COMMUNICATION TOOLS AND B.U.D.S.

SERVICE TOOLS

SERVICE TOOLS – OTHER SUPPLIER

GENERAL

Refer to *PROCEDURES* in this subsection for instructions on using the communication tools.

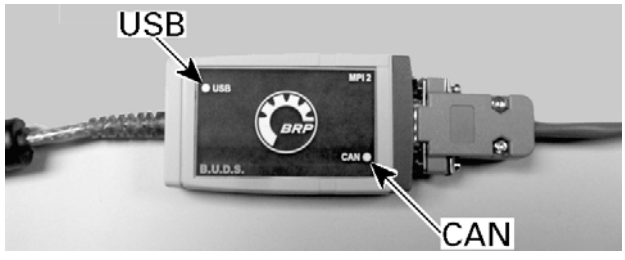
If communication problems occur, refer to *TROUBLESHOOTING* in this subsection.

TROUBLESHOOTING

DIAGNOSTIC TIPS

MPI-2 Connection Troubleshooting

The MPI-2 includes 2 status lights to indicate the connection condition: USB and CAN. **Both lights must be GREEN** for the MPI-2 to function properly. Otherwise, refer to the following charts.



vdd2006-001-151_b

Prerequisite for USB Communication:

– PC Computer turned ON
– MPI-2 connected to PC computer.

COMMUNICATION PROBLEM (USB)	
STATUS	WHAT TO DO
Light is OFF	– Check USB connection between MPI-2 and PC computer. – Check USB operation on PC computer (hardware or Windows drivers).

Prerequisite for CAN Communication:

1. MPI-2 connected to the vehicle communication connector.
2. Ignition key turned ON.
3. B.U.D.S. started and logged.

COMMUNICATION PROBLEM (CAN)	
STATUS	WHAT TO DO
Light is OFF	– Check connection between MPI-2 and diagnostic cable connector. – Check connection between diagnostic cable connector and vehicle communication connector.
Light is RED	– Check CAN wires/connectors on vehicle.

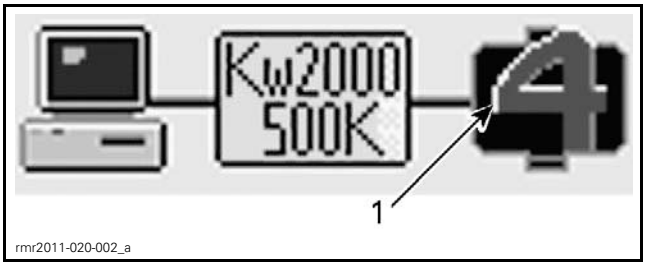
Communication Problems when Using B.U.D.S.

Missing Module

Ensure the appropriate number of modules is shown at the bottom of B.U.D.S. screen.

MODEL	NUMBER OF MODULES
RS MODELS	
SM5 Model	5 (ECM, VCM, DPS, LCD (RS-S only) and multifunction gauge)
SE5 Model	6 (ECM, VCM, DPS, TCM, LCD and multifunction gauge)

MODEL	NUMBER OF MODULES
ST MODELS	
SM5 Model	6 (ECM, VCM, DPS, PBM, LCD and multifunction gauge)
SE5 Model	7 (ECM, VCM, DPS, TCM, PBM, LCD and multifunction gauge)
RT MODELS	
SM5	6 (ECM, VCM, DPS, WPM, LCD and multifunction gauge)
SE5	7 (ECM, VCM, DPS, TCM, WPM, LCD and multifunction gauge)



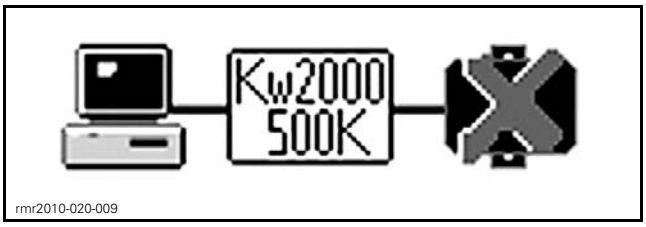
1. Number of modules

NOTE: The LCD (liquid crystal display) is part of the cluster.

If one or more "ECU" is not communicating with the MPI, refer to *DIAGNOSTIC AND FAULT CODES*.

No Vehicle is Detected

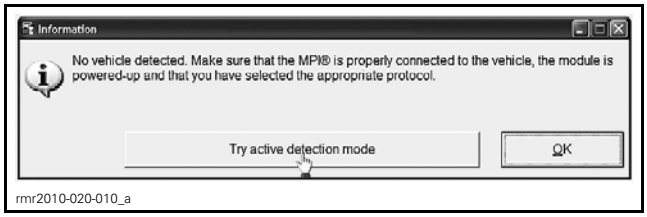
If an "X" is shown in the status bar and the protocol indication is blinking between Kw2000 500K and KW2000, it means that no "ECU" is communicating with the MPI.



Check the following:

– Connections between the PC computer and the vehicle
– The multifunction gauge is powered up.

If B.U.D.S. does not automatically exit the following message box, click the **Try active detection mode** button. This will manually establish the communication with the vehicle.



PROCEDURES

MULTI-PURPOSE INTERFACE-2 (MPI-2)

The MPI-2 (Multi-Purpose Interface-2) in conjunction with the MPI-2 diagnostic cable is used with B.U.D.S. to communicate with the Electronic Control Units (ECUs).

MPI-2 Power

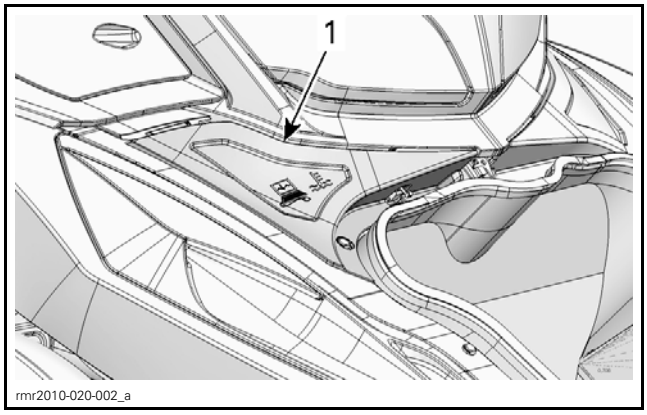
The MPI-2 interface card uses the power from the PC computer's USB port.

Connecting the PC to the Vehicle

⚠ WARNING

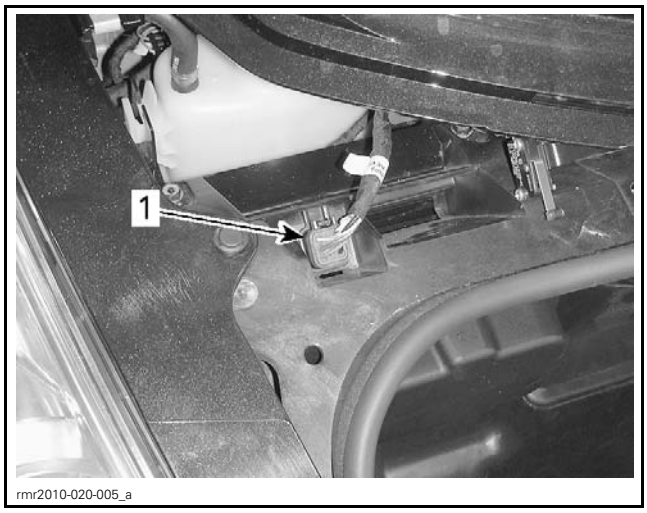
If the computer you are using is connected to a power outlet, there is a potential risk of electrocution when working in contact with water. Be careful not to touch water while working with the computer.

1. Open front storage compartment cover.
2. Remove the RH service cover.



1. Service cover

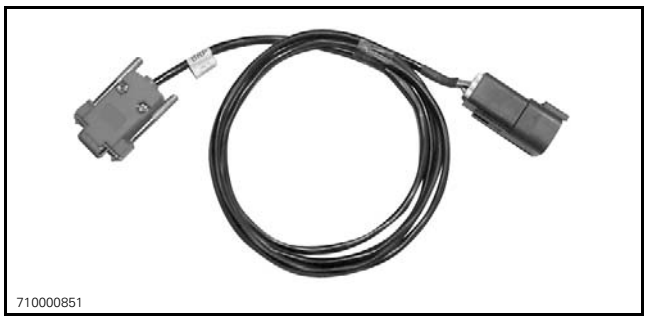
3. Locate the vehicle communication connector.

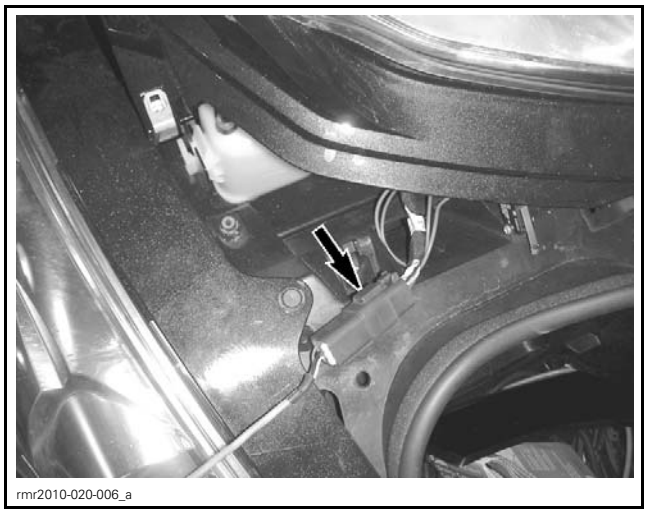


TYPICAL
1. Vehicle communication connector location

Remove the communication connector from its holder (protective cap).

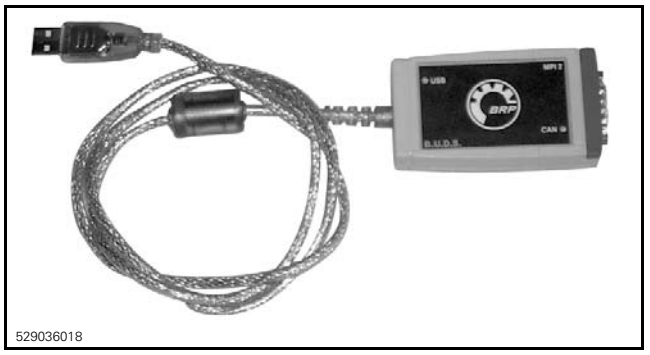
Connect one end of the MPI-2 DIAGNOSTIC CABLE (P/N 710 000 851) to the vehicle communication connector.

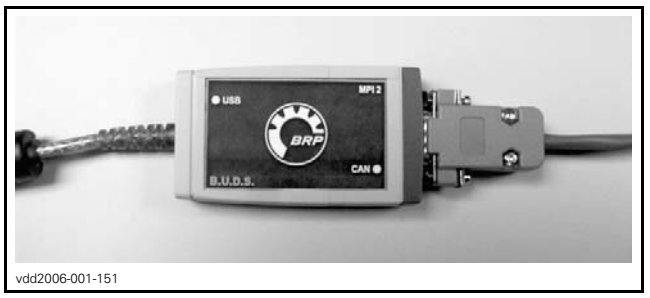




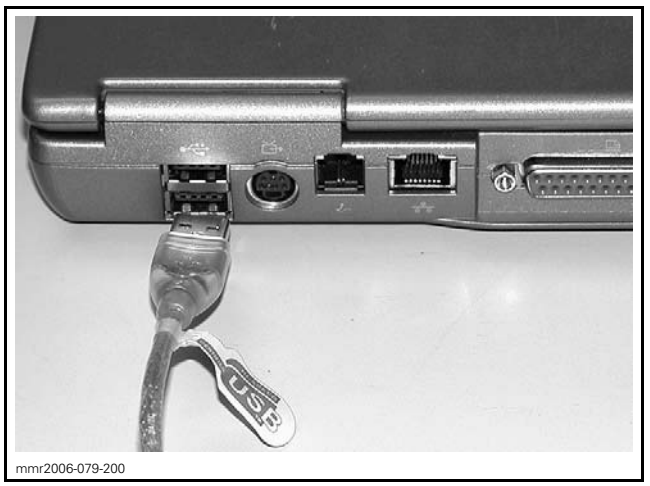
TYPICAL - MPI-2 CONNECTION TO VEHICLE COMMUNICATION CONNECTOR

Connect the other end of the diagnostic cable to the MPI-2 INTERFACE CARD (P/N 529 036 018) connector.



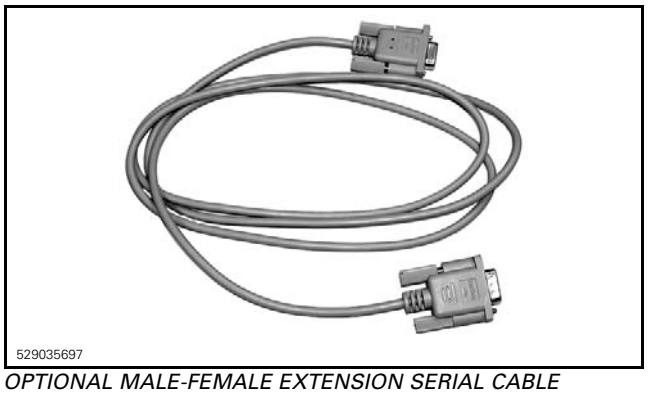


Connect the MPI-2 USB connector to the USB port on the PC (personal computer).



Use B.U.D.S. as described further in *B.U.D.S.* topic.

NOTE: An optional MALE-FEMALE EXTENSION SERIAL CABLE (P/N DB9) available at electronic retail outlets can be used between diagnostic cable and MPI-2 interface. Do not exceed 7.6 m (25 ft) or communication between the vehicle and the PC computer may be lost.



OPTIONAL MALE-FEMALE EXTENSION SERIAL CABLE

B.U.D.S.

B.U.D.S. (BRP Utility and Diagnostic Software) is designed to allow electrical and electronic component monitoring, activation of certain components for testing and diagnostic purposes, and to carry out setting changes.

Always use the latest applicable B.U.D.S. version available on BOSSWeb.

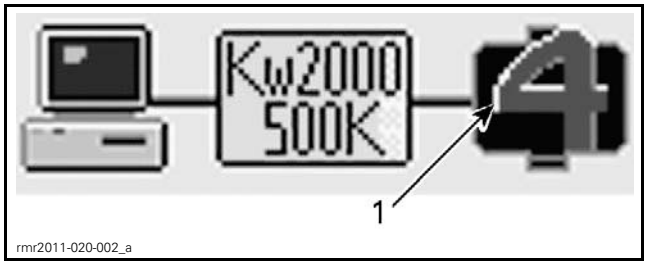
Reading the Electronic Control Units Using B.U.D.S.

IMPORTANT: Ensure all connections have been made **before starting B.U.D.S.** to allow proper operation. Refer to *CONNECTING THE PC TO THE VEHICLE* in this subsection.

1. Turn ignition key to ON.
2. Start B.U.D.S. and logon.

NOTE: B.U.D.S. will automatically choose the appropriate MPI 2 protocol.

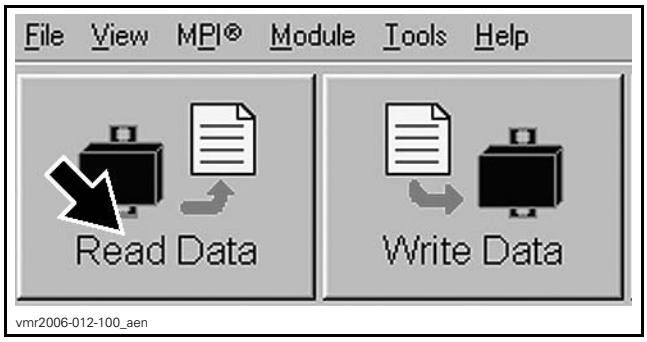
3. Ensure the appropriate number of modules is shown in the status bar.



TYPICAL — CONNECTION SUCCESSFUL
1. Number of modules

If the number is less than indicated in table above, refer to *TROUBLESHOOTING* in this subsection.

4. Read the ECUs by clicking the **Read Data** button.

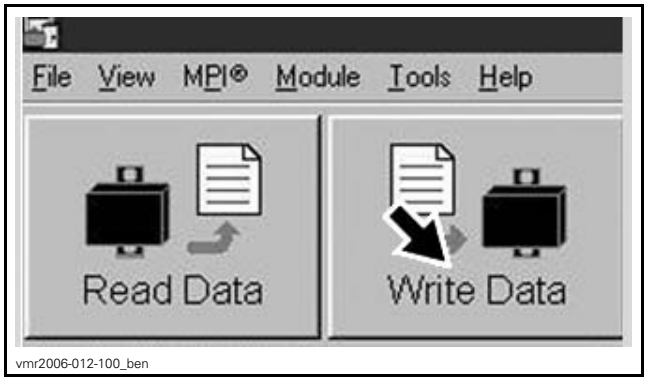


Writing Changes in an ECU

If the word **Modified** appears at the end of the vehicle file name at the top of the B.U.D.S. page, then a change has been made that requires it to be saved to the proper electronic module.

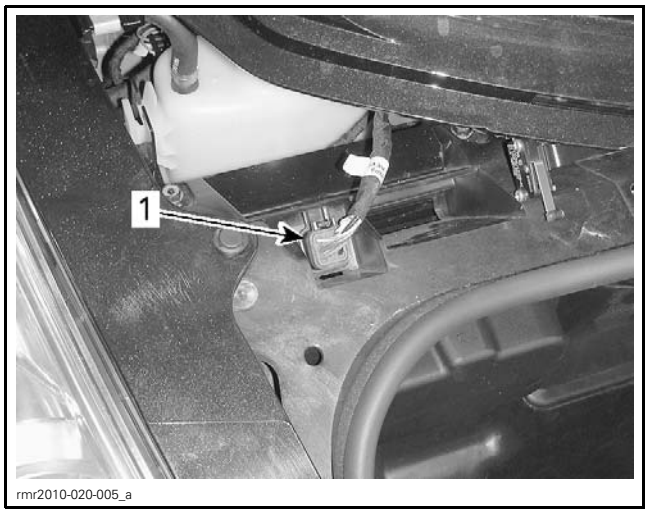
1. Indicate setting or data modified; Write Data to save

Click the **Write Data** button.



NOTE: A message box will confirm a successful operation.

Disconnect the MPI connections and store the communication connector in its protective cap.

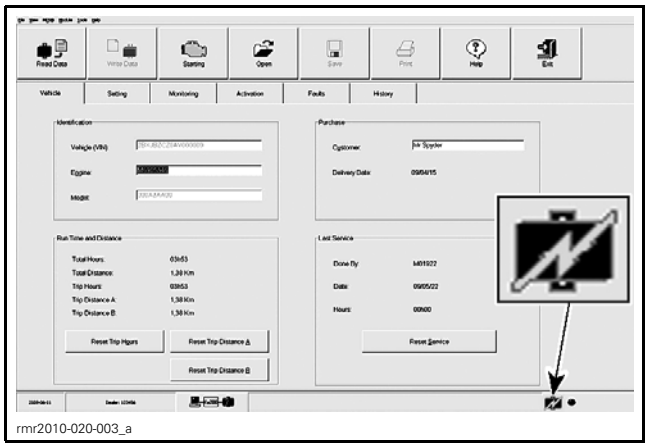


1. Communication connector stored in protective cap

NOTICE Failure to secure the diagnostic connector in its protective cap may result in corrosion or other damage to the terminals.

Electronic Modules (ECU) Update

Whenever B.U.D.S. is first connected to a vehicle, check for an update icon in the B.U.D.S. status bar at the bottom of the **Vehicle** page.

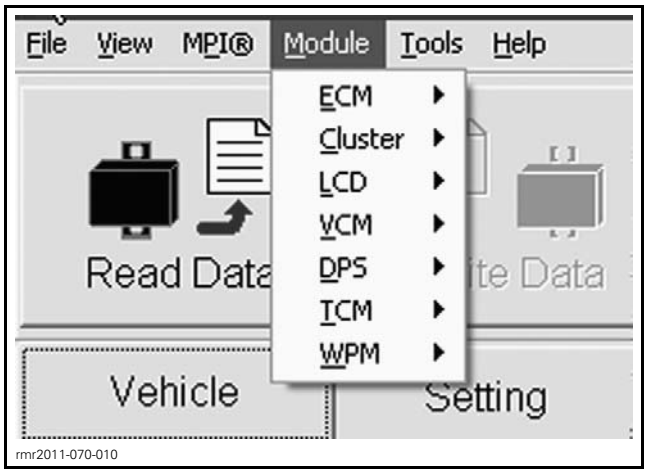


TYPICAL - UPDATE ICON

If the update icon is visible, B.U.D.S. indicates that a file is available to update at least one of the electronic modules.

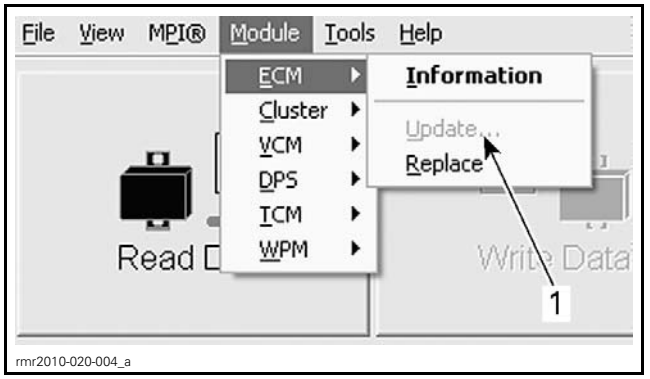
NOTE: If an update file is available on BOSSWeb but B.U.D.S. being used is not up to date, the update icon will not appear. Refer to the service bulletins to see if there is an update available.

Use the **Module** submenu and check all modules one at a time to see which module(s) can be updated.



TYPICAL - MODULE SUBMENU LIST, SE5 MODEL ILLUSTRATED

1. If the **Update** option is **greyed out**, no update file is available for this module.
2. If the **Update** option is **black**, an update file is available for this module. Select the update option and load the proper file.



TYPICAL
1. Greyed out: No update to perform
Black: Update file available

DIAGNOSTIC AND FAULT CODES (RS SERIES)

GENERAL

MONITORING SYSTEM

The Engine Management System (EMS) and Vehicle Stability System (VSS) (including their sub systems) feature a monitoring system that self-diagnose their electronic components. This mode becomes active when ignition key is turned on.

NOTE: Some components need the engine to be running so that they can be monitored (fuel injectors for example).

The monitoring system continuously validates that the electronic components (control modules, sensors and actuators) are not faulty or defective. When a malfunction is detected, the involved electronic module:

– Sets an active fault code.
– Adapts the proper protection strategy according to the failure.
– Sends out signals to the multifunction gauge to inform the rider of a particular condition.

If a minor fault occurs, engine and vehicle will continue to operate without noticeable loss of performance.

If a more significant fault occurs, engine RPM may be limited and engine/vehicle will continue to operate with reduced performance.

If a major fault is detected by the EMS or VSS, engine RPM will be limited as well as vehicle speed.

These strategies are used to protect engine/electrical system from damage and to maintain safe operation of the vehicle.

Pilot Lamps

When a problem is detected, a pilot lamp will turn on or blink in the multifunction gauge. Refer to the following chart.

RS Model

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) Or Icons		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
E displayed instead of selected gear		None	Gearbox position sensor malfunction	Limited power steering assist.
		N + R flashing quickly	Undetermined gear position	Stop vehicle and allow to reach neutral. GBPS may need to be re initialized or has failed.
None		BAD KEY	Wrong or defective key	Use the right key for the vehicle.
	On	HI TEMP	Engine is overheating	Turns on when engine temperature reaches 113°C (235°F).
		HI TEMP LIMP HOME	Engine is overheating	Engine RPM is limited to protect engine when engine temperature is above 115°C (239°F).
	On	LO BATT VOLT	Low battery voltage	Turns on when battery voltage is lower than 11.5 V or higher than 16 V. Engine RPM is limited to protect engine/electrical system.
		HI BATT VOLT	High battery voltage	
	On	ABS FAULT	ABS malfunction. No ABS operation	No ABS operation. Wheel lock may occur when braking hard.
	On	VSS FAULT LIMP HOME	VSS malfunction	Engine RPM is limited to maintain safe operation.
		SEAT SWITCH DEFECTIVE	Defective pillion rider seat switch	Check fuse
	On	EBD FAULT	VSS malfunction	No EBD operation. Rear wheel lock may occur when braking hard.
		BRAKE FAILURE	Low brake fluid level or faulty sensor	– Check for brake fluid leaks. – Check brake fluid level and adjust

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) Or Icons		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
	On	CHECK ENGINE	Engine management component malfunction	Engine RPM may be limited to protect engine depending on the fault. A fault code is active.
		CHECK DPS	Dynamic power steering component malfunction	Partial or no assist from DPS depending on the fault.
		CHECK TCM	Transmission Control Module component malfunction	Engine RPM may be limited. Shifting may be harsh. Transmission may not shift or may have restrictions.
		KEY ERR	Anti theft	Key not programmed for the vehicle.
	Flashing	LIMP HOME	Important engine management component or VSS malfunction	Vehicle speed is limited.
		LIMP HOME	Brake applied while driving	Vehicle speed is limited.
	On	None	Low oil pressure	– Check for oil leaks. – Check oil level and adjust .

RS-S Model

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICONS		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
E displayed instead of selected gear		None	Gearbox position sensor malfunction	Limited power steering assist.
		N + R flashing quickly	Undetermined gear position	Stop vehicle and allow to reach neutral. GBPS may need to be re initialized or has failed.
None		BAD KEY	Wrong or defective key	Use the right key for the vehicle
		COMMUNI-CATION FAULT	CAN (controller area network) communication problem	Turns on when battery voltage is less than 11.5V or higher than 16V. Engine RPM is limited during low battery voltage condition to protect engine/electrical system.
	On	HI TEMP LIMP HOME	Engine is overheating	Engine RPM is limited to protect engine when engine temperature is above 115°C (239°F).
	On	LO BATT VOLT	Low battery voltage	Turns on when battery voltage is lower than 11.5 V or higher than 16 V. Engine RPM is limited to protect engine/electrical system.
		HI BATT VOLT	High battery voltage	
	On	ABS FAULT	ABS malfunction. No ABS operation	No ABS operation. Wheel lock may occur when braking hard.

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICONS		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
	On	VSS FAULT LIMP HOME	VSS malfunction	Engine RPM is limited to maintain safe operation.
		SEAT SWITCH DEFECTIVE	Defective pillion rider seat switch	Check fuse
	On	EBD FAULT	VSS malfunction	No EBD operation. Rear wheel lock may occur when braking hard.
	On	BRAKE FAILURE	Low brake fluid level or faulty sensor	– Check for brake fluid leaks. – Check brake fluid level and adjust
	On	CHECK ENGINE	Engine management component malfunction	Engine RPM may be limited to protect engine depending on the fault. A fault code is active.
		CHECK DPS	Dynamic power steering component malfunction	Partial or no assist from DPS depending on the fault.
		CHECK TCM	Transmission Control Module component malfunction	Engine RPM may be limited. Shifting may be harsh. Transmission may not shift or may have restrictions.
	Flashing	LIMP HOME	Important engine management component or VSS malfunction	Vehicle speed is limited.
		LIMP HOME	Brake applied while driving	Vehicle speed is limited.
	On	None	Low oil pressure	– Check for oil leaks. – Check oil level and adjust
	On	CHECK TRANSMISSION	TCM fault	Engine RPM may be limited. Shifting may be harsh. Transmission may not shift or may have restrictions.
	On	CHECK DPS	DPS fault	Partial or no assist from DPS depending on the fault.
	On	KEY ERR	Anti theft	Key not programmed for the vehicle.

Limp Home Mode

When a major component of the EMS and/or VSS (including their sub-systems) is not operating properly the limp home mode will be set.

Engine RPM will be limited and vehicle speed may be limited depending on the failure.

This mode allows the rider to safely return home. This would not be possible without this advanced system.

LIMP HOME will be displayed in the multifunction gauge.

FAULT CODES

A fault code is an indication that a glitch or malfunction is detected by the monitoring system of the vehicle.

A fault code consists of an alphanumeric designator followed by a hexadecimal number of 3 digits. The alphanumeric designator defines the category of the fault code while the hexadecimal number refers to a unique fault.

FAULT CODE CATEGORY (ALPHANUMERIC DESIGNATOR)	MODULE/ SYSTEM	EXAMPLE OF FAULT CODE
From P0 to P3	Power train, TCM and DPS	P062F
From C0 to C3	Vehicle stability system (VSS)	C0031
From U0 to U3	Communication between module and sensors	U0073

RELATED MODULE AND FAULTS	
MODULE	FAULT CODE CATEGORY
ECM	P
TCM (SE5 model)	P and U
VCM	Mainly C and some U
DPS	Mainly P and some U

When a minor fault occurs, turn OFF ignition key, wait 30 seconds then turn it ON. This should change the fault state from active to occurred. The vehicle should then operate normally. If a fault persists, you may try disconnecting/reconnecting its related sensor.

When many fault codes which, may or not be related to a specific system are set at the same time, it is likely to be the result of a burnt fuse(s) or a faulty relay.

Fault Code States

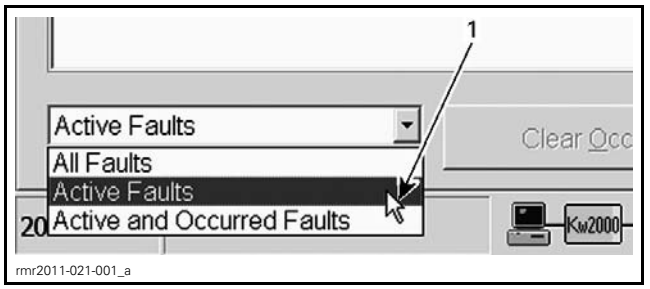
The various electronic control units (ECUs) used in the vehicle generate a variety of fault codes depending on the level of monitoring they are capable of. Fault codes have 3 possible states:

– Active
– Occurred
– Inactive.

Only fault codes in an **active state** may be viewed in the cluster.

All types of fault codes may be viewed in B.U.D.S.

Click the **Fault** tab then click on the drop-down list on the LH lower corner.



TYPICAL
1. Drop down list

Choose the fault code state you want to display.

Active Fault Codes

An active fault code is an indication of a fault that is **currently triggered**.

The active fault may or may not compromise normal operation of the related system(s). Service action in B.U.D.S. should be used to correct the problem that caused the fault code.

Once the fault condition(s) of the active fault is no longer present, its state will change to "occurred".

NOTE: An active fault code cannot be cleared. The problem relevant to the fault code must be repaired before clearing the fault.

Occurred Fault Codes

An occurred fault code indicates a fault that was active, but **no longer** is.

The occurred fault does not presently affect system or component operation but is retained as a history of the faults that were detected.

The fault may have been generated due to a system or component that was momentarily operating outside normal parameters. Repeated occurred faults of this type should be considered when troubleshooting a problem, and may require that maintenance action be taken.

An occurred fault may also be generated when disconnecting and reconnecting a component, replacing a burnt fuse, or may be due to a momentary high or low voltage.

Inactive Fault Codes

An inactive fault code represents a fault code that is neither active, nor occurred. It is simply part of a list of all possible faults which may be monitored by the various ECUs, which may become active or occurred if the monitoring system detects an applicable fault. These codes can be viewed in B.U.D.S.

How to Display Fault Codes on the Multifunction Gauge

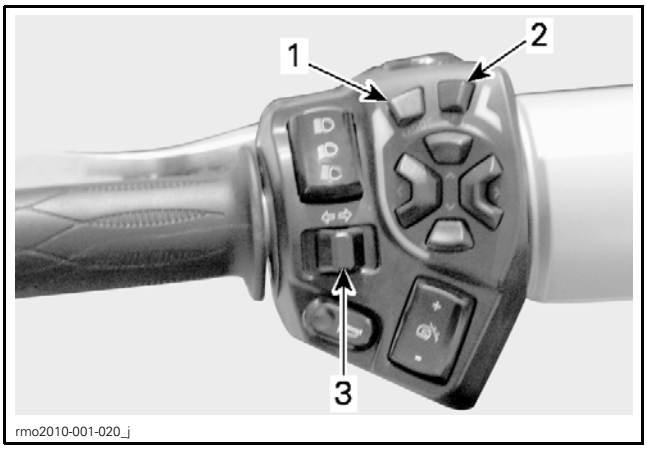
NOTE: A fault code must be active to be displayed in the multifunction gauge.

If a fault is detected, an indicator light and a fault message may come on in the gauge.

Proceed as follows to display an active fault code:

Procedure if Engine can be Started

1. Turn ignition key to ON.
2. Wait for the multifunction gauge to complete its self test function.
3. **Simultaneously press** the following three buttons on the LH multifunction switch assembly.
   – MODE
   – SET
   – Turn signal button.



1. MODE button
2. SET button
3. Turn signal button

If there is no active fault code, nothing will be displayed.

FAULT CODE DIAGNOSTIC

Diagnostic Tips

ECUs share information and their systems may interact with each other. Certain faults may cause more than one ECU to set a fault code or indication (pilot lamp or message) as the failure of some components may affect the operation of several systems.

IMPORTANT NOTE

The primary electronic systems depend on other secondary system(s) or sensor(s) for their normal operation.

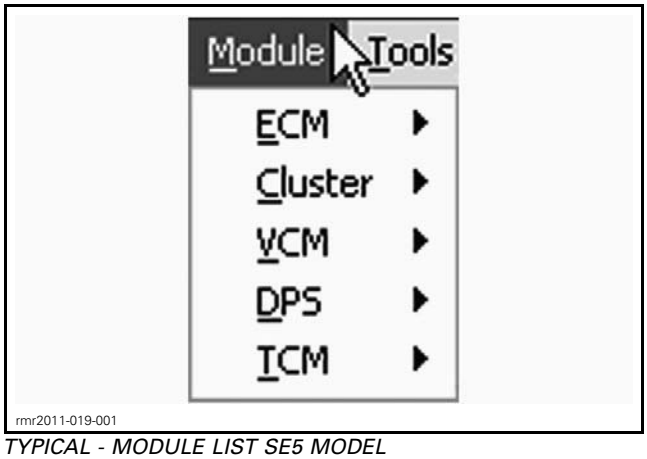
If a primary system generates a fault code, usually the fault belongs to it. However, in some cases, the primary system may not be at fault. A malfunction in a secondary system, or a sensor, may be the cause of the fault code generated by the primary system. Since proper operation of the primary system could be compromised by the fault in the secondary system or sensor, the primary system generates the fault code to indicate a malfunction in the system.

Example: If several faults are active at the same time, such as for the VSS, ABS, EBD and EMS systems, and you look at the fault codes using B.U.D.S., you will see many active fault codes displayed. When looking at them closely, you will notice that each system share a common fault; YRS (yaw rate sensor) fault. The culprit is likely to be the YRS. These primary systems are all dependent on the YRS for their normal operation.

Missing Module

If a module is missing, several fault codes might appear. To quickly find which module is missing, check the following:

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click **Module** in the menu bar.
4. Look at the list of modules. If a module is not visible, then it is not communicating through the CAN bus (controller area network).



TYPICAL - MODULE LIST SE5 MODEL

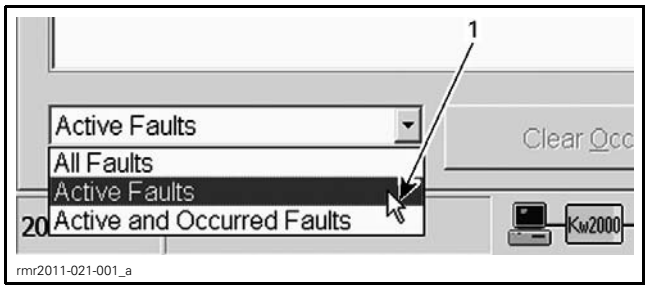
NOTE: The **TCM** listed is only available with the **SE5 model**.

5. Refer to the following table to find the appropriate subsection in this manual to diagnose the missing module.

MISSING MODULE	SECTION TO REFER TO
ECM	*ELECTRONIC FUEL INJECTION (EFI)*
Cluster	*LIGHTS, GAUGE AND ACCESSORIES*
VCM	*VEHICLE STABILITY SYSTEM (VSS)*
DPS	*STEERING (DPS) AND FRONT WHEELS*
TCM (SE5 model)	*HYDRAULIC CONTROL MODULE*

How to Read Fault Codes Using B.U.D.S.

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click on the **Faults** tab.
4. Click on the drop-down list on the LH lower corner.

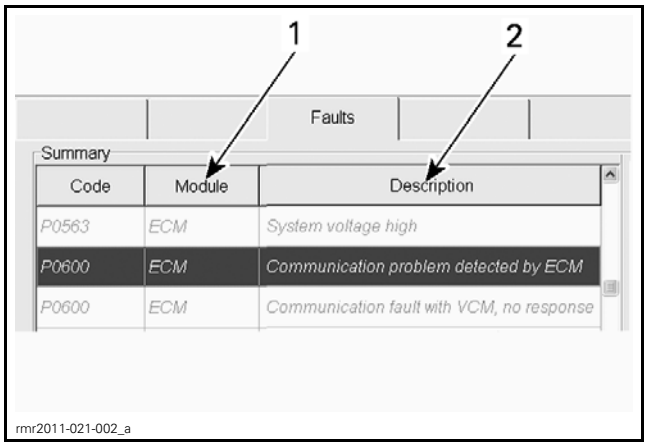


1. Drop down list

5. Choose to display the **Active Faults**.

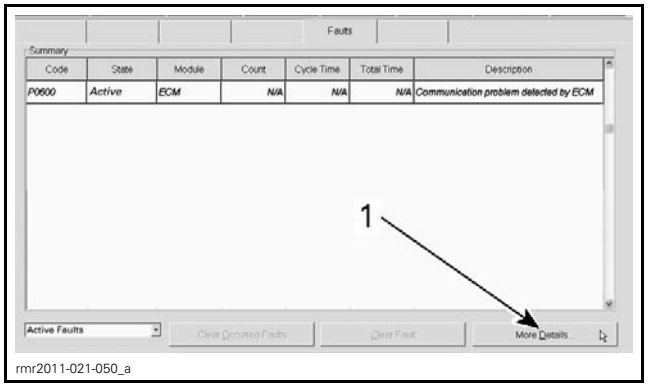
When reading a fault code in B.U.D.S., pay particular attention to which module reports a fault. It is indicated in the **Module** column.

The **Description** column gives a short description of the fault.



SOME COLUMNS REMOVED FOR CLARITY PURPOSE
1. Module that reports a fault
2. Fault description

Click on the **More Details** button, on the RH lower corner, to display the "Possible Causes" and the "Service Actions" to step further in the diagnosis.



1. Click here

Interpreting the Fault Codes

A fault code number may indicate different faulty components.

For example:

Fault code **P0600, Communication problem detected by ECM**.

- The fault is reported by the ECM (module column).
- The ECM cannot communicate (description column).
- Since there is no other module involved, the faulty module is likely to be the ECM (internal problem).

Fault code **P0600, Communication fault with VCM, no response**.

- For the same fault number, reported by the same module (ECM), the faulty module is different. This time, the fault description points to the VCM.
- Therefore the problem is in the connections/wiring harness between the ECM and the VCM or the VCM itself (**not** the ECM).

How to Clear Fault Codes Using B.U.D.S.

Before reading fault codes, ignition switch must have been OFF 30 seconds before using B.U.D.S.

Connect vehicle to the latest applicable B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Click on the **Read Data** button.

Click on the **Faults** tab.

NOTE: Only the"**occured**" state faults can be cleared.

Click the "Clear Occurred Faults" button.

CLEAR OCCURED FAULTS

This will reset the appropriate counter(s) and will also record that the problem has been fixed in the related module memory.

Then, follow the prompts in B.U.D.S.:

- Turn ignition switch OFF.
- Wait 30 seconds.
- Turn ignition switch ON.
- Validate in B.U.D.S. that fault(s) were properly cleared.

SPECIFIC FAULT CODES

The following gives information related to specific fault codes.

P2545 and C0040 Simultaneous Faults

These faults, when occurring, are likely to be caused by disconnected or burnt taillight bulbs.

VSS Faults

Several modules use signals from the VSS module, or from the VSS sensors.

Every time the VSS has an active fault, other modules may also be in a fault state.

VSS and ABS Simultaneous Faults

Likely to be disconnected or faulty wheel speed sensor(s).

VSS, ABS, EBD Simultaneous Faults

Likely to be a disconnected or faulty:

- VCM
- Rear wheel speed sensor(s).

PRS (Pillion Rider Sensor) Fault

When there is a fault, the VSS will work in safe mode as if 2 passengers were seated. If only the driver is seated, the VSS will be intervening more frequently.

Cruise Control Faults

The cruise control system is closely interlinked and dependent on the proper operation of many other systems for its' operation which, may involve several ECUs.

If the cruise system cannot be engaged or displays a fault, check for and correct other system faults before assuming the cruise system is at fault.

Simultaneous Faults:
- U0400 (DPS, TCM (SE models))
- C1281 (VSS after key OFF then ON)
- C006C (ECM after key OFF then ON)

These faults, when occurring, are likely to be caused by a wrong "Platform" option in the **Vehicle Configuration** within B.U.D.S. Refer to *ECM*

REPLACEMENT in *ELECTRONIC FUEL INJECTION (EFI)* and set the option that reflects the vehicle involved.

FAULT CODES

The fault code descriptions use the same acronyms and connector identifications as per wiring diagrams.

For the latest fault codes, use Knowledge Center and enter the following search criterias:

– Enclose the search within quotes " "
– Enter: "Roadster DTC + Fault code + Module"
– Examples: "Roadster DTC P0036 ECM"
"Roadster DTC C1220 VCM"
"Roadster DTC U0073 VCM"

NOTE: The module may be omitted in the search criterias (example: "Roadster DTC U0073".

DIAGNOSTIC AND FAULT CODES (ST AND RT SERIES)

GENERAL

MONITORING SYSTEM

The Engine Management System (EMS) and Vehicle Stability System (VSS) (including their sub systems) feature a monitoring system that self-diagnose their electronic components. This mode becomes active when the ignition key is turned ON.

NOTE: Some components require the engine to be running for them to be monitored for normal operation (fuel injectors for example).

The monitoring system continuously validates that the electronic components (control modules, sensors and actuators) work in their operating range and are not faulty or defective. When one of these conditions is encountered, the related electronic module(s):

– Sets an active fault code.
– Adapts the proper protection strategy according to the failure.
– Sends out signals to the multifunction gauge to inform the rider of a particular condition.

A fault code is an indication that a glitch or malfunction is detected by the monitoring system of the vehicle.

If a minor fault occurs, the engine and vehicle will continue to operate without noticeable loss of performance.

If a more significant fault occurs, engine RPM may be limited. The engine/vehicle will continue to operate with reduced performance.

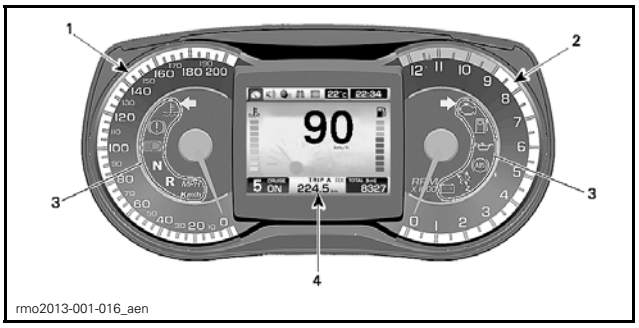
If a major fault is detected by the EMS or VSS, engine RPM will be limited as well as vehicle speed.

These strategies are used to protect engine/electrical system from damage and to maintain safe operation of the vehicle.

Indicator Lamps or Icon for Problematic Conditions

When a problem is detected, an indicator lamp will turn on or blink **in the multifunction gauge**.

Most of the time, a message is displayed in the **digital display** to provide additional information related to the fault that triggered the lamp.



rmo2013-001-016_aen

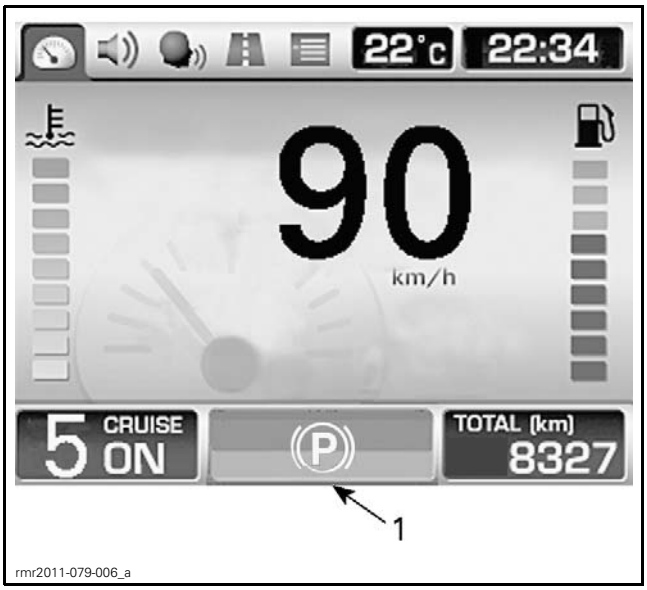
1. Indicator lamp in multifunction gauge
2. Digital display

The message displayed in the **digital display** appears over a flashy background color.

rmr2011-079-005_a

1. Message over a flashy background

After a moment, the message disappears and is replaced by an icon in the lower central portion of the digital display.



1. Icon

TWN: ST table taken from rmo2013–003 indicator lamps (malfunctions)

ST Models

TWN: LOW fuel level row deleted

TWN: RH columns modified as per shop 2011 when cell is all in green. When there is red, as per 2013 operator's guide

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICON		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
E displayed instead of selected gear		None	Gearbox position sensor malfunction	Limited power steering assist.
		N + R flashing quickly	Undetermined gear position	Stop vehicle and allow to reach neutral. GBPS may need to be re initialized or has failed.
None		BAD KEY	Wrong or defective key	Use the right key for the vehicle
	On	HI TEMP	Engine is overheating	– Stop and wait for engine to cool off. – Check for leaks. – Check coolant level and adjust
	On	HI TEMP LIMP HOME	Engine is overheating	Engine RPM is limited to protect engine when engine temperature is above 115°C (239°F).
	On	LO BATT VOLT	Low battery voltage	Turns on when battery voltage is lower than 11.5 V or higher than 16 V. Engine RPM is limited to protect engine/electrical system.
	On	HI BATT VOLT	High battery voltage	
ABS	On	ABS FAULT	ABS malfunction. No ABS operation	No ABS operation. Wheel lock may occur when braking hard.

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICON		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
	On	VSS FAULT LIMP HOME	VSS malfunction	Engine RPM is limited to maintain safe operation.
	On	SEAT SWITCH DEFECTIVE	Defective pillion rider seat switch	Check fuse
	On	EBD FAULT	VSS malfunction	No EBD operation. Rear wheel lock may occur under hard braking.
	On	BRAKE FAILURE	Low brake fluid level or faulty sensor	– Check for brake fluid leaks. – Check brake fluid level and adjust.
	On	PARKING BRAKE FAILURE	Faulty parking brake or component	– Make sure battery tension is at least at 10,5 V. – Check fuse no. 1 on the right fuse box
	On	CHECK ENGINE	Engine management component malfunction	Engine RPM may be limited to protect engine depending on the fault. A fault code is active.
	On	CHECK DPS	Dynamic power steering component malfunction	Partial or no assist from DPS depending on the fault.
	On	CHECK TCM	Transmission Control Module component malfunction	Engine RPM may be limited. Shifting may harsh. Transmission may not shift or may have restrictions.
	Flashing	LIMP HOME	Important engine management component or VSS malfunction	Vehicle speed and/or engine RPM is limited.
	Flashing	LIMP HOME	Brake applied while driving	Vehicle speed and/or engine RPM is limited.
	On	None	Low oil pressure	– Check for oil leaks. – Check oil level and adjust .
	On	CHECK TRANSMISSION	TCM fault	

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICON		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
	On	CHECK DPS	DPS fault	
	On	KEY ERR	Anti theft	Key not programmed for the vehicle.

TWN: ST table taken from rmo2013–005 indicator lamps (malfunctions)

RT Models

TWN: Low fuel level row deleted

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICON		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
E displayed instead of selected gear		None	Gearbox position sensor malfunction	Limited power steering assist.
		N + R flashing quickly	Undetermined gear position	Stop vehicle and allow to reach neutral. GBPS may need to be re initialized or has failed.
None		BAD KEY	Wrong or defective key	Use the right key for the vehicle.
		REAR STORAGE COMPARTMENT OPEN	Top or side storage compartment cover open	Close and latch cover.
		COMMUNI-CATION FAULT	CAN (controller area network) communication problem	Turns on when battery voltage is lees than 11. 5 V or higher than 16 V. Engine RPM is limited to 3700 during low battery voltage condition to protect engine/electrical system
	On	HI TEMP LIMP HOME	Engine is overheating	Engine RPM is limited to protect engine when engine temperature is above 115°C (239°F).
	On	LO BATT VOLT	Low battery voltage	Turns on when battery voltage is lower than 11.5 V or higher than 16 V. Engine RPM is limited to protect engine/electrical system.
		HI BATT VOLT	High battery voltage	
	On	ABS FAULT	ABS malfunction. No ABS operation	No ABS operation. Wheel lock may occur when braking hard.
	On	VSS FAULT LIMP HOME	VSS malfunction	Engine RPM is limited to maintain safe operation.
		SEAT SWITCH DEFECTIVE	Defective pillion rider seat switch	Check fuse .

INDICATOR LAMPS (MALFUNCTIONS)				
INDICATOR LAMP(S) OR ICON		MAIN DIGITAL DISPLAY	CAUSE	WHAT TO DO
	On	EBD FAULT	VSS malfunction	No EBD operation. Rear wheel lock may occur under hard braking.
	On	BRAKE FAILURE	Low brake fluid level or faulty sensor	– Check for brake fluid leaks. – Check brake fluid level and adjust
	On	PARKING BRAKE FAILURE	Faulty parking brake or component	– Make sure battery tension is at least at 10,5 V. – Check fuse no.1 on the left fuse box
	On	CHECK ENGINE	Engine management component malfunction	Engine RPM may be limited to protect engine depending on the fault. A fault code is active.
		CHECK DPS	Dynamic power steering component malfunction	Partial or no assist from DPS depending on the fault.
		CHECK TCM	Transmission Control Module component malfunction	Engine RPM may be limited. Shifting may harsh. Transmission may not shift or may have restrictions.
	Flashing	LIMP HOME	Important engine management component or VSS malfunction	Vehicle speed and/or engine RPM is limited.
		LIMP HOME	Brake applied while driving	Vehicle speed and/or engine RPM is limited.
	On	None	Low oil pressure	– Check for oil leaks. – Check oil level and adjust
	On	CHECK TRANSMISSION	TCM fault	
	On	CHECK DPS	DPS fault	
	On	MANUAL	ACS fault	
	On	KEY ERR	Anti theft	Key not programmed for the vehicle.

* BRP recommends having the vehicle transported when in LIMP HOME. If you operate the vehicle in LIMP HOME, avoid abrupt maneuvers and immediately go to the nearest authorized Can-Am roadster dealer to have your vehicle serviced before riding again. In LIMP HOME, the engine RPM is limited and therefore the vehicle speed.

Limp Home Mode

When a major component of the EMS and/or VSS (including their sub-systems) is not operating properly, fault code(s) will be triggered and limp home mode will be set.

Engine RPM will be limited and vehicle speed may be limited depending on the failure.

This mode allows the rider to safely return home. This would not be possible without this advanced system.

LIMP HOME will be displayed in the multifunction gauge.

FAULT CODES

Fault Code Categories

A fault code consists of an alphanumeric designator followed by a hexadecimal number of 3 digits. The alphanumeric designator defines the category of the fault code while the hexadecimal number refers to a unique fault.

FAULT CODE CATEGORIES		
ALPHANUMERIC DESIGNATOR	MODULE/ SYSTEM	EXAMPLE OF FAULT CODE
From P0 to P3	Power train, TCM and DPS	P062F
From C0 to C3	Vehicle stability system (VSS)	C0031
From U0 to U3	Communication between module and sensors	U0073
From B0 to B3	Body (including luggage compartments)	B1000

RELATED MODULE AND FAULTS	
MODULE	FAULT CODE CATEGORY
ECM	Mainly P and some U
TCM (SE5 model)	Mainly P and some U
VCM	Mainly C and some U
DPS	Mainly P, some C and U
Cluster	P, B, C and U
WPM (Windshield and Park Brake Module)	P, U and C

TWN: Following L5 was below, déplacer ici

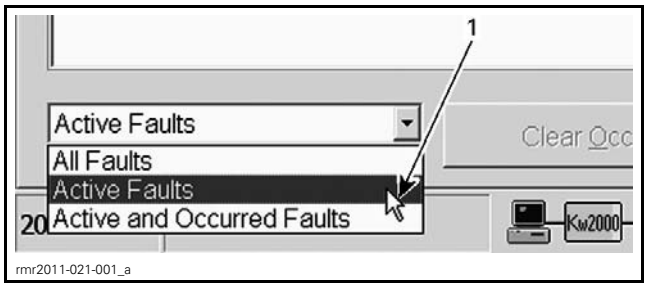
Fault Code States

The various electronic control units (ECUs) used in the vehicle can generate a variety of fault codes depending on the level of monitoring they are capable of. Fault codes have 3 possible states:

– Active
– Occurred
– Inactive.

Click the **Fault** tab then click on the drop-down list on the LH lower corner.

Choose the fault code state you want to display.



TYPICAL
1. Drop down list

Active Fault Codes

An active fault code is an indication of a fault that is **currently triggered**.

The active fault may or may not compromise normal operation of the related system(s). Service action in B.U.D.S. should be used to correct the problem that caused the fault code.

Once the fault condition(s) of the active fault is no longer present, its state will change to "occurred".

Occurred Fault Codes

An occurred fault code indicates a fault that was active, but **no longer** is.

The occurred fault does not presently affect system or component operation but is retained as a history of the faults that were detected.

Inactive Fault Codes

An inactive fault code represents a fault code that is neither active, nor occurred. It is simply part of a list of all possible faults which may be monitored by the various ECUs, which may become active or occurred if the monitoring system detects an applicable fault.

TWN: fin de la copie

How to Display Fault Codes Using the Multifunction Gauge

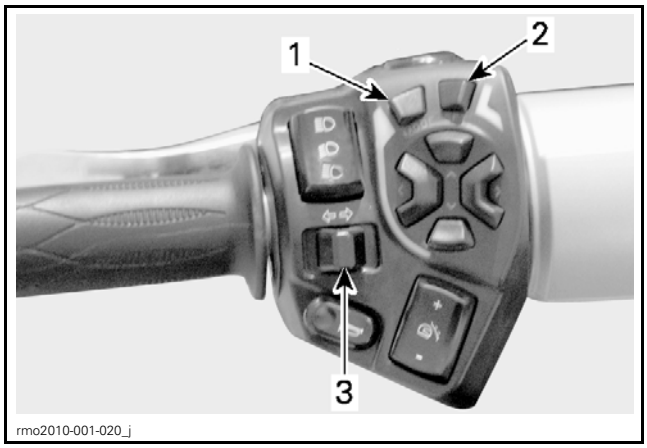
NOTE: A fault code must have the "Active" state to be displayed in the multifunction gauge. Other fault code states must be read using B.U.D.S.

If a fault is detected, an indicator light and a fault message may come on in the gauge.

Proceed as follows to view the fault codes:

1. Turn ignition key to ON.
2. Wait for the multifunction gauge to complete its self test function.
3. **Simultaneously press** the following three buttons on the LH multifunction switch assembly.
   – MODE

– SET
– Turn signal button.



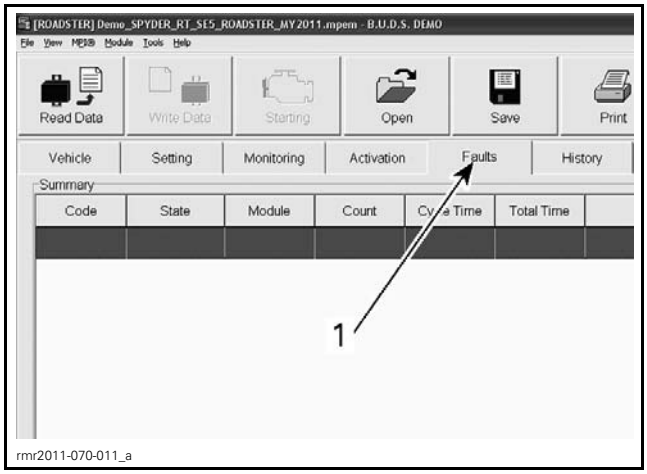
1. MODE button
2. SET button
3. Turn signal button

If there is no active fault code, nothing will be displayed.

How to Read Fault Codes Using B.U.D.S.

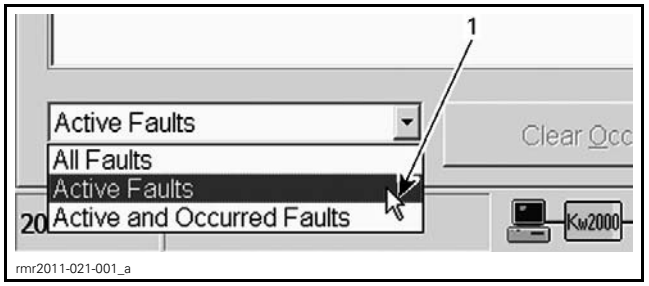
NOTE: All fault code types can be read with B.U.D.S.

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click on the **Faults** tab.



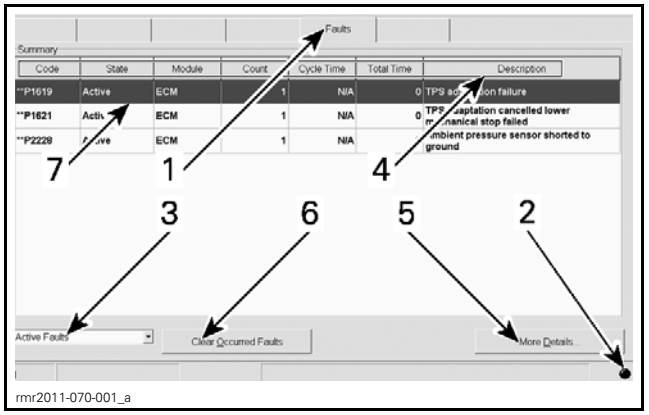
1. Fault tab

4. Click on the drop-down list on the LH lower corner.
5. Choose the fault state to display.



1. Drop down list

FAULT STATE	INFORMATION
All faults	Display all possible faults regardless of state
Active faults	Display only faults matching this state Empty area if there is no active fault
Active and occurred faults	Display only faults that have either state Empty area if there is neither active nor occurred fault



FAULT PAGE
1. Fault tab
2. Fault indicator light
3. Fault code state drop box
4. Fault nomenclature
5. More details button
6. Clear occurred faults button
7. Selected fault

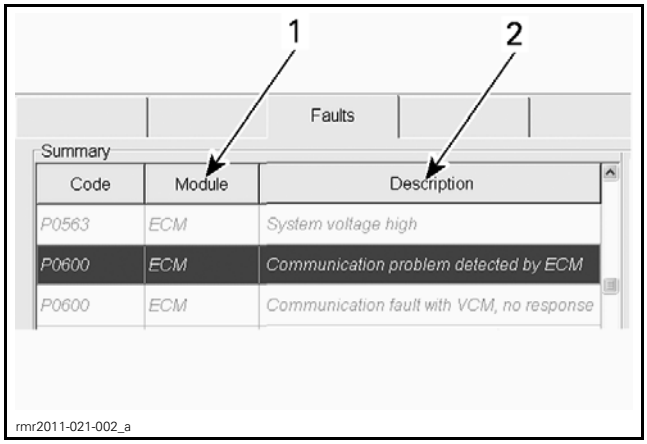
FAULT PAGE DESCRIPTION	
ITEM	INFORMATION
Fault tab	Click tab to display the fault page
Fault indicator light	When flashing, it indicates there is active fault(s)
Fault code state drop box	Click drop box to select the type of faults to display
Fault nomenclature	Display specific information and statistics related to the fault (see fault nomenclature table)

FAULT PAGE DESCRIPTION	
ITEM	INFORMATION
More details button	To display possible causes and service actions related to the selected fault
Clear occurred faults button	To clear all occurred faults in related ECU(s)
Selected fault	When a fault is selected, additional information pertaining to that fault will be displayed when clicking the "More details" button To select a fault, click on the fault with the mouse or use the cursor up or down to scroll to the desired fault

FAULT NOMENCLATURE	
COLUMN	INFORMATION
Code	Fault code number. When 2 stars (**) precedes the code, detailed conditions when the fault occurred, can be displayed by clicking the "More details" button
State	Display the fault state (active, occurred, inactive)
Module	Displays the module that reports the fault code. This is the module that detects or has received a message of an anomaly and reports it. List of modules: LCD (liquid crystal display) or Cluster (multifunction gauge) DPS (dynamic power steering) ECM (engine control module) TCM (transmission control module) VCM (vehicle control module) WPM (windshield and parking brake module)
Count	Number of times this fault occurred within the driving cycle Value: From 0 to 255
Cycle time	Not to be used Value: From 0 to 255 minutes
Total time	Not to be used Value: From 0 to 64 255 minutes
Description	Provides a short description of the fault

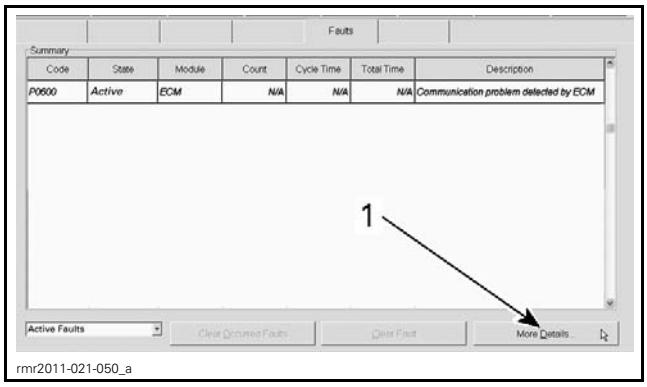
When reading a fault code in B.U.D.S., pay particular attention to which module reports a fault. It is indicated in the **Module** column.

The **Description** column gives a short description of the fault.

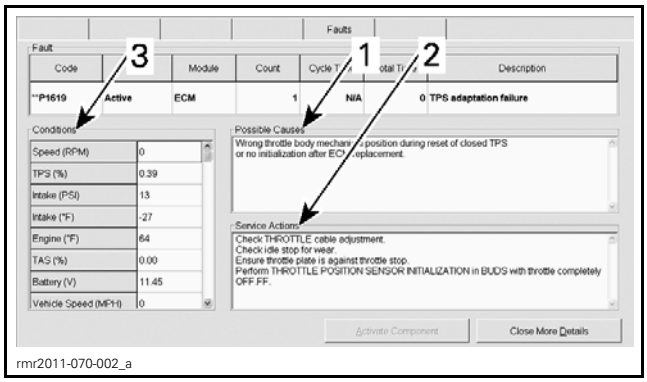


SOME COLUMNS REMOVED FOR CLARITY PURPOSE
1. *Module that reports a fault*
2. *Fault description*

Click on the **More Details** button, on the RH lower corner, to display the "Possible Causes" and the "Service Actions" to step further in the diagnosis.



1. Click here



MORE DETAILS PAGE
1. Possible causes related to the selected fault
2. Service actions
3. Operating conditions when fault occurred

MORE DETAILS PAGE DESCRIPTION	
ITEM	INFORMATION
Possible causes	List the possible causes that triggered the fault
Service actions	List the possible actions to perform to solve the fault
Conditions when fault occurred	List the operating conditions of the engine and/or vehicle when the fault was triggered

TWN: following topic "fault code states" déplacer plus haut

How to Clear Fault Codes Using B.U.D.S.

Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Click on the **Read Data** button.

Click on the **Faults** tab.

NOTE: Only the **Occurred** state faults can be cleared.

Click the "Clear Occurred Faults" button.

CLEAR OCCURED FAULTS

This will reset the appropriate counter(s) and will also record that the problem has been fixed in the related module memory.

Observe the "Occurred" fault(s). They should all disappear. Otherwise, follow this procedure.

– Turn ignition switch OFF.
– Wait 30 seconds.
– Repeat procedure to clear faults again.

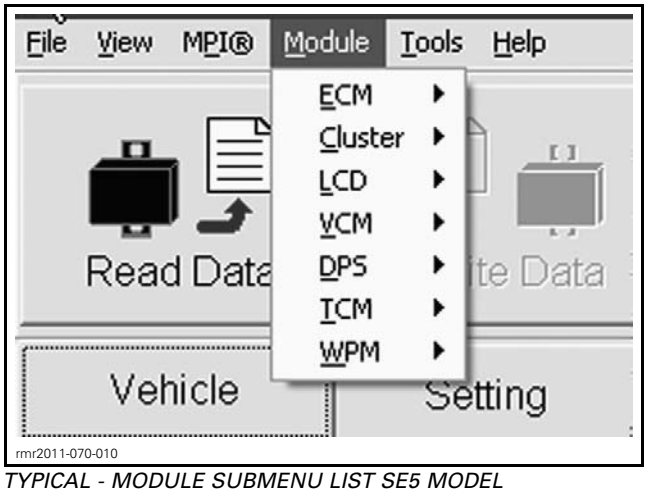
FAULT CODE DIAGNOSTIC

Missing Module

If a module is missing, several fault codes will appear.

To quickly find which module is missing, perform the following:

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click **Module** in the menu bar.
4. Look at the list of modules.
5. If a module is not visible, then it is not communicating through the CAN bus (controller area network).



TYPICAL - MODULE SUBMENU LIST SE5 MODEL

NOTE: The TCM listed is only available with the SE5 model.

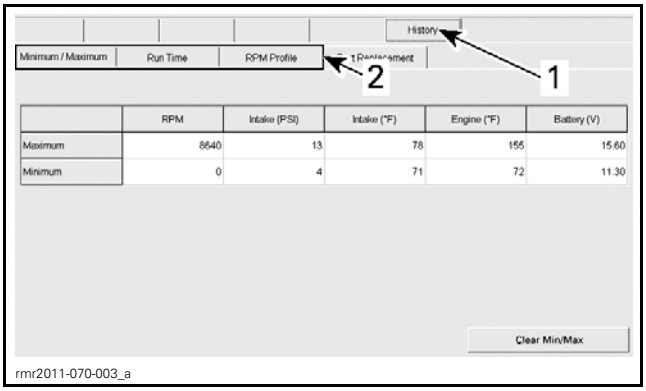
6. Refer to the following table to find the appropriate subsection in this manual to diagnose the missing module.

MISSING MODULE	SECTION TO REFER TO
ECM	*ELECTRONIC FUEL INJECTION (EFI)*
LCD and Cluster	*LIGHTS, GAUGE AND ACCESSORIES*
VCM	*VEHICLE STABILITY SYSTEM (VSS)*
DPS	*STEERING (DPS) AND FRONT WHEELS*
TCM (SE5 model)	*HYDRAULIC CONTROL MODULE*
WPM	*BODY*

Diagnostic Tips

To see the last minute of operating conditions, click on the History tab in B.U.D.S.

NOTE: The page displays data whatever there is fault code(s) or not.



1. History tab
2. Additional history pages

HISTORY PAGE DESCRIPTION	
ITEM	INFORMATION
Minimum/ Maximum	Display the minimum and maximum values encountered. Click "Clear Min/Max" to reset the values
Run time	Display the time proportion in what mode the engine was running in
RPM profile	Display the RPM range proportion in which the engine was running in

When a minor fault occurs:
– Turn ignition key OFF.
– Wait 30 seconds.
– Turn ignition key ON.

This should change the fault state from "Active" to "Occurred".

The vehicle should then operate normally.

If a sensor-related fault persists, you may try disconnecting/reconnecting the sensor.

Read the following for a general approach to troubleshoot fault codes (active or occurred).

GUIDELINES TO SOLVE FAULT CODES	
CONDITION	ACTION
Troubleshooting vehicle	Use B.U.D.S. to: Read fault codes. Display "Active" faults to see components currently not operating normally. Display "Occurred" faults to troubleshoot intermittent problems. Monitor system(s), sensor(s), switches and actual conditions. Activate component(s) for troubleshooting. Set components, bleed brake system etc. Know the last minute of operating conditions by using the "History" page. Know the operating conditions, if available, when a fault code occurred by using the "More details" button in the fault page.
New fault(s) appear after a vehicle maintenance or repair	Check sensor connections or mixed up connections. **Before** vehicle maintenance: Read the electronic modules with B.U.D.S. Save and print the B.U.D.S. file (keep faults option only). **After** vehicle maintenance: Read the electronic modules with B.U.D.S. Compare the fault code(s) before and after the maintenance using the printed copy and the current B.U.D.S. reading. Investigate only the newly fault codes. Clear all occurred faults in B.U.D.S.
Communication faults displayed as "Occurred" after module flashing	Normal behavior when flashing a module Clear all occurred faults and check again
Sensor "Active" fault	Read the fault description in B.U.D.S. Click on the "More Details" button. Look at the "Conditions" when available. Read the "Possible Causes". Apply the "Service Actions".
Low system voltage on one module Power problem on sensor(s)	Check related fuse(s) and relay. Check related power and ground wires. Check for common power supply to several sensors/modules (refer to *POWER DISTRIBUTION AND GROUNDS)*. **NOTE:** Some sensors are supplied by the battery while others are supplied by a module.
Low system voltage on several modules (several communication faults will also appear)	Check battery condition and connections. Check related fuse(s) and relay. Check voltage regulator/rectifier.
High system voltage on several modules	A battery charger has likely been used to substitute the vehicle battery. Clear all occurred faults and check again. Check voltage regulator/rectifier.
When all modules report that a module is missing	Check the module that is reported as missing. Check related fuse(s) and relay. Check related power and ground wires.
When several modules are in fault	Search for a common problem such as a faulty sensor.
CAN bus failure, CAN buss OFF	When several modules and sensors report that a module is missing. The missing module may report CAN bus failure, CAN bus off. Check related CAN wires (continuity, short to ground, short between CAN low and high). Check module pins and wiring terminals. Then, the other modules should stop reporting that module is missing.

GUIDELINES TO SOLVE FAULT CODES	
CONDITION	ACTION
Occurred fault(s)	May have been generated due to a system or component that was momentarily operating outside normal parameters.
	May be generated when disconnecting and reconnecting a component, replacing a burnt fuse, or may be due to a momentary high or low voltage.
	Before being "Occurred", a fault has always been "Active" for a certain time, indicating that an unexpected condition or problem has been present during the driving cycle A frequent momentarily fault or an intermittent fault may never be seen as "Active" in B.U.D.S. while there is still a pending problem. This type of malfunctions can be discovered by looking at the "Occurred" faults and then by evaluating the fault count. As long as a fault is present, it is displayed as "Active"
Fault count (0 - 255)	**Low value:** Suggests handling problems (connections, terminal contact/shape etc.). **High value:** Suggests a frequent and unsolved problem. The problem should be investigated.
Fault conditions (More details button)	Look for abnormal, excessive values.
Hard to find problems	When the basic troubleshooting has been done and the fault code(s) persists, often the problem is related to the wiring harness, connections or electromechanical components. Short to ground, to battery or between wires. Wire splices, chafing, terminal problems (pulled out, bent, out of shape, corroded etc.). Bad contacts in switch or relay.

ECUs share information and their systems may interact with each other. Certain faults may cause more than one ECU to set a fault code or indication (pilot lamp or message) as the failure of some components may affect the operation of several systems.

IMPORTANT NOTE

The primary electronic systems depend on other secondary system(s) or sensor(s) for their normal operation.

If a primary system generates a fault code, usually the fault belongs to it. However, in some cases, the primary system may not be at fault. A malfunction in a secondary system, or a sensor, may be the cause of the fault code generated by the primary system. Since proper operation of the primary system could be compromised by the fault in the secondary system or sensor, the primary system generates the fault code to indicate a malfunction in the system.

Example: If several faults are active at the same time, such as for the VSS, ABS, EBD and EMS systems, and you look at the fault codes using B. U. D. S., you will see many active fault codes displayed. When looking at them closely, you will notice that each system share a common fault; YRS (yaw rate sensor) fault. The culprit is likely to be the YRS. These primary systems are all dependent on the YRS for their normal operation.

SPECIFIC FAULT CODES

The following provides additional information related to specific fault codes.

VSS Faults

Several modules use signals from the VSS module, or from the VSS sensors.

Every time the VSS has an active fault, other modules may also be in a fault state.

VSS and ABS Simultaneous Faults

The problem is likely to be disconnected or faulty wheel speed sensor(s).

VSS, ABS, EBD Simultaneous Faults

The problem is likely to be a disconnected or faulty:

– VCM

– Rear wheel speed sensor(s).

PRS (Pillion Rider Sensor) Fault

When there is a PRS fault, the VSS will operate in safe mode as if both a driver and a passenger were seated. If only the driver is seated, the VSS will be more active.

Cruise Control Faults

The cruise control system is closely interlinked and dependent on the proper operation of many other systems for its' operation which, may involve several ECUs.

If the cruise system cannot be engaged or displays a fault, check for and correct other system faults before assuming the cruise system is at fault.

Simultaneous Faults:
- U0400 (DPS, TCM (SE models))
- C1281 (VSS after key OFF then ON)
- C006C (ECM after key OFF then ON)

These faults, when occurring, are likely to be caused by a wrong "Platform" option in the **Vehicle Configuration** within B.U.D.S. Refer to *ECM REPLACEMENT* in *ELECTRONIC FUEL INJECTION (EFI)* and set the option that reflects the vehicle involved.

FAULT CODES

The fault code descriptions use the same acronyms and connector identifications as per wiring diagrams.

For the latest fault codes, use **Knowledge Center** and enter the following search criterias:

– Enclose the search within quotes " "
– Enter: "Roadster DTC + Fault code + Module"
– Examples: "Roadster DTC P0036 ECM"
"Roadster DTC C1220 VCM"
"Roadster DTC U0073 VCM"

NOTE: The module may be omitted in the search criterias (example: "Roadster DTC U0073".

TWN: Traduction: Même structure en fançais