

Trouble Shooting Guide

Problem:

Undertake the following test

NOTE: - This cruise control can be connected to the bike's CAN-BUS system and can use this as a source for various operating signals rather than having individual wires going to connections on the bike. In most cases the cruise control sources road speed, engine speed, front and rear brake operation and clutch operation signal from the CAN-BUS system if available, which means that wires will not be fitted to the harness for these signals. In almost every case, the cruise control will have a direct connection to either the front (usually) or rear brake switch as a back up for the CAN-BUS signals.

NOTE: - The most common cause of cruise control malfunction is loose or dirty electrical connections. Disconnect, clean and reconnect ALL electrical connections if the cruise control will not operate in diagnostic mode. Check the stop codes on the computer as that will give you an indication of what might be stopping the cruise control from engaging. The usual connections are: computer plug, control switch plug, throttle position sensor plug/s, fuse, brake light switch and CAN-BUS.

1 Bike's throttle stops working

Usually engine warning light also comes on.

TPS calibration incorrect, perform TPS calibration.
TPS wiring fault, incorrect pinouts or damaged wire
Internal fault in cruise control computer

2 Indicator light on control switch flashing red/green after ON-OFF button pressed to turn cruise control on

Brakes have not been operated after ignition turned on
Brake light globe faulty or brake light stuck on
Brake light wiring fault
Check stop codes (see page 4)

3 Cruise will not engage.

NOTE: The cruise control will NOT engage after power up (ignition turned on) until the brakes have been applied and released at least once.

Use the result of the stop code and diagnostic test to indicate which of the following tests should be performed

Brakes have not been operated after power up
Brake light globe faulty or brake light stuck on
Check stop codes (see page 4)
Perform diagnostic test (see page 5)
Computer power test.
Brake wire test
Control switch test
Throttle Position Sensor test (in diagnostic mode)
Harness continuity and voltage/resistance tests
Incorrect calibration or computer not calibrated

4 Cruise control erratic, surges or loses/gains speed.

Adjust cruise control sensitivity
Throttle Position Sensor test (in diagnostic mode)

5 Cruise lags or overshoots when engaged

Note: - Sensitivity adjustment procedures are shown in Section 10 of the Information, Setup and Operation Manual.

Throttle Position Sensor test (in diagnostic mode)
Adjust cruise control sensitivity

6 Cruise disengages (Note: Carefully check all wiring for intermittent connections)

Check diagnostic stop codes (see page 4)
Brake light globe faulty
Brake light switch faulty/adjustment
Brake wire test
Throttle Position Sensor test (in diagnostic mode)

7 Cruise accelerates too slow

Throttle Position Sensor test (in diagnostic mode)
Incorrect calibration/re-calibrate computer
Adjust cruise control sensitivity

8 Cruise will not disengage with brake

Brake light switch faulty
Brake wire test
Throttle Position Sensor test

9 Engine will not return to idle

Throttle Position Sensor test (in diagnostic mode)
Broken throttle grip spring or sticking throttle tube

10 Cruise will not operate at higher speeds (above 80 kph / 50 mph)
Check diagnostic stop codes (see next page)

CAN-BUS speed calibration incorrect

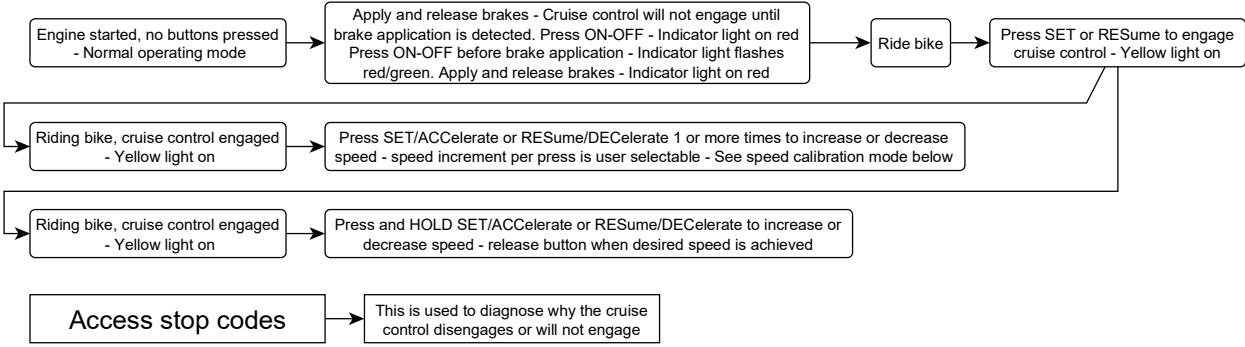
11 Cruise will not operate at lower speeds (below 60 kph / 35 mph)
Check diagnostic stop codes (see next page)

CAN-BUS speed calibration incorrect

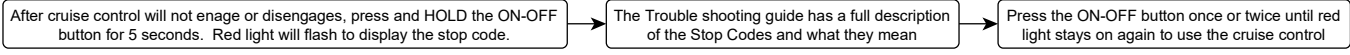
MOTORCYCLE CRUISE CONTROL MENUS

This section shows all the menus and sub-menus used for normal operation, diagnostics, setup and calibration and adjustment procedures available on the motorcycle cruise control

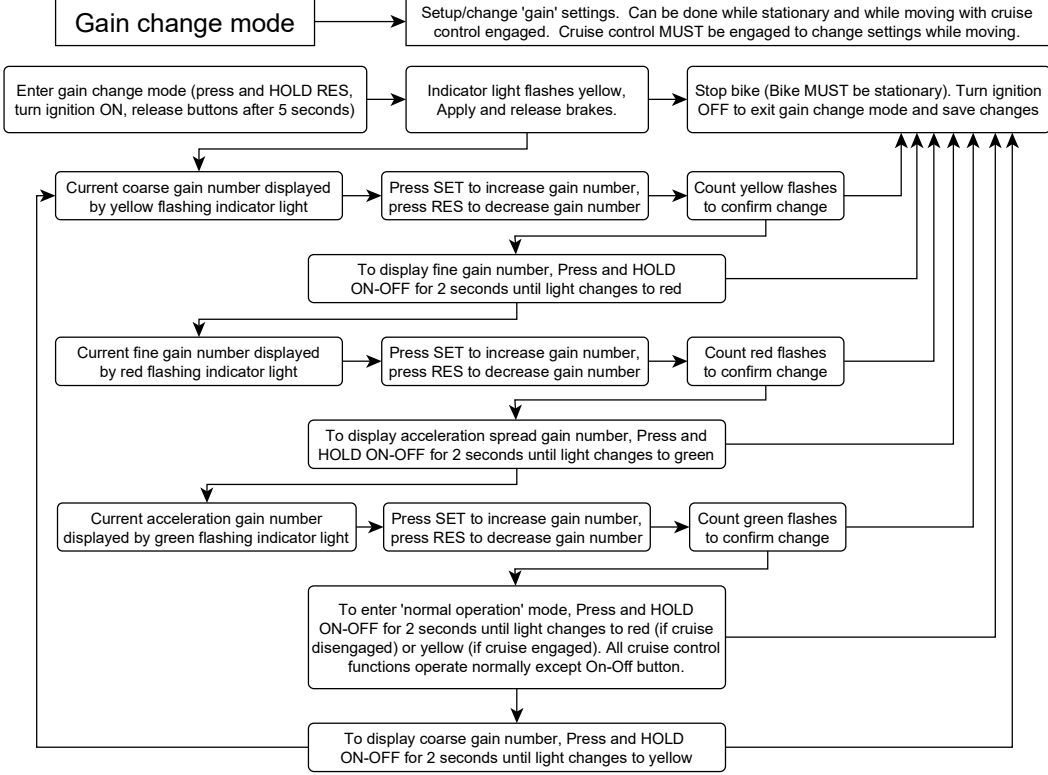
Normal cruise control operation



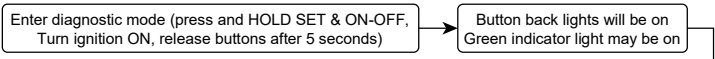
Access stop codes → This is used to diagnose why the cruise control disengages or will not engage

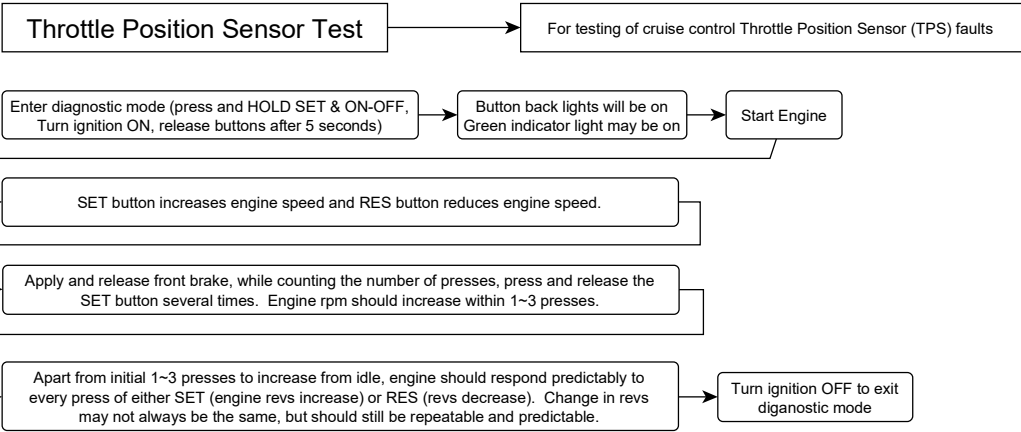
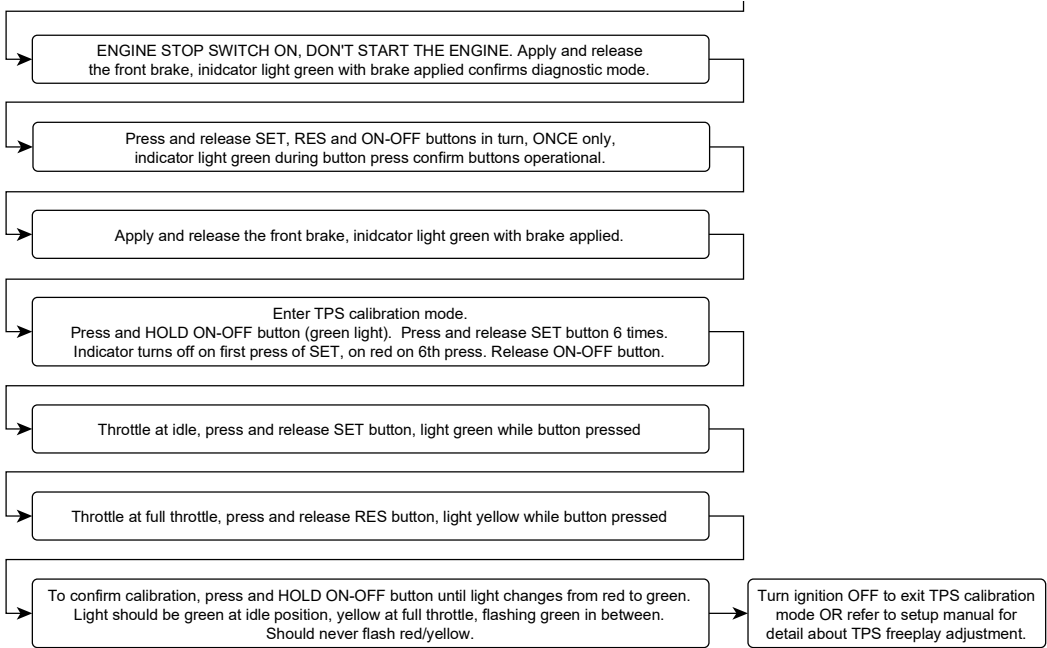


Gain change mode



Throttle Grip Position Sensor Calibration → For calibrating the cruise control to the bike's Throttle Grip Position Sensor (TPS)





MOTORCYCLE CRUISE TROUBLE SHOOTING TESTS

Diagnostic Stop Codes

This cruise control has stop code function built in. The indicator light on the control switch can display the stop code at any time by pressing and holding the ON-OFF button for 10 seconds. The red light (LED) beside the connector on the cruise control computer also displays the code by flashing at all times. This stop code is displayed whenever the cruise control fails to engage when SET or RES are pressed or whenever the cruise control disengages and on power up.

When the ignition is first turned on stop code 11 (power reset) will be shown, unless there is a fault that causes another code to display. The cruise control may be disengaged by the operator on purpose (by applying the brakes for example, a code 6 would display), by the operator accidentally (manually accelerating for example, a code 4, 5, or 9 would display) or if there is a fault. **Note that this is NOT a fault code**, it is a stop code and a code is produced and displayed at all times except when the cruise control is engaged.

Ride the bike at normal speeds (50~110 kph or 30~70 mph). Press SET to engage cruise control. If cruise control does not engage, check that the indicator light does NOT come on YELLOW (red indicates power on, yellow indicates cruise is engaged).

If the engage light DOES come on (yellow light), but the cruise control does not control the vehicle speed, then the problem is either an electrical or mechanical failure in the throttle control system, as the cruise control 'believes' that it is engaged and is trying to control the vehicle speed. Enter diagnostic mode (second page of this manual) and perform a full diagnostic test. In particular, check that the engine rpm can be raised and lowered using the SET and RES keys in diagnostic mode. If engine rpm cannot be raised in diagnostic mode, check electrical connections to the bike's Throttle Position Sensor. Any issues with these connections should also cause a fault in the bike's engine management and cause the 'check engine' light to come on.

If the engage light does NOT come on when you press SET, or the cruise control disengages unexpectedly, stop the bike. DON'T TURN THE IGNITION SWITCH OFF. Press and hold the ON-OFF button for 5 seconds or observe the RED LED (light) beside the connector on the computer. If the cruise control will not engage or disengages, the red LED on the computer and the control switch (if ON-OFF is pressed for 5 secs) will flash to indicate what is **preventing** the cruise control from engaging, or what was the **last** cause of the cruise control disengaging. The red LED will flash on and off, about once per second, the number of times that indicate the appropriate stop code number, then will pause for 2 to 3 seconds then will flash the stop code again.

Depending on the software version, the flashes may be all the same length (short) OR could be long flash/s, then short flashes. If they are all short, you simply count the flashes between each 2 seconds pause. If there is a long flash or flashes, then short ones, each long flash is a 10. So one long flash only is stop code 10. 2 long flashes is 20. 2 long and one short is stop code 21. 5 short flashes is stop code 5, and so on. The computer red LED will continue to flash this code until power (ignition switch) is turned OFF or the SET or RES button is used to engage or attempt to engage the cruise control. To stop the code being displayed on the control switch, press and release the ON-OFF button.

Remember, if the engage light does come on when the SET button is pressed, the cruise control HAS engaged, even if the throttle is not being operated. If this happens, when you stop the bike, you could get any one of several different stop codes displayed. Any of the following codes are possible in this event, 2, 3, 5, 6, 7, 9 or 10 as any of these events could be what disengages the cruise control when you slow down to a stop. None of these codes are the real cause of the problem, the problem is an issue with the throttle control systems.

Stop Code Description

<u>Stop Code Description</u>	<u>Code</u>	<u>Possible cause</u>
ON-OFF switch signal detected	1	ON-OFF switch accidentally pressed/faulty
No speed signal	2	Speed signal/sensor/wiring faulty
Below minimum engage speed (about 35kph)	3	Speed pulse rate too slow/faulty#
Above maximum engage speed (about 180kph)	4	Speed pulse rate too high/faulty#
Over speed or under speed (130% or 70% of SET speed)	5	Speed signal/sensor/wiring faulty
Brake signal detected\$	6	Brake light/wiring fault/sticking brake switch
Not used on this module	7	
Clutch signal detected Voltage level input	8	Clutch/neutral/sidestand switch/wiring fault
Exceed maximum allowable acceleration	9	Too much speed pulse variation^
Overrev sense (tacho sensing)	10	Changed gear or clutch slip, ignition system wiring/connection fault.
Power reset (NOTE: - Stop code 11 will be displayed EVERY time the ignition is turned on)	11	Fault in power wiring to cruise control <u>or</u> ignition turned off and back on.
Not yet calibrated/lost calibration	12	Calibration routine must be performed%*
Brake signal detected OR no brake power detected\$	13	Brake light/wiring fault/sticking brake switch OR bad brake power connection or blown brake fuse

Brakes not detected on power up (if cruise turned on, indicator light on switch will flash red/green until brakes are detected)	14	Brakes not applied (cruise will not engage until brake application has been detected)
Lost tach signal	15	Tach sensor wiring fault
NOTE: - Some of the following stop codes only apply to conventional throttle systems with a throttle servo, NOT to Throttle By Wire. If these codes are observed, they indicate an internal fault in the computer.		
Disengage/brake application time out@	16	SET or RES button pressed too soon after cruise disengaged or brakes released
Brake circuit logic failure	17	Internal circuit fault in cruise computer
CruiseSafe brake circuit power fault	18	Internal circuit fault in cruise computer
CruiseSafe brake circuit no power fault	19	Internal circuit fault in cruise computer
CruiseSafe monitor circuit fault	20	Internal circuit fault in cruise computer
Servo motor current leak	21	Internal circuit fault in cruise computer
Servo motor current too high	22	Jammed throttle servo motor or internal circuit fault in cruise computer
Servo current too low	23	Throttle servo fault or bad connection
Watchdog reset	24	Internal circuit fault in cruise computer
Servo clutch current leak	25	Internal circuit fault in cruise computer
Servo clutch current too high	26	Throttle servo fault
Servo clutch no current	27	Throttle servo fault
Remote manual stop (autonomous vehicles only)	28	Cruise disengaged via remote signal
Lost CAN-BUS signal	29	CAN-BUS harness damage/bad connection !
No CAN-BUS signal	30	CAN-BUS harness damage/bad connection !
CAN-BUS brake 1 - Brake signal from CAN-BUS input	31	CAN-BUS harness damage/bad connection !
CAN-BUS brake 2 - Brake signal from CAN-BUS input	32	CAN-BUS harness damage/bad connection !
CAN-BUS clutch - Clutch operation signal from CAN-BUS input	33	CAN-BUS harness damage/bad connection !
Throttle By Wire TPS not calibrated	51	TPS calibration not completed
Throttle By Wire TPS input mismatch	52	TPS fault or calibration not correct
Throttle By Wire TPS under range	53	TPS fault or calibration not correct
Throttle By Wire TPS over range	54	TPS fault or calibration not correct

#Note: - Speed pulse rate errors could also be caused by the computer calibration being incorrect for the vehicle.

\$Note: - Brake application can produce stop code 6 OR stop code 13 depending on how the brake light switch is wired in the vehicle. If the brake light switch controls power to the brake light (the most common method) , stop code 6 will be generated. If the brake light switch control ground from the brake light, stop code 13 will be generated. Stop code 13 will also be generated if power to the brake light system fails, ie. A blown brake circuit fuse.

^Note: - Speed pulse acceleration errors can be caused by intermittent/dirty wiring connections on the bike's speedometer sender or CAN-BUS errors.

*Note: - If the computer resets or has to be re-calibrated more than once it should be returned for warranty investigation.

%Note: - Code 12 requires that the configuration of the computer be rebuilt. This is easy for the user to do.

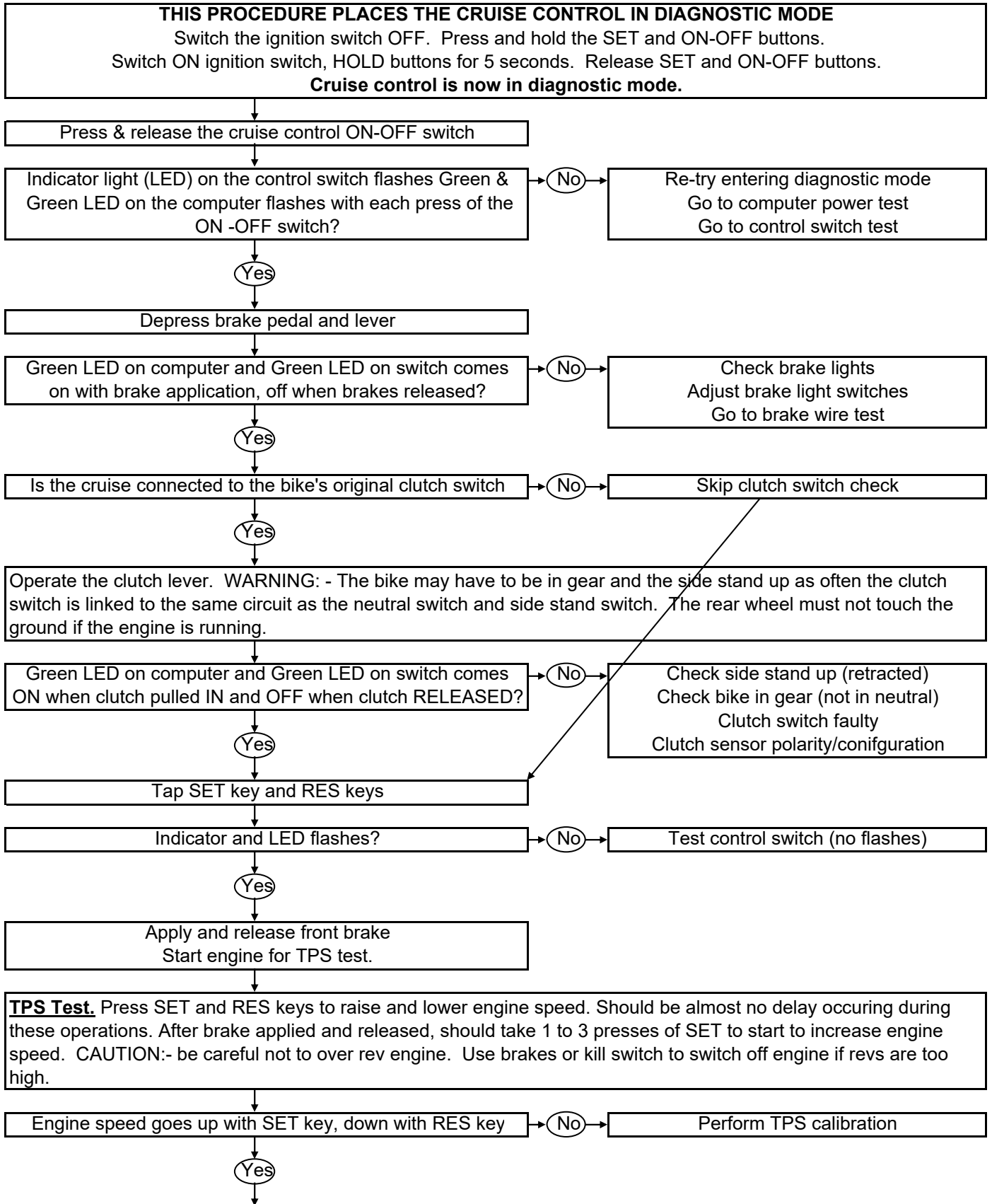
See Chapter 8 (Diagnostic Mode Operation) of the "Information, Set up & Operation Manual" to perform a full diagnostic check to ensure that everything works as it should and to configure the clutch/neutral sensor. See Chapter 9 (Calibration, Adjustments & Road Test) of the "Information, Set up & Operation Manual" to re-calibrate the speed signal pulse rate and initial throttle pull and to adjust the sensitivity.

@Note: - After the cruise control is disengaged AND every time after the brakes are released, there is a short delay during which the cruise control will not engage.

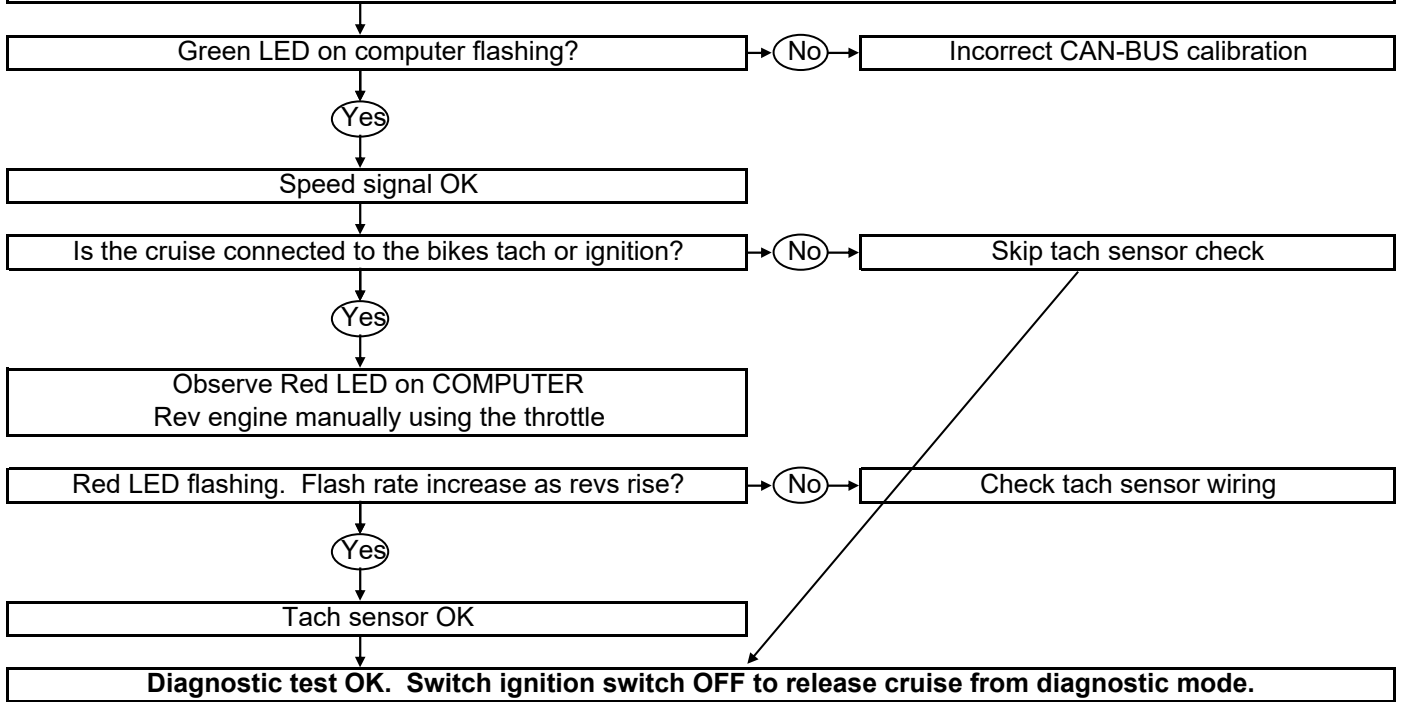
!Note: - CAN-BUS errors can be caused by bad connections, damaged wiring harness or incorrect CAN-BUS coding.

In many cases CAN-BUS coding is different from model to model or model year of the same make. Some manufacturers use the same coding on all the models, but others change the coding frequently with each model update or each new model. CAN-BUS is very resistant to electrical interference, but it is not immune. So far every manufacturer we have seen has it's own CAN-BUS coding and protocols. In the case of CAN-BUS brake or clutch signals this could be caused by a faulty or sticking switch or wiring fault to the switch.

Cruise control diagnostic test (Includes Throttle Position Sensor (TPS) test)

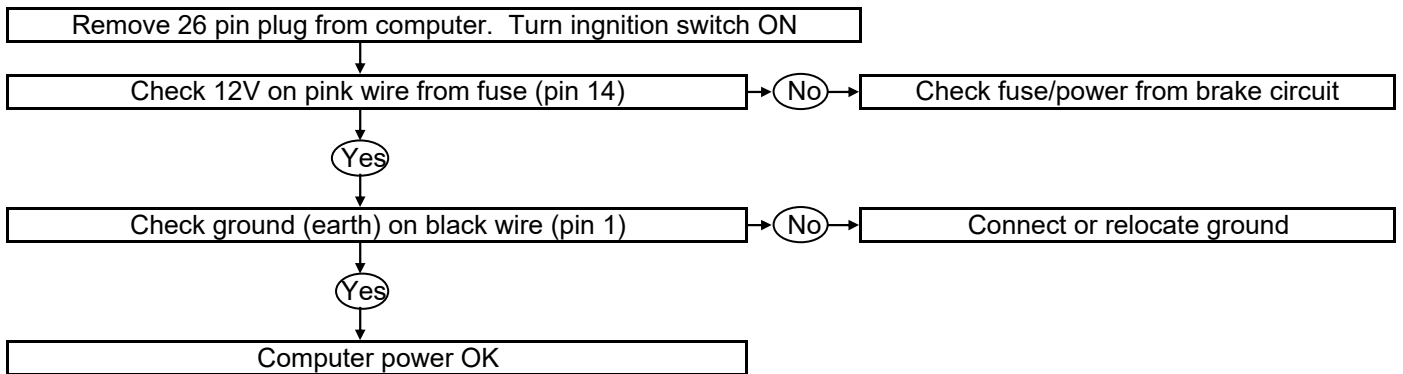


Speed sensor signal test can only be performed on the center stand on bikes that have speed signal generated from the CAN-BUS system where the speed signal comes from the rear wheel. Engage 3rd or 4th gear and release the clutch GENTLY.
 Increase the wheel speed to about 50~60kph (30~35mph). Observe the GREEN light inside the computer.
 Note: - The flash rate of the light is dependant on the speed of the vehicle. If the speed sensor calibration is correct, the light will flash roughly once every two seconds at 50kph (~30mph).

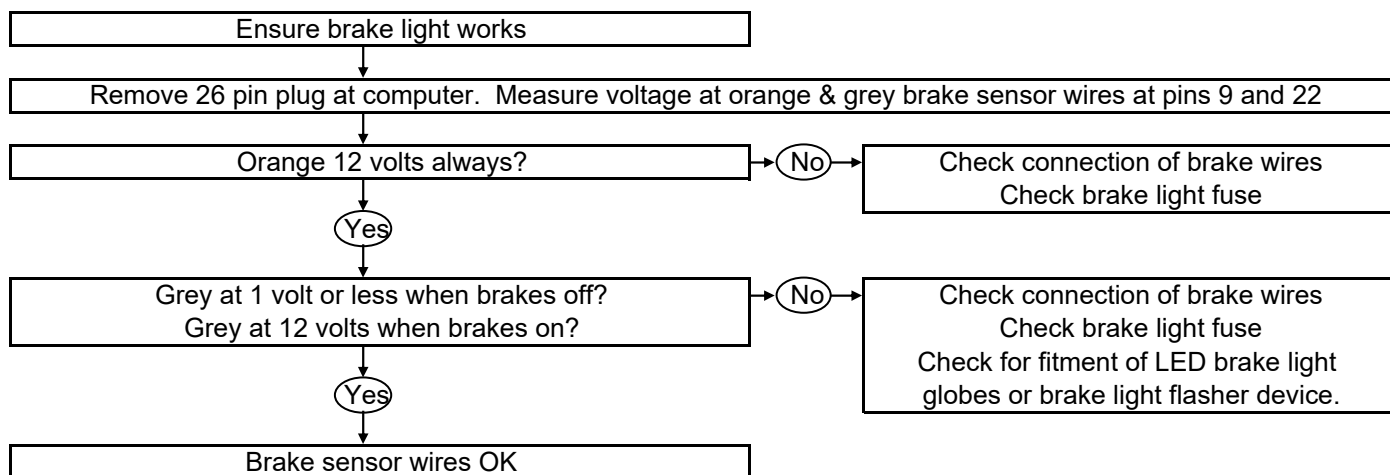


Computer power test (a multimeter set to 15 volts range will be needed for this test)

Note: - You will need a small pin with a rounded or tapered end and not over 1.0mm (0.040") diameter to use as a test probe. Wire paper clips are ideal. This can be inserted into the terminal holes in the 26 way computer plug. BE CAREFUL NOT TO DAMAGE THE TERMINALS. IF THE PROBE WILL NOT SLIP INTO THE TERMINAL HOLE EASILY, DON'T USE IT.



Brake wire test

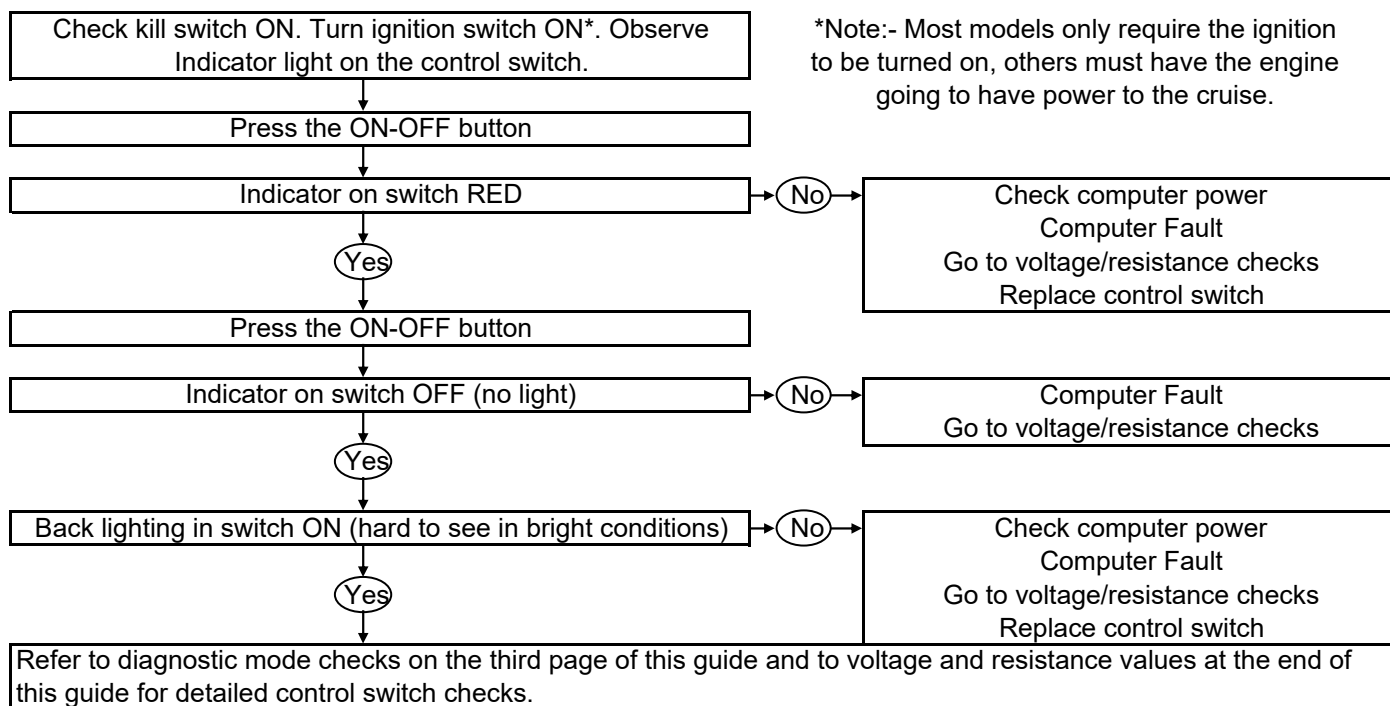


Computer calibration

Refer to the Chapter 9 (Calibration, Adjustment & Road Test) of the Information, Set up & Operation Manual for information about Throttle Position Sensor and Speed Sensor Pulse Rate calibration and Adjusting the Sensitivity.

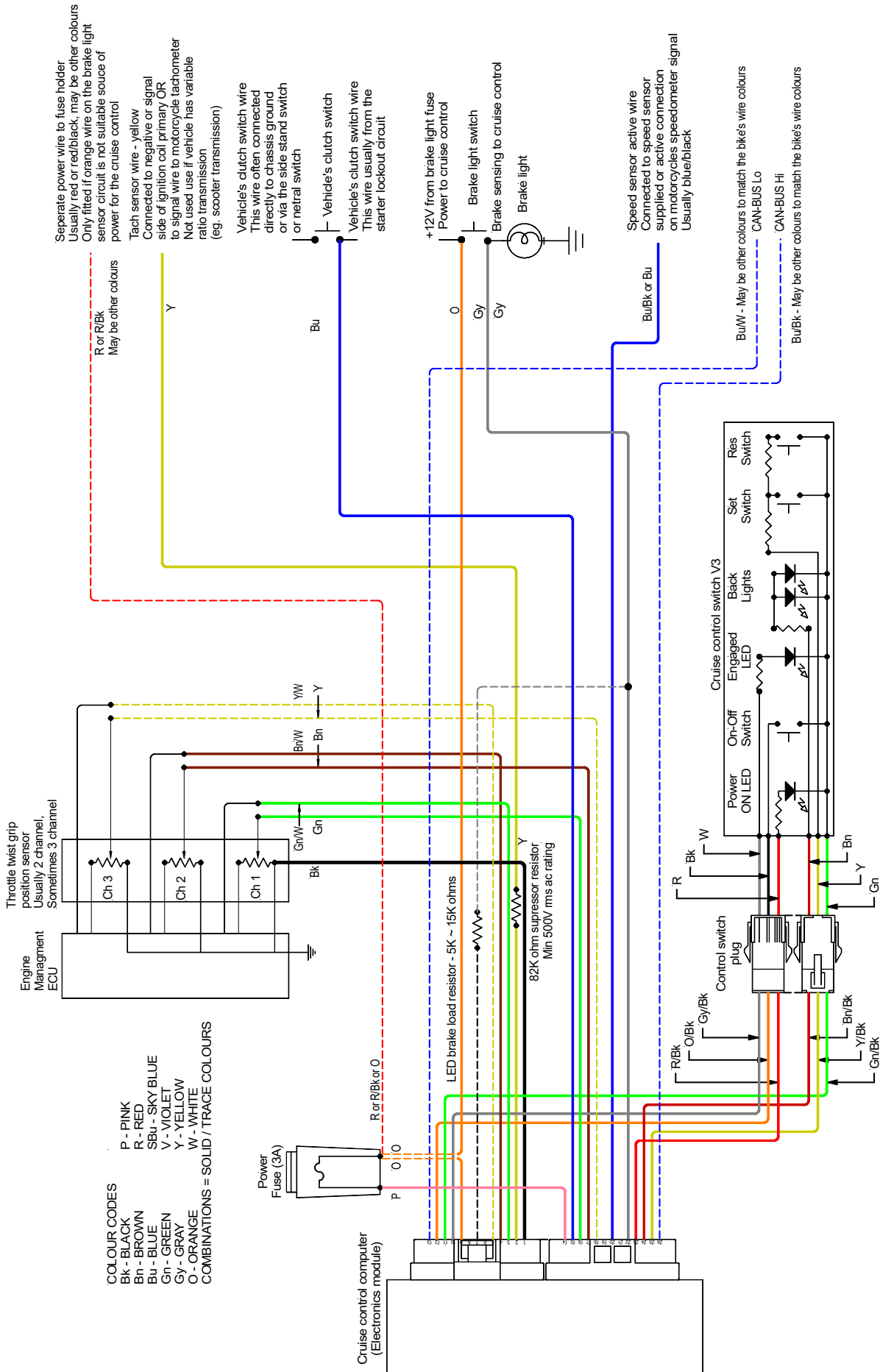
Control switch test#

Note: - refer to switch voltage and resistance values at end of guide for detailed check of switch



*Note:- Most models only require the ignition to be turned on, others must have the engine going to have power to the cruise.

Wiring diagram

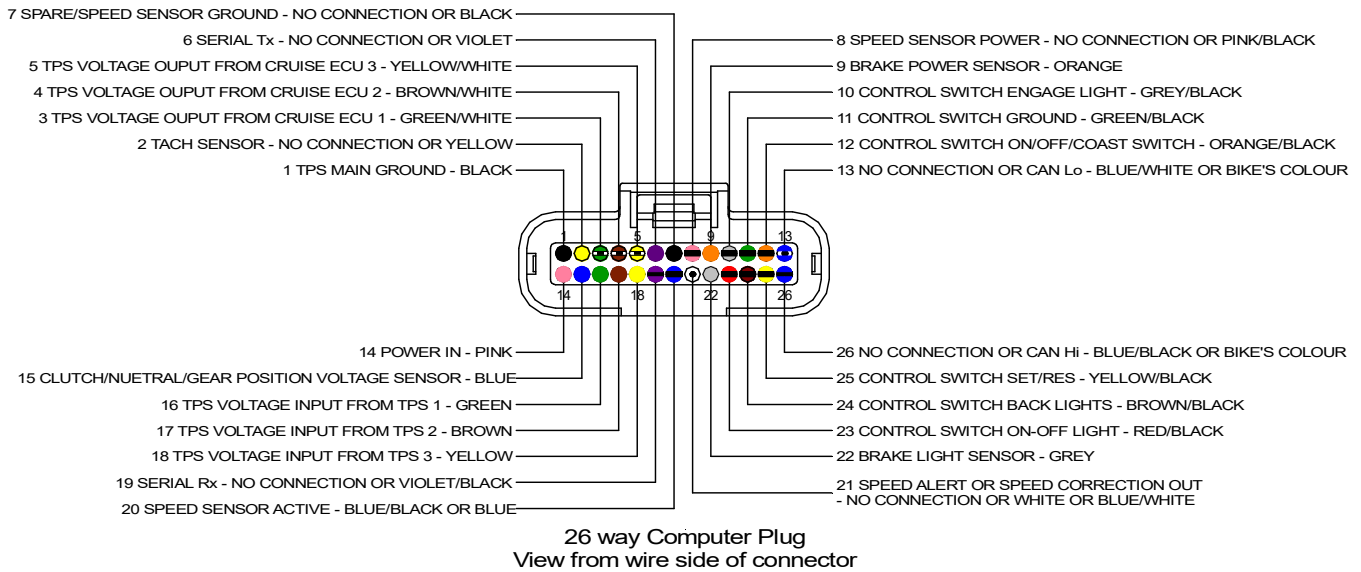


- COLOUR CODES**
- Bk - BLACK
 - Bn - BROWN
 - Bu - BLUE
 - Gn - GREEN
 - Gy - GRAY
 - O - ORANGE
 - P - PINK
 - R - RED
 - SBU - SKY BLUE
 - V - VIOLET
 - Y - YELLOW
 - W - WHITE
- COMBINATIONS = SOLID / TRACE COLOURS

NOTE: - This diagram shows all possible connections. Not all connections may be used on some motorcycles. In most cases if CAN-BUS wires are connected to the bike, speed sensor, tach sensor and clutch sensor wires will not be fitted

Harness wiring pin configuration and tests

Harness computer plug pin configuration Check continuity of all wires and that the wires go to the correct pins.



Resistance checks

Resistance values at harness computer plug for suspected Control Switch fault

Note: - check with ignition switch **OFF** and computer **UNPLUGGED** from loom

Note: - You will need a small pin with a rounded or tapered end and not over 1.0mm (0.040") diameter to use as a test probe. Wire paper clips are ideal for this. This can be inserted into the terminal holes in the 26 way computer plug. **BE CAREFUL NOT TO DAMAGE THE TERMINALS. IF THE PROBE WILL NOT SLIP INTO THE TERMINAL HOLE EASILY, DON'T USE IT.**

Note: - switch wires have a black trace (stripe) unless otherwise specified below

ON-OFF switch

Pin 12 (power switch, orange) & Pin 11 (switch ground, green) ∞ Ω(ohms) when cruise ON-OFF switch released
" 0 Ω(ohms) when cruise ON-OFF switch pressed

SET & RES buttons

Pin 25 (switch signal, yellow) & Pin 11 (switch ground, green) ∞ Ω(ohms) when no buttons pressed
" 820 Ω(ohms) on SET
" 1.5 KΩ(K ohms) on RES

Resistance values at harness computer plug for suspected ground connection fault

(check with ignition switch **OFF** and computer **UNPLUGGED** from loom)

Touch the ohmmeter probes to the pin numbers or locations indicated

Pin 1 (ground, black) & battery negative 0 Ω(ohms)

Resistance values at loom computer plug for suspected Speed Sensor fault

(check with ignition switch **OFF** and computer **UNPLUGGED** from loom)

Touch the ohmmeter probes to the pin numbers indicated

Pin 20 (sensor active, blue) & pin 7 (sensor shield, black) 350~600 Ω(ohms) if using supplied speed sensor
Unknown if units taps into motor cycle speedo.

Voltage values at loom computer plug

Note: - check with cruise computer plugged in, ignition ON and cruise control ON in DIAGNOSTIC mode

Do the following to put cruise control in diagnostic mode: Turn ignition switch OFF. Press and hold the SET and ON-OFF buttons. Turn the ignition switch ON. Release the SET and ON-OFF buttons. Cruise control is now in diagnostic mode.

Place +ve probe in the back of the computer plug to measure voltages and -ve probe to battery negative or frame.

Note: - you will need a small sharp probe to either push through the wire insulation or push in between the seal and the wire on the back of the computer plug to contact the terminal inside the plug.

Control switch

Note: - switch wires have a black trace (stripe) unless otherwise specified below

Note: - check with cruise computer plugged in, ignition ON and cruise control ON in DIAGNOSTIC mode

Do the following to put cruise control in diagnostic mode: Turn ignition switch OFF. Press and hold the SET and ON-OFF buttons. Turn the ignition switch ON. Wait 5 seconds, then release the SET and ON-OFF buttons. Cruise control is now in diagnostic mode.

Pin 10 (engage light signal, grey/black) Indicator light OFF	0V with no buttons pressed
Pin 10 (engage light signal, grey/black) Indicator light Green	2~4V with brakes applied or SET or RES pressed
Pin 24 (back light power, brown/black - (motorcycles)	~12V while ignition is on.
Pin 24 (spray control auto signal, green/red - ATV's)	0V after SET or RES pressed, spray switch in Auto
Pin 24 (spray control auto signal, green/red - ATV's)	~12V after brakes applied, spray switch in Auto

Note: - check with cruise computer plugged in, ignition ON and cruise control NOT in DIAGNOSTIC mode

Turn ignition switch OFF, then turn ignition switch back ON to release cruise from diagnostic mode

Pin 11 (switch ground, green/black)	0V
Pin 12 (power switch signal, orange/black)	4~5V with ON-OFF released
"	0V with ON-OFF pressed
Pin 23 (ON-OFF indicator light, red/black) Indicator light ON Red	~12V with ON-OFF pressed & released
Pin 23 (ON-OFF indicator light, red/black) Indicator light OFF	0V with ON-OFF pressed & released
Pin 25 (SET & RES switch signal, yellow/black)	~4.8V no buttons pressed
"	~2.0V with SET pressed
"	~2.8V with RES pressed

Clutch/Neutral sensor (only the Hi-Lo sensor, this does not apply to Voltage Level sensor)

Clutch sensor check should be done with the vehicle in gear (not in neutral) for clutch sensor test. Often the clutch switch & neutral switch are all part of the same circuit. Neutral sensor check should not have any special requirements.

Clutch/Neutral sensor (when configured for 0V or low signal detection)

Pin 15 (clutch/neutral sensor, violet, blue or light green)	0~0.5V clutch pulled in or neutral selected
"	4.5~12V clutch released or other gear selected

Clutch/Neutral sensor (when configured for 12V or high signal detection)

Pin 15 (clutch/neutral sensor, violet, blue or light green)	4.5~12V clutch pulled in or neutral selected
"	~0V clutch released or other gear selected

Power

Pin 14 (12V power in , pink)	~12V
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Throttle Position Sensor and CAN-BUS inputs and outputs

Pin 1 (vehicle sensor ground, black)	~0V
Pin 3 (Ch 1 V out from cruise control, green/white)	Typ 0.5 to 4.5V varies with throttle position
Pin 4 (Ch 2 V out from cruise control, brown/white)	Varies with throttle position
Pin 5 (Ch 3 V out from cruise control, yellow/white)	Varies with throttle position
Pin 16 (Ch 1 V in from vehicle TPS, green)	Typ 0.5 to 4.5V varies with throttle position
Pin 17 (Ch 2 V in from vehicle TPS, brown)	Varies with throttle position
Pin 18 (Ch 3 V in from vehicle TPS, yellow)	Varies with throttle position
Pin 13 (CAN Lo, blue/white or match vehicle colour)	
Pin 26 (CAN Hi, blue/black or match vehicle colour)	

NOTE: - Channel 1 of TPS usually has voltage range from around 0.5V at idle, to 4.5V at full throttle.

Channel 2 of TPS may have similar voltage range to 1, or reverse (4.5V at idle, to 0.5V at full throttle) OR may be roughly half voltage (0.25V at idle to 2.75V at full throttle). Channel 3 (if used) will be another variation on these numbers. These are approximate and indicative numbers only and will vary for different makes and models.

Speed sensor - not usually used on CAN-BUS systems

Pin 20 (speed sensor active signal, blue or blue/black)	0V to 4~12V pulses with wheel rotation (normally 5V)
Pin 7 (speed sensor ground, black) OR	0V
Pin 1 (main ground, black)	0V
Pin 8 (speed sensor power, pink/black)	12V

Note: - Speed sensor signal with MCS 027 passive coil speed sensor will be about 0.1V pulse when the magnet passes the wheel. Meter needle will flicker on 0.5v range. If the cruise is connected to the motorcycles speedometer sender is may produce a similar signal (some BMWs use this type of speedo sender) or it will be a 0V to 4~8V pulse that occurs with wheel rotation.

Note: - Pins 7 and 8 are usually only used when the cruise control kit comes with a speed sensor and tone wheel, usually fitted to a drive shaft, rear axle or rear wheel. If the vehicle has an electric speedometer, the cruise control speed signal wire will be connected to the vehicles speedometer sender wire on pin 20.

Brake sensor

Pin 9 (power/brake sensor supply, orange)	~12V
Pin 22 (brake sensor, grey) incadescent (standard) lights	0V with brakes OFF
Pin 22 (brake sensor, grey) LED lights	0~2V with brakes OFF
Pin 22 (brake sensor, grey)	~12V with brakes applied

Unused positions

- Pin 2 NOT USUALLY USED
- Pin 5 NOT USED (used if third channel for TPS required)
- Pin 6 NOT USUALLY USED
- Pin 7 SPARE GROUND - USUALLY NOT USED WHEN CONNECTED TO VEHICLES SPEEDO SENDER
- Pin 8 SPEED SENSOR POWER - NOT USED WHEN CONNECTED TO VEHICLES SPEEDO SENDER
- Pin 13 Only for CAN-BUS connection
- Pin 18 NOT USED (used if third channel for TPS required)
- Pin 19 NOT USUALLY USED
- Pin 21 NOT USED OR SPEED LIMITER OUTPUT - WHITE OR WHITE/BLACK
- Pin 26 Only for CAN-BUS connection

Notes: