

Trouble Shooting Guide

Problem:

Undertake the following test

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 servo plug, fuse, speed sensor or speedometer connection, brake light switch, ground (usually battery negative), tach sensing (ignition coil or tachometer) and/or the clutch switch.

1 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)

2 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)
 Clutch switch test
 Clutch sensor polarity (see diagnostic mode)
 Computer power test.
 Brake wire test
 Control switch test
 Vacuum test
 Throttle servo tests
 Throttle servo cable test
 CIU test
 Magnets missing/speed sensor signal
 Loom continuity and voltage/resistance tests
 Incorrect calibration or computer not calibrated

3 Cruise control erratic, surges or looses/gains speed.

*Note: - We have seen several instances where the throttle spindles on carburettors or throttle bodies have become 'sticky' with age. Spraying all linkages and spindles with silicone or teflon spray can be beneficial. Clean and lubricate the twist grip/handlebar with engine oil. This is THE most common cause of cruise control performance issues.

4 Cruise lags or overshoots when engaged

Note: - Speed Pulse Calibration, Initial throttle Pull Calibration and Sensitivity adjustment procedures are shown in Section 9 of the Information, Setup and Operation Manual.

Lubricate all throttle and cruise control cables*

Adjust cruise control sensitivity
 Check carburettor cable free play
 Speed sensor test if sensor installed
 Throttle servo tests
 Throttle servo cable test
 CIU test if CIU installed

Check carburettor cable free play
 Perform Speed Signal Pulse Rate calibration
 Perform Initial Throttle Pull calibration
 Adjust cruise control sensitivity
 Throttle servo tests
 Throttle servo cable test
 CIU test if CIU installed

5 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
 Clutch switch faulty
 Throttle servo tests

6 Cruise accelerates too slow

Throttle servo tests
 Incorrect calibration/re-calibrate computer

7 Cruise will not disengage with brake

- Brake light switch faulty
- Brake wire test
- Throttle servo tests
- Throttle servo cable test

8 Engine will not return to idle

- Check carburettor cable free play
- CIU test if CIU installed
- Throttle servo cable test
- Broken throttle spring or sticking carburettors

9 Cruise will not operate at higher speeds (above 80 kph / 50 mph)

Check diagnostic stop codes (see next page)

- Speed sensor test / gap too small
- Too many magnets installed
- Incorrect calibration/perform speed calibration

10 Cruise will not operate at lower speeds (below 60 kph / 35 mph)

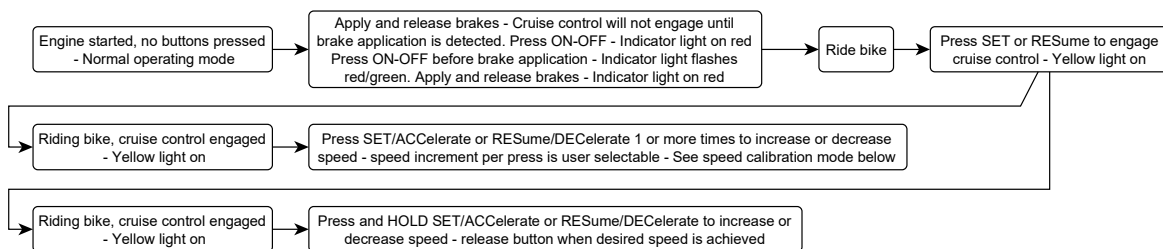
Check diagnostic stop codes (see next page)

- Speed sensor test / gap too large
- Magnet/s missing
- Incorrect calibration/perform speed calibration

MOTORCYCLE CRUISE CONTROL MENUS

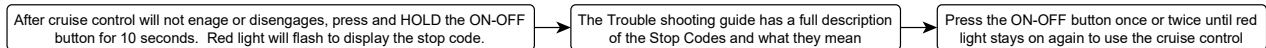
This section shows all the menus and sub-menus used for normal operation, diagnostics, setup and calibration and adjustment procedures available on the motorcycle cruise control

Normal cruise control operation

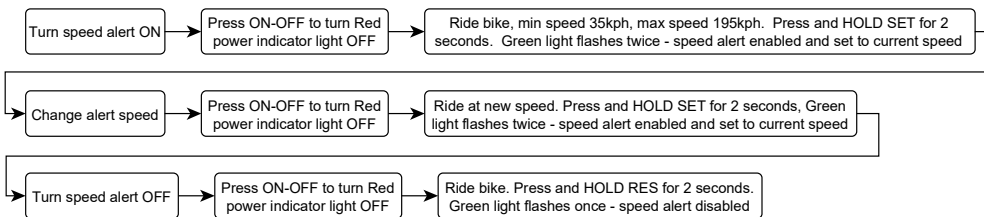


Access stop codes

This is used to diagnose why the cruise control disengages or will not engage

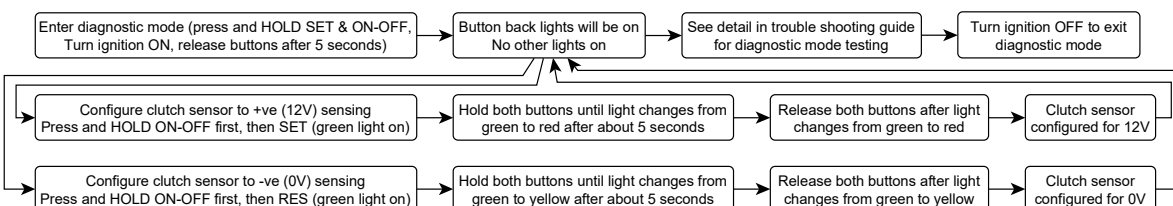


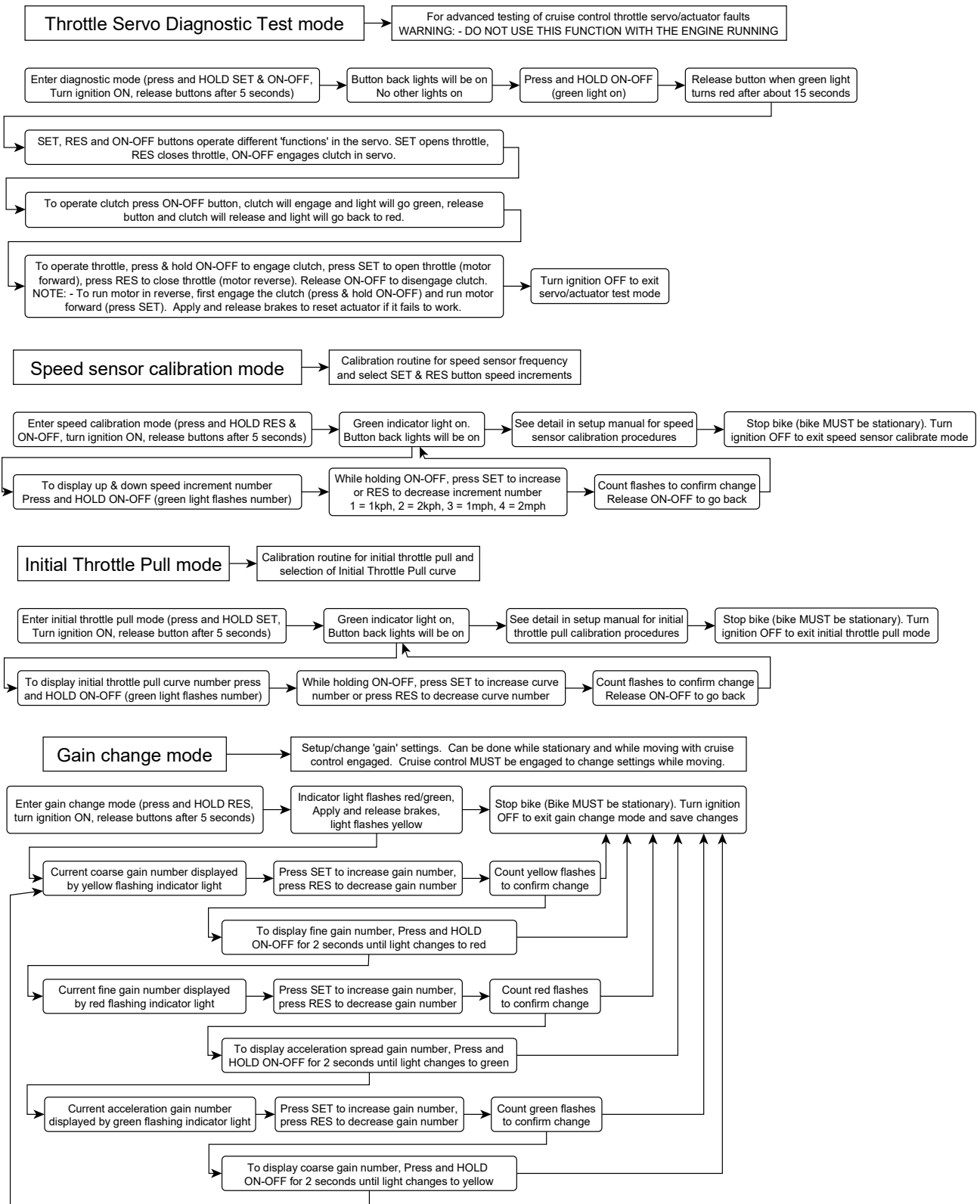
Speed Alert operation



Diagnostic mode

Test electrical and mechanical operation of cruise control Setup clutch sensor configuration. Advanced throttle servo/actuator testing





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 cruise control throttle servo, check voltages to and at the servo, test servo operation, check servo cable and CIU operation.

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. 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

ON-OFF switch signal detected

No speed signal

Below minimum engage speed (about 35kph)

Above maximum engage speed (about 180kph)

Over speed or under speed (130% or 70% of SET speed)

Brake signal detected\$

Clutch signal detected Hi-Lo input

Clutch signal detected Voltage level input

Exceed maximum allowable acceleration

Overrev sense (tacho sensing)

Power reset (**NOTE: - Stop code 11 will be displayed EVERY time the ignition is turned on**)

Not yet calibrated/lost calibration

Brake signal detected OR no brake power detected\$

Brakes not detected on power up (if cruise turned on, indicator light on switch will flash red/green until brakes are detected)

Lost tach signal

Code

Possible cause

1	ON-OFF switch accidentally pressed/faulty
2	Speed signal/sensor/wiring faulty
3	Speed pulse rate too slow/faulty#
4	Speed pulse rate too high/faulty#
5	Speed signal/sensor/wiring faulty
6	Brake light/wiring fault/sticking brake switch
7	Clutch/neutral/sidestand switch/wiring fault
8	Clutch/neutral/sidestand switch/wiring fault
9	Too much speed pulse variation^
10	Changed gear or clutch slip, ignition system wiring/connection fault.
11	Fault in power wiring to cruise control <u>or</u> ignition turned off and back on.
12	Calibration routine must be performed%*
13	Brake light/wiring fault/sticking brake switch OR bad brake power connection or blown brake fuse
14	Brakes not applied (cruise will not engage until brake application has been detected)
15	Tach sensor wiring fault

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 current leak	21	Internal circuit fault in cruise computer
Servo 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

#Note: - Speed pulse rate errors could also be caused by the computer calibration being incorrect for the vehicle. See Chapter 9 of the Information, Set up & Operation Manual to re-calibrate the speed signal pulse rate.

\$Note: - Brake application can produce stop code 6 OR stop code 15 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 15 will be generated. Stop code 15 will also be generated if power to the brake light system fails, ie. A blown brake circuit fuse.

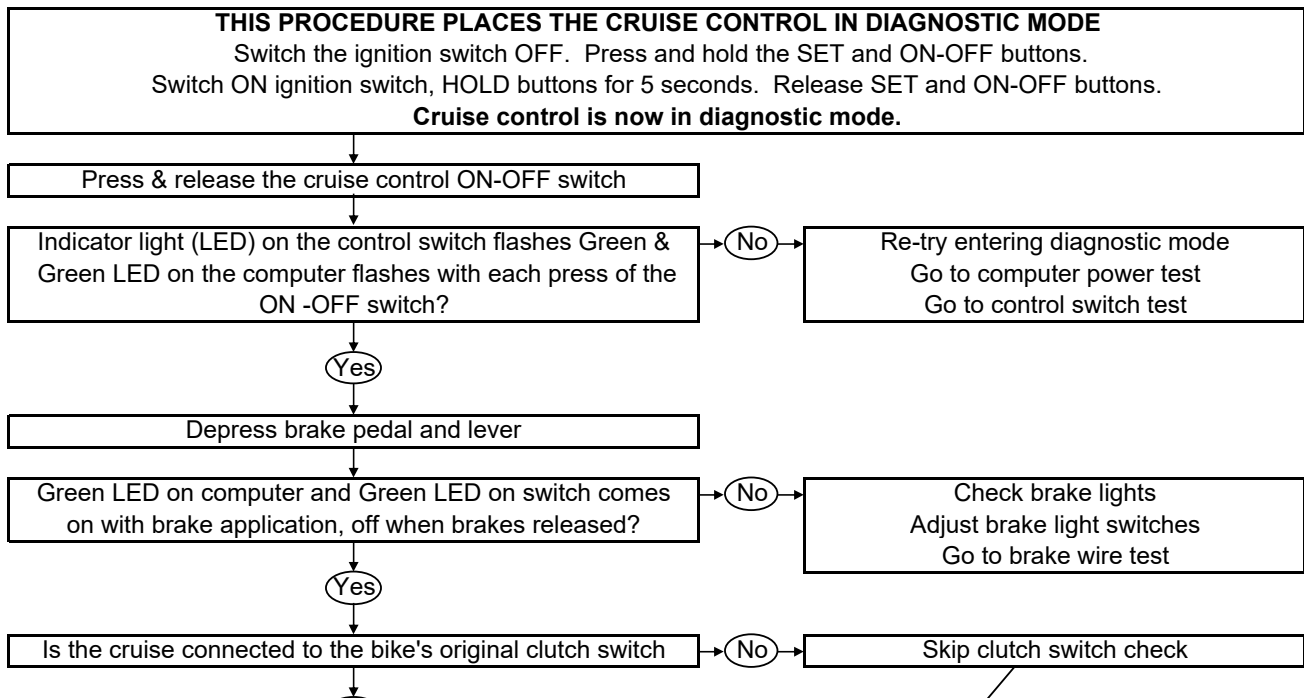
^Note: - Speed pulse acceleration errors can be caused by intermittent/dirty wiring connections, missing speed sensor magnets or one or more magnets that have been turned around (wrong pole facing the speed sensor).

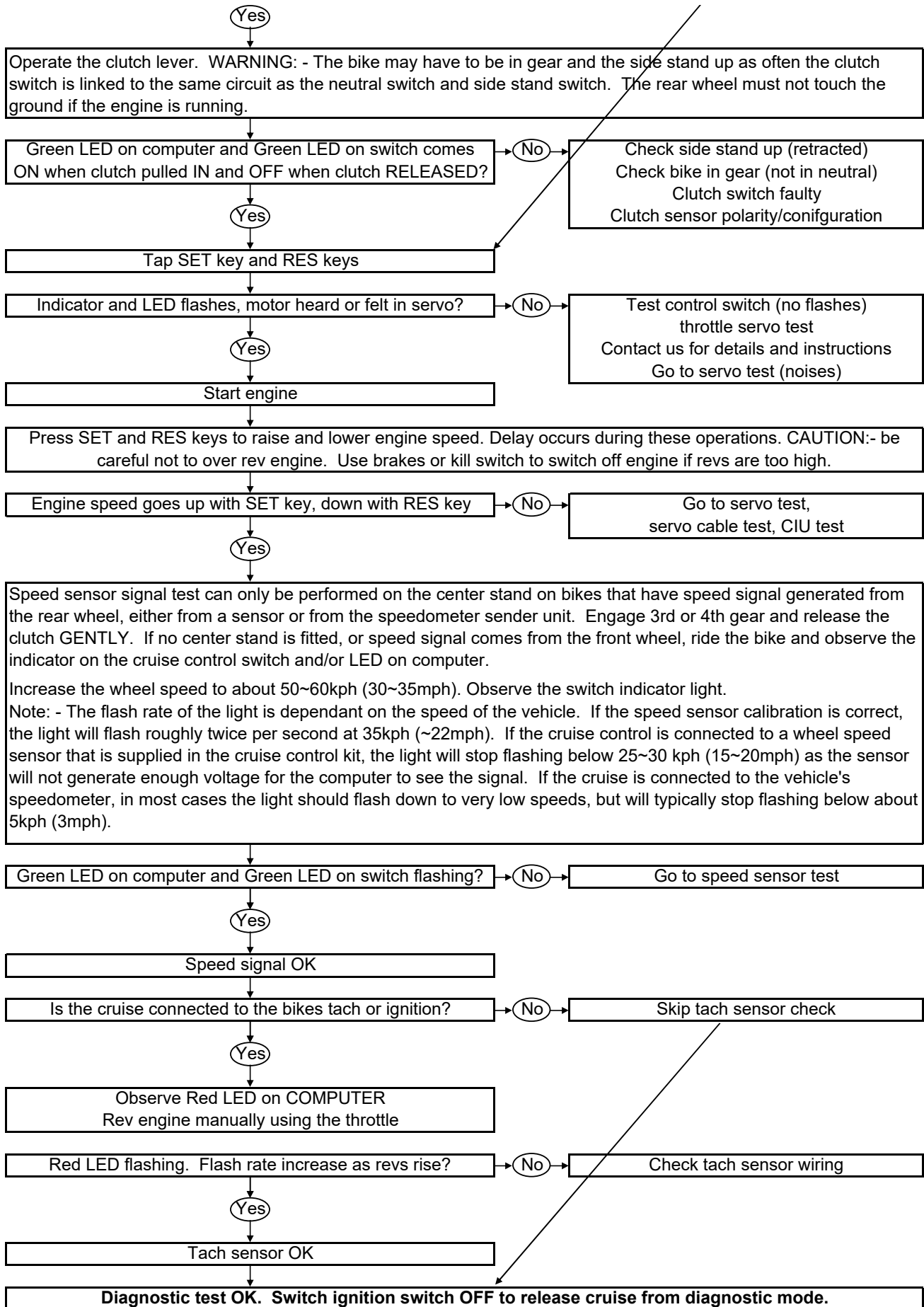
*Note: - If the computer resets or has to be re-calibrated more than once it should be returned for warranty investigation.

%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 delay time of ~1.5 seconds during which the cruise control will not engage.

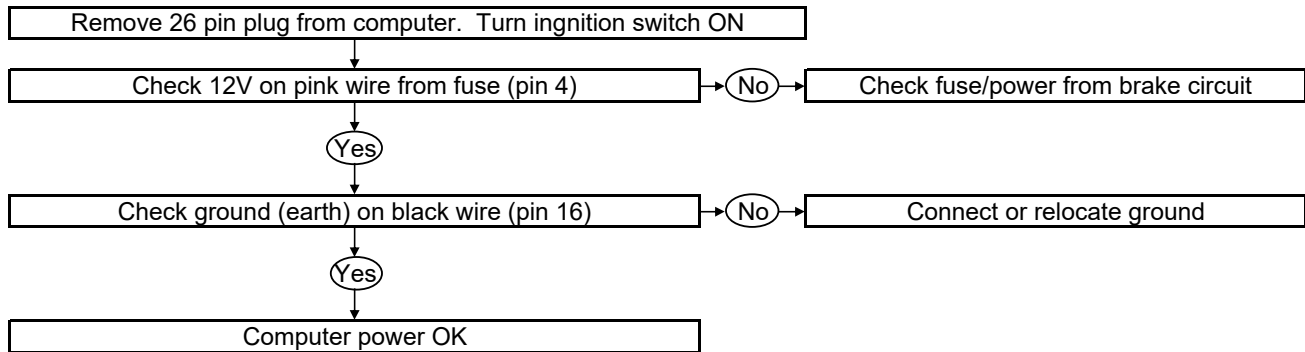
Cruise control diagnostic test





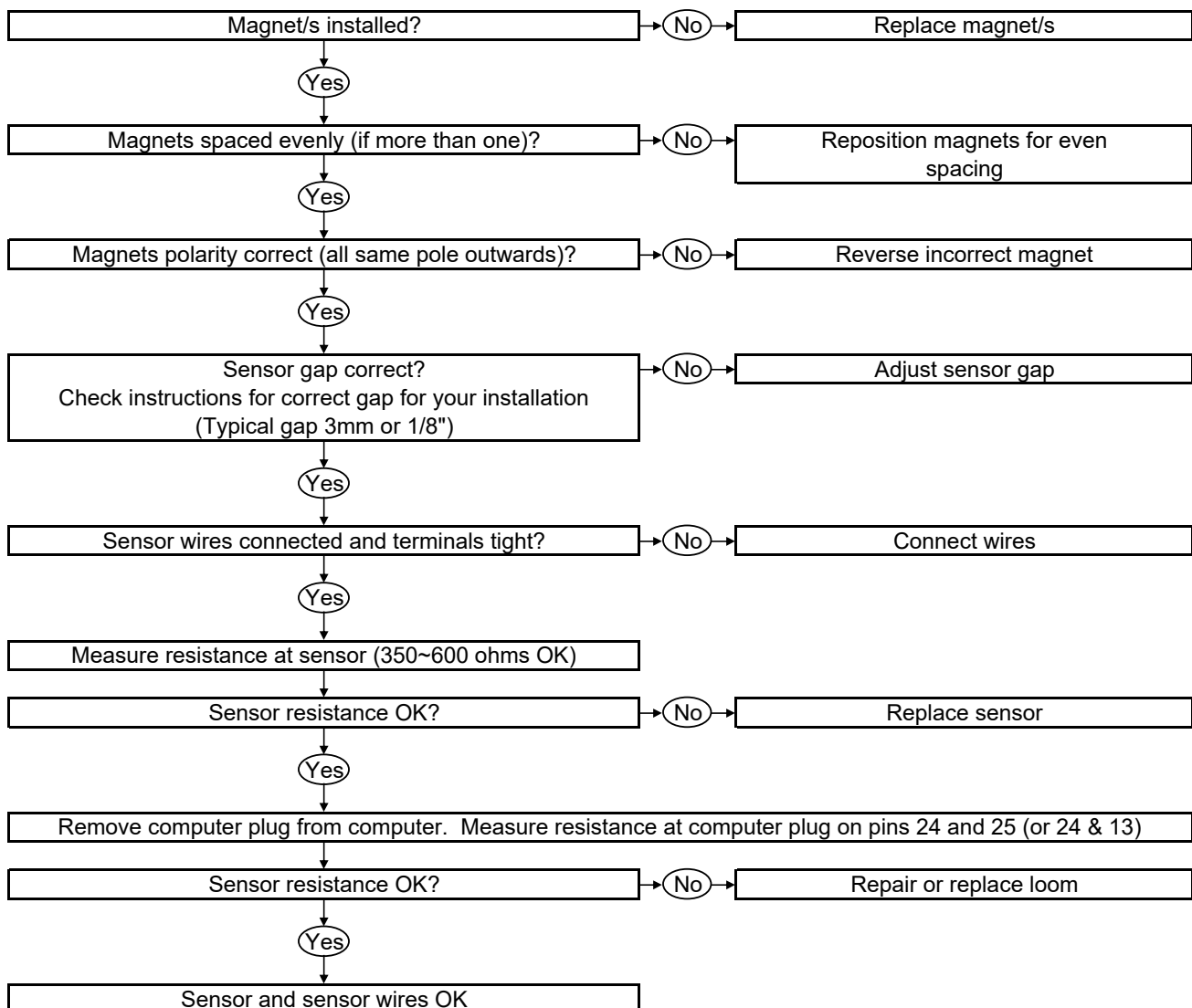
Computer power test (a multimeter set to 15 volts range will be needed for this test)

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.

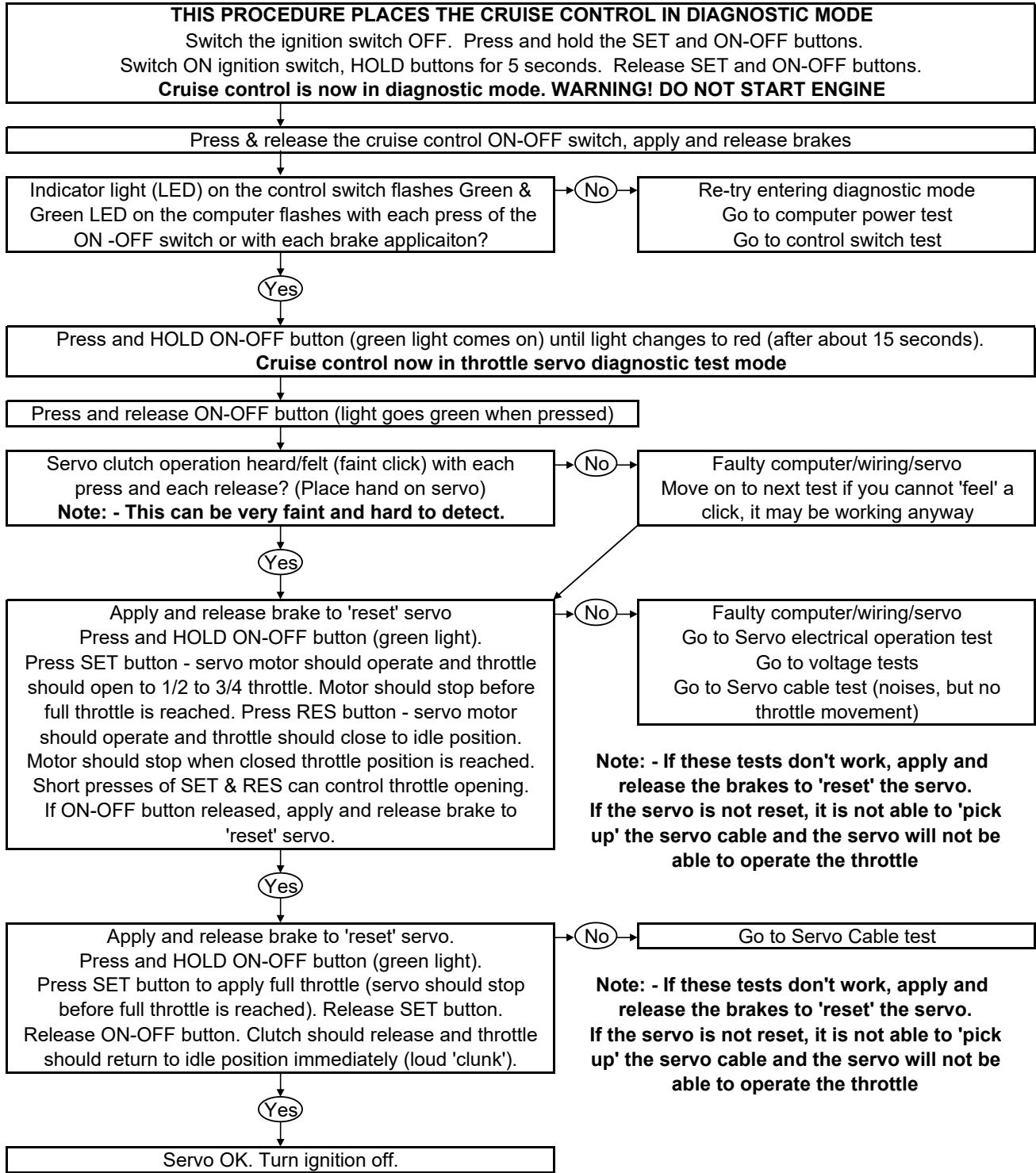


Speed sensor test (a multimeter set to 1 or 2 Kohms range will be needed for this test)

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.



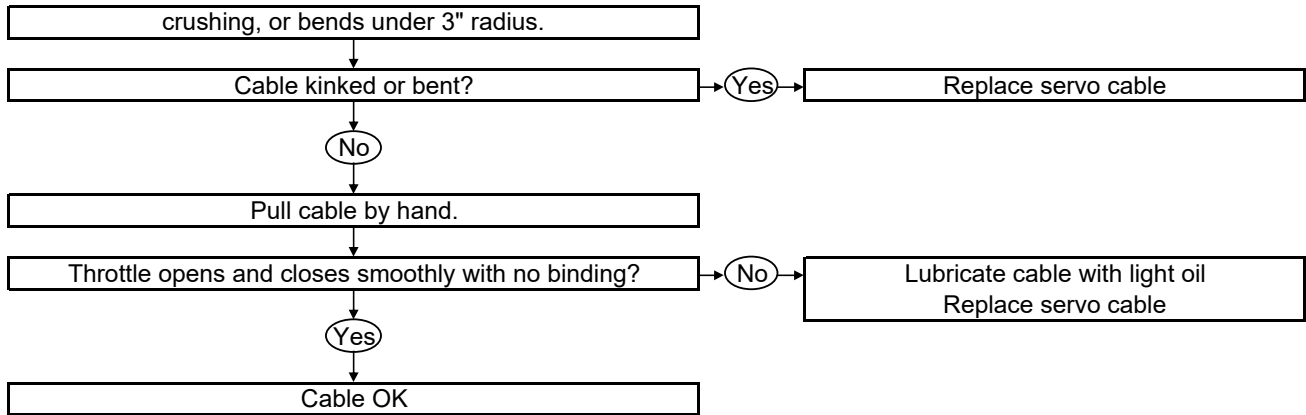
Throttle servo advanced diagnostic operation test



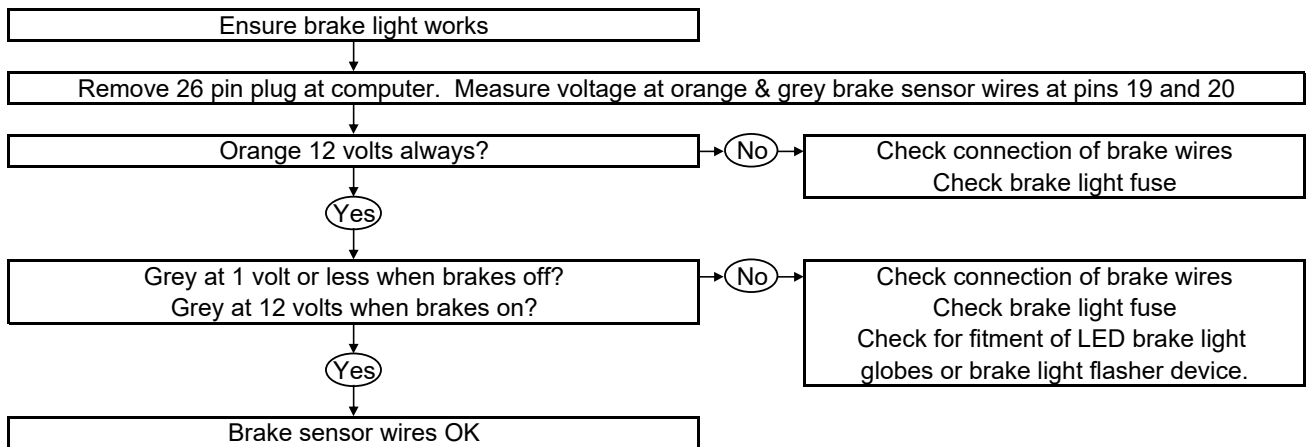
Throttle servo electrical operation test

Email us for the servo test manual at sales@mcruiase.com

Throttle Servo Cable test

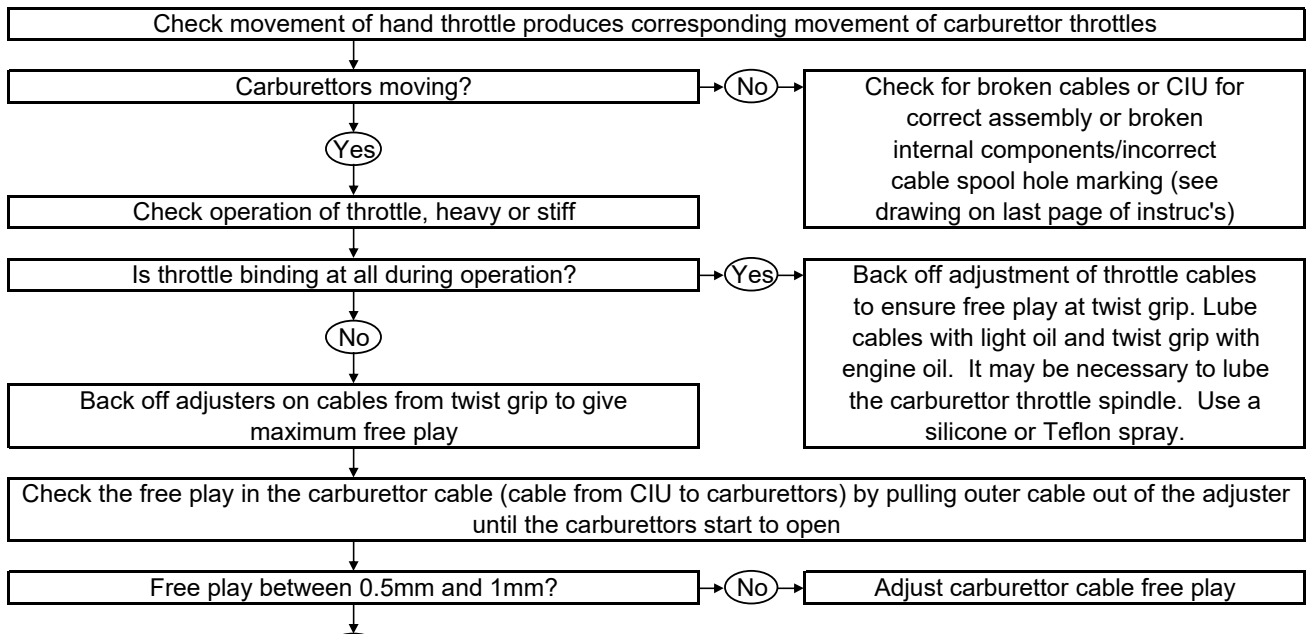


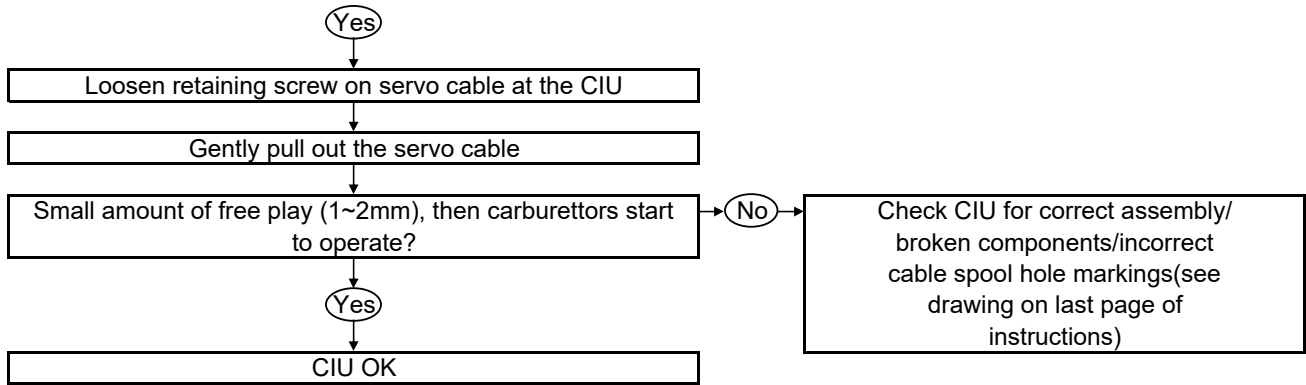
Brake wire test



CIU test

(Only models that don't have the throttle servo cable connected directly to the carburettor or throttle body spindle)



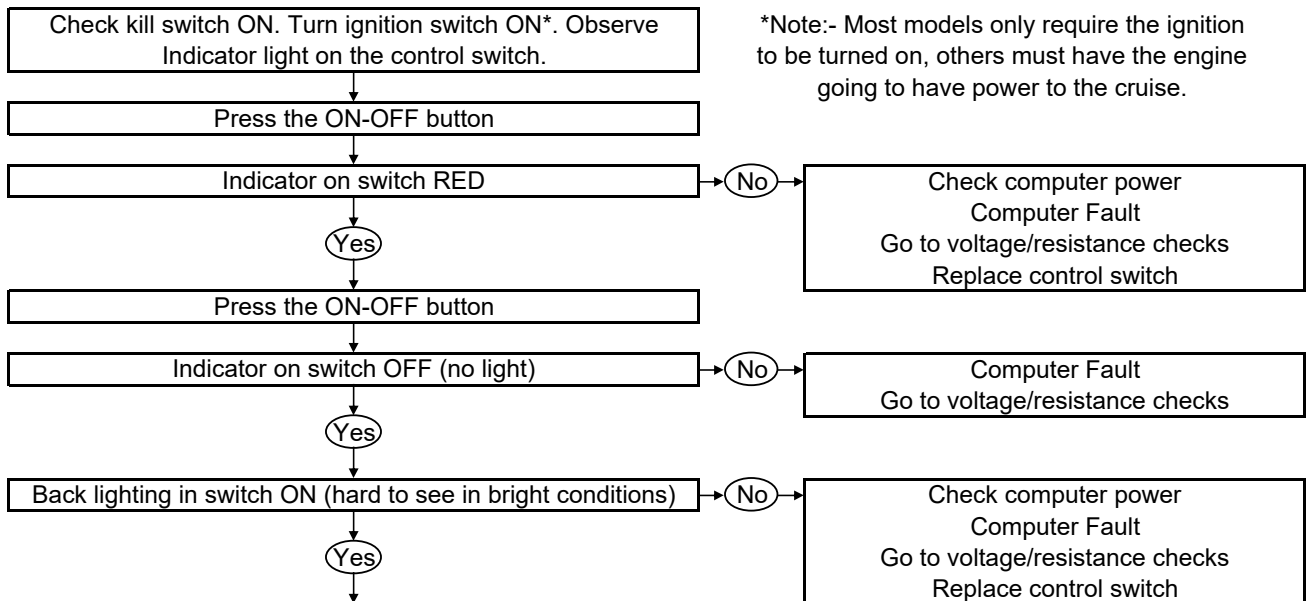


Computer calibration

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

Control switch test#

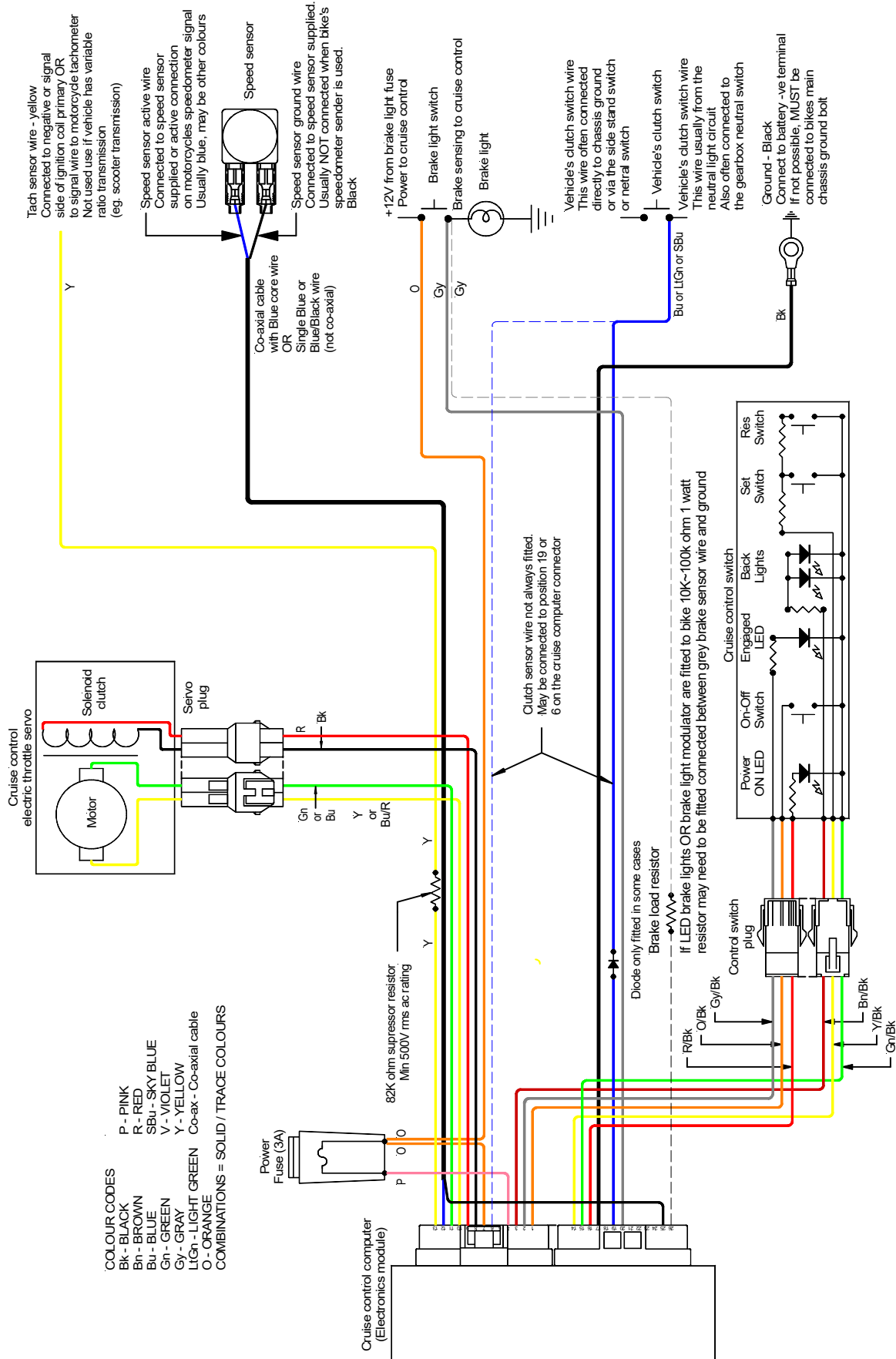
Note: - refer to switch voltage and resistance values at end of guide for detailed check of switch



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

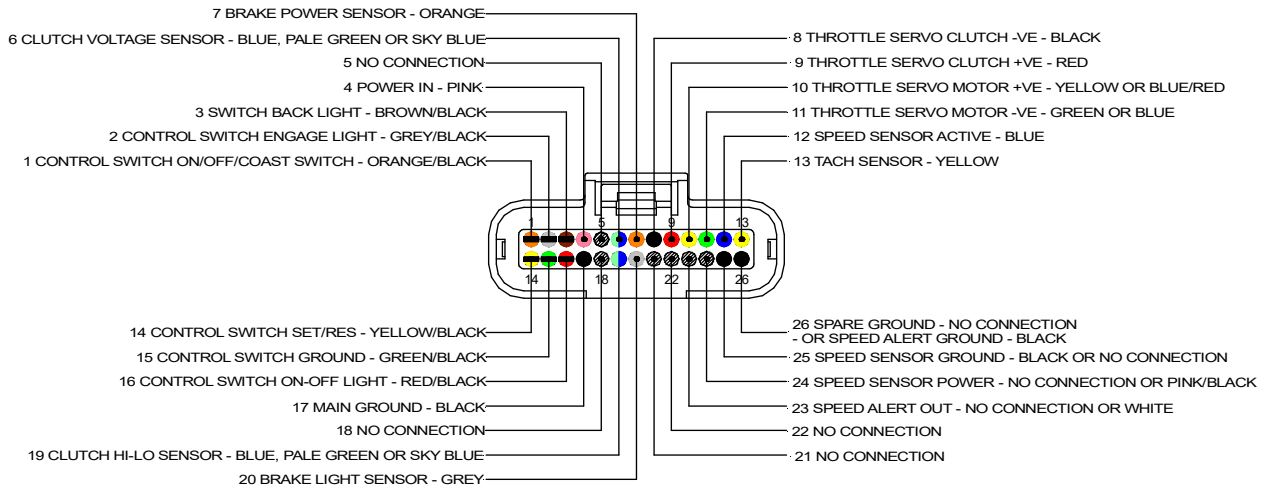
Refer to diagnostic mode checks on the third page of this guide and to voltage and resistance values at the end of this guide for detailed control switch checks.

Wiring diagram



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.



NOTE: - In some cases, position 6 may be used for clutch sensing instead of position 19

Resistance checks

Resistance values at loom 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 1 (power switch, orange) & Pin 5 (switch ground, green) $\infty \Omega$ (ohms) when cruise ON-OFF switch released
 " 0Ω (ohms) when cruise ON-OFF switch pressed

SET & RES buttons

Pin 14 (switch signal, yellow) & Pin 5 (switch ground, green) $\infty \Omega$ (ohms) when no buttons pressed
 " 820Ω (ohms) on SET
 " $1.5 K\Omega$ (K ohms) on RES

Resistance values at loom 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 17 (ground, black) & battery negative 0Ω (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 12 (sensor active, blue) & pin 25 (sensor shield, black) $350\sim600 \Omega$ (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 2 (engage light signal, grey/black) Indicator light OFF	0V with no buttons pressed
Pin 2 (engage light signal, grey/black) Indicator light Green	~2V with brakes applied or SET or RES pressed

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 1 (power switch signal, orange/black)	~5V with ON-OFF released
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"	0V with ON-OFF pressed
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Pin 3 (back light, brown/black)	~12V
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Pin 14 (SET & RES switch signal, yellow/black)	4~5V
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"	~2.0V with SET pressed
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"	~2.8V with RES pressed
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Pin 15 (switch ground, green/black)	0V
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Pin 16 (ON-OFF indicator light, red/black) Indicator ON Red	~12V with ON-OFF pressed & released
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Pin 16 (ON-OFF indicator light, red/black) Indicator OFF	0V with ON-OFF pressed & released
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Clutch/Neutral sensor (only the Hi-Lo sensor, this does not apply to Voltage Level sensor)

Clutch/Neutral sensor check should be done with the motorcycle on the centre stand where possible, side stand up and with the bike in gear (NOT in neutral). Often the clutch switch, neutral switch and side stand switch are all part of the same circuit.

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

Pin 19 or 6 (clutch/neutral sensor, blue or light green)	0~0.5V clutch pulled in
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"	5~12V clutch released
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Clutch/Neutral sensor (when configured for 12V or high signal detection)

Pin 19 or 6 (clutch/neutral sensor, blue or light green)	~12V clutch pulled in
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"	~0V clutch released
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Power

Pin 4 (12V power in , pink)	~12V
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Throttle servo

Pin 8 (servo clutch ground, black)	< 0.5V after SET or RES pressed
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Pin 8 (servo clutch ground, black)	0V after brakes applied (meter may flicker once)
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Pin 9 (servo clutch power, red)	~12V after SET or RES pressed
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Pin 9 (servo clutch power, red)	0V after brakes applied
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Pin 10 (servo motor +ve, yellow or blue/red)	*0V with ~12V pulses when SET pressed
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Pin 11 (servo motor -ve, green or blue)	*0V with ~12V pulses when RES pressed
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Ground

Pin 17 (ground, black)	0V
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Speed sensor

Pin 12 (speed sensor active signal, blue)	See note below
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Pin 25 (speed sensor ground, black) OR	0V
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Pin 17 (main ground, black)	0V
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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 BMW use this type of speedo sender) or it will be a 0V to 4~8V pulse that occurs with wheel rotation.

Brake sensor

Pin 7 (power/brake sensor supply, orange)	~12V
Pin 20 (brake sensor, grey) incadescent (standard) lights	0V with brakes OFF
Pin 20 (brake sensor, grey) LED lights	0~5V with brakes OFF
Pin 20 (brake sensor, grey)	~12V with brakes applied

Unused positions

Pin 5 NOT USED
Pin 6 or 19 NOT USED
Pin 18 NOT USED
Pin 19 or 6 NOT USED
Pin 21 NOT USED
Pin 22 NOT USED
Pin 23 NOT USED OR
Pin 23 SPEED ALERT OUTPUT - GREY
Pin 25 SPEED SENSOR GROUND - OFTEN NOT USED WHEN CONNECTED TO BIKES SPEEDO SENDER
Pin 26 SPARE GROUND - SOMETIMES USED WITH LED BRAKE LIGHTS OR AS GROUND FOR SPEED ALERT

Notes: