



# **Motorcycle Electronic Cruise Control Operation & User Manual ©**

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**MOTORCYCLE CRUISE CONTROLS**

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## **Some background information for everyone on throttle-by-wire systems and cruise controls.**

Frank and I at MCCruise are unapologetically conservative in our approach to this technology. The reasons are simple – even a cursory search for 'sudden unintended acceleration' on Google produces some startling results.

We cannot afford such events occurring on motorcycles – people will die – it is as simple as that. Consequently, we have made modifications and conducted exhaustive tests to ensure our kits will not cause dangerous situations. That said, with throttle-by-wire, we are totally in the hands of the motorcycle manufacturers' over-riding safety and limp-home systems kicking in appropriately. It is an area we have thought long and hard about before entering this market at all.

The other significant issue is what happens when a 'limp-home' event occurs on these vehicles. The most common response to ANY error in the signals from the twist grip/cruise control to the bike's engine management system is that the engine stops responding to throttle completely, and the engine drops to idle and sometimes stops altogether. This means that in the event of any error in signals from the twist grip and cruise control to the bike's engine management, the bike will no longer respond to throttle AT ALL, it behaves as if a throttle cable has broken. To restore control to the twist grip, the ignition switch must be turned off and back on again.

We think riders deserve to know the facts: corrosion, water ingress and electrical noise are serious potential threats on motorcycles and we do not take them lightly.

We still have some reservations generally about throttle-by-wire systems on cars and bikes, we have not heard of any safety issues with bike systems, but a search on Google will find a lot of issues with cars, and bikes use the same type of throttle-by-wire control methods that cars use.

The design of these throttle-by-wire systems means that we physically cannot build in some of the basic safety overrides we built into our previous model cruise controls (for mechanical throttle systems), so more than ever we are reliant on the integrity of the motorcycle manufacturers' throttle control systems and safety overrides and very careful installation on the part of the installer.

Researching all this, designing and testing takes time and costs money. The cost of our product reflects that. We have put a lot of time and effort into making this product as safe as we can, and as easy to install as possible.

From you, the users, point of view, if for some reason an issue does occur, pulling the clutch will prevent the bike accelerating if too much throttle is applied, and if the engine stops producing power, pulling the clutch will allow you to roll to a stop without the engine slowing the vehicle dramatically. The engine may sit on the rev limiter, but engine management systems prevent the engine over revving on all modern motorcycles. You can then use the 'kill', or engine stop switch. With the combination of clutch and kill switch YOU retain control of the motorcycle.

## OPERATING INSTRUCTIONS

Refer to Section 5, Overview of Cruise Control Information, Set up & Operation Manual for details of how the cruise control works.

**NOTE: - THE CRUISE CONTROL COMPUTER TAKES A FEW SECONDS (LESS THAN 3 SECONDS) TO 'BOOT UP'. AVOID PRESSING ANY BUTTONS FOR THE FIRST FEW SECONDS AFTER TURNING THE IGNITION SWITCH ON OR STARTING THE BIKE.**

**NOTE: - After starting the bike, apply the brakes at least once. The cruise control will not engage until it detects the brakes have been applied and released.**

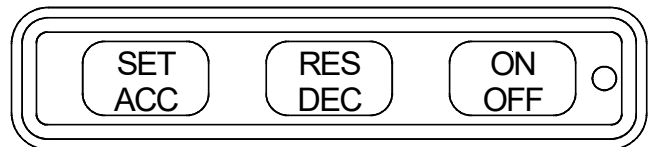
**NOTE: - Cruise control performs a brake test every time the ignition is turned on (power up). If the cruise control is turned ON (ON-OFF button pressed) BEFORE the brakes are applied AND released, the indicator light on the switch will flash red/green alternating and the cruise control will not engage. Apply and release the brakes and the light will change to red and allow normal operation. On some late model bikes that have CAN-BUS communications that the cruise control is connected to, only one brake will perform this function, usually the front brake. Both brakes will disengage the cruise control, but only one will 'enable' the cruise control.**

Although your cruise control has many operating features, it has been designed to be very easy to operate. Its operating range is from about 30kph (18mph) to about 180kph (110 mph).

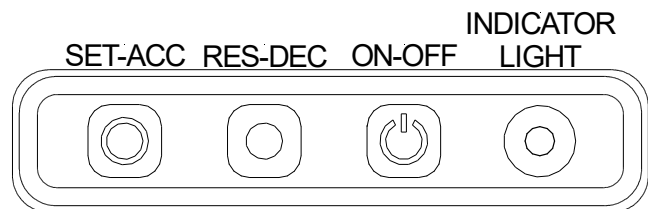
The cruise control operates by monitoring the road speed of the bike and uses a computer to maintain any 'set' speed within its operating range. The computer is instantly de-activated by either front brake lever or rear brake pedal pressure sufficient to operate the brake light switch.

MotorCycle Cruise Controls has three different control switches that can be supplied with the cruise control.

The earlier design has three large buttons and a small indicator light on the end of the switch next to the ON-OFF button. The buttons have text written on them for the functions. This switch was phased out in late 2020.



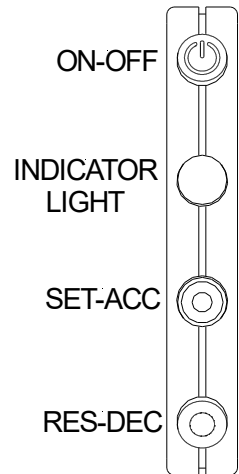
It has been replaced by this switch. The overall size of the switch is the same, it has the same mounting brackets and the same mounting holes. The text has been replaced by pictographs on the buttons. It is a direct replacement for the previous control switch shown above.



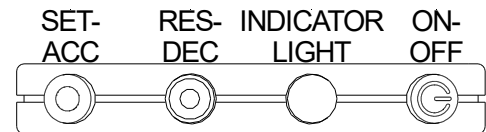
We also have another switch. This design has smaller buttons with no text, only pictographs on the buttons.

The ON-OFF button has a ‘standard’ power switch pictograph on it.

When it is mounted vertically on the handlebar, as shown here the orientation of the SET and RES buttons is as shown.



In some cases, this switch is also mounted below the bike’s switch gear, and is mounted horizontally, the position of the SET and RES button are swapped.



The main functions performed by each switch are as follows:

#### ON/OFF BUTTON (also COAST button)

- The ON-OFF button ‘enables’ the SET/ACC (Set/Accelerate) and RES/DEC (Resume/Decelerate) buttons when turned ON (indicator light on RED). Pressing the OFF-ON switch OFF disables the cruise control (indicator light off). Normally the cruise control is turned off when the ignition is turned on, and the ON-OFF button must be pressed to turn the cruise control on. This can be changed so the cruise control starts up in the same state as when the ignition was turned off. **Contact us for the procedure to do this.**
- The ON-OFF button also has a ‘Coast’ function. If the cruise control is engaged, pressing the ON-OFF button once will disengage the cruise control without turning the cruise control off.
- The cruise control has an Over Speed Alert function. If a suitable light or beeper has been fitted and connected, pushing the ON-OFF button so the cruise power light is OFF (no red light) enables the SET and RES button to operate the speed alert.

#### SET/ACC BUTTON

The SET/ACC button has four main functions:

- When the bike is in motion within the cruise control’s operating range, momentarily pressing the SET button engages the cruise control to maintain the speed at the time the SET button was pressed;
- While the cruise control is controlling the bike’s speed, firmly tapping the SET button increases the set speed by the selected speed increment for each tap. This increment can be customised to 1kph, 2kph, 1mph or 2 mph;
- While the cruise control is controlling the bike’s speed, pressing and holding the SET button results in the bike smoothly accelerating until the SET button is released (or until the bike achieves the cruise control’s maximum operating speed).
- If the cruise control is turned off (no red light) pressing the SET button for 2 seconds at any speed above about 30kph will turn on the speed alert and set it to the current speed. Pressing the SET button for 2

seconds again at a different speed will change the alert speed to the new current speed.

## **RESume/DEC BUTTON**

The RES/DEC button has four main functions:

- If the cruise control has been controlling the bike's speed and has been deactivated using the brakes, depressing and releasing the RES button causes the cruise control to engage and return to its previously set speed;
- While the cruise control is controlling the bike's speed, firmly tapping the RES button decreases the set speed by the selected speed increment for each tap. This increment can be customised to 1kph, 2kph, 1mph or 2 mph;
- While the cruise control is controlling the bike's speed, pressing and holding the RES button results in the bike smoothly decelerating until the RES button is released (or until the bike achieves the cruise control's minimum operating speed).
- If the cruise control is turned off (no red light) pressing the RES button for 2 seconds at any speed (typically will need to be above 25kph or 15mph) will turn the speed alert off.

## **INDICATOR LIGHT**

The indicator light has two main functions:

- The light will illuminate RED when the cruise control is turned ON using the ON-OFF button.
- When driving the bike the cruise control indicator will illuminate YELLOW whenever the cruise control is engaged.
- If, when the ignition is turned on, the cruise control is turned on BEFORE either brake lever is operated, the indicator light will flash red/green alternating. If the brakes are then applied and released, the light will change to red, indicating the cruise control is ready for operation. If the light is flashing red/green the cruise control will not engage.

If the cruise control or bike has a fault, the indicator can help to diagnose the source of the problem.

The indicator light and the SET, RES and ON-OFF buttons and brakes are also used to set up other functions of the cruise control such as diagnostic mode and set up and calibration of the cruise control.

**NOTE: - The control switch indicator light has three colours, RED and GREEN and YELLOW. RED indicates power on. YELLOW indicates cruise control engaged. GREEN is used to confirm the cruise control functions during the diagnostic checks and other modes.**

**At some times the GREEN light on the COMPUTER is linked to the GREEN light on the CONTROL SWITCH and both will come on and go out at the same time. At other times they operate independently. The RED light on the COMPUTER is for displaying stop (diagnostic) codes and also indicates tach sensing when in diagnostic mode. It is only used to diagnose problems. See your trouble-shooting guide for more details on this function. It will flash ON and OFF at various times during cruise control operation. This is normal and can be ignored.**

**NOTE: - If the bike's speed drops below 75% of the current set speed or under the minimum speed (about 30km/h or 18mph), the cruise control deactivates by itself. This is very uncommon unless the**

SET speed is already close to the minimum speed. If it does, simply accelerate using the throttle and SET or RESume the cruise control again.

If the bike's speed increases to 150% of the current SET speed or over the maximum speed (about 180km/h or 110mph), the cruise control deactivates by itself. This can happen when accelerating manually. If it does, simply decelerate using the throttle and SET or RESume the cruise control again. If the acceleration rate is higher than the preset limit for the cruise control the cruise control will also disengage. For example, if you overtake another vehicle briskly, it is likely that the cruise control will disengage due to exceeding the acceleration limit.

### **Brake levers**

**NOTE: - After starting the bike, apply the brakes at least once. The cruise control will not engage until it detects the brakes have been applied. On some late model bikes with CAN-BUS if the cruise control is connected to the bike's CAN-BUS system, only one brake lever, usually the front brake, will 'enable' the cruise control. On bikes with 'normal' braking systems either brake lever will 'enable' the cruise control.**

Applying either front or rear brake sufficient to operate the brake light will instantly disengage the cruise control. **Check that the brake light comes on BEFORE any braking force occurs. If the light comes on AFTER braking force occurs, repair/replace/adjust the brake light switches to correct this.**

**NOTE: - In the event of a cruise control malfunction, operating the brakes will disconnect cruise control from the bike's throttle system thus deactivating the cruise control at all times while the brakes are applied.**

### **Clutch lever**

The cruise control is usually connected to the clutch lever switch and/or the bike's ignition system. Usually both will be connected.

Pulling in the clutch lever may allow the engine revs to climb. The cruise control monitors engine revs, and if the engine revs vary (climb or drop), the cruise control will disengage. This feature is intended as a safety feature only and is not intended to be used day to day to disengage the cruise control.

The clutch switch (if connected) will also disengage the cruise control. Most clutch switches operate towards the end of the lever travel, so to get quick disengage the clutch lever needs to be pulled in all the way. If the clutch is 'feathered' and the clutch slips rpm change will be detected and this will disengage the cruise control.

### **Over Speed Alert Function**

The cruise control now incorporates an Over Speed Alert function which can be connected to a beeper and/or light. This function is built into the cruise control computer. An optional connection 'kit' incorporating connecting wires and instructions to allow an LED light, normal 12V light globe or 12V beeper to be connected to the cruise control computer can be purchased either with the cruise control or after the purchase of the cruise control.

The Speed Alert can be set to any speed desired or turned off in a couple of seconds. When the vehicle speed reaches the alert speed, the light/beeper will start to operate. At first the operation is subtle with short flashes/beeps, but as speed increases up to 5kph over the alert speed, the duration of the flashes/beeps increase until the light/beeper is on almost continuously.

The speed alert output provides 12V for the light or buzzer and can provide up to 3 watts (0.25 Amp), so any light or buzzer that draws less than 0.25 Amp (250mA) at 12 Volts (3 watts) may be connected to the cruise control computer to be used as a speed alert.

### **How to operate the Over Speed Alert.**

To enable the speed alert (turn it on), while riding the bike at any speed above 35kph (~22mph) and below 195kph (~120mph), check that the cruise control is turned OFF (no red light on the switch) and press SET for 2 seconds. After 2 seconds the light on the switch will flash green twice and the speed alert is turned on and set to your current speed. To change the alert speed, simply press the SET button for two seconds again at your desired speed and the new speed will be set in the speed alert.

To disable the speed alert (turn it off), while riding the bike (the bike must be moving) check that the cruise control is turned OFF (no red light on the switch) and press RES for 2 seconds. After 2 seconds the light on the switch will flash green once and the speed alert will be turned off.

The speed alert will default to OFF if the ignition is turned off and back on again. Note, on some motorcycles, if the cruise control is connected to the bike's auxiliary power, it may take a couple of minutes for the power to turn off after the ignition is turned off. The cruise control must turn off completely before the speed alert will turn off.

## **SAFETY ISSUES & FEATURES**

### **Electrical 'Noise'.**

Noise is a broad term used to describe the electromagnetic radiation of energy. Noise is generated during rapid changes in voltage or current levels or by radio transmitters (ignition systems, alternators, mobile phones and other heavy current carrying wires). If noise gets coupled into the cruise control wiring harness it can create disturbances within the cruise control computer. The cruise control may drop out after engagement or not engage at all, but still pass all diagnostic tests.

The most likely causes of electrical noise interference on a motorcycle is faulty spark plug leads or fitment of non suppressed spark plug leads, or the electrical system could be in poor repair due to age or lack of appropriate preventative maintenance.

**WARNING: - It is ESSENTIAL that the spark plug leads are radio suppression type leads and that they are in good condition. Inspect the spark plug leads for any cracks, and replace if required. All original equipment high-tension ignition leads, in optimal condition, should be acceptable, but the cruise control MUST NOT BE USED IF AFTERMARKET, SOLID CORE HIGH TENSION LEADS ARE FITTED.**

Ideally all cruise control wiring should be kept as far as possible from all high voltage and high current wiring. This is often difficult to achieve on a motorcycle due to space limitations, so it is important to FOLLOW THE WIRING HARNESS INSTALLATION INSTRUCTIONS CAREFULLY.

Make sure that the bike's battery and charging system are in good condition and the battery electrolyte levels are correct and the battery connections are clean and tight. The battery acts as an electrical 'buffer' and absorbs electrical spike energy and stabilises voltage in the electrical system.

### **CruiseSafe throttle cut off.**

As an additional safety measure, MotorCycle Setup has developed a new component for use on motorcycle cruise controls; the CruiseSafe cut off.

The MotorCycle Setup 'CruiseSafe' *throttle cut off* cuts the connection to the vehicle's TPS (Throttle twist grip Position Sensor) whenever the brake is applied.

The 'CruiseSafe' cut off is a simple switch incorporated into the brake circuit so that when the brake switch operates, the connection to the TPS is broken.

**WARNING: - In order to stop the motorcycle in the event of cruise control electrical malfunction, simply pull on the brakes. This will disconnect the TPS almost instantaneously.**

**WARNING: - In the event of a major malfunction, the cruise control may re-apply the throttle when the brakes are released. If this occurs, remove the fuse from the cruise control wiring harness until the cause can be found and remedied.**

**WARNING: - Any erratic behaviour from the cruise control should be regarded as suspicious, if the cruise control disengages at random or it fails to engage without turning the ignition switch off and back on, the cruise control's fuse should be removed until the cause can be found and remedied.**

The 'CruiseSafe' protects you against accidental damage to the wiring harness or any sort of electrical failure or interference in the cruise control electronics causing a malfunction, because whenever the brakes are applied, the cruise control TPS connection is disconnected.

Its operation is failsafe, which means that if you lose power to the brakes, the brake light globes blow, a wire becomes disconnected or the 'CruiseSafe' fails, the cruise control TPS connection is disconnected. The ONLY electrical failure it cannot protect against is if the brake light switch/s fail. Then you must turn the cruise control and the bike OFF using the bike's engine kill switch or ignition switch to kill the engine.

MotorCycle Setup has chosen to use a mechanical switch instead of an electronic device, because electrical interference cannot hinder its operation.

### **Other safety features.**

The cruise control can be shut off by any of the following methods:

- Applying the brakes;
- Pulling in the clutch (as long as clutch and/or tach sensing are connected);
- Pressing the ON/OFF button to OFF;
- Fast acceleration, that exceeds the acceleration limit that the cruise control will allow;
- Accelerating to 150% of the SET speed or exceeding the maximum speed;
- Decelerating to 70% of the SET speed or running under the minimum speed (30kph, 20mph);
- Turning the engine kill switch OFF (this stops the engine but may NOT turn off the cruise control);
- Turning off the ignition key.

The cruise control will disengage if any of the connectors become separated, if the brake light filament breaks or the brake light system loses power - for example if a fuse blows.



There are numerous safety features designed into the cruise control computer to ensure that should one or more components fail there is still a way to turn off your cruise control.

**For safe riding NEVER operate this cruise control in heavy traffic conditions or on wet roads or other hazardous conditions.**

**WARNING: Your cruise control is designed with numerous safety features, but only the motorcycle KILL SWITCH or the IGNITION KEY can overcome a runaway condition caused by a jammed throttle grip.**

**Regular inspection of control cables (where fitted) is recommended to prevent jamming of the throttle, which could occur if cables were frayed or damaged.**

## **ADJUSTING THE CRUISE CONTROL PERFORMANCE AND COMFORT**

There are several different adjustments available to change the cruise control's operation. Some change the cruise control's performance, some are only for the rider's preference, some can affect both the performance and be tailored to suit the rider.

The following adjustments are available:

### **Initial Power ON setting**

The cruise control normally is turned off when the bike's ignition is turned on, and the rider must press the ON/OFF button to 'enable' the cruise control. This function can be changed so that the cruise control stays in the same state when the ignition was last turned off. ie: If the cruise control was turned ON when the ignition is turned off, it will still be ON when the ignition is turned on the next time. If the cruise was turned OFF, it will still be OFF when the ignition is next turned on.

### **ACC/DEC button increment.**

The speed increment of the SET and RES buttons is adjustable. When the cruise control is engaged' each press of the SET and RES button will change the set speed by a fixed amount. This amount can be tailored to suit the rider. This can be changed so a single button press can adjust the speed by 1kph, 2 kph, 1mph or 2mph

### **Coarse & Fine Gain or Sensitivity**

The Gain can be adjusted to suit the motorcycle and rider and different load conditions (solo or two up with luggage and/or with a trailer). Coarse Gain is mainly to change the cruise control's response to hills or other influences that tend to change the motorcycle's speed. Fine Gain is mainly to 'fine tune' the cruise control's response when it is in steady state operation to keep it 'locked' on to speed and 'tune out' minor speed errors or minor oscillations in speed.

### **Acceleration Spread**

This adjustment changes how quickly the cruise control 'pushes' the motorcycle to return to set speed when there is a difference between the actual speed and the set speed. This can be set to be quite gentle so if there is a speed difference, the cruise control will return back to SET speed very gently so it is barely noticeable, or it can be set to be quite aggressive and return to set speed quite rapidly. This adjustment is mainly to suit the rider's preference, but can also help with cruise control performance in some cases.

### **Tach (over-rev) sensor sensitivity.**

Normally, the tach sensor is setup to allow roughly 15% engine over or under speed before it will disengage the cruise control. Releasing or slipping the clutch will cause the cruise control to disengage if the engine rpm varies by more than 15%. This is enough to allow the rider to change gear once (eg from 6<sup>th</sup> to 5<sup>th</sup> or vice-

versa) without the cruise control disengaging. Note that clutch operation in most cases will disengage the cruise control anyway. However, some bikes with automatic or semi-auto transmission systems change gear themselves, in those cases, a larger tolerance would be used. Also, if the rider wants the tach sensor to be more 'responsive' a smaller tolerance would be used. The tach sensor can be set up to different sensitivity levels from 10% to 50% in several steps. Note that this percentage quoted is nominal at 100kph (62mph). The percentage is higher at lower speeds, and lower at higher speeds.

**Refer to section 9 'CALIBRATION, ADJUSTMENTS & ROAD TEST' of the Cruise Control Information, Set up & Operation Manual for full details of setting up and adjusting the cruise control.**

## **FINAL COMMENTS AND RIDING TIPS.**

**CAUTION: - The cruise control computer is basically water proof, but it is advisable to avoid direct water spray onto the computer. The switch assembly and other components are quite water resistant – but are not WATERPROOF. When washing the bike, avoid spraying or pouring water directly onto any component.**

The staff at MotorCycle Setup hope you enjoy using your new cruise control and use it wisely and safely. Remember that cruise controls are not a license to concentrate less while riding. We recommend you approach all other road users with greater care when using the cruise control and use substantially larger safety margins when riding in traffic. Its use in built-up areas is not recommended.

You will probably find using the cruise control a bit disconcerting at first as some bikes exhibit slight 'hunting' (acceleration and deceleration) of the bike when going downhill. It is often not possible to eliminate the latter effect entirely as the computer continuously attempts to balance its set speed with the road speed.

The cruise control engages most smoothly when the engine is under load. We recommend SETTING or RESUMING cruise operation while holding a constant speed and throttle position. Maintain speed using the throttle for a fraction of a second after pressing the SET key to allow time for the cruise control to take up the throttle and until you feel the cruise take over after pressing RESume.

Practice turning the cruise control off quickly so that you will be ready for any emergency. Experience suggests touching the footbrake is the best and quickest way to turn the cruise control off. If by chance you are not holding the right handlebar when you need to make an emergency stop, the first reaction is to grab the front brake and clutch. In doing so, you may inadvertently push the throttle open. If this happened the engine revs would rapidly rise because the clutch was disengaged. You may think the cruise control is malfunctioning. Release your grip on the throttle and the bike should return to idle. The best way to avoid this occurrence is to practice rolling the throttle off whenever you use the front brake.

## **TROUBLE SHOOTING**

A potential source of problems is electrical interference. Your kit has been developed based on testing to avoid this type of problem by installing the loom and computer in unaffected areas. However, as the speed rises the electrical fields generated by the bike increase. Also, older bikes tend to produce larger electrical fields from old spark plug leads or coils. If you experience this type of problem, check that you have followed the installation instructions precisely. Correct any obvious mistakes. If the problem persists call MotorCycle Cruise Controls for advice. As a last resort, we will refer you to a local installer if you are prepared to pay for him to check the installation and follow his recommendations. If our dealer/installer network is unable to make the unit work properly, you will receive a full refund of the cost of the cruise control (NOT including freight) on return of the kit. If the cruise control was purchased through a dealer (or other third party) it must be returned via that third party.

There is a separate trouble-shooting guide supplied with the kit. See the enclosed trouble-shooting guide for detailed instructions. The trouble-shooting guide has several parts.

The first section has a listing of potential problems and suggested tests to find the cause and remedy them.

The second section shows the cruise control menus with all the various functions.

The third section explains how to use and interpret the diagnostic stop codes. This is useful to see what LAST caused the cruise control to disengage if you are having intermittent disengagement problems, OR what is stopping the cruise control from engaging when SET or RES is pressed. NOTE: - Most of the stop codes are NOT fault codes, they just tell you what last disengaged the cruise control or what is preventing it from engaging, but they can point to the cause of the cruise control not working as it should.

The fourth part has a comprehensive range of diagnostic trouble shooting tests.

The last section gives comprehensive technical details such as wiring diagrams, connector pin outs, expected resistance and voltage readings.

The most common cause of problems is intermittent/dirty electrical connections and failed brake light globes. Check the connections for continuity at all connection points. Perform a diagnostic mode check (see the trouble shooting guide or section 8 in the installation manual) and check the stop codes, as this will provide an indication of what components are not working correctly. Refer to the installation manual for details on the installation.

## **SPARE PARTS**

Refer to the parts list at the front of the installation manual for a full list of the parts supplied in the cruise kit.

