



MADMAN MARINE PTY LTD ®

AP-WRC4

Autopilot Wireless Remote Control

INSTALLATION & USER MANUAL

Rev 1

July 2022

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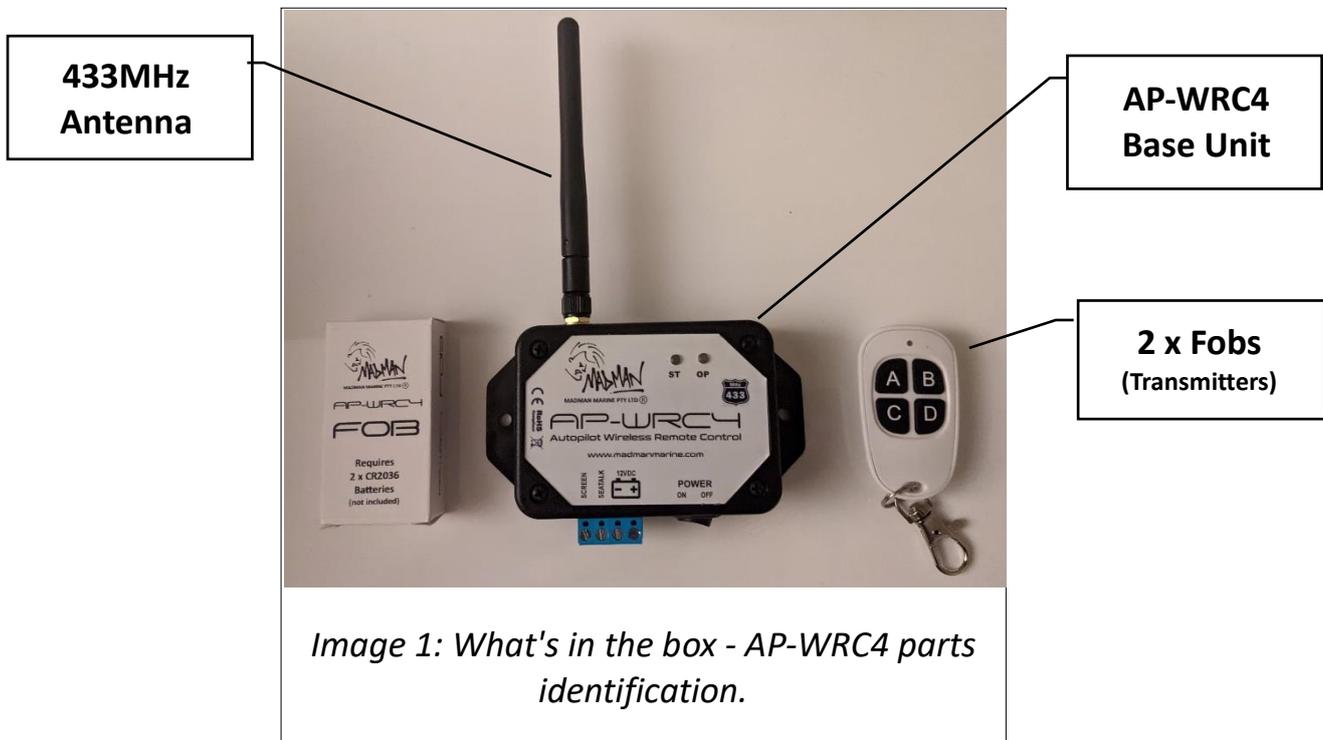
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1 Introduction

1.1 System Overview



Your Madman Marine remote control provides wireless control of Raymarine autopilots with SeaTalk, or SeaTalkng for Evolution autopilots via a Raymarine SeaTalk to SeaTalkng converter.

It has been designed for owner installation and is ready for use after making 3 electrical connections between it and the existing autopilot. The AP-WRC4 additionally requires batteries to be installed in the fobs.

The remote control is ideal for single-handed or short-handed crews to be able to steer from the front of the boat (for example when changing sails or setting/retrieving a spinnaker) or even from inside the cabin. Specifications

The system consists of a base unit which houses a microcontroller and electronics for communicating with the autopilot, a 433MHz antenna, and two (2) remote control fobs (transmitters). Additional fobs are available for purchase also.



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1.2 Specifications

Electrical Supply Voltage	6.5 to 15Vdc
Operating Current	< 80mA
Internal Fuse Type	Automatically resetting
IP Rating	<i>Base unit:</i> 20 <i>Fob:</i> 67
Operational Range	50m (line of sight)
Operating Frequency	433Mhz
Fob Battery	2 x CR2016 lithium in each fob (user replaceable)

Note: Specifications may change without notice.

2 Important Information



2.1 SAFETY WARNING – PLEASE READ CAREFULLY

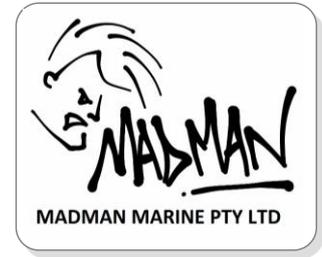
The AP-WRC4 remote control is an electronic device which, as with all electronic devices, could unexpectedly malfunction or not work as intended.

If any problems arise during use, turn the power supply to the AP-WRC4 off and determine whether the problem persists with the AP-WRC4 turned off. Do not use the remote control while underway if any problems are evident or if you suspect the remote control is causing problems.

Perform all testing of the remote control while the vessel is stationary to avoid unplanned or uncontrolled course changes.

The batteries of the fob could become too discharged to operate properly at any time. Also, with crew moving about the boat and items being stowed in different locations the operating range of the remote can be affected differently from one moment to the next.

Therefore, do not use the AP-WRC4 in situations where there is insufficient room for the vessel to alter course without risk of collision or grounding, such as in a narrow channel or when in close proximity to other vessels.



2.2 *Disclaimer*

Use the AP-WRC4 entirely at your own risk. Madman Marine Pty Ltd will not be held liable for any consequential loss, damage or injury in any way connected with the use of the AP-WRC4 remote control. Madman Marine Pty Ltd's liability under any circumstances shall not be greater than the purchase price of the AP-WRC4 remote control.

3 Installation

3.1 *Base Unit Installation*

3.1.1 Overview

The AP-WRC4 base unit must be mounted to a flat surface inside the boat's cabin where it will be protected from water, dust and mechanical damage.

The base unit does not need to be in direct line of sight of the fobs so can be hidden out of view if desired, however the fewer obstructions between the base unit and the fob, the better the performance. Ideally, only the deck will be between the base unit and the most distant location from which the fob will be used (usually the bow). If more than one bulkhead (or other obstruction) in addition to the deck is in the path between the most distant location from which the fob will be used and the base unit, then operation may be unreliable.

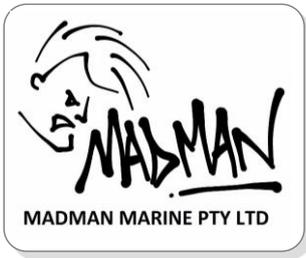
Refer to Image 2 for preferred mounting orientation details. The image shows the AP-WRC4 mounted on a flat vertical surface which runs fore and aft. The back of the enclosure faces outboard while the bottom faces the cabin sole.

3.1.2 Antenna Attachment

Screw the antenna to the gold-coloured connector at the top of the base unit. Once the base unit has been mounted, the antenna can be adjusted by rotating or bending to almost any desired position.

Ideally the antenna will be positioned in a vertical alignment for best performance.

Avoid positioning the antenna in a horizontal alignment otherwise performance may suffer.



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3.1.3 Mounting Location

The following should be considered when selecting a suitable mounting location:

- Ability to view the LED indicators,
- Obstructions between base unit and furthest point of use,
- Protection from water (including condensation), dust and mechanical damage,
- Proximity to equipment or cabling which could cause interference to, or be interfered by, the AP-WRC4.

There are two flanges on the base unit enclosure which have holes provided for mounting to any flat surface with screws (2 required).

The preferred mounting orientation is shown in the image below:

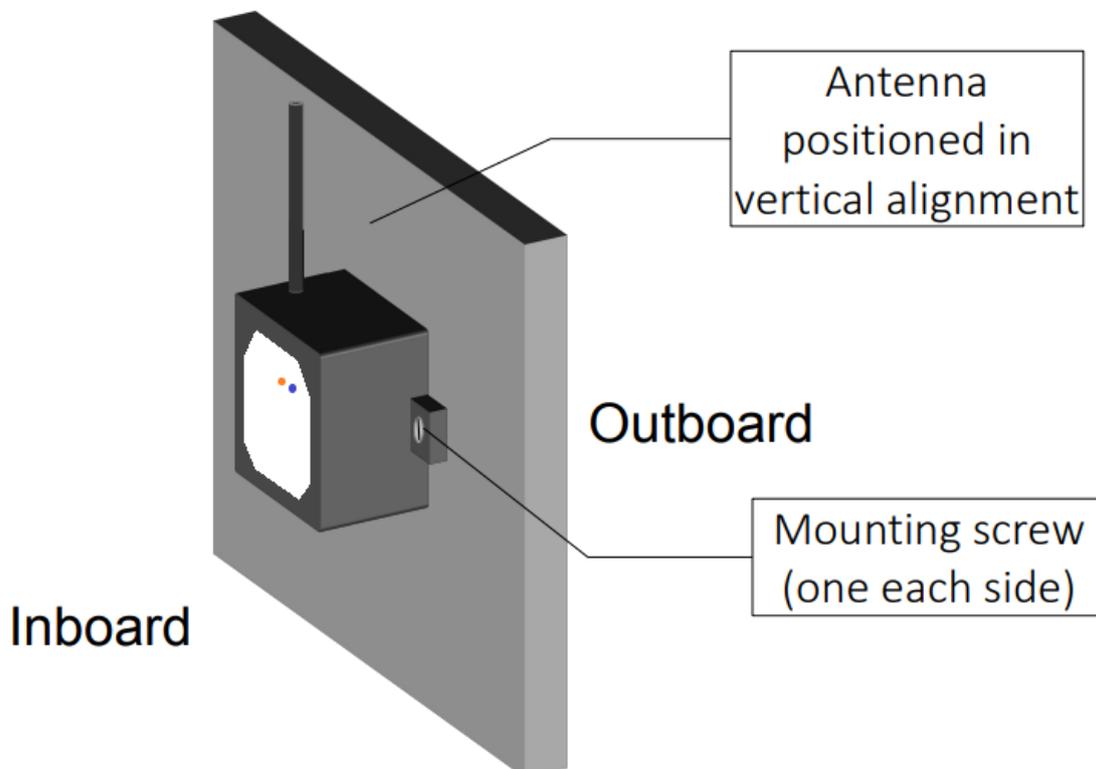
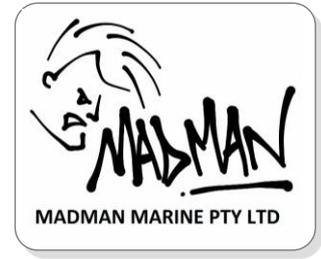


Image 2: Preferred mounting orientation.

As a temporary measure, the AP-WRC4 base unit could be mounted with self-adhesive Velcro until the mounting location has been tested as suitable.



3.2 Electrical Installation

3.2.1 Cable Route Considerations

Although the recommended cable should have an overall screen (shield) to reduce the effects of interference from electromagnetic noise (EMI), care should still be taken in selecting the route the cable for the AP-WRC4 is to take. The cable should be kept as far as possible from the following items:

- radio transmitters and associated antennas and antenna cables,
- fluorescent lights,
- electrical cables carrying AC current,
- engines including outboard motors
- AC powered electrical equipment

Also avoid routing the cable near compasses or other sensitive instruments to avoid interference from the AP-WRC4.

3.2.2 Electrical Colour Code

3.2.2.1 SeaTalk Autopilots

This section applies to ST1000, ST2000, ST4000, SPX etc.

Ideally, the colour coding of the 3 cores of the cable used to connect the AP-WRC4 to the autopilot would be as follows:

Wire & Colour		Description	AP-WRC4 Terminal
	Red	+12 Vdc	
	Black	0 Vdc	
	Yellow	SeaTalk data	SeaTalk
(bare)	Screen	Cable screen	Screen

Use the above colours if using cable purchased from Madman Marine.



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3.2.2.2 Evolution Autopilots

This section applies to Evolution autopilots with control units ACU100, ACU200 etc.

Using the SeaTalk to SeaTalkng cable (with yellow connector) that came with the SeaTalk to SeaTalkng converter kit, cut the SeaTalk connector (circled below) off the end of the cable and strip the end of the cable back to expose two wires and the screen.



Image 3: Raymarine SeaTalk connector (circled)

Use the following wire colour code for the stripped wires and terminate at the AP-WRC4's terminal block.

Wire & Colour		Description	AP-WRC4 Terminal
	Red	+12 Vdc	
	Yellow	SeaTalk data	SeaTalk
(bare)	Screen	0 Vdc	



3.2.3 AP-WRC4 Connections

The electrical connections for the AP-WRC4 are all made at the blue coloured terminal block at the bottom of the base unit. The terminals are labelled as shown...

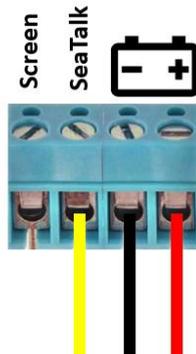


Image 4: AP-WRC4 terminal block and wire colours

3.2.4 Autopilot Electrical Connections

The connection method differs depending on the model autopilot to be connected. Refer to the specific instructions for your particular types of autopilot.

It is assumed the autopilot electrical installation has previously been completed and the autopilot functions correctly.

3.2.4.1 [ST1000+ and ST2000+](#)

Run the cable from the AP-WRC4 mounting location to the rear of the autopilot bulkhead connector.

Terminate the bare wires in the terminals of the bulkhead connector as shown:

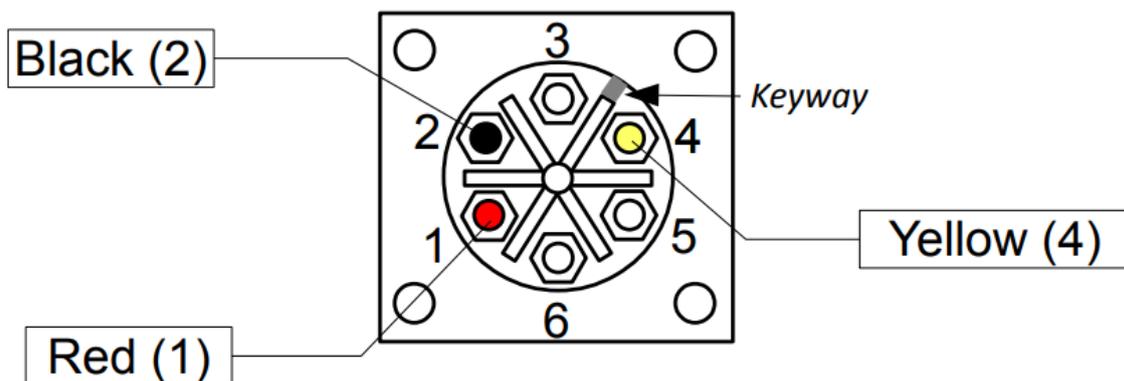


Image 5: Rear of ST1000+ / ST2000+ Bulkhead Socket



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3.2.4.2 [ST4000+](#)

Run the cable from the AP-WRC4 mounting location to the rear of the ST4000+ controller/display. Crimp or solder the bare wires into small spade terminals (refer Image 7) and then push the spade terminals onto the pins of the ST4000+ SeaTalk port pins following the colours as shown in Image 6.

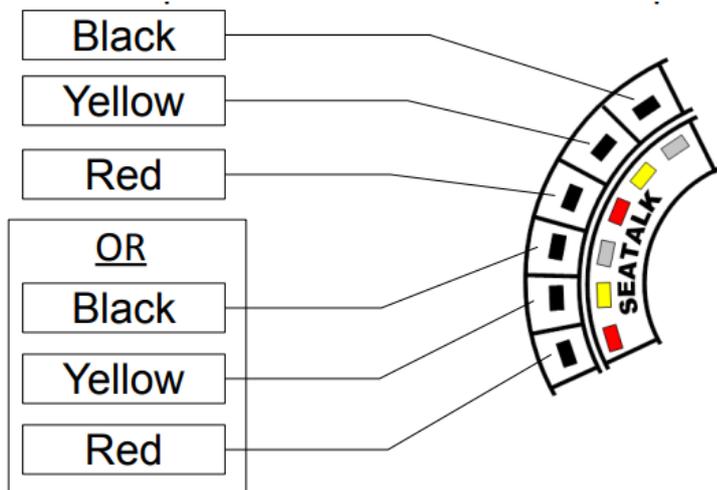


Image 6: ST4000+ SeaTalk Port

3.2.4.3 [Course Computer \(e.g., S-1, SPX5- SPX30\)](#)

Run the cable from the AP-WRC4 mounting location to the course computer. The cable will typically enter at the bottom of the course computer enclosure.

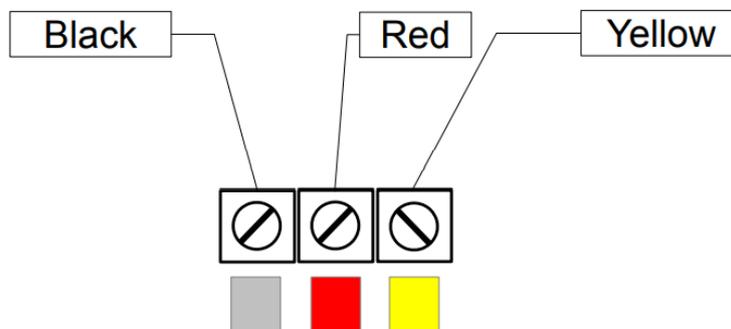
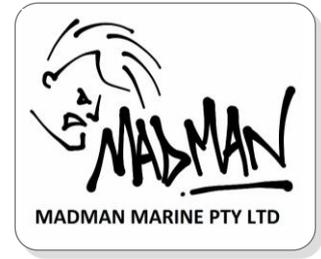


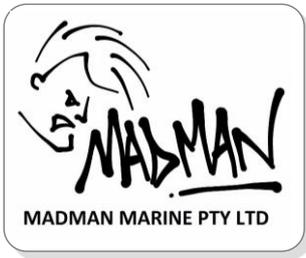
Image 8: Course Computer (e.g. S-1, SPX5 – SPX30) SeaTalk Port Terminals

Terminate the bare wires into the screw terminals of a spare SeaTalk port of the course computer. Match the wire colour to the corresponding terminal colour with black going to the grey (screen) terminal.



3.3 INITIAL FOB TESTING

1. Check that the fobs have two batteries installed in each one by pressing any button and verifying that the blue light on the fob turns on. If not, install new CR2016 lithium batteries before proceeding further. *(Refer to section 6 **Error! Reference source not found.** for battery replacement instructions)*
2. Confirm the autopilot has power to it by checking that the display is on and displaying a value. Test the autopilot operates as per normal from the autopilot's own buttons by first pressing the 'Auto' key and then pressing the course change buttons to alter position by 1 and 10 degrees to both port and starboard. **Do not proceed until you are satisfied the autopilot is operating normally.**
3. Switch on power to the AP-WRC4. Watch for the blue OP LED indicator on the AP-WRC4 to flash 3 times indicating start up. *(If the LED does not flash after turning power on, refer to the troubleshooting section).*
4. Verify that the orange ST light remains off after 5 or more seconds. *(If the orange ST LED turns on and does not turn off again within 30 seconds, refer to the troubleshooting section).*
5. Press each button on each fob and verify that the blue OP LED on the AP-WRC4 turns on briefly with each button press. *(If the OP LED does not turn on for any button presses, refer to the troubleshooting section).*
6. **Press the 'Auto' button on the autopilot to select Auto mode** (for ST1000/ST2000+ a letter 'A' appears next to the value on the autopilot display).
7. Press Button A (or B) on one of the AP-WRC4 fobs and verify that the number displayed on the autopilot changes by 1. (Note: the autopilot may not move with only a 1 degree course change).



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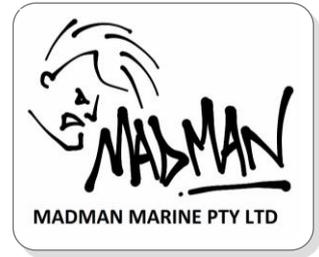
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8. Press Button C (or D) on the AP-WRC4 fob and verify that the number displayed on the autopilot changes by 10.
9. Press the 'Standby' button on the autopilot to select Standby mode (for ST1000/ST2000+ a flashing letter 'C' appears next to the value on the autopilot display).
10. Press and hold (for at least 1.5 seconds) Button A on the AP-WRC4 fob and verify that the autopilot changes to Auto mode (for ST1000/ST2000+ a letter 'A' appears next to the value on the autopilot's display).
11. (Optional, with 'Standby' enabled) Press and hold (for at least 1.5 seconds) Button B on the AP-WRC4 fob and verify that the autopilot changes to Standby mode (for ST1000/ST2000+ a flashing letter 'C' appears next to the value on the autopilot's display).
12. If all of the above check out then the AP-WRC4 is ready to use.



Image 9: AP-WRC4 LED Indicators (circled)



4 OPERATION

4.1.1 General

The fob (transmitter) buttons replicate the functions available from the autopilot to provide the same course changing and auto-tacking functionality. In addition, the autopilot mode can be changed between Standby, Auto, Wind Trim and Track modes from the fob.

A blue light on the fob indicates when a button is being pressed. The blue 'OP' light on the base unit turns on to acknowledge each button press.



Image 10: AP-WRC4 Fob

When pressing a button hold the button down for about half a second. A button press which is too short will be ignored and a button press which is too long may cause an undesired mode change.

4.1.2 Standby Mode Selection Enable/Disable

The AP-WRC4 ships with the ability to select Standby mode from Button B disabled by default. To enable the ability to select Standby mode from Button B a DIP switch inside the base unit must be turned 'On'.

To access the DIP switch, remove the 4 screws from the front of the base unit and remove the cover. Locate the DIP switch as shown in Image 11 and using a small screwdriver or similar, move the red slider of the DIP switch to the desired position:



'OFF' = Standby mode is disabled from Button B (default)



'ON' = Standby mode is enabled and can be selected using a long press of Button B

Image 11: Standby Enable/Disable DIP Switch inside base unit (circled).



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4.1.3 Button Assignments

The fob buttons are assigned the following functions:

- Button A change 1 degree to port / select Auto
- Button B change 1 degree to starboard / select Standby
- Button C change 10 degrees to port
- Button D change 10 degrees to starboard
- Buttons A & C (together) auto-tack to port
- Buttons B & D (together) auto-tack to starboard
- Buttons A & B (together) select Wind Trim mode
- Buttons C & D (together) select Track mode

4.1.4 Changing Mode

The buttons are assigned the following mode change functions:

- Long Press Button A select 'Auto' mode
- Long Press Button B select 'Standby' mode (*if enabled*)
- *Buttons A & B select 'Wind Trim' mode[#]
- *Buttons C & D select 'Track' mode

* Must be in 'Auto' mode first.

Wind Trim mode only available if valid wind data is being received by the autopilot.

4.1.5 Changing Course

Press each button (or combination of buttons) briefly when wanting to change course by 1 or 10 degrees or to auto-tack.

To auto-tack it is acceptable to (for example) press and hold Button A first and then press Button C – the two buttons do not need to be pressed at exactly the same time but the second button needs to be pressed quickly after pressing the first button to prevent undesired course changes.

For long button presses (changing to Auto or Standby) hold the button(s) pressed for at least 1.5 seconds. (*see section 4.1.2 to disable Standby mode if necessary*).

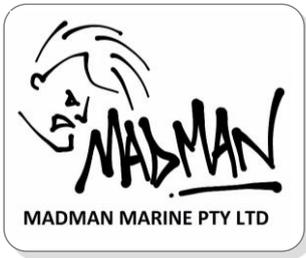


Important Notes:

- Do not hold Button A (or B) for longer than one second before pressing Button C (or D) due to the mode change functions of Buttons A and B when held for 1.5 seconds.
- Pressing Button C or Button D first in a multi-button press may cause a 10 degree course change if the second button is not pressed immediately.
- **Do not press the A or B buttons repeatedly in quick succession** as this may be registered as a single long button press resulting in an unexpected mode change! Allow at least half a second between button presses.

5 TROUBLESHOOTING

GENERAL		
SYMPTOM	CAUSE	REMEDY
Orange ST light is on and autopilot does not respond to fob button presses.	Autopilot is not turned on.	Check that the Autopilot display is on (meaning it has power to it).
	SeaTalk data not connected.	Confirm that the SeaTalk data wire is connected properly (refer to installation section) and the connection is free from corrosion.
	<i>[Evolution Autopilots only]</i> The SeaTalk to SeaTalkng converter has no power.	Check that the SeaTalk to SeaTalkng converter has power to it and that the green light is on. Follow the documentation for the SeaTalk to SeaTalkng converter to troubleshoot if the green light is not on.
The blue OP LED does not flash on the AP-WRC4 when fob buttons are pressed.	AP-WRC4 is switched off. AP-WRC4 does not have power to it.	Check that power is being supplied to the AP-WRC4 and the switch at the bottom of the AP-WRC4 is turned on. With Evolution type autopilots, check the autopilot is on and power is being supplied to the SeaTalk to SeaTalkng converter. Watch to see that the blue LED of the AP-WRC4 base unit flashes 3 times when power

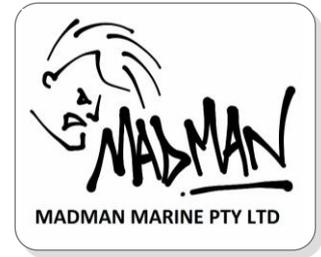


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		is first turned on. Press any of the fob buttons while observing the blue LED of the AP-WRC4. If the blue LED illuminates when buttons are pressed then the AP-WRC4 has power and is responding to button presses.
Cannot select Wind Trim Mode	No wind instruments connected to autopilot	The autopilot must be receiving valid wind data before Wind mode can be selected. Connect wind instruments to the autopilot using NMEA or SeaTalk.
Everything works but sometimes button presses do not register with the Autopilot	Autopilot is finishing a course change	On occasions when the Autopilot is completing a movement in Auto mode it will ignore commands from SeaTalk. This is not a problem with the AP-WRC4.
FOB OPERATION		
SYMPTOM	CAUSE	REMEDY
Blue OP LED on the AP-WRC4 base unit does not illuminate when fob buttons are pressed.	The fob (transmitter) is not working	Refer to “Blue light on fob...” section below if no buttons work. Replace batteries if any of the buttons do not work.
	The base unit is not turned on.	Check that any main switch for the 12V supply to the base unit is turned on.
One or more fob buttons do not work (even though light on fob illuminates when buttons pressed)	Fob batteries are drained.	Replace batteries in fob (2 x CR2016)
	Fob signal weak or obstructed.	Replace the batteries if the range of the fob has deteriorated. If possible, remove obstructions between the fob and the base unit. Check for sources of radio interference. Relocate the base unit if necessary.
		Faulty fob.
Blue light on fob (transmitter) does not light up when a button	Fob batteries are dead or not installed.	Replace batteries in fob (2 x CR2016)



is pressed.		
Standby mode not selected when Button B is pressed for a long time.	Button B Standby mode is disabled.	Enable Standby mode selection from Button B by moving the Standby Enable/Disable DIP switch to the 'On' position. Refer to section on page 13.
Autopilot unexpectedly goes into Standby mode	Button B being pressed multiple times in quick succession.	Allow at least half a second between button presses. If Standby mode selection is not required from the fob then disable Standby mode selection – see section on page 13.

6 BATTERY REPLACEMENT

The fobs are not shipped with batteries due to restrictions on transporting lithium batteries by air and so new batteries must be installed in the fobs before using the AP-WRC4.

1. Separate the two halves of the fob by using a small flat blade screwdriver or similar to gently pry the fob apart.
2. Insert two CR2016 lithium button cell batteries into the battery holder. Ensure that the side of the battery with the writing (positive side) is facing up for each battery.
3. Snap the two halves of the fob together again.
4. Press all buttons one at a time and ensure the red light on the fob turns on each time a button is pressed.



Image 12: Fob opened to reveal battery holder location (circled).



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7 SALES & SUPPORT

For all sales and support enquiries, contact:

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