

## Australian Off Road - Series IV Systems Manual – Black Water System

1. The TMC macerator toilet system has generally been used in a marine environment and began development for use by AOR in 2011. The system was initially used in Series 3 vans replacing the vacuum cassette system then in use.
2. This Manual should be read in conjunction with your van's Owner's Manual.
  - a. This Manual is supported by 3 annexes as follows:
    - i. Annex 1: Black Water System Layout;
    - ii. Annex 2: Black Tank Gauge recalibration process, and
    - iii. Annex 3: Replacement of TMC Toilet macerator pump and housing process.

**Note:** Annexes 2 and 3 are not physically part of (attached to) this manual for simplicity of management of the manual.

**Warning:** Appropriate personal protective equipment (PPE) must be worn when undertaking any work on the black water system as the fluids and parts could be contaminated by human waste products.

### Description

3. The toilet system has 9 main components includes:
  - a. 12 volt wiring loom, 30 Amp fuse, tank gauge, tank sensor and a flush button/switch;
  - b. Water supply pipe with 'Y' strainer and 2 brass non return valves;
  - c. TMC 12 Volt Macerator Toilet;
  - d. Inverted 'U' bend with anti-siphon valve;
  - e. 110 or 140 litre Black Water Tank (simply referred to as the '*Black Tank*' here after);
  - f. Black Tank Waste Pump, a Seaflor Macerator Pump, with 25mm camlock outlet;
  - g. Manual back up drain valve with 25mm camlock outlet;
  - h. Black Tank vent line with a charcoal filter, and
  - i. Black System Flush lines.

**Note:** A generic diagram is provided at Annex 1 to this Manual to help the user identify the nominal location of the various parts identified above.

4. **Electrical System (TMC Toilet and Waste Pump):** The power to the macerator is fed from the 12v house battery system via the '6' fuse primary fuse holder. The '6 fuse' primary fuse holder is located under the seat with the house batteries. The power supply runs from the fuse holder through the flush button to the macerator motor. The macerator motor power circuit is completed back through the fuse holder to the battery. The macerator motor is protected by a 30 Amp fuse.
5. The Waste Pump 12 Volt power supply is also from the house batteries through a 30 Amp fuse in the '12' blade fuse block. There is an operating switch for the pump located in the front boot. Additionally, the main power isolation switch (marked "ACC") must also be on for the pump to work.

**Note:** If your van's Power Control Panel is a "Connex 6 Way Fused & Backlit Switch Panel" (as per the photo opposite) there is also a 3 Amp blade fuse behind the Main Isolation Switch (marked "ACC") that should be checked if there is no power to



the Waste Pump or Gauge. Access to this fuse is by removing the cover from the Power Control Panel.

6. **Black Tank Gauge.** The Black Tank Gauge is located with other control items in the panel next to the door. The gauge is protected primarily by a 3 Amp blade fuse located in the 12 blade fuse block.



**Note:** If your van's Power Control Panel is a "Connex 6 Way Fused & Backlit Switch Panel" refer also to the "Note" at paragraph 5 above.

7. The gauge relies on a foil sensor which is fitted to the outside of the Black Tank on the driver side.
8. The Black Tank is also fitted with a manual/visual gauge located below the front boot and mounted to the van's main chassis rail on the driver side. It is integrated with the Black Tank Vent Line. Refer to paragraph 23 below for additional information.
9. **Toilet Water Supply.** Water is drawn to flush the toilet from the rear water tank or when fitted, the shower recycle tank. Toilet waste (black water/effluent) is collected in a 110 or 140 litre Black Tank which can then be disposed of at a RV dump point.
  - a. **Vans without the shower recycle tank:** In the fresh water supply line for the toilet there are 2 brass non return valves. These are fitted to ensure there is always water in the feed line to the toilet's macerator pump. A 'Y' filter has been added to the line to ensure swarf from the water tanks does not interfere with the correct function of the two non return valves. The 'Y' strainer is a 2018 modification by AOR and if not installed on your van may be available as an upgrade from AOR or its authorised representatives. The photograph below identifies the general location of these valves and other related fittings.

**Note:** This photograph is from a late 2015 Series 4 Q Plus and has been included to aid in the identification and location of certain parts associated with the flow of fluids used with the toilet. It is indicative only and should not be considered as absolute as there are variations between vans.



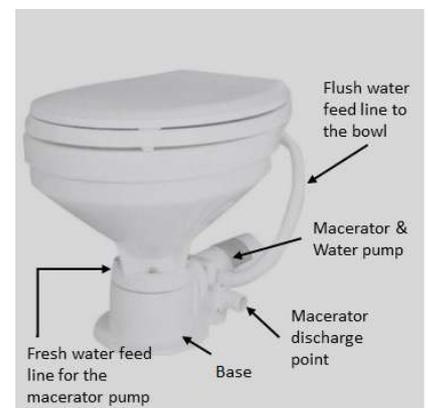
b. **Vans with the Shower Recycle System:**

The toilet in these vans draw water from a dedicated 20 Lt tank that collects the shower runoff. This tank is located under the floor of the van forward or the rear water tank (i.e.: near the axle line). The flush water feed line runs from this tank through a 'Y' strainer and a brass non return valve before being attached to the water feed line of the TMC toilet macerator pump. The non return valve and the 'Y' filter are located below the floor behind the driver side wheel. The photograph to the right shows the typical location of the non return valve and the 'Y' strainer.



10. **TMC Toilet.** The toilet has a:

- bowl & lid;
- macerator which incorporates the flush water pump and motor;
- macerator base;
- fresh water feed hose;
- waste fluid discharge hose, and
- flush water (pump to bowl) hose.



11. Whilst the repair process is discussed separately, if the macerator fails, AOR recommends that the complete macerator & base unit be changed out as one piece.

12. **Anti Syphon Valve.** The inverted 'U' bend and anti syphon valve are installed in the toilet/black tank waste fluid line, and is intended to ensure the toilet bowl's fluid level (post flush) remains above the height of the 'toilets 'U' bend which helps prevent the Black Tank and waste fluid line venting noxious fumes back through the toilet into the van.

13. The anti-syphon valve is installed at the rear of the shower cubical and is accessible by removing the drawers from the rear vanity/kitchen unit. The photograph to the right shows the general location of the inverted 'U' bend and the anti-syphon valve.



14. The valve (a 'Joker' or 'Duckbill') is accessed by undoing the cap and then carefully removing the rubber valve.

15. **Flush Lines.** Flush lines are fitted to help maintain the system. Photographs of all flush points are included in your van's operation manual, but in general, the connections are located on:

- a. the driver's side of the van behind the wheel arch (to flush the black line between the TMC Toilet and the Black Tank). This flush point is identified in the photograph at paragraph 9.a above;
- b. at the front of the van behind the stone guard on the driver's side (to aid in flushing the visual gauge line; vent line, and Black Tank), and

- c. beside the Waste Pump's 25mm camlock outlet fitting near the front of the body on the passenger side (or in later Series IV vans, in the 'A' frame). This is to backflush the Black Tank/Waste Pump line. This point should not be confused with the cam lock adaptor provided by AOR with each van that can be used to backflush the Waste Pump.

16. **Nylon Bodied In-Line Non Return Valves.** There are also a number of Nylon bodied non return valves fitted within the black water lines. These are fitted to prevent the flush water (contaminated by black water) flowing the wrong direction during flushing activities.



17. The most important of these valves is fitted in the TMC Toilet/Black Tank Waste Line between the TMC Toilet macerator unit and the flush line connection point. This valve's function is to stop the flush water going back into the toilet bowl.

18. The second of these valves is installed in the Black Tank discharge line between the manual discharge take off point and the Waste Pump. This valve was deleted in late 2017. AOR has a modification on its update list that includes disabling this valve by removing the neoprene flap from inside the valve body.

19. **Black Tanks.** Until late 2018 vans were fitted with a 110 Lt black water tank, after which the tank size was upgraded to a 140 Lt black water tank.

20. The Black Tank is fitted with both a:

- a. manual discharge valve with a 25mm Camlock fitting for mating to the 25mm discharge hose(s) provided;
- b. a 12 Volt Waste Pump which is also connected to a 25mm Camlock fitting;
- c. fluid level gauge(s) (see paragraphs 6 and 8 above), and
- d. a vent line (see paragraph 23 below).

21. **Waste Pump.** The Waste Pump (a Seaflo Macerator Pump) is installed either inside the front boot or under the 'A' frame (late 2018 onwards). A switch to operate the Waste Pump is located within the front boot. The Waste Pump unit requires the main power on the Power Control Panel to be turned on for it to operate.

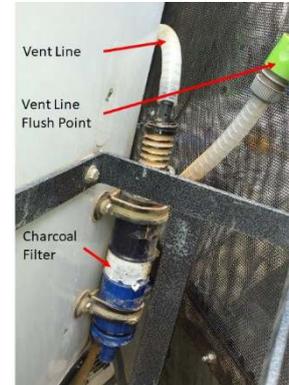
**Note:** *It is important that before turning on the Waste Pump, to ensure the discharge valve is open. Failure to do so will build up pressure within the Waste Pump unit and may damage its seals, or create a leak of effluent from connections in the associated hoses.*



*The Waste Pump installed inside the front Boot*

22. Part of this installation is a large 'loop' of the 25mm feed line from the Black Tank immediately prior to the Waste Pump. This is required to ensure the Waste Pump is always primed. A dry impellor will burn out rapidly thus preventing the Waste Pump from working effectively. With some of the early 'A' frame installations, this loop was not installed. AOR has a modification to re-instate this loop.

23. **Black Tank Vent Line.** The Black Tank Vent Line runs from the driver side of the black water tank forward and up the leading edge of the van immediately behind the stone guard on the inside of the 'jerry can' holder. It is normally hidden by a steel guard. The vent line is joined to the visual gauge line via a 'crossover join' just above the chassis rail. The gauge line leads to a removable plug/sealed flush point, and the vent line to an inverted 'U' turn, finishing in a charcoal filter that vents to the atmosphere. The joining of the gauge line to the vent line allows air in the gauge line to be displaced via the vent line and charcoal filter as the fluid level rises and falls in the gauge line.



## Modifications

24. A gradual upgrade of the Series 4 system has occurred since 2015 and includes:
- fitting 2 brass non-return valves to the inlet pipe from the water supply tank,
  - fitment of a brass 'Y' strainer to eliminate swarf entering the system, and
  - deletion the Nylon bodied non return valve from Black Tank/Waste Pump waste line to enable the Waste Pump to be backwashed. For vans with this non return valve fitted, AOR has a modification which disables the valve by removing its internal parts creating an open flow fitting.
  - Towards the end of 2017, the Waste Pump was relocated from the front boot to the underside of the 'A' frame.
  - Early vans were supplied with a 20 Amp fuse for the toilet macerator which has been upgraded to a 30 Amp fuse.
  - Some mid 2017 models have a 25mm discharge hose that kinks when bent around a sharp radius which then stops the toilet from being emptied. A repair kit is available from AOR. This section of pipe is identified in the photograph at paragraph 9.a above.
  - An owner(s) inspired inline 25mm shut off tap is a modification some owners have fitted to enable the control of water supply to the toilet bowl.
  - The Black Tank's external clear level indicator hose becomes opaque over time. A replacement polycarbonate tube is available from AOR at owner expense.

## Maintenance

**Warning:** Appropriate personal protective equipment (PPE) must be worn when undertaking any work on the black water system as the fluids and parts could be contaminated by human waste products.

25. The Black Water System require regular maintenance to enable the system to function reliably. Most issues are caused by a lack of water, i.e.: rubber impellers deteriorate quickly when run dry and the waste lines may gradually foul and block if not flushed with sufficient water or regularly.

**Note:** The system does not require any additional lubrication. Oil will accelerate the deterioration of seals, and other than by a common drive shaft, there is no physical connection between the macerator blade cavity and the water pump. The use of corrosive cleaners should be avoided at all times. 'Earth' and other biodegradable effluent friendly products are recommended to clean the bowl.

**Note:** AOR issued a service recommendation in October 2017 '...to hold the flush button for at least 10 seconds to ensure solid waste is cleared from the TMC Toilet/Black Tank Waste Line into the Black Tank...'

26. **Electrical System.** In general, there is no maintenance required for the electrical system associated with the TMC Toilet's macerator or Waste Pump units. In the first instance, if either of the units do not run check the fuse(s) and change them if appropriate. The 'Fault Finding' guide at the end of this section provides additional guidance.
27. **Black Tank Gauge.** The Black Tank gauge may require recalibration from time to time. Initially its accuracy can be checked by undertaking a comparison of the gauge reading against that evident by the external sight tube.

**Note:** The van must be level for the gauge to read accurately.

The gauge is nominally set to indicate full when the tank is about 7/8<sup>th</sup> full to allow some warning and additional capacity before emptying. There is a risk that over filling the Black Tank could lead to waste fluids overflowing the vent line and flooding the carbon filter; rendering it potentially useless. There is also a risk of the tank failing if over filled/pressurised. The sensor unit for the gauge is a twin foil setup glued to the exterior of the tank (driver side). Other than ensuring the gauge wires remain connected to the foil, and the foil is still adhered to the tank, there is in general, no ongoing maintenance required for the sensor.

28. AOR has a comprehensive calibration process and a copy is included at Annex 2 to this manual.
29. **Toilet Water Supply.** The TMC Toilet flush water supply systems for both the recycle tank and standard fresh water tank feed lines both incorporate non return valves, and when fitted, 'Y' strainers.
30. The 'Y' strainer has been fitted to remove any remnant swarf that washes out of the feed tanks with the water supply. This swarf was getting entrapped in the non return valve's internal mechanism, which stopped them working effectively. Water from the TMC Toilet flushing water pump would then bleed back into the feed tank allowing the pump's rubber blades to dry out. Initially, this is evident by a noticeable time lag between engaging the flush button and flush water appearing in the bowl. If this occurs, the toilet bowl's flushing water feed pipe should be back filled to reprime the pump. If this does not work, then the non return valves may need to be removed and cleaned, or replaced.

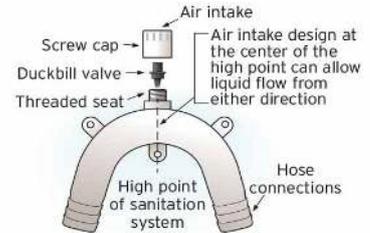
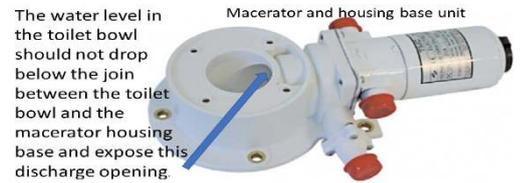
**Note:** To prime the pump, backfill the flush water feed line (and pump) using a hose attached to the van's front tap (if a mains supply is not available). Take the fitting off the end of hose, flatten the hose slightly and place it pointing up under the toilet bowl's rim at the rear of toilet bowl where water normally enters the toilet bowl from the flush supply: then have the water turned on slowly. The amount of water running back into the bowl will increase sharply when the feed line and pump are full of water.

31. For vans with the 'Y' filter installed, the filter cap should be removed annually and the filter cleaned of any contamination. The toilet bowl's water feed pipe will need to be back filled to reprime the pump after this service.

32. **TMC Toilet.** The toilet itself should not require any ongoing maintenance past cleaning and the occasional check of the seat retaining nuts to ensure they remain tight.

33. When the van is in storage, AOR recommend that the toilet be flushed at least monthly.

34. **Anti Syphon Valve.** The anti syphon valve should not need programmed maintenance. If the standing water level in the toilet bowl after flushing drops below the join between the toilet bowl and the macerator housing (typically exposing the discharge pipe in the macerator housing), this could indicate that the anti syphon valve needs cleaning. As noted at paragraph 13 above, the anti-syphon valve is located at the rear of the shower cubical and is accessible by removing the drawers next to the shower. The valve itself is accessed by undoing the cap with the air vent hose attached, and then carefully removing the internal rubber 'Duckbill' valve. The valve can be cleaned using warm soapy water and a cotton bud.



35. The picture to the right shows a typical anti syphon valve construction. The web site noted below provides a basic understanding of how the anti syphon works and why it is so important. <https://www.boatus.com/magazine/2018/april/anti-siphon-valves.asp>

36. **Flush Lines.** The flush lines are installed to be used, and should be used regularly!

37. The TMC Toilet/Black Tank Waste Line should be flushed routinely at the end of each trip as part of the Black Tank emptying and flushing routine.

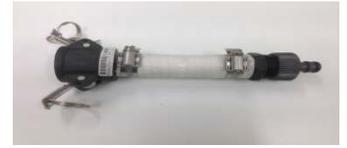
38. The Black Tank Vent Line can be flushed as required to clear the visual gauge or to clean the carbon filter should it become contaminated if the Black Tank is over filled. When flushing the gauge line, it is possible that the flush water will also pass through the crossover join, entering the vent line and flooding the charcoal filter. If this happens, the charcoal filter must be left to dry.

**Caution:** When backflushing any of the waste lines or the Waste Pump, it is strongly recommended that the manual discharge valve be opened to allow the tank to vent to atmosphere during the flushing activity. Failure to do so could lead to the Black Tank deforming with a possibility of damage, or waste fluid being forced out of the tank via the Vent Line and contaminating the charcoal filter. This is because the vent pipe is unable to cope with the water being added to the blackwater system at mains pressure. Either the Black Tank manual drain valve must be opened, or the Waste Pump must be switched on to ensure pressure does not build up in the Black Tank when mains pressure is being used to flush the waste lines.

39. **Nylon Bodied In-line Non Return Valves.** The nylon non return valve(s) should not normally require any maintenance. If contaminated water from flushing the TMC Toilet/Black Tank Waste Line should be observed entering the toilet bowl, the nylon non return valve in this line must be removed and cleaned or replaced as appropriate.

40. **Black Tank.** The Black Tank should be emptied whenever it is filled, and should be flushed and drained at the end of each trip and each time the van is to be stored. Flushing water through both the TMC Toilet/Black Tank Waste Line flush point and the Black Tank/Waste Pump Waste Line flush point will help dislodge any settled waste. Refer also to the 'Caution' at paragraph 38 above.

41. **Waste Pump.** AOR recommend that each time the Waste Pump is used to empty the Black Tank, the Waste Pump should be backflushed using the adaptor supplied (see the photograph opposite). Backwashing the Waste Pump is the same process used to prime the Waste Pump if needed although potentially at a higher water pressure.



**Note:** When backflushing the Waste Pump to clear a blockage or cleaning the Waste Pump after use, then the warning given by the 'Caution' at paragraph 38 above should be adhered to. If you are trying to reprime the Waste Pump, then do so with the water supply at a very low pressure.

42. **Black Tank Vent Line.** As per paragraph 38 above, the Black Tank Vent Line only needs to be flushed when necessary.
43. **Additional Information.** See your AOR Owner's Manual for additional information.
44. A 'Fault Finding' guide is included in the next section below. This guide also includes a list of useful part numbers.

## Fault finding:

**Warning:** Appropriate personal protective equipment (PPE) must be worn when undertaking any work on the black water system as the fluids and parts could be contaminated by human waste products.

**Note:** Annex 3 covers the process for removing and replacement of the TMC toilet macerator unit.

Issue:	Check:
<p>1. TMC Toilet motor does not make a noise when the flush button is pressed.</p> <ul style="list-style-type: none"><li>a. Fuse blown</li><li>b. Battery flat/below 12v</li><li>c. Fuses being constantly blown</li></ul>	<ul style="list-style-type: none"><li>• Replace the 30 Amp blade (also called spade) fuse if required, and retry flushing.</li><li>• Check battery state of charge; recharge batteries as appropriate, and retry flushing.</li><li>• TMC Toilet pump impeller stuck. Remove covers from back and top of motor tap the motor with a hammer or similar: if this does not free the motor, then the unit should be removed for inspection/replacement.</li></ul>
<p>2. TMC Toilet motor running slower than normal and blowing fuses</p> <ul style="list-style-type: none"><li>a. Battery Charge low</li><li>b. Too much internal resistance</li></ul>	<ul style="list-style-type: none"><li>• Batteries not fully charged. Check state of charge; recharge batteries as appropriate, and retry flushing.</li><li>• TMC Toilet motor is drawing too much current due to internal damage, e.g.: internal rust build-up in motor housing. Remove and replace base unit with new motor and impeller unit.</li></ul>
<p>3. TMC Toilet motor makes a noise but no water is being pumped</p> <ul style="list-style-type: none"><li>a. No water in tank</li><li>b. TMC Toilet pump has lost prime</li></ul>	<ul style="list-style-type: none"><li>• Refill rear tank or recycle tank as appropriate.</li><li>• Prime the TMC Toilet pump. Press the flush button again for a maximum of 5 seconds. If water does not appear, wait for 30 seconds and try again. Prime the toilet using a hose if above does not work.</li></ul> <p><b>Note:</b> A description of how to prime the TMC Toilet pump is included as a 'Note' to paragraph 30 above.</p>

Issue:	Check:
<p>3. TMC Toilet motor makes a noise but no water is being pumped (Cont.)</p> <p>c. Brass 'Y' filter is blocked</p> <p>d. TMC Toilet pump impeller damaged</p>	<ul style="list-style-type: none"> <li>• Remove the stone guard to access the 'Y' filter. Remove plug from brass valve; withdraw the filter and plug the valve with clean rag to prevent water draining.</li> </ul> <p>Clean the filter. Remove the rag; refit the filter and refit the valves plug.</p> <p><b>Note:</b> a 23mm socket is required to undo/do up the valve's plug.</p> <ul style="list-style-type: none"> <li>• The TMC Toilet pump impeller is worn or damaged and requires replacement. (AOR recommend to install a new base unit complete with new motor and macerator base set).</li> </ul> <p><b>Note:</b> AOR Service can provide advice on the process for changing out the macerator unit.</p>
<p>4. TMC Toilet macerator is working: the bowl empties, but flush water is not available immediately when the flush button is pressed. Probable cause is the TMC Toilet's flush water feed pump is no longer primed</p> <p>a. After prolonged storage</p> <p><b>Note:</b> Do not run the pump for more than 5 seconds without water as impeller may over heat</p>	<p><b>Note:</b> This scenario assumes the water feed tanks have been checked and are full.</p> <ul style="list-style-type: none"> <li>• It is possible that the non return valve(s) have allowed a slow bleed of the priming water back into the supply tank. Reprime the TMC Toilet pump by back filling the bowl's flush water feed line, and retry.</li> </ul> <p><b>Note:</b> A description of how to prime the TMC Toilet pump is included as a 'Note' to paragraph 30 above.</p>

Issue:	Check:
<p>4. (Cont)</p> <p>b. Non return valves are not holding water head.</p>	<ul style="list-style-type: none"> <li>• Remove the stone guard to access the non return valve(s). Unscrew hose clamps and remove valves and clean.</li> <li>• Re-install the valve(s), back fill the toilet bowl's flush water feed line to ensure the pump is primed, and retry the unit.</li> </ul> <p><b>Note:</b> A description of how to prime the TMC Toilet pump is included as a 'Note' to paragraph 30 above</p> <p><b>Note:</b> A heat gun may be required to remove the hose from the filter.</p>
<p>5. No water in bowl</p> <p>a. After prolonged storage</p> <p>b. After travelling</p> <p>c. After flushing toilet</p>	<ul style="list-style-type: none"> <li>• It is possible that the water has evaporated or the anti syphon valve is not fully effective. Refill the TMC Toilet bowl and observe the level over a 24 hour period of time. See also 5.c below.</li> <li>• This is possibly 'normal'. Press the flush button to refill the toilet.</li> <li>• The anti-siphon break valve is blocked allowing the bowl water to be sucked into the waste discharge line: <ul style="list-style-type: none"> <li>○ Quantum/Quantum+: Remove the middle drawer in rear storage unit.</li> <li>○ Matrix: Remove top two drawers next to shower.</li> </ul> <p>and locate inverted 'U' bend fitted next to the shower housing. The valve is fitted at top of inverted 'U' bend. Remove the breather hose and unscrew the nut and remove the rubber 'Duckbill' valve.</p> <p>Carefully clean with soapy water, cotton bud and small cable tie.</p> <p>Refit valve, screw cap and vent line.</p> <p><b>Caution:</b> Do not over tighten the screw cap when refitting.</p> </li> </ul>

Issue:	Check:
<p>6. Water is being pumped but supply is limited</p> <ul style="list-style-type: none"> <li>a. Water tank is almost empty</li> <li>b. TMC Toilet pump impeller worn or damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Check water levels and refill tank</li> <li>• See Issue 3.d above</li> </ul>
<p>7. TMC Toilet bowl will not empty</p> <ul style="list-style-type: none"> <li>a. TMC Toilet macerator impellor/blades clogged. <i>Note: adding water from the shower rose before No 2's assists the macerator function.</i></li> <li>b. TMC Toilet/Black Tank waste line blocked. <i>Note: AOR recommend only using toilet paper that breaks down easily, e.g.: suitable for septic systems</i> <i>Note: Refer also to the 'caution' at paragraph 38 in the main body of text.</i></li> <li>c. Kinked waste line. For mid 2017 built vans in particular, check for a kinked waste pipe at the rear of the van on the driver's side near the wind down leg. This pipe is identified in the picture at paragraph 10.a in the main body of text above.</li> </ul>	<ul style="list-style-type: none"> <li>• If the bowl is 2/3 or more full, leave for 15 minutes to allow excess fluid to drain off, and retry.</li> <li>• If above does not lower the fluid level in the bowl, break up mixture with poking stick and retry flushing.</li> <li>• If the bowl has little water in it. Add water using the shower head to at least ½ full, and press the flush button.</li> <li>• Flush the line by connecting a hose to the flush point located behind the Driver's side wheel arch. Turn the blue inline valve on and flush for 2 minutes. <i>Note: Ensure that as a minimum, the manual discharge valve is open during the flushing activity.</i> Water should be heard entering Black Tank. Ensure the Black Tank does not overflow. If no water is heard running into the Black Tank, turn the tap off and check for a blockage where the waste line enters the Black Tank by removing the hose from the end fitting (an elbow) and inspecting/cleaning it. Reassemble the connection and retry flushing. <i>See the <b>Warning</b> at the start of this section.</i></li> <li>• If the waste pipe is kinked contact AOR for a repair kit comprising a replacement pipe; joiner, and hose clamps.</li> </ul>

Issue:	Check:
<p>8. Black Tank will not empty</p> <p>a. Waste Pump is pulsing</p> <p><b>Note:</b> <i>This is possibly not an issue. At least 30 litres of liquid (1/4 tank) is required in the tank for the Waste Pump to pump continuously</i></p>	<ul style="list-style-type: none"> <li>• Try pumping out at a later date or use the manual outlet to drain the tank.</li> <li>• If the tank is full, the Waste Pump may have an air lock or be partially blocked.</li> <li>• Turn off the pump, and using the AOR adaptor, backflush the Waste Pump, and retry.</li> </ul> <p><b>Note:</b> <i>Ensure the manual discharge valve is open during the flushing activity. If only priming the Waste Pump keep the water flow very low.</i></p>
<p>9. Waste Pump is running but no waste is being discharged</p> <p><b>Note:</b> <i>Turn the pump off to ensure the impeller does not burn out.</i></p> <p>a. Charcoal filter/ vent line is blocked. This leads to a vacuum being formed inside the Black Tank creating resistance to the pumping action of the Waste Pump.</p> <p>b. Waste pump is blocked.</p>	<ul style="list-style-type: none"> <li>• Inspect and backflush the vent line via the flush point near the charcoal filter. This is located on the driver's side behind the stone guard.</li> </ul> <p><b>Note:</b> <i>if you flood the charcoal filter with water during flushing, you must let the filter dry out.</i></p> <p><b>Note:</b> <i>Ensure the manual discharge valve is open during the flushing activity.</i></p> <ul style="list-style-type: none"> <li>• Backflush the Waste Pump using the AOR provided adaptor.</li> </ul> <p><b>Note:</b> <i>Ensure the pump is turned off before starting this process. The pump <b>must not be run</b> whilst you are backflushing it.</i></p> <p><b>Note:</b> <i>Ensure the manual discharge valve is open during the flushing activity.</i></p>

Issue:	Check:
<p>10. Waste Pump cannot be backflushed</p> <p>a. Backflush connector fitted, flush water on, but no flush water entering the Black Tank.</p>	<ul style="list-style-type: none"> <li>• If you cannot hear the flush water passing into the Black Tank/seeing discharge via the open manual discharge valve: check to see if you have a Nylon bodied non return valve in the waste discharge line between the Black Tank and the Waste Pump. It may be that this valve has not been modified to an open valve configuration.</li> </ul> <p>Remove, clean, and disassemble valve.</p> <p>Remove the neoprene rubber flap, and reassemble the valve (minus the flap).</p> <p>Re-install the valve in the waste discharge line.</p> <p>Retry backflushing of Waste Pump.</p> <p><b>Note:</b> <i>Ensure the manual discharge valve is open during the flushing activity.</i></p>
<p>11. Waste Pump does not work</p> <p>a. Waste Pump Motor does not turn over.</p> <p>b. Waste Pump could be blocked solid.</p> <p>c. Waste Pump has been backflushed but continues to blow fuses.</p>	<ul style="list-style-type: none"> <li>• Check fuse and replace if required.</li> </ul> <p><b>Note:</b> <i>There is a 30 Amp fuse in the 12 blade fuse box for the Waste Pump. See also the 'Note' at paragraph 5 in the main body of text above if you have a Connex Switch Panel.</i></p> <ul style="list-style-type: none"> <li>• . Backflush the Waste Pump.</li> </ul> <p><b>Note:</b> <i>Ensure the manual discharge valve is open during the flushing activity.</i></p> <ul style="list-style-type: none"> <li>• Waste Pump motor is drawing too much current due to internal damage, e.g.: internal rust build-up.</li> </ul> <p><b>Note:</b> <i>AOR recommend replacing the entire assembly</i></p>

Issue:	Check:
<p>12. Smell from front of van.</p> <p>a. The effective life of charcoal filter has expired.</p> <p>a. Black Tank has been overfilled, and waste fluid has flowed out of the gauge or vent tube through the charcoal filter.</p>	<ul style="list-style-type: none"> <li>• Remove and replace charcoal filter. <b>Note:</b> Replacement filters are available from AOR and should be also available from most Caravan Service/Part centres. <b>Note:</b> If the filter is removed, ensure that any fasteners removed from the van's body associated with the filter clamp or protective metal shield, are refitted and sealed with a suitable waterproof silicon.</li> <li>• Empty the Black Tank and backflush the vent line. <b>Note:</b> Ensure the manual discharge valve is open during the flushing activity. Backflushing the vent line should also flush the charcoal filter. It could take several days for the charcoal filter to sufficiently dry out to function again. If water does not flow through the filter, the filter should be removed and cleaned (flushed with fresh water), and reinstated. If the filter does not appear to be eliminating the odour, the filter should be removed and replaced.</li> </ul>
<p>13. Black Tank Electronic Gauge indicating incorrect level</p> <p>a. Gauge does not light up</p>	<ul style="list-style-type: none"> <li>• Check fuse and replace fuse(s) as appropriate <b>Note:</b> There is a 30 Amp fuse in the 12 blade fuse box for the Waste Pump. See also the 'Note' at paragraph 5 in the main body of text above if you have a Connex Switch Panel. If the fuses are OK, seek advice from the AOR Service Department.</li> </ul>
<p>b. Gauge out of calibration. <b>Note:</b> The van <u>must be level</u> to provide accurate calibration.</p>	<ul style="list-style-type: none"> <li>• Gauge needs recalibration. See Annex 1 to this Manual or Check the AOR Owners Forum for a calibration process.</li> </ul>



## Useful Part Numbers

**Note:** AOR usually carries most parts needed to effect routine maintenance and repairs to your vans. There are occasions however where quick delivery from AOR is not practicable so it is worth noting that quite a few generic parts can be purchased from caravan part suppliers around Australia, plus for the TMC Toilet and black water system parts in particular, national marine parts suppliers such as Whitworths and SWB Marine are a possible source.

Where possible, the list below includes AOR plus Whitworths and SWB Marine's part numbers.

Item Description	AOR SKU/Pt. No.	Whitworths Catalogue/Pt. No.	SWB Pat. No.
TMC 12Volt Toilet,	TBA	89656	SP RWB 2322
TMC Pump & Macerator complete with toilet base.	PUM-SAA-05	N/A	SP192
TMC Pump & Macerator (minus toilet base)	N/A	89674	N/A
TMC Pump Service kit	TBA	89678	SP606
TMC Centrifugal Impeller (plastic)	TBA	89676	SP613
Waste Pump: Seaflo Macerator Pump 712 GPH 12V	1-MAP-MAS-01	N/A	N/A
TMC Toilet Flush Switch	Narva P/No. 60033BL – Momentary (On) Heavy-Duty Push Button Switch with Waterproof Neoprene Boot		
Black Tank Vent Line Charcoal Filter	1-FIL-SAA-01	90163	N/A

## Annexes:

1. Black Water System Layout
2. Black Tank gauge recalibration process.
3. Replacement of TMC Toilet macerator pump and housing process.



## **Annex 2.**

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### **Black Tank gauge recalibration process**

## **Annex 3.**

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### **Replacement of TMC Toilet macerator pump and housing process**