

## Moondance

### 2022 North Pacific Pilothouse



Welcome aboard Moondance!

Before we placed Moondance in charter with San Juan Yachting we were long time charter guests, so we have been in your shoes. Cruising the Pacific Northwest is one of the best experiences of our lives and it was not long before we decided to get a boat of our own and share that experience with you and other guests.

We spent considerable time looking for a vessel that would meet our needs of having friends and family onboard as we explore the San Juan's, Puget Sound, Gulf Islands, and points further north. We hope you enjoy Moondance as much as we do and have a great experience on your adventure. If you can think of anything...anything at all...that would make Moondance more enjoyable for you, please let us know through San Juan Yachting. We've tried not to overlook any detail in our effort to make Moondance the ultimate trawler for exploring the Pacific Northwest.

The following Owner's Notes are provided as a convenience to our charter guests. Given the complexity of a boat and its systems, it would be impossible to cover all conditions and situations that may occur when operating a boat. We have done the best we can to provide an easily used reference source for the most likely and common issues that you need to be aware of while on your charter, yet there are space limitations and not all operating details can be covered. These notes change every year as Moondance herself changes every year due to ongoing maintenance, improvements, and the recognition that a boat is constantly evolving.

As a charter guest you are here at your own risk and responsibility. Hopefully you have a high level of practical experience and knowledge to operate Moondance comfortably and safely. We offer a half day training with a captain to encourage you to have the best possible and least stressful experience. If you are not 100% comfortable with the operation of Moondance and her systems, please seek immediate assistance from San Juan Yachting.

Everyone's comfort and safety are the number one priority. We wish you a safe and fun journey as you explore the PNW aboard Moondance. Enjoy!

Kent & Kim

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## 1. Specifications and Vessel Information

**U.S. Customs Re-Entry Decal** – Located next to the cockpit entry door, starboard side.

**Vessel Hull Number**—YD049018F123

**Coast Guard Registration Number**- 1335201

**FCC Call Sign** WDN7590                      **MMSI** 368309830

**US Customs Annual Pass #** 23041331

**Coast Guard Boarding Document** – Refer to the Charter Guest Reference Manual (white binder), Section 5 Documentation. Explains what to expect if you are boarded by the Coast Guard and where to find the information/equipment they may ask to see as part of their safety inspection.

2022 North Pacific Pilothouse

LOA: 54&1/2 feet- includes anchor pulpit and the tender overhang.

Beam: 15'4"

Draft: 5' with a long keel to protect the running gear. Depth transducer is at 4&1/2 feet

Bridge clearance: 23 feet

Displacement: 58,000 lbs.

Diesel Engine: Cummins 355 QSB 6.7L, 350 Hp, Cruising speed 7-8 knots, Max speed 10 knots

Diesel Fuel: 700 gallons total, two tanks of 350 gallons each

Water: 250 gallons

Holding tank: 65 gallons

Rocna 88 lb. anchor on 400 feet galvanized chain. Pulpit is 8 feet above water line.

Forward Cabin 7' Headroom: Queen bed, in-suite bathroom

Midship Cabin 7' Headroom: Queen bed, bathroom across hall

Salon 6'9" Headroom: Settee that converts, folding table, 2 recliners, TV that folds down from the ceiling.

Galley 6'9" Headroom: Large Refrigerator/Freezer/Icemaker, Propane stove/oven, Microwave/Convection

Pilothouse: 2 Helm chairs, settee that converts into a small bed, folding table

Flybridge: 2 helm chairs, seating for 6 more, table, hardtop, propane locker with 2 tanks.

Moondance January 2024

Electronics/Navigation: Garmin suite, two 16inch MFD's, 48" Open Array Radar, Forward Vu Sonar, weather system display, rear facing cameras and engine room camera.

Vesper Cortex VHF/AIS/GPS in pilothouse, Icom M510 VHF for flybridge and pilothouse

Icom-M94D portable VHF/AIS/DSC for use on tender

Side Power Bow and Stern thrusters with proportional control and a remote

Maxwell RC12-10 24V Windlass with capstan. Anchor pulpit is 8 feet above water.

Shore Connections: 30A/120V Smart Plug Connector at bow, 50A/240 V retractable cable at starboard stern. Pigtail adaptors that are stored in step drawer leading to pilothouse- 50 to 30amp, 30 to 20amp, 30 to 15amp.

1650 Ahr Victron Lithium house battery bank

1200W solar panels and high output Balmar XT 250 alternator for charging all the batteries.

ITR Hurricane Chinook Diesel/Electric Hydronic heating with 5 zones and water heater

Dometic AC reverse heat system with three zones. **Requires 50A/240V shore power.**

Splendid Washer/Dryer Combo unit. **Requires 30A/120V shore power.**

Whole boat freshwater system. Filtered water for sink dispenser & icemaker, cartridges in ER

Presto Marine Lift on swim step for raising and lowering of the tender.

Highfield CL 340 Tender with Tohatsu 25HP and Garmin Chart Plotter. Max 6 people, 1215 lbs.

## 2. Moondance Nuances

**Moondance was delivered new in March 2023.** We would appreciate it if everyone cared for her as you would if she were your own. Please do not wear the same shoes/sandals inside the boat, that you wore outside; socks would be preferred. Thus, keeping things as clean as possible and minimize damage to the beautiful wood floors. Please negotiate the narrow lower hallway with caution ---No rolling luggage banging into the walls and corners, causing dings and other damage. We recommend soft-sided luggage like duffle bags; they are also easier to store. There is a Shark vacuum cleaner and a small hand-held vacuum cleaner in the hallway closet to make keeping the floors and carpet clean as easy as possible. No dogs or smoking!

**No Generator:** Moondance has a state-of-the-art electrical system with a huge 1650 Ah Lithium-Ion battery bank and 1200W of solar with the intention that it would allow for a comfortable stay at anchor without needing to run a noisy and inefficient generator. Every effort has been made to make Moondance as efficient as possible and there are battery and electrical monitoring systems onboard for the accurate monitoring of your power status. In the prime summer season, the solar panels do an excellent job of recharging the battery bank. Our experience is that in most circumstances you can expect 3-4 days of freedom from civilization and the need to find shore power. Depending on conditions and whether we want to do laundry, we often bypass shore power when docked.

### 3. Emergency/Safety Equipment - Hopefully you will not need these but know locations.

**Automatic Bilge Pumps (3).** Rocker switches are located on the pilothouse helm station on the lower left side. During normal operation the switches are left in “AUTO” mode. Can be switched to “ON” for override mode if needed, or to test them. They also have breakers on the DC panel—ALWAYS ON. The bilge pumps are located as follows: Forward Bilge located under the floor access in the forward stateroom, Midship Bilge located in Engine Room, just forward of the engine. Access via the floor hatch in the galley or salon. Stern Bilge in the lazarette. Access via the hatch in the cockpit.

**Manual Bilge Pump** - Located on the forward wall of the engine room. Best accessed via the hatch in the galley. Large handle extends to allow for more leverage and efficient operation.



**Carbon Monoxide Detectors.** Located in salon and forward cabin.

**Emergency Tiller:** Located in lazarette- secured by clips in the ceiling. Attachment point is via an access plug on swim step.

**Engine Room Fire Suppression System:** Moondance has an automatic fire suppression system in the engine room. The system will shut down the engine and release material into the engine room to control a fire. A manual release is in the corner of the salon on the starboard side. Rely on the engine room camera to monitor the engine room. Do not open a hatch to check, it will allow oxygen in to feed the fire.

**Fire Extinguishers – Standard - #4** Galley - under sink, Hall closet - mounted high on the left side, Forward head - mounted under sink, Tender - under seat next to helm. **Special CO2-** under port chart table. This extinguisher is for electrical fires only and will not cause extensive damage to the electronics due to corrosive chemicals.



**First Aid Kit:** Lowest drawer in starboard cabinet in pilothouse. Safety Drawer.

**Flares and other emergency signals:** Lowest drawer in starboard cabinet in pilothouse. Safety drawer.

**Rechargeable Flashlights:** Top drawer of both starboard and port cabinets in the pilothouse, top left drawer in the galley, top drawer in cabinet between the two recliners. Spare flashlights and the appropriate USB charging cords are in the top starboard drawer in pilot house.

**Searchlight:** Remote control is located at both helms. Breaker is on DC panel.

**Horn, handheld:** Lowest drawer in starboard cabinet in pilothouse. Safety Drawer.

**Life sling:** Starboard stern rail. Please review the schematics on the face of the case for procedures. The lanyard is secured to the boat so that tossing the floating harness allows it to tow behind the boat like a ski tow rope. Circling the person overboard will draw the recovery line near them.

**PFDs, Inflatables (6)** Two hanging from hooks in the pilothouse, another 4 located under the settee in the pilothouse. NSO: please check for “green” visible at bottom of clear canister before each cruise. That confirms a CO2 cannister is installed and the seal is not broken, and the PFD is armed and ready to use. These should be always worn when working on the deck and often in the cockpit. i.e., when approaching/leaving a dock and when anchoring. **NOTE THAT TWO OF THE PFDs ARE NOT AUTOINFLATABLE. THEY ARE CLEARLY MARKED AND ARE RED IN COLOR (VS. BLUE).**



**PFDs, Foam Vest #10:** Located under settee in pilothouse.

**Propane Detector:** The Trident propane detector and solenoid switch control panel is in the galley just forward of the window. The propane solenoid is in the same unit and should be off unless actively cooking.

**Seat Cushions:** In case of crew overboard, throw anything that floats, quickly!

**Tapered Plug, Universal Foam Orange StaPlug:** starboard bottom drawer in PH. Safety drawer.

**Tools:** West Marine tool set is located under the settee in the Salon. Complete socket set and other tools for more complex issues located in engine room port side.

**Windlass Clutch Release/Manual Handle:** Bottom safety drawer of starboard cabinet in pilothouse.

## 4. Batteries, Inverter/Charger, Battery Monitoring

### HOUSE BANK BATTERIES—1650 Ah Lithium in Lazarette

- Lithium batteries have a much wider range of safe usage than lead acid batteries. The available power is approximately 80% or 1300 Ah when fully charged. They can tolerate being discharged down to 20% SOC (State of Charge) and do not require being fully recharged to 100% SOC to maintain their capacity.
- The Battery Monitoring System (BMS) is essential in keeping track of the SOC and should be checked frequently to monitor the battery capacity and charge status.
- Ensure batteries are charging when connected to shore power – you can check this on the Victron BMV monitor at the helm, or the Victron Cerbo monitor in the salon hallway next to the galley.
- When underway, the engine and its high output alternator will automatically charge the house batteries if their SOC is below 80%.



- Moondance has solar panels that can produce 1200W. On a typical summer day in the PNW this may allow for the generation of 300-350Ah, which should do a good job of offsetting your typical daily electrical usage when at anchor.
- Moondance does not have a generator, but the house lithium battery bank is ample enough to handle normal DC loads including lights, diesel cabin heater and the Fusion entertainment system.
- The inverter allows prudent use of select AC electrical appliances as you need them, yet you must be aware of devices that can really suck power such as the microwave/oven, as well as Starlink.
- Under ideal sunny conditions we have gone 5 days without shore power.

**BATTERIES OTHER THAN HOUSE - AGM BATTERIES** – All clearly labelled and secure in white boxes.

- Engine start battery. Located in engine room.
- Bow Thruster and Windlass battery. Located under the forward berth.
- Stern thruster. Located in lazarette.
- These batteries are charged by DC-to-DC chargers located in lazarette.

**VICTRON BMV 712 BATTERY SMART MONITOR**

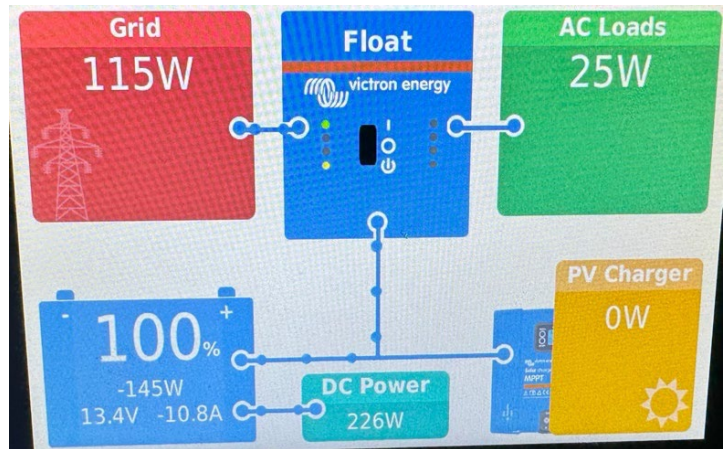
- This circular monitor is located on the port side of the pilothouse helm and has the following readouts that you scroll through using the + or – buttons:
- State of Charge (SOC) as a percentage - This is the most important way to monitor the batteries. **DO NOT allow SOC to fall below 20%. The system is programmed to shut down below 20%.** If SOC is approaching 20%, power usage needs to be severely rationed. You may also need to start the engine and allow the alternator to charge the batteries if solar is not providing adequate input. Lithium batteries are happiest in the 40-90% range, giving you approximately 750Ah of usable charge. A periodic charge to 100% when on shore power is fine, yet a 100% SOC is not as important with lithium vs. lead acid batteries.
- Time remaining - this estimate how long the batteries can support the present load.
- Battery Temperature - Lithium batteries can only operate in a limited temperature range and will shut down with excessive heat or cold.
- Voltage - Terminal voltage at the battery --14.6V for fully charged, 12V when fully discharged.
- Current - This is the actual current flowing into and out of the batteries. Negative flowing out of the batteries and Positive flowing into the batteries from the charge sources. Keep in mind that lithium batteries can accept charge MUCH faster than lead acid batteries. This can be displayed as Amps or watts.
- Power - power drawn from or received by the batteries. Watts/Hr.
- Consumed Ah - this keeps track of the Ah removed from the batteries. Number decreases as batteries charge.





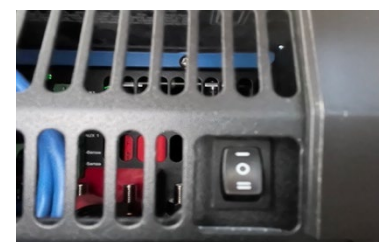
## VICTRON CERBO DISPLAY

- This is located next to the galley and displays electrical flow from all the systems in an easily understood schematic. This allows easy monitoring of your energy storage, energy usage, and where the energy input is coming from. Do not attempt to change any of the parameters without supervision from our maintenance pro.
- AC Input/Shore Power is the upper left corner.
- Inverter activity is in the upper center.
- AC load such as the refrigerator, microwave, etc. is upper right corner.
- Battery capacity - SOC% is lower left corner.
- DC power draw is lower center.
- PV/Solar power generation is lower right.



## VICTRON INVERTER/CHARGER

- A Victron Multiplus II 3000 Inverter/Charger is installed on the starboard side of the forward wall in the lazarette and is easily accessed via the cockpit hatch and steps into the lazarette.
- The main function of the inverter is to take DC power stored in the house batteries and convert it to AC power that can be used by the various appliances that require AC power such as the refrigerator, microwave, and Starlink. The inverter also supplies AC power to the various AC outlets throughout the boat so that you can plug in devices such as laptops, hair dryers, etc. It must be kept in mind that the process of converting energy from DC to AC is only 95% efficient. The inverter cannot handle huge loads or demands -- its maximum output is approximately 30A. You will need to be selective on what AC devices you are operating at the same time: it cannot handle powering the microwave and a hair dryer simultaneously.
- The inverter also functions as a battery charger for the house batteries when connected to shore power. The lithium batteries accept a charge more quickly than lead acid batteries, and do not slow down their acceptance of charge as they reach capacity like lead acid batteries do, so they can place quite a load on shore power sources. Do not add more load to system until the float light is on. There are three DC to DC chargers located next to the Inverter in the lazarette and they are responsible for charging the engine starter battery, the stern thruster battery in the lazarette, and the bow thruster & windlass battery in the forward cabin.
- The inverter control is labeled Victron Digital Multicontrol and is located at the lower left corner of the DC panel in the pilohouse. **This should always be On**, even when on shore power.
- If for any reason you need to restart the Inverter/Charger you can use the Multicontrol on the large breaker panel to turn it off and then back on. There is also an On/Off rocker switch located at the lower right-hand corner bottom of the actual inverter/charger in the lazarette. The switch is recessed in an opening, making it difficult to see, yet can be felt pretty easily.



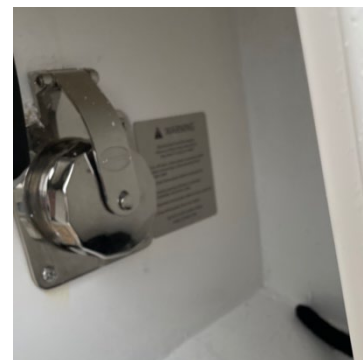
## POWER USAGE AWARENESS

- DC systems are more energy efficient on a boat than AC systems, and most systems you will use daily are highly efficiency DC systems. All the lighting is DC LEDs.
- AC systems are less energy efficient and have an inherent 5% penalty in converting DC to AC via the inverter. The following are approximate power usage of various appliances, and some considerations:
- Starlink draws 12amps AC, which is significant if you have it running all the time. Best to use it when motoring and to shut it down overnight and when not in use. Continuous use 24hrs=288Ah/day!!
- Refrigerator: 75-100Ah per day. This is one of the biggest power draws, yet obviously we want our food kept cold and fresh. Please try to keep the refrigerator door closed as much as possible.
- Hair dryer: 30amps. Please keep its use to a minimum since it takes a lot of energy.
- Microwave/Convection Oven: 150Amps. Extensive use of the microwave oven is a huge draw and needs to be kept to reasonable time frames. If you operate the microwave for 6 minutes (1/10<sup>th</sup> of an hour) you use 15Ah which is OK. Yet if you were to operate the microwave for 30 minutes (1/2 hr) you would use 125Ah which is a lot of energy. This is why Moondance has a propane stove/oven to do the majority of the cooking.
- Toaster: 10Amps
- TV: 10Amps
- We have found that the battery and solar capacity of Moondance allows us to use power as needed and we have never missed not having a generator. Hopefully that will be your experience as well.

## 5. CHARGING THE BATTERIES

### Shore Power Connections

- Connect to shore power either at the bow or stern. Both have ELCI 50A breakers.
- ELCI Breakers are safety devices to prevent Electric Shock Drownings. While more dangerous in fresh water, drownings happen in both fresh and saltwater when people become better electrical conductors of leakage A/C current than the surrounding water.
- The bow ELCI breaker is in the port anchor locker. The stern ELCI breaker is in the lazarette.
- There is a hardwired power cable retractor and 65 ft 50A/240V cable accessed via the starboard locker on the swim step. The Shore Power Cord breaker on DC panel needs to be on and the in/out toggle control switch for the cord is located just above the locker, adjacent to the control for the tender lift. There is a protective metal bridge to prevent accidentally activating either control. Make sure the breaker is turned off when not actively extending or retracting the cable. Note: A 50A/240V shore connection is required to run the Dometic AC units.



- The bow has a Smart Plug and 50 ft cord that can be used for accessing 30amp/120V shore power. We tend to leave this neatly coiled on the bow if the conditions are nice. If the weather is inclement or the seas rough where spray will occur over the bow, store the cord in the port anchor locker or lazarette. There is also a 50 ft extension cord in the lazarette.
- On the DC panel in the pilothouse, the lower left corner of the panel has the 240 Volt AC Selector Switch. Shore 1 is the stern power cable and Shore 2 is the bow power cord. Moondance does not have a generator. The switch should be in the OFF position while attaching shore power. Once everything is attached and secure, turn on the power at the shore power pedestal breaker, then turn the 240V AC selector switch to the appropriate shore power depending on which cord you are using. The green light will only come on when attached to 50amp shore power via the stern 50A/240V cable.
- There are several pigtail electrical adaptors stored in the drawer located in the steps leading from the salon to the pilothouse, to give you flexibility in attaching to shore power.



### Solar

- Moondance has 1200 watts of solar panels which, under good conditions in the PNW, can produce about 350Ah through the day, enough to offset significant amounts of daily energy consumption if the crew is conservative.
- Obviously, this power production will be markedly reduced in inclement weather and during the shoulder seasons when daylight hours are shorter.

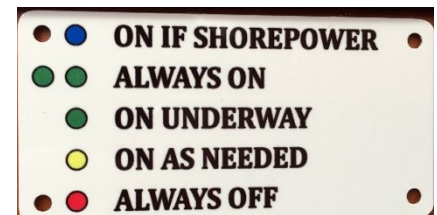


### Alternator - with engine running

- We have installed a Balmar XT 250 High Output Alternator with a Wakespeed external regulator. This system is capable of producing 200A in most cruising situations, so during a 2-hour cruise you can expect 400Ah to be produced and used to charge the batteries. The alternator will only charge the batteries if SOC is less than 80%.

## 6. Electrical Breaker Panels

- Located behind wooden doors over the top of the settee in the pilothouse.
- The panel is organized with the AC on the left and DC on the right.
- The AC and DC panel breakers use the **color dot convention**.





**AC PANEL – 240V AC SELECTION - Lower left corner of AC panel**

- Generator- Moondance does not have one.
- Shore 1- Main power cable at starboard side of swim step with Glendinning mechanism.
- Shore 2- Smart Plug system at bow. Smart plug cord stored in the lazarette or on the bow.
- Off

**AC PANEL 120 VOLT AC/60 HZ DISTRIBUTION - Upper left corner of panel and middle of panel**

- AC Main/Reverse Polarity 50A paired breakers - Master switch for AC panel.
- Water Heater – 30-gallon Torrid water heater in ER. Only use this when on shore power due to high power consumption, otherwise use diesel water heating with Hurricane furnace.
- Washer/Dryer- Can only be used on shore power - 30A or 50A.
- Spare breaker
- Hurricane 2- 12amp electric heating element to heat water in Hurricane unit. Must be on shore power.
- Spare breaker
- Spare breaker
- Charger/Inverter Reverse Polarity 50A paired breakers - Normally On
- Refrigerator- We usually leave the fridge switch “ON” whenever we’re on the boat. If the house battery charge level drops to near 20% SOC and you aren’t planning to connect to shore power, turn the fridge off. Your provisions will stay cold overnight.
- Microwave
- FWD Cabin Outlets
- Cabin 2 Outlets
- Bridge Outlets- must be on to power Starlink
- Galley Outlets
- Salon Outlets

## Moondance January 2024

- Outlets Deck
- Engine Room Outlets
- Hurricane 1- 12amp electric heating element to heat water in Hurricane unit. Must be on shore power. Note that if both Hurricane breakers were on you would draw 24A, limiting further power usage when on 30amp shore power.
- Spare breaker

### **AC PANEL 240VOLT/60 HZ DISTRIBUTION - right side of the AC panel**

- Stabilizer - Moondance does not have one.
- Spare - pair
- Air Conditioner State Rooms - paired breakers - must be on 240 Shore power
- Air Conditioner 2 Pilot House - paired breaker - must be on 240 Shore power
- Air Conditioner 3 Salon-paired breakers - must be on 240 Shore power

### **DC PANEL 12 VOLT DC DISTRIBUTION - top full panel**

- Stereo - Needs to be on to use the Fusion AV system.
- Courtesy Lights - Use these at night to illuminate the exterior decks and walkways.
- Forward Cabin Lights
- Cabin 2 Lights
- Bridge Lights
- Galley Lights
- Salon Lights
- Engine Room Lights
- Searchlight
- Anchor Light - Turn on at night when at anchor and off in the morning.
- Thrusters - This must be on to operate both bow and stern thruster.
- Windlass - Must be on to operate the Windlass. Should be OFF at all other times.
- Tank Gauge - must be on for tank gauges on the helm.
- Engine Room Blower - used to cool the ER, not needed for normal engine operation.
- Horn - On when underway
- Spare
- Wipers - Pilothouse windshield wipers
- DC Outlets - This powers the various USB sockets throughout Moondance. Leave on at all times.
- Davit- Must be on to operate the Presto Marine Lift System for the tender.
- Fan - On to operate the various fans in cabins and pilothouse. Also, the PH defroster
- Shore Power Cord - extension & retraction of stern power cable. Turn off when not actively using.
- Fresh Water Pump - fresh water faucets, showers, heads, and swim step hose-bib. Turn off when off the boat.
- Sump Pump 2 - Always on - Protective cover - Collects condensate from the AC units.
- Stabilizer - Moondance does not have a stabilizer.
- Flybridge - For the electronics on the flybridge. Needs to be on for radar and the rearview cameras to function. Should be one when underway.
- Chart Plotter

- Radar
- AIS - Always on to enable locating Moondance via AIS.
- Video System - Three cameras: Engine room, rearview over flybridge, rearview over tender
- Depth Sounder - Specific to the Panoptic Forward Vu specialized depth sounder. Turn on only as needed, i.e. when anchoring in a challenging location. Do not leave it on, it will shorten transducer life.
- Autopilot
- TV antenna
- WiFi- On to power router and wifi
- Bilge pump three breakers - ALWAYS ON. Protective cover.

#### **DC PANEL 12 VOLT DC DISTRIBUTION - lower smaller panel**

- Running Lights - Turn on if cruising at night. Charter guests are prohibited from cruising at night. There is a lot of debris in the PNW waters, and the risk of damage is substantial.
- Water Maker - Not currently installed.
- Oil Change Pump
- Shower Sump Pump - Both showers. Always On. Protective cover.
- Washdown Pump - bow only, seawater washdown for anchor. Turn on as needed and remember to turn off.
- Head - turn on for operation of forward head.
- Head 2 - turn on for operation of guest head off the hallway.
- Macerator Pump - Should only be on when actively pumping out the holding tank in approved waters. Has a protective cover to prevent turning it on accidentally.

#### **VICTRON DIGITAL MULTICONTROL - Controls the Victron Inverter - lower right corner of DC panel**

- 3 position toggle switch: **ON is normal position**. Can function as both an inverter and battery charger. Charger only - will only charge the batteries, cannot make AC from the batteries. Off can be used to restart inverter if needed.
- Current limit knob allows you to set the maximum inverter amp pull when on shore power. It does not consider the AC draw, which can be monitored with the displays at the top of both AC panels. The limit knob can be useful if you run into the situation where the shore breaker keeps popping and you need to limit the power draw to prevent that.
- Mains On - lit if there is power to the inverter, allowing it to charge the batteries.
- Bulk - lit if inverter is substantially charging the batteries.
- Absorption - lit if the batteries are charging in the absorption mode.
- Float - lit if batteries are fully charged and the inverter is keeping them full.
- Inverter On - Inverter is making AC from the batteries.
- Overload - lit if inverter is overloaded. See manual.
- Low Battery - indicates the inverter has shut down because the house batteries are too low.
- Temperature - indicating that inverter is too hot.

## 7. Helm Electronics, Instruments, Controls



### GARMIN CHART PLOTTER:

- Moondance is equipped with dual Garmin 16-inch MFD's in the pilothouse and a single 12-inch MFD on the Flybridge. These are powered by the Chart Plotter and Flybridge breaker on the DC electrical panel and BOTH need to be on for full connectivity of all the NMEA network devices.
- The Garmin chartplotter gives you many options and it can be overwhelming. I would suggest reviewing as many online tutorials as possible and download the manual for GPSSMap 8400/8600/8700 from Garmin on a portable reader so that you can readily refer to it. You can access the manual on the chartplotter itself: "Info" tab at the bottom of the screen and then scroll down towards the bottom to select "Owner's Manual".
- After power is applied, the system will return to the last formats/settings selected. The most popular selections for screen formats are accessed by selecting Home which will display Category tabs across the bottom of the screen. Going left to right- Autopilot engage, Pinned, Charts, Radar, Sonar, Combo, Smart Mode, and Vessel. Hitting the various Category Options brings up different Features Tabs at the next level up across the screen. If you hit Charts on the Category row, Nav Chart is at the far left should be commonly used. On the Home screen the Settings button is to the far right and it is rather small.
- Our standard format for the Chart Toolbar on the right side of the screen goes from top to bottom: GPS speed over ground, COG, GPS position, Barometric Pressure, Time, Depth. I will normally have the same layout on all the MFD screens so that you can quickly see the most important data on every screen without searching for it.
- Please refrain from changing settings beyond the typical functions like chart orientation, radar overlay, AIS overlay and range. It takes time to set all of this up.
- Please use plastic covers to protect instrument screens when not in use (stored in second drawer of starboard chart table, pilothouse).

## Commonly Used Chart Plotter Selections:

**Finding the Navigational Chart** - Press HOME>Charts>Nav Chart

**Zooming in and out** - These are touch screens, so the two-finger method used on your smart phone or tablet works. Can also use the +/- on the screen.

**Returning the screen to the vessel's current location** - Stop panning at the lower right-hand corner of the screen.

**Clearing Pre-existing Waypoints, Routes and Tracks** - INFO (left of HOME)>Manage User Data>Delete User Data>then the desired option for Tracks, Routes, Waypoints.

**Chart Orientation** - We recommend either Heading Up or North Up. Options tab at lower right of screen, choose the tab with the curled page, Chart Settings, Map Orientation.

**Display Brightness** - Short press of the Power Button will bring up the Brightness control.

**Course over Ground (COG) Vector/Line** - Ensure the COG line is always ON by default. Options>choose the tab with three dots and a star>Cruising.

**Measuring distances** - Tap chart location you want to measure>measure tab on top toolbar>Enter Range/Bearing and the distance will be displayed>Close to exit>Stop Panning

**Turn on Tides & Currents** - On Nav Chart>Options>Layers>Charts>Tides & Currents>Turn on Animation, Slider to Auto. Check Tides and Currents from Information at top right of screen after selecting a location.

**AIS Overlay & Targets** – OPTIONS>choose the tab with curled pages>Layers>Other Vessels>AIS.

**Video Cameras** - Home screen>Vessel on bottom Category row>Video Feature>Options tab to bring up the three video sources. Note that the Video System breaker must be on.

### Suggested Port and Starboard Plotter Presentations for Moondance

Underway

Port Plotter: Chart Nav, Range @ 4nm or 6nm

Starboard Plotter: Chart Nav, Range @ 0.2nm or less

Docking:

Port Plotter: Rear facing video over the flybridge allows you to easily see behind you.

Starboard Plotter: Chart>Nav>Range @ very close in, use what makes sense to you.

**Radar/Radar Overlay** - Press HOME>Charts>Radar Overlay on Feature row. I suggest having one MFD with the overlay and another one as a normal Nav Chart.

Xmit On/Off - turning the Radar On/Off - upper left corner.

Auto High - normally leave on.

Wave/Sea Clutter - allows adjustment for the interference caused by high waves.

Rain Clutter - allows adjustment for the interference caused by rain.

Trails On/Off - allows you to track moving vessels which will leave a faint trail on the screen.

M-scope - uses Doppler technology to highlight moving objects such as other boats. Green indicates they are moving away from you; red indicates toward you.

AIS vessels should be enabled on the radar overlay screen to ease identification as on other screens.



**Forward Facing Sonar - Panoptic LiveVu or Front Vu-** Press Home>Sonar>LiveVu Forward or Front Vu on Feature row. Once again, have one screen dedicated to a NavChart and the other to the sonar. The two tabs present different images which can take some time to learn and interpret, yet the idea is that it allows you to see contours on the floor and obstructions and other objects up to 300 feet in front of the boat. The main use is to get a more detailed image of the bottom so that you can anchor in a challenging area, such as a narrow shelf on the edge of a sheer drop off like those found in Princess Louisa Sound, BC or Alaska. It is meant to be operated at a very low speed like 1-2 knots. **DO NOT OPERATE AT GREATER THAN 3 KNOTS.** Make sure you turn off the breaker when it is not in use to extend the lifespan of the transducer. The transducer extends 4 inches below the hull, and it is easy to damage or even shear off. You access the transducer via the hallway bilge hatch in front of the closet and the guest cabin. 99% of the time you do not need this system, but it can be very helpful in challenging anchorages.

**VESPER CORTEX, VHF, DSC A.I.S. (Automatic Identification System), anchor watch, MOB.** Port side of helm. This device integrates several functions and includes a handheld wireless module that controls it. The hand piece does not need to be on for the AIS to function. Do not remove the handpiece from Moondance's interior.

The Cortex Quick Start Guide is included in the Quick Start section at the back of these notes. While the Vesper Cortex is nice technology, we strongly advise reviewing videos of its use online before arrival. It can be rather intimidating, and it will take time to get used to it. When in doubt, just rely on the iCom standard VHF whose handpiece is just port of the helm. The Flybridge breaker on the DC panel must be on for this radio to operate.

#### AIS

- Moondance transmits her position and data via an AIS signal as well as receives AIS signals from other vessels equipped with AIS transmitters (Commercial vessels are required to have AIS, recreational vessels are optional). The AIS breaker should be ON all the time.
- The chart plotter is tied to the AIS Unit and shows the positions of vessels with AIS as triangles. Make sure the AIS overlay is turned ON. Instructions above.
- AIS information supplements marine radar, which continues to be the primary method of collision avoidance for water transport.
- AIS requires each vessel to have a 9-digit MMSI (Maritime Mobile Service Identity) number to transmit position and data. Moondance's MMSI number is **368309830**
- The triangle points in the direction that the vessel is moving and if you touch the screen over the triangle, the system will give you additional information (such as name, size, speed, bearing, etc.) about the vessel. The system also transmits this same type of information about Moondance to other vessels with AIS.
- The AIS is an added safety feature which allows large commercial vessels to easily see you and your direction/speed. They may try to contact you via VHF channel 16 to verify your course intent.
- AIS allows San Juan Sailing/Yachting to provide faster assistance in case of unplanned maintenance issues as well as alert San Juan Sailing/Yachting of Moondance's return.
- The AIS also enables a collision avoidance system and alarms. This can be annoying in many circumstances and the user should adjust it accordingly.

**VHF Radio Function** on the Cortex handpiece



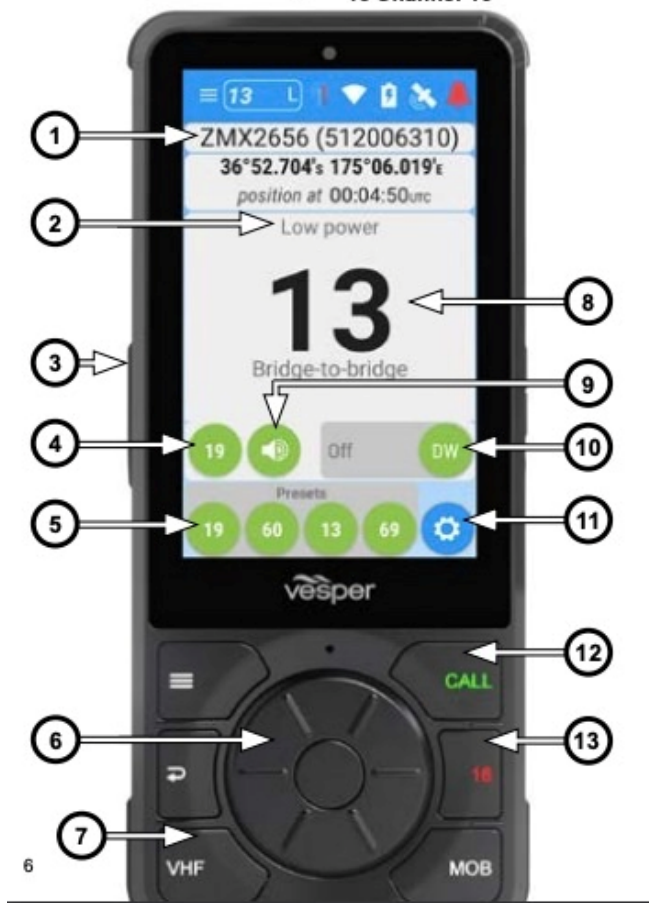
**VHF**

Loud, clear and easy to operate VHF radio engineered for the harsh marine environment.

- |                                          |                                                            |
|------------------------------------------|------------------------------------------------------------|
| 1 Your Vessel Details                    | 8 Selected Channel<br>(Swipe to change or use click-wheel) |
| 2 Transmission Power                     | 9 VHF Mute<br>(alarms still active)                        |
| 3 Push to Talk                           | 10 Dual Watch                                              |
| 4 Last Channel                           | 11 VHF Settings                                            |
| 5 Channel Presets                        | 12 Call (Initiate DSC Call)                                |
| 6 Change Channel<br>(Or via touchscreen) | 13 Channel 16                                              |
| 7 VHF (VHF Radio key)                    |                                                            |

**To make a VHF call**

- 1 Select VHF**  
Select via a keypad button (VHF) or the Main Menu.
- 2 Select the appropriate channel**  
You can also press the PTT key from any screen if the required channel is already selected to bypass steps 1 and 2.
- 3 Verify the channel is clear**  
You cannot obstruct the communications of other channel users due to Federal Communications Commission (FCC) and international guidelines.
- 4 Press the Push To Talk (PTT) key**  
'Transmitting' is displayed.
- 5 Speak into the handset**
- 6 Release the PTT key**



**Other Cortex Functions - DSC Calls to a Target on Plotter, Anchor Watch, Man Overboard** - See the Vesper Cortex Quick Start at end of Owners Notes. I would suggest turning off the AIS collision alarms since they can be very intrusive.

**ICOM VHF/DSC M510 COMMAND MIC** – Radio is on the port side of the flybridge and has a wired handpiece in Pilothouse with same functions as Flybridge base unit. The handpiece for use on the flybridge is stored in the starboard top drawer in the Pilothouse.

- Backup for the Vesper unit
- Easy to use as a standard VHF unit.
- Flybridge breaker must be ON. The base unit on the flybridge should be left ON.
- **Turning On and Off** - The Icom radios will remember if they were off or on when the power was last removed. To toggle ON / OFF, press the large channel tuning knob for 1-2 seconds.
- **Silencing a DSC Alarm** - When another boat (or the Coast Guard) activates the DSC alert, all VHF radios within listening range sound an audio alarm. To silence this alarm, press the Clear button on the radio.
- **Changing from High to Low transmit power** - Press the HI/LO button on the microphone or use the soft menu button along the bottom of the display. It is best practice to use low power whenever possible.
- **To quickly get to channel 16** - Tap the 16/9 button on the radio for immediate access to this channel. Holding it in for 1-2 seconds will take you to channel 9.
- **Accessing the weather channels (WX)** - Use the left / right arrow buttons to scroll the soft menu at the bottom of the display, find CH/WX and select it. The radio will toggle between the Weather band channels and the Communication band channels.
- **Changing between International & U.S. channel** - Press the MENU key, navigate the soft menu, select the Radio Set. Note the setting for CHAN Group is USA. If not, scroll with the tuning knob to highlight the CHAN Group, select ENT and change the setting to USA. In general, the VHF radios should always be monitoring channel 16 while cruising in the Pacific NW, including Canadian waters.
- **How to set up and use Dual Watch** - Dual Watch is a common radio function to monitor two radio channels simultaneously where one of the channels is the emergency hailing channel, 16, and the other channel is any other communication channel you choose. Note that when the radio detects any radio traffic on channel 16, it prioritizes it and interrupts any on-going radio traffic on the other channel.
- **To setup Dual Watch** - use the left / right arrow buttons to scroll the soft menu at the bottom of the display. Tune the radio to the desired 'secondary' channel you wish to monitor. Then select DW to activate Dual Watch functionality. Select DW again to disable the function.
- **How to set up and use Channel Scanning** - The Icom radio will scan all communication channels that are designated with a "\*" (star symbol) when the Scan function is activated. It will pause and monitor each 42 starred channels when it has traffic and then continue its scan when that traffic ceases for more than five seconds. Scan will continue until it is disabled. Traffic on channel 16 will still take priority and interrupt any scan in progress.
- **To setup the channels to be scanned**, first review each communication channel, and ensure the ones of interest are designated with a star symbol. You can toggle the star on or off using the soft menu at the bottom of the display.
- **To start scanning**, use the left / right arrow buttons to scroll the soft menu at the bottom of the display, press Scan soft key. Press it again to stop the Scan function.



### GARMIN AUTOPILOT - Top center of helm

- To engage the autopilot, use the helm wheel to select your heading and then press “ENGAGE” one time.
- There are push buttons to the right and left at the bottom of the display for course adjust. A brief press changes it by one degree and long press changes it by 10 degrees.
- To disengage the autopilot, press “STBY” and take control via the helm wheel.
- Turning the helm wheel while still engaged allows you to change course as needed, yet once you release the helm, the control returns to the autopilot and the original heading. This is referred to as shadow drive, a safety feature of Garmin.



### GARMIN MULTIFUNCTIONAL DISPLAY - Just below the autopilot on helm, also on flybridge helm

- Display toggles through various functions including the following:
- Weather station - wind direction and speed, two different formats
- Water depth and GPS speed



### MERCURY ENGINE MONITORING SYSTEM - Starboard of the MFD. Easiest way to monitor engine fuel consumption. It takes approximately 1 minute to boot up and perform engine systems check when the ignition key is turned on. It is not a touchscreen. Use buttons to scroll up and down. The Home and Speed screens are the most useful.

- Home - First screen to display. Shows RPM in digital format.
- Fuel - not configured. Rely on the standard fuel tank gauges.
- Battery - another voltmeter display
- Speed - Accurately displays fuel burn rate and RPM, I tend to leave this screen on. Does not display speed.
- Trim Tabs - N/A
- System - will display error and fault messages.

### CUMMINS DIESEL INSTRUMENTATION

- RPM is large center display. It also displays engine hours and voltage in default mode. Mode button allows you to scroll through different screens. Warning messages will also be displayed as needed, such as “low coolant”.
- Alternator Voltmeter is upper left.
- Engine oil pressure is lower left.
- Transmission oil pressure is upper right.
- Water temperature is lower right.



**THRUSTERS - BOW & STERN**

- Bow and stern thruster controllers (joysticks) are at both helms. Press and hold both ON buttons until the green light turns on. Breaker switch must be on.
- The thrusters have proportional control, 20%, 40%, 60%, 80%, 100% power at the main controls. Full



deflection of the paddles gives full thrust in that direction.

- By pushing the controls in opposite directions when not moving you can pivot in one spot.
- There is a HOLD function which uses low thrust on both bow and stern thrusters to hold Moondance against a dock while the lines are secured. The amount of thrust can be adjusted, yet low works in most circumstances. Make sure you are **not** moving fore or aft when you engage this feature.
- There is a remote that allows you to move where you can see better. The remote does NOT have proportional control. When turned on the lights flash every couple of seconds.
- Thruster controller will turn off after 10-15 minutes of no use.
- Full thrusters can only be used in short (5-10 second) bursts or will overheat and trip the breakers.
- Bow thruster breaker and battery is in the forward stateroom under the berth which lifts up with a hydraulic assist. Reset the breaker by pushing down on the red button in the center of the yellow switch handle.
- Stern thruster breaker located on the port side of the lazarette forward wall. Reset the breaker by pushing down on the yellow button in the center of the yellow switch handle.



**DIESEL TANK GAUGES** - port and starboard sides of the MFD's. Tank Gauge DC switch must be on. Tank gauges are not the most accurate means of measuring your fuel. However, given the 700gallon capacity and the typical fuel usage on a charter, it is very unlikely you will need to worry about running out of fuel. We still advise that you check the fuel tanks with the site gauges on each tank in the ER. See FUEL for detailed instructions.

**WATER TANK GAUGE** - port side just outside diesel tank gauge. Tank gauge DC switch must be on. When water tank is 100% full, the gauge will read slightly over 75% due to a design flaw. There is a green dot on the gauge to indicate full. There is approximately 25 gallons left when it reads empty. Water capacity is 250 gallons, and it takes 20-30 minutes to fill a nearly empty tank.

**BATTERY MONITOR SYSTEM** – port side of MFD. Easiest way of monitoring the status of the batteries. This is your primary source of information regarding the battery SOC and how much power you have left.

**EXHAUST ALARM FOR OVERHEATING** - port side of MFD. Monitors the temperature in the exhaust. If it goes off, shut down the engine immediately unless vessel is in a dangerous situation and it is essential to maintain propulsion.



**WINDLASS CONTROL AND CHAIN COUNTER** - starboard side of helm. DC breaker must be on.

**SEARCHLIGHT CONTROL** - port side of helm. Searchlight DC switch must be on



### **WINDSHIELD WIPERS, WASHER, DEFROSTER**

- The wipers are variable control and can be operated individually or in combination.
- Turn ON the WIPER breaker at the DC panel.
- Using the wiper control panel at the helm, the left button turns ON all 3 wipers and toggles thru various speeds.
- The center button selects which wipers are ON or OFF.
- The RIGHT button will spray all 3 windshields with fresh water then activate all 3 wipers for 4 wipes and stop (similar to your car).
- To operate the defroster, the Hurricane Diesel Heat system must be on, and the Fan switch on the DC panel needs to be turned on. The control for the windshield defroster is labeled FAN HEATER and is located on the vertical wall of the helm just below the windshield wipers controls. The rotary switch allows you to control the air flow to the front windows.



**CAMERAS** - access via the Garmin MFD - Engine room, rear view from back of hardtop, rear view from back of flybridge. The Flybridge, Chartplotter, and Video system breakers must all be on.

- The rear-view camera over the flybridge makes close quarter handling much easier and less stressful.
- To display the cameras on the MFD- Home>Vessel>Video>Options>Source to pull up the three camera options.

**HORN** - Switch at lower left corner of both helms

**BILGE PUMPS #3** - Can be tested by turning them on individually and listening for their operation. Bilge pumps are in forward cabin bilge, engine room, and lazarette.



**RADAR** - Hopefully you will have little need for the radar while the cruising the San Juan and Gulf Islands. During the summer, fog is not that common and will typically burn off by the late morning. If you wake up to foggy conditions, the best plan is to sit tight and enjoy your current location, rather than venture out. Keep in mind that your Chartering Contracts prohibits operation in conditions of restricted visibility and at night. In the unlikely situation of having fog suddenly envelope you, the radar becomes your best friend and is essential for safe navigation. Consequently, it is a good idea to operate the radar in good conditions to familiarize yourself with the image and how to interpret it.

To start the Radar - Home, Radar on bottom row, which then gives you several options for the radar display. "Overlay" is most commonly used. This will bring you back to the chart, but with the Standby icon in the upper left corner. Pressing Standby will cause the radar to start transmitting.

**DEPTH SOUNDER** - Depth is displayed at the right lower corner of all the chartplotters. We suggest using the depth sounder mainly as an aide to navigation in shallow water i.e., in preparation of entering a harbor, bay or an anchorage location. The key to avoiding rocks is NOT the depth sounder but knowing where you are on the chart at all times. ROCKS ARE THE SINGLE BIGGEST NAVIGATIONAL HAZARD IN THE ISLANDS. THE MAJORITY ARE CHARTED, YET NOT ALL. As you go further north, the accuracy and completeness of charted rocks will diminish. In deeper water the unit will increase its sensitivity, and it is common for that to create false readings due to currents, changes in water temperature, fish etc. If the depth reading is blinking on and off, it is not getting a return signal which indicates you are in very deep water. The depth reading is from the transducer, which is about 4 ft below the waterline, so the depth below is a little deeper than the reading. We strongly advise you to have a minimum of 12-15 feet of water under the boat. When anchoring, make sure you consider the tides and the potential to lose a substantial amount of water depth through the tidal cycle.

**FORWARD VIEW SONAR- Panoptic LiveVu.** This is only used when you are trying to anchor in challenging circumstances where you want to get a better idea of what the bottom looks like. The depth sounder breaker must be on. Do NOT cruise with this on; it will shorten its life. The actual transducer extends 4 inches from the bottom of the hull on the starboard side and is easily damaged. If a log goes under the starboard side, it is conceivable that it could be broken off.

## 8. VHF RADIO PROTOCOLS

- Rule No. 1: Respect the channel designations, especially those of the "big three." Channel 16 is reserved for distress and safety calls and for contact calls to other vessels or shore stations. Channel 13 is used for vessel bridge-to-bridge communications and is heavily used by commercial ships for communication between ships. Channel 22A is used for safety broadcasts and U.S. Coast Guard communications; after hailing on 16, you're usually asked to switch to 22A. You should always monitor 16 in case a nearby boat needs help and to hear Coast Guard safety messages.
- Weather channels 1-9, 4 & 7 come in best in the San Juan's.
- Vessel Traffic Lanes - San Juan Islands and Puget Sound: Ch 5, Canada/ Haro Strait: Ch 11
- What channels should you use for regular conversations? Channels 68, 69, 71, 72, and 78A are considered non-commercial channels, and in most areas, 68 and 72 are commonly used by the recreational-boating community. But remember that the VHF is officially for "operational" purposes. This can be as informal as passing on a weather report, but conversations about what the dog chewed up yesterday are inappropriate. Channel 70 is restricted and cannot be used.
- Whatever type of conversation you may be having, remember that no one else within a 20-mile range can talk on that channel while you're talking. Considering the limited number of appropriate channels, an extended conversation can inconvenience a large number of other boaters. So, keep your VHF communications brief and to the point.
- To hail another vessel, simply call the name of the vessel two or three times, followed by your own vessel's name and station ID if applicable. Moondance's call sign is **WDN7590**. Wait for a response, then immediately switch to a working channel. For example, depress the microphone key and say "Espresso, Espresso, Espresso this is Moondance on channel 16, over." You must release the key to hear a response. The term "over" let's the listeners know you are releasing the key. The response might be, "Moondance this is Espresso, Switch channel 68, over." Moondance would answer, "Moondance switching 68." Both vessels switch their radios to 68, hail each other and converse normally. At the end of the conversation, "Espresso returning to stand by channel 16," or "Moondance out." The term "out" signifies that you are terminating the conversation. Never say "over and out." Those are conflicting terms.

- Securite, securite, securite: Commonly used in the San Juan's and Gulf Islands in areas of narrow passages and limited maneuverability to alert nearby vessels of potential issues and letting them know you are there.
- In an emergency, your broadcast needs to be more structured. With the radio tuned to Channel 16 and the power set to high, begin your broadcast by stating either "Mayday" or "Pan-pan" three times over. Mayday is used when you're in a life-threatening situation. Pan-pan is the appropriate call to make when you're in a bad situation that isn't life threatening at the moment but could become life threatening. Next, state your vessel's name, latitude and longitude (found on MFD Garmin toolbar), a brief description of your boat, and the nature of your emergency. Speak slowly and clearly and wait for a response from the Coast Guard. Once the Coast Guard knows the exact situation and location, be ready for some follow-up questions. You're likely to be asked about such things as the size and type of the boat you're on, the number and age of the people on board, and whether anyone has any medical training.
- DSC – Digital Select Calling. When you press and hold the DSC "panic button" on the VHF, the radio will automatically transmit your vessel information and exact location. Since it's digitally processed and uses narrow receiver bandwidth, it also boosts range over normal voice communications. The radio then automatically changes to Channel 16 and you should monitor until the Coast Guard hails you.

## 9. Engine CUMMINS Diesel 355 HP

- The primary engine room access is through the large floor hatch in the salon, with a ladder that makes it easier to get down. This gives you the best access to the ER and most items that should be inspected and monitored.
- There is another access through a slightly smaller hatch in the galley, which allows for visual inspection of the raw water intake filter, which is located close to midline, forward of the engine. You can enter the ER via this hatch without having to move the large rug in the salon so it can be more convenient, even though there is no ladder to assist.
- For safety reasons, these hatches should be always closed when underway or not in use.
- ER lighting is operated from a switch on the DC panel in the pilothouse, and there is a switch in the ER.
- There is an engine room blower switch on the DC panel. The blower is not needed for engine start/operation. But is useful for cooling down the engine room after operation if you need to spend time in the engine room, or if it is a warm day and the heat from the ER will rise and heat the salon and galley excessively.
- Our Maintenance Pros will check oil and coolant levels, belt tension and debris in raw water strainer whenever Moondance returns from a charter. Charter Guest is NOT required to perform these checks unless a problem is noted such as the engine running hot or the exhaust alarm for heating is going off.
- If on a multiple week charter, please check oil level and other engine vitals weekly.
- Prop walk in reverse to is to starboard but is very slight due to long deep keel.

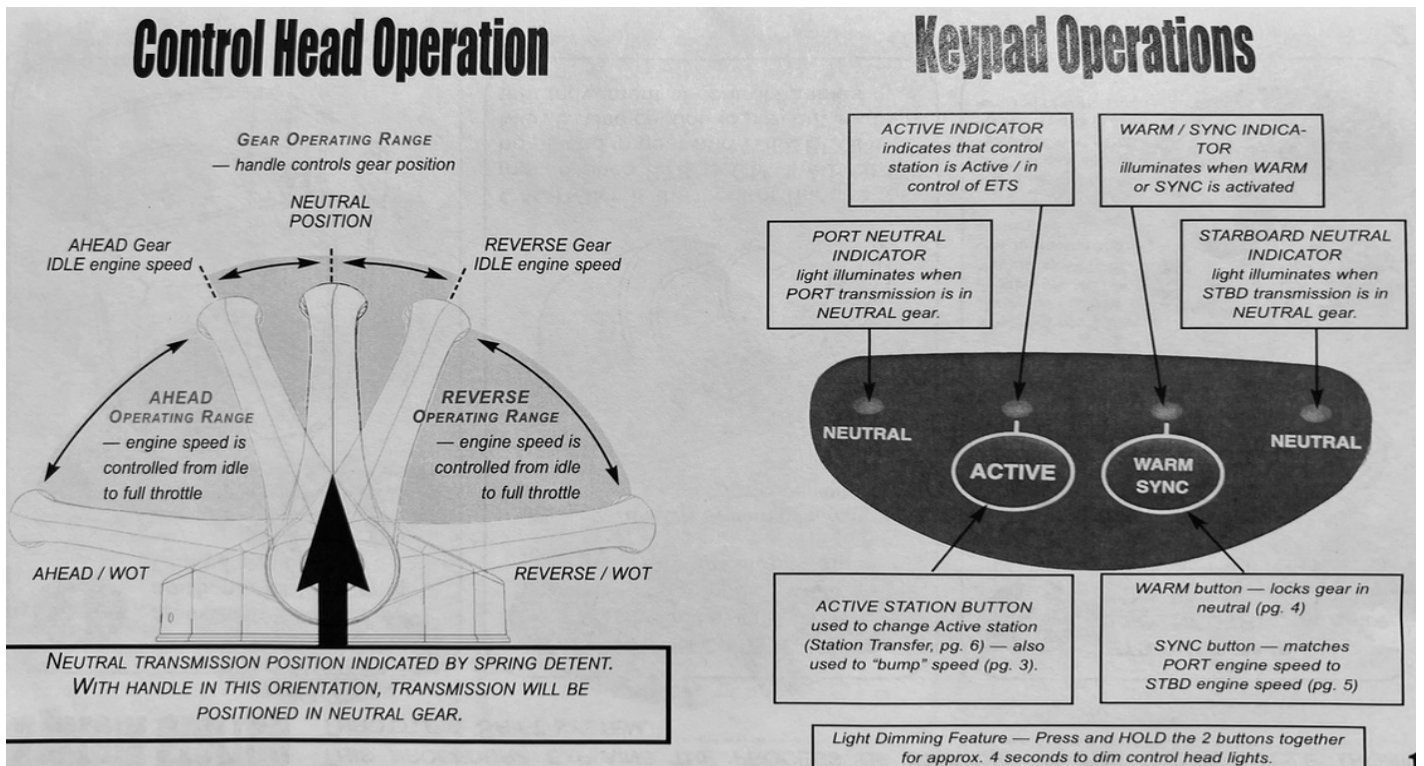
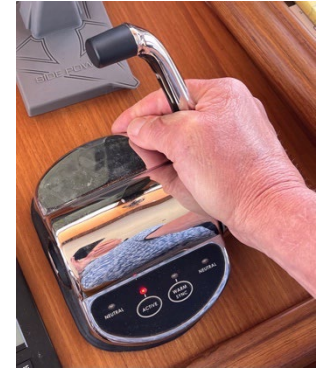




- Fuel Burn Rate: RPM/GPH- 1500/2.4, 1600/3.0, 1700/3.6, 1800/4.0, 1900/5.1, 2000/6.9, 2100/6.9, 2200/7.7, 2300/8.0, 2400/8.8, 2500/9.6, 2600/10.9, 2700/12.2, 2800/13.7. **Redline is 3000 RPM**
- The Mercury Engine display can provide a real time display of fuel burn rate.
- Please run at 2500 RPM for 10 minutes every other day to burn off soot and carbon buildup in the turbo and exhaust systems which helps keep the engine in the best possible condition.

### Electronic Throttle & Shift-ETS

- These controls are located at both helm stations.
- The ETS handle must be in the vertical, neutral position before starting the engine. The system is active once you turn it on. Stay in neutral idle until you are ready to move the boat.
- For the best possible control of throttle movement, keep your hand very low on at the base of the handle, not at the top of the handle.
- Please see the following schematic and instructions provided by Cummins

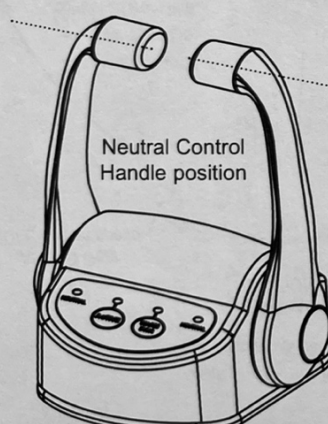


# System Startup

THIS PROCEDURE EXPLAINS THE PROCESS OF STARTING UP THE CUMMINS ELECTRONIC THROTTLE & SHIFT SYSTEM.

**1 CONTROL HANDLES** must be in the Neutral position prior to starting Control System.

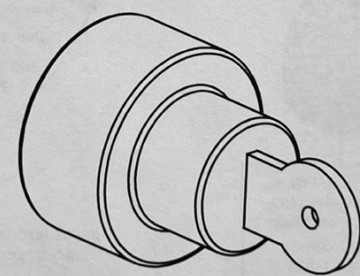
*Position control handles to Neutral before starting EEC system*



Neutral Control Handle position

**2 TURN ON ETS** with the ignition switch. Do not move handles while system is starting up.

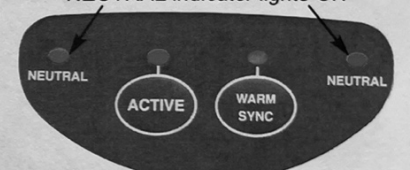
*Turn ON system by turning ON engine ignition switch*



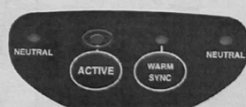
**CAUTION:** If the control handles are moved once ETS is ON, the boat will be placed in gear and **WILL BEGIN TO MOVE**. Use caution to prevent inadvertent movement of control handles.

**3 ETS SYSTEM IS ON** when NEUTRAL indicator lights and ACTIVE light are fully illuminated.

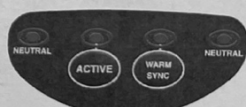
*NEUTRAL indicator lights ON*



If ACTIVE light blinks slowly then control handles are NOT in Neutral. Move handles to Neutral and system will start



If all 4 keypad lights blink simultaneously, system is in ALARM Mode. Shutdown system and restart.



# Warm Mode

THIS MODE LOCKS THE TRANSMISSION IN NEUTRAL WHILE ALLOWING ENGINE THROTTLE TO BE INCREASED OR DECREASED.

**1 To enter WARM Mode** Control Handles **MUST** be in NEUTRAL. **PRESS and RELEASE WARM** button one time.

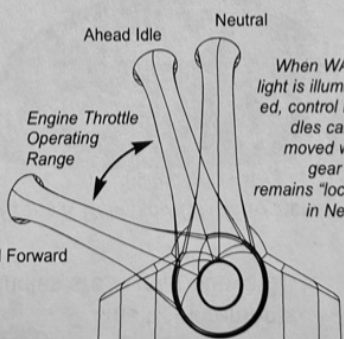
*When Control Handles are in the NEUTRAL position then press WARM button once.*



*The ACTIVE station's keypad lights should look like the illustration below.*



**2 ADVANCE CONTROL LEVER** into engine throttle operating range. The engine gear will remain "locked" in neutral while engine speed is increased.



Ahead Idle Neutral Full Forward

*When WARM light is illuminated, control handles can be moved while gear shift remains "locked" in Neutral*

**It is STRONGLY RECOMMENDED** that the system be placed in WARM Mode at all times when boat is docked!

**3 To exit WARM Mode** and regain gear operation, bring handles back to neutral and **PRESS AND RELEASE WARM** button one time.

*When Control Handles are in the NEUTRAL position and you press the WARM button once — the ACTIVE station's keypad lights should look like the illustration below.*

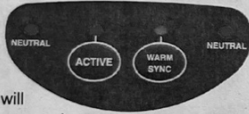



# Cruise Mode

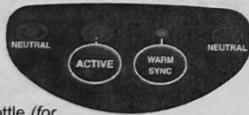
THIS MODE IS USED DURING NORMAL OPERATIONS AND PERMITS CONTROL OVER TRANSMISSION AND ENGINE SPEED USING THE CONTROL HEAD LEVERS.

**1** **ACTIVE** light will be ON during normal "cruise" operation indicating station is "active" and in control of boat's propulsion system.

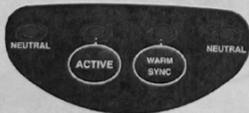
If ACTIVE light is fully illuminated (NOT blinking) station is "active" and in control of engine's gear and throttle (Neutral lights will only be ON if gear is in neutral position).



If ACTIVE and NEUTRAL lights are blinking every 2 seconds, station is INACTIVE and not in control of engine's gear and throttle (for multi-station applications ONLY).

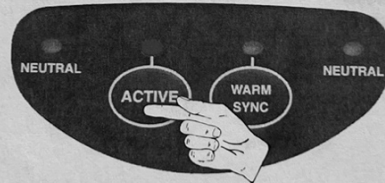


If all 4 keypad lights blink simultaneously, system is in ALARM Mode.

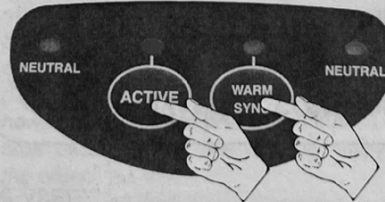


**2** During normal CRUISE Mode you can "bump" engine throttle settings in small increments while handles are in gear above IDLE.

Press & Release ACTIVE to increase engine speed

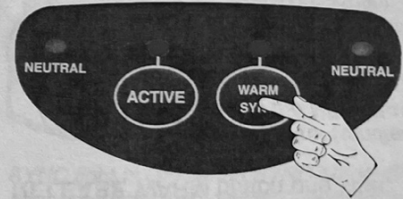


Press & Release ACTIVE & WARM / SYNC to decrease engine speed



**3** During normal CRUISE Mode you can enter WARM Mode or SYNC Mode by:

**TO ENTER WARM MODE** (pg. 4) bring control handles to the NEUTRAL position and PRESS & RELEASE WARM button. WARM light will be ON.



**TO ENTER SYNC MODE** (pg. 5) move handles out of Neutral in the ahead direction, PRESS & RELEASE SYNC button.

WARM / SYNC light will be ON.

# Station Transfer

THIS PROCEDURE ALLOWS PROPULSION SYSTEM TO BE TRANSFERRED FROM ONE HELM CONTROL STATION TO THE OTHER.

**1** **PRESS AND RELEASE ACTIVE** button one time, at the helm station where you want to take control (ACTIVE light will begin to flash).



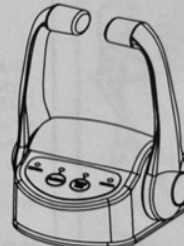
**ACTIVE LIGHT WILL FLASH WHEN ACTIVE BUTTON IS PRESSED AT INACTIVE STATION**

**2** **CONTROL HANDLES** must be in an appropriate handle position at station taking control in order for transfer to be completed (see chart below). When handles are in an appropriate handle position for transfer, the ACTIVE light will begin to flash quickly.

Control handles at ACTIVE station can be in any position prior to transferring control to another station



Control handles at "station taking control" MUST be in an appropriate handle position to transfer control to it



Active Station	Station taking Control
In NEUTRAL	In NEUTRAL
In GEAR / IDLE	In Neutral or same GEAR / IDLE
In GEAR / with speed	In Neutral or same GEAR / same or slower speed setting

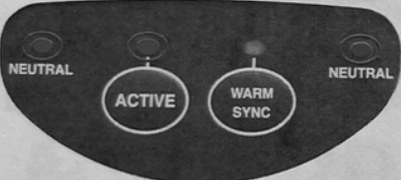
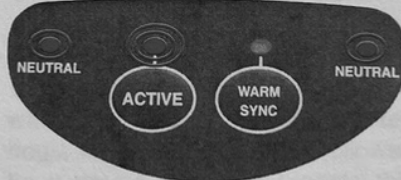
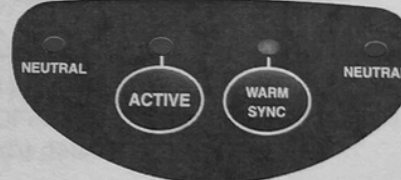
**3** **PRESS AND RELEASE ACTIVE** button a second time. The new Control station is now the Active station and has control of the engine and transmission.



**ACTIVE LIGHT WILL BE FULLY ON AFTER ACTIVE BUTTON IS PRESSED FOR THE SECOND TIME**

# Station Transfer

LIGHT SEQUENCE AT STATION TAKING CONTROL DURING STATION TRANSFER PROCESS

<p><b>1</b> PRIOR TO PRESSING ACTIVE BUTTON at station where you wish to take control, the ACTIVE light will blink once every 2 seconds (inactive station heartbeat).</p>  <p>ACTIVE LIGHT WILL FLASH ONE TIME EVERY 2 SECONDS</p>	<p><b>2</b> AFTER PRESSING and RELEASING the ACTIVE button once, the ACTIVE light will blink — blink rate will depend on control handle setting at station taking control.</p>  <p>SLOW BLINK — HANDLES NOT IN APPROPRIATE POSITION.</p> <p>QUICK BLINK — HANDLES ARE IN THE APPROPRIATE POSITION, PROCEED TO STEP 3.</p>	<p><b>3</b> Control transfer is COMPLETE after PRESSING and RELEASING the ACTIVE button a second time, while ACTIVE light is quick flashing.</p>  <p>SOLID ACTIVE LIGHT INDICATES TRANSFER IS COMPLETE. NEW STATION IS NOW IN CONTROL.</p>
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## Engine Start

- Check fuel tank levels on gauges located at the pilothouse helm.
- Check around outside of vessel for loose lines in water.
- If moored, prepare lines so that they can be retracted and retrieved easily while onboard.
- Make sure that the electronic throttle and shifter, ETS, is in the neutral position -straight up- and do not move it until ready to engage the prop and move the boat. Turn ignition key to ON. The ETS system will light up with NEUTRAL & ACTIVE lights on.
- Wait for the Mercury Engine Monitoring display to boot up. When the vessel status in the lower left of the screen reads OK then start engine by turning the ignition to START.
- You cannot check for water flow from the exhaust on Moondance since the exhaust is below the waterline.
- There is no need for a long warm up before leaving. Extended idle is detrimental to the engine. Once the engine has reached 80 degrees it is OK to put the transmission in gear and leave at idle. Keep the RPM's <1000 until the engine temp is >100. Slowly increase the RPM as the temperature increases. RPM<1300 until temperature >130, RPM<1600 until temperature is at least 160. Normal temperature is 160-165 degrees.
- Cruising at 7-8 knots and 1800-2000 rpm is normal and will give a burn rate approx. 6gph. The Mercury engine monitor will give you an instantaneous readout of your fuel burn rate.
- Do not run the engine for an extended time below 1200 RPM or above 2800 RPM. Redline is 3000 RPM.
- Running at 2500 RPM for 10 minutes at the end of a cruise every other day is beneficial in burning off carbon deposits that may build up at lower RPM's.

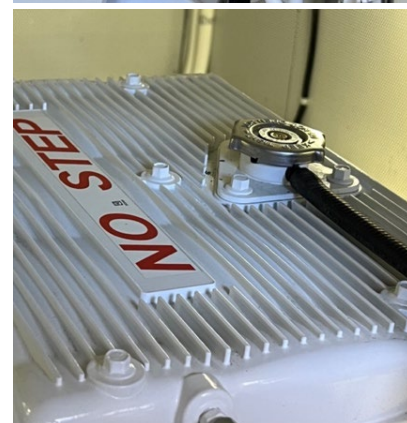
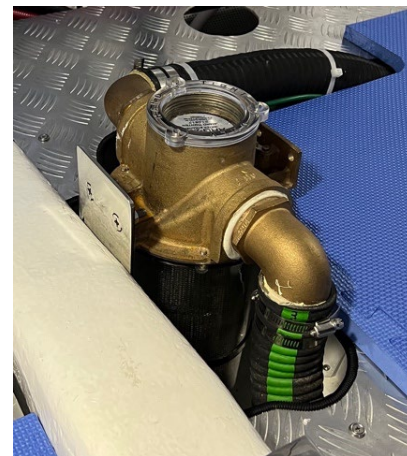
### Shut Down

- ETS handle straight up in neutral position.
- Turn engine key to OFF with key in ignition switch.
- Do not use the Start/Stop button located to the right of the ignition key unless you are on the flybridge. If on flybridge, use the stop button, then return to the pilothouse and turn OFF the ignition key.
- Do not touch the red emergency stop toggle on the vertical surface of the helm in front of the steering wheel. This should only be used in an emergency where you are unable to turn off the engine by turning the ignition key to OFF. If this switch has been accidentally activated it is impossible to start the engine.



### Engine Room Inspection

- A visual inspection of the engine room is certainly appropriate every day just to make sure things look right. The pads under the engine and transmission should be clean with minimal if any accumulation of oil or other fluids. If you see something, inspect further, and bring it to the attention of SJY or our maintenance pro.
- Check the engine sea strainer/raw water intake located forward of the engine. You want this to be clean and free of eel grass, and if you do see substantial material in the strainer or the engine is running hot, then the filter needs to be cleaned.
- Check Racor Fuel filters located on the aft engine room wall. These should be clean with no accumulation of water.
- Check oil level weekly if on an extended charter. The oil dipstick has a yellow handle and is located on the port side of the engine. You want to check the oil level when the engine is cool. If the level is low add oil slowly through the fill cap on top of the engine. Do not add excessive oil—periodically recheck the oil level during the process of adding oil. The oil dipstick is difficult to push back in and requires a fair amount of force to replace it fully. It MUST be fully replaced, and the handle turned to secure it.
- Moondance's Cummins diesel does not have a coolant overflow tank so you cannot easily manually check the coolant level. There is a sensor that is quite sensitive, and it may go off with even a slight drop in the coolant level. If the alarm goes off, do not panic. Continue normal operation as long as the water temperature stays in its normal range of 160-165. Once you stop, you can manually check the coolant once it cools by opening the coolant cap and using a light to look into the tank. The coolant should be just a hair below the metal collar inside the top of the reservoir. Add additional coolant, yet do not allow the level to go above the collar.
- The engine room should be kept tidy with nothing loose that could shift and cause damage. Turn off engine room lights once done. There is a switch in the ER and breaker switch on the DC panel.



### Engine overheats

- Normal engine temp is 160-165 degrees. If the exhaust temperature alarm sounds, or the temperature goes above 160-165 degrees, the most likely cause is eelgrass plugging the raw water strainer, located just forward of the engine. Try to avoid eelgrass whenever possible. There can be mats of eelgrass floating on the water, especially along

those “soapy” looking tide and eddy lines in the water and they should be avoided. When eelgrass gets sucked into the engine cooling water intake, it collects in the raw water strainer, and impairs the flow of water needed to cool the engine. To clear eelgrass from the raw water strainer:

- Stop the engine.
- Shut the thru hull valve to the strainer.
- Open the strainer and extract the eelgrass.
- Replace the lid and tighten. Make sure the O-ring is in place, otherwise you cannot get a good seal.
- **MAKE SURE YOU OPEN THE THRU HULL VALVE.** Failure to do so prevents water flow to the engine and will cause overheating.
- Then restart the engine.
- If, after restarting the engine it overheats again, check the seal between the strainer, the O-ring, and the lid. If the strainer is drawing air, it won't draw water. If needed, open and then retighten the lid on the strainer and check to make sure the O-ring is in place in the lid (and not lying in the bilge.)
- If any questions, call San Juan Sailing and Yachting or our maintenance pro for assistance.

### Loss of Oil Pressure or Coolant

- If the engine loses oil pressure, the warning buzzer will sound and the oil icon warning light on the tachometer will light up, so check which light is showing red. If it's the oil light, shut down the engine and check the oil. If the level is low, add oil accordingly. Contact San Juan Sailing.
- The alarm buzzer is more likely to indicate engine overheating, and the temperature icon light will light up. Shut the engine down unless you are in a hazardous location.
- Moondance's Cummins engine has a monitoring system and has a low coolant alert on the engine panel. You can continue to run the engine, while making sure that the temperature stays in the normal range of 160-165. If coolant level is low, it needs to be added when the engine is cool, via the coolant cap on the starboard side of the engine. Check the bilge for a light green liquid (coolant). If coolant is found in the bilge, contact SJSY immediately.
- Another possible cause of the engine overheating is a thrown belt. Without a belt on the raw water pump, the coolant will not circulate and cool the engine. Replacement belts are in the engine spares.
- One other possibility is that the impeller in the raw water pump has failed. The impellers are replaced every spring, yet it is still possible that a hard object may be drawn in and break off an impeller blade. A replacement impeller is found with the engine spares. Call SJSY or our maintenance pro if you suspect you have a belt or impeller problem.

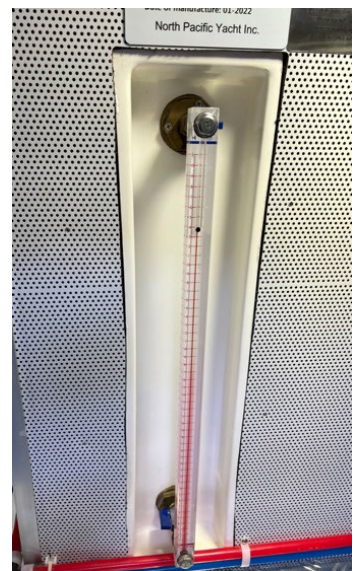
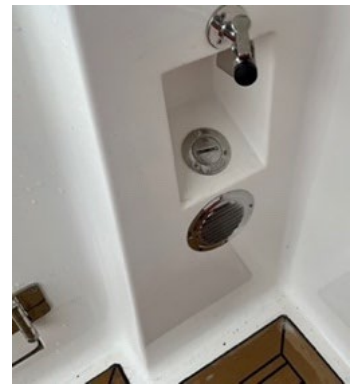
**Emergency Start** - If the Engine Start Battery is dead, you can use the House Batteries to start the engine. In the lazarette there is a switch labelled EMERGENCY START COMBINE/BATTERY PARALLEL. You push the yellow switch down and turn it. Start the engine immediately and turn switch back to off position.

**Bottom line-** If the engine is giving you problems, call SJSY or our maintenance pro for assistance.



## 9. Fuel

- Moondance has two fuel tanks that are cross connected. The two fuel tanks should empty at approximately the same pace. The cross-connection flow rate is not fast enough to allow fueling from one side -- each side needs to be filled separately when at a fuel dock.
- The fuel tanks hold 350 gallons each, and they each have sight gauges to confirm fuel amounts.
- The fuel gauges are in the pilothouse on the dashboard in front of the helm. Turn on the TANK GAUGE breaker on the DC panel to activate the fuel gauges.
- Given the 700 gallons fuel capacity of Moondance and her efficient fuel consumption rate, it is very unlikely you will need to add fuel during a normal charter of several weeks, yet still pay attention to the fuel gauges at the helm and periodically check the site gauges in the ER. In most cases, you will just need to top off the fuel when you return to Bellingham.
- Please make every effort to buy fuel from a good source -- clean diesel is essential for trouble free motoring.
- Fuel filler caps are in the cockpit forward outer corners. The tank vents are located on the inside of the cockpit next to the fill caps. Please wet the flooring with water before fueling to minimize potential absorption of spilt fuel. Have absorbent paper towels ready to catch any potential spill. The starboard side is very touchy about the positioning of the nozzle. USE CAUTION!!
- Fueling: One person handles the nozzle, and another person watches site gauges in the ER. The tank should be filled to the top of the site gauge where it reads **50**. At that point the tank is approximately 80% full. Repeat for the other tank. Wearing the EarTec Headsets makes communication between the person monitoring the site gauges and the person fueling much easier.
- It is always a good idea to check the site gauges on the fuel tanks every 2-3 days and make sure what you see is consistent with the gauges in the pilothouse. The site gauges have the valves at both the top and bottom and they should always be kept closed when you are not actively checking the levels. Keeping the valves closed prevents a disastrous fuel leak if the sight gauge was damaged. You must open both the top and bottom valves and allow the gauges to equilibrate with the tank for a few seconds to get an accurate reading. Be sure to close both top and bottom valves when done.
- If you are planning on a cruise of 3-4 weeks or more, you may want to top up the fuel tanks to their full capacity. Fill slowly and listen carefully to the vents located below the fuel filling hole. Stop filling when the pitch rises. Make sure you do not overflow!! Fuel spillage is very serious and can result in substantial fines. Pay Attention and be careful. Repeat for the other tank.



### Fuel Filters

- Located in the engine room on the aft wall near the center line.
- Diesel engines require perfectly clean fuel to operate reliably, and modern diesel engines have two filters in parallel to protect the engine. There are two primary Racor filters, and you only use one at a time, leaving the other filter as a clean spare in case of problems.
- The pointed end on the selector valve with the yellow handle points toward the filter in use.
- The vacuum gauge between the filters indicates filter condition. When the gauge is pointing in the white zone, the filter is okay. When pointing in yellow, it is time to switch filters. Do not allow it to go into the red zone!
- During your check-in, please report if you switched filters.



## 10. Anchors and Windlass

- With a large anchor, 400 feet of 3/8 chain, and a massive bridle, the ground tackle should keep you safe if you set the anchor properly.
- Windlass raise/lower anchor foot pedals are located on the port and starboard sides of the windlass under covers.
- Please do not use the windlass controller at the helm.
- Chain Length Marking: 18-inch length of yellow nylon line woven into chain. 1 piece every 25ft, 2 pieces at 100', 200', 300'. Blue nylon zip ties have been added every 100ft to aide in keeping track. Fluorescent Fuchsia zip ties indicate you are at the end of the chain-- STOP!
- Windlass on/off switch is located on the DC panel in the pilothouse. There is a breaker switch on the port side of the forward cabin bed which can be reset by pushing the yellow lever up and back into position.
- Make sure you turn off the DC panel breaker when the windlass is not in use.
- The windlass clutch release/tighten tool is in bottom safety drawer of the starboard cabinet in PH. If the windlass slips when raising the anchor, the clutch may need to be tightened. In an emergency, if the anchor needs to be lowered quickly the clutch can be loosened. Keep enough tension on the clutch so the chain pays out at a controlled rate – keep an eye on the chain pile and be prepared to tighten the clutch if a knot of chain is pulled up.





- ALWAYS have the engine running when operating the windlass. This will provide additional charging capability and gives you maneuvering options if you run into problems while deploying or raising the anchor.
- Primary Anchor: Rocna 88# anchor 400 ft of 3/8" chain, short segment of nylon rope, to allow cutting anchor loose in emergency.
- Secondary Anchor: Stored in port chain locker. 30' chain, 200 feet nylon line
- There is a chain counter in the pilothouse that is helpful in keeping track of the amount of chain out.
- There is a fair-weather bridle stored in the port chain locker and a foul-weather bridle stored on the flybridge under the far aft seating. As charter guests I would suggest that you should probably not be anchoring in conditions that would warrant the use of the heavy-duty foul-weather bridle, which has 1 inch 30 ft long lines, and whose point of attachment to the chain would be approximately 20 ft below the water line. With this you have effectively added 25 feet of rode and increased your holding power.
- Use the fair-weather bridle with ½ inch 25 ft lines while setting the anchor and to hold the anchor overnight. Using the bridle takes the load off the windlass and will also minimize noise transmission into the forward cabin. When using the fair-weather bridle, you have effectively added another 15-20 feet of rode. Consider this in your rode scope calculation as you prepare to anchor.
- Use the snubber line to release the load off the winch when anchor is fully raised. Secure snubber tightly to the stanchion behind the windlass and then loosen the load on the windlass with a slight touch on the down control. If you are in an extremely protected anchorage in shallow water, it is not unreasonable to just use the snubber after anchoring. If there is ANY doubt, use the bridle.
- There is a seawater wash down hose bib at the bow on the starboard side of the windlass. It is best to spray water on the chain before it gets to the roller so that mud and other debris washes back into the sea. It is also helpful to have the boat hook handy to remove whatever may come up along with the anchor. If you spray down the chain from port side of the winch, hook the hose around the back of the stanchion so it cannot be caught by the chain. The washdown breaker on the DC panel must be on to use the washdown hose. Make sure you turn off the breaker switch once the washdown is done.
- **Be careful when raising or lowering the anchor. The crew member operating the windlass on the bow needs to be especially careful to keep everything clear of the moving chain and operating windlass. Damage to the boat or injury to the operator can occur if someone is not paying close attention to the operation of the windlass and chain.**

## Details

The scope normally used in the islands is 4 to 1. It is not 7 to 1, unless conditions call for it, i.e. sustained winds over 25 knots, in which case you would be strongly advised to be moored at a safe dock. Most of the anchorages are well protected and popular, so you will likely have someone anchored nearby. Most coves are 20'- 40' deep, so expect to pay out about 100'-200' of rode. You should be slowly reversing when playing out rode so that the anchor chain is laid out in a linear fashion and not just dumped in a pile on the bottom. When calculating rode, make sure you consider the anchor pulpit is 8 feet over the water. Since the tides can change water depth up to 12' in the San Juan Islands, be aware of where you are in the tide cycle when choosing an anchorage and calculating how much rode to put out. Once the calculated amount of rode has been laid out, you need to attach the bridle and set the anchor by putting the idling engine in reverse for several seconds while observing the bridle and anchor chain which should be under tension. At that point put the engine back into neutral and the chain should relax again. Never pull on the chain for more than several seconds and never at any speed higher than idle, doing so may cause damage to the ground tackle.

Once you are confident the anchor has been set, you and your crew should spend at least 10 minutes monitoring your location and making sure you are not dragging. This can be done via careful marking of local

landmarks or using an anchor watch program. You can also monitor your position on the chart plotter with it fully zoomed in. Once you are assured that you are not dragging or drifting, it is appropriate to shut down the engine.

Please use the anchor bridle to take the load off the windlass. The anchor bridle takes strain off the windlass, pulpit and pulpit pulley and shifts the load to the bow cleats which are much stronger and more durable. An additional benefit is that the anchor bridle will significantly lower the chain noise transmitted to the forward cabin, as well as increase the holding power of the ground tackle.

When selecting an anchorage, you should look at the charts and cruising guides for tips on good locations. Ideally you want a soft bottom with sand, mud, or gravel. Avoid areas with eel grass which would be damaged by anchoring. You also want to select a spot in an anchorage where you have room to swing on the anchor without interfering with other boats. The first boats have priority in an anchorage and each successive boat has the responsibility of leaving enough room.

Stern-tie shorelines may be needed in some tight anchorages to prevent the boat from swinging. 500' of nylon line is stored on a reel in the lazarette. Once the primary anchor is set off the bow, the tender is deployed to take the line to shore. The reel can be suspended between the arms of the lift with a broom handle from the lazarette used specifically for this purpose. Ideally, the stern tie line should be passed through a permanent eyelet that has been installed for this exact purpose on the shore and then the line is returned to the boat, creating a large loop that is then tightened to prevent the boat from swinging. When leaving, you simply release the line and quickly pull it back through the islet and onto the boat, while carefully monitoring that it does not interfere with other boats and your own prop. If a shore eyelet is not available, you can consider other options such as looping around a huge rock. Looping around a tree is illegal in most situations due to the potential damage to the tree.

Inability to raise the anchor due to fouling is rare, yet it can occur. One potential cause is pulling the boat forward with the windlass, which can cause the anchor to dig too deep. One technique to free the anchor is to pull forward as far as possible without having the chain contact Moondance and try raising it again. If that does not work, take a line, and fashion a loop around the anchor chain and then weight it down where it will sink to the ocean floor. Then take the tender and go forward past the chain to get a 45-degree angle with the bottom and pull the anchor out, opposite of the direction that the flukes were pointing.

## 11. Highfield Tender and Presto Marine Lift

- 11' Highfield RIB Console Tender, 6 people capacity, 25hp Tohatsu Outboard. The tender motor has a battery start and automatic choke. 5-Gal fuel capacity. There is a Garmin GPS Map to aid navigation- It does not have a touchscreen.
- **DO NOT TOW THE TENDER.** Secure it on the lift and slide the lift fully forward. Towing is TOO risky, and the possibility of loss or damage is TOO great. IT IS NOT AN INEXPENSIVE TENDER!
- While raising and lowering the lift into the water only takes a minute or so, securing the tender to the lift before cruising takes approximately 10 minutes and requires close attention to the step-by-step procedure described below. There are also multiple photos to help you. The first time you unload the tender it will seem daunting, yet it gets much easier with a little practice.
- The lift with the loaded and secured tender can be slid to the intermediate position to allow easy access to the swimstep from the cockpit and a dock.
- ALL passengers **MUST** be off the tender when positioning the tender on the lift and when raising and lowering lift. Having a passenger onboard is dangerous.
- The Tohatsu outboard must be tilted at least **15 degrees** before loading on the lift to avoid damage to the swimstep.
- We strongly advise that everyone wear a PFD when on the tender. There is a legal requirement to have a PFD for every passenger on the tender.

- The lift system will raise the tender high out of the water and is easily raised and lowered using the control switch located on the starboard swimstep locker exterior, next to the switch that controls the power cord retraction system.
- The DC Davit breaker must be turned on to operate the lift which is hydraulically powered.



#### LOWERING THE TENDER

- To move the tender from the fully retracted position the locking pins on both arms need to be raised and the lift pushed to the intermediate position where the pins should drop into holes securing it there.
- The next step is to remove the ratchet tie downs securing the tender to the lift. Carefully note their positions which should match the photos in these notes.
- There are two secondary  $\frac{3}{4}$  inch ratcheting tie downs that encircle the tender and secure it to the lift. Release these tie downs and flip them over the bow and outboard respectfully so that the long straps can be pulled parallel of the support arms. **Do not detach the  $\frac{3}{4}$  inch straps from the lift.**
- The primary tie downs are another two 2-inch ratcheting tie downs at the bow and stern of the tender. Release and detach these tie downs from the lift and tender and store them in the cockpit. **Do not lose them, they are required to secure the tender to the lift.**
- **Do not release the white cable that runs between the lift and the tender's transom.**
- Push the lift and the tender to the very end of the tracks and make sure the locking pins are engaged in the holes in the tracks. **YOU CANNOT LOWER THE LIFT UNLESS IT IS IN POSITION AT THE END OF THE TRACKS.**
- Either tie the painter line from the bow of the tender to a cleat or have someone hold on to the line while another person lowers the lift using the switch on the starboard swimstep locker. **DO NOT STOP IN THE MIDDLE.** Doing so will cause the tender to tilt and potentially slide off the lift.
- Once the lift is completely lowered into the water, release the wire cable from the port lift and leave it attached to the transom eye- do not remove it from the tender. At this point the tender will float free and can then be moved off the lift and to a position where the tender can be easily boarded. No passengers can be on tender when lowering or raising the tender.
- Raise the lift back out of the water, and slide it forward, so tender has good access to the stern.

#### RAISING THE TENDER

- All passengers must be offloaded before positioning tender over the lift.
- Using the painter and stern lines, position the tender over the lift, pulling it close to the lift. Attach the white wire cable from the tender transom to the port lift. You want the tender positioned so that there is a little slack in this cable before raising the tender. The tender tubes should be about two inches away from the lift and you may need to move the tender forward several inches to get enough slack in the cable to allow that.
- The tender motor should be raised at least **15 degrees** so that it does not contact the swim step when the lift is raised and retracted.
- Raising the tender needs to be done continuously without stopping part way.
- Once the lift is in the fully raised position, slide the lift forward to the intermediate position and make sure the locking pins drop into the holes in the rails. Ideally let the tender sit for several minutes to allow for some drying to occur.
- Replace & tighten the primary 2-inch ratchet tie downs from the bow & stern of the tender to the lift.

- Then replace the secondary ¾ inch tie downs that encircle the tender. This will require some effort to get them around the tender bow and the outboard and to the appropriate position on the far side of the tender. Make sure that the tie downs run flat and straight as they cross the tender tubes to minimize chafing and wear.
- **Rinse the lift off with fresh water to minimize corrosion.** There is a freshwater hose located in the port swim step locker. The Fresh Water Pump needs to be on at the DC panel. When storing the hose make sure it does not meet the diesel furnace exhaust that runs through the compartment: the hot exhaust will easily melt the hose.
- **Pull the lift and tender back to the fully retracted position and make sure that the locking pins drop back in their holes to secure the tender and lift.**
- **Thoroughly secure the tender and lift before moving Moondance.** In heavy following seas or rough conditions, there should be no possibility that the tender could be lifted off the lift.

Positions of the secondary ratcheting tie downs securing the tender to the lift. Secondary ratcheting tie downs are secured to the lift- Do not remove. White cable at transom which must be attached when raising/lowering.



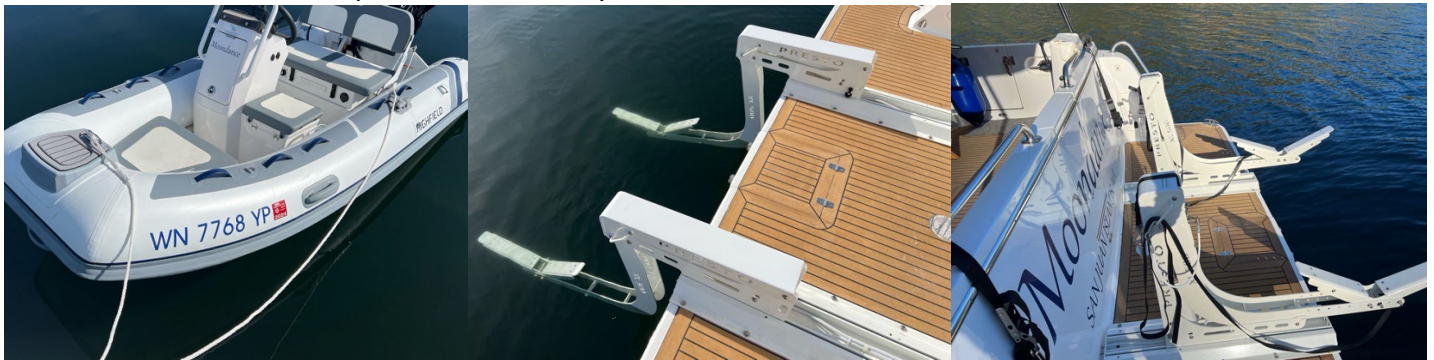
Primary 2-inch ratcheting tie downs at bow & transom attached to the lift via holes in the support arms. Tender on lift, secured with tie downs and lift fully retracted with locking pins down.



Lift and tender in intermediate position, full extended position, and lowered with tender in water. Outboard raised 30 degrees to prevent damage to swim step when tender moved over the swim step.



Tender floating free of lift with lines used to control. Lift fully lowered to allow positioning of the tender. Lift raised and in intermediate position. Secondary tie downs attached to lift and lift arms.



### Highfield Tender with Tohatsu 25hp outboard start procedure.

- Connect the engine shut-off cord to your wrist or clothing and snap the clip under the red kill switch below the ignition key.
- Turn battery cutoff to “on”. Make sure the throttle is in the neutral position - if it is not in the correct position, it will not start. Lower the engine completely into the water using the control on the throttle arm. Turning the key will start the outboard.
- There are labeled buttons on the console for various options. Aux 1 will power the Garmin Chartplotter.
- The tender is rated for 6 passengers. It is capable of considerable speed so be very cautious and aware of safety when operating the tender.
- The tender and outboard motor are very heavy, making it difficult to take the tender up on a beach. Raise the motor and row the dinghy to shore as it can be challenging to raise the motor while surfing into the beach. You also want to avoid damage to the tender prop when in shallow water. Tie the tender painter (bow line) to a secure object or have crew hold onto the painter.
- **Make sure the drain plug is in place in the transom before you lower the tender in the water. Sinking a tender is very embarrassing and expensive.** The plug should be removed only to allow rainwater to drain from the tender.

- The tender has an Anchor Buddy bungie cord system stored under the main seat, which allows you to leave the tender floating offshore while you hike and explore. Secure the bungie on the anchor to the transom metal eye. Row the tender out into deeper water and drop the anchor. Return to shore stretching the bungie as you go. Pay out the painter or secure a longer line which is also stored under the seat, to the front cleat and then let the bungie pull the dinghy out into deeper water. Tie the dinghy painter or longer line to a secure object on shore.
- If the tender battery is dead, it can be charged by plugging an AC cord into the plug under the primary seat and the outlet in the cockpit. The AC breaker switch for cockpit outlet will need to be on.
- If the tender needs inflation, there is a foot pump and patch kit stored under the tender seat. The dinghy has three (3) baffles, each with an inflation valve located on the inside of the boat. The foot pump is held closed with a locking clasp. Release the clasp, insert the appropriate inflation nozzle into the valve and give a ¼ turn to lock it in place. Inflate the baffle or keel with the foot pump until it is firm. When done, carefully detach the inflation hose. If the valve is still open, press it once to close it.

## 12. Fresh Water System, Showers & Sump Pumps

- The freshwater pump breaker is located on the DC panel. Please turn this breaker off when you are away from the boat. The freshwater pump will burn up if air gets into the pump due to an empty/nearly empty tank or a broken line/loose hose fitting.
- The water fill cap for the single 250-gallon tank is located on the starboard side steps leading to the flybridge. Please double check that the cap reads “WATER” before filling.
- The deck cap key is in the key drawer in the salon.
- The water gauge is located on the port side of the helm dashboard. Unfortunately, the water tank and sensor were designed such that it will never read FULL. You can safely fill the water tank completely full where the water will overflow from the vent located on the side of the hull below the water port. It can take 20 minutes or more to fill an empty tank.
- There is a backup water pump that can be used if the primary water pump fails. You switch between the two water pumps by accessing the water pumps in the forward bilge via the forward cabin floor hatch. There is an electrical switch located above the pump.
- Filtered water goes to the icemaker and the small spigot on the right side of the sink.
- Hot water is produced in the following three ways:
  - (1) - Hurricane Diesel Heater - Control panel is in salon at the top of the steps leading to the cabins. Touch the screen to activate. Turn on the diesel furnace by touching the flame indicator at the upper left and it will provide hot water within 15 minutes and can continue to supply hot water until you run out of water. This is the most efficient way to heat water when anchored. The Hurricane unit is quiet, yet I would suggest turning it off overnight when at a quiet anchorage. There are also two electric heating elements in the Hurricane that can be used when on shore power. The 1.5kV level requires that the Hurricane 1 breaker on the AC panel be on, and the 3.0kV level requires both the Hurricane 1 and Hurricane 2 breakers on the AC panels be on. With both electric elements on it will consume 24amps. Diesel heating is more efficient than electrical.



- (2) - Engine heat - The engine automatically heats the hot water tank while running and will provide a good amount of hot water. This is a good reason to shower after arriving at your destination and take advantage of essentially free hot water. This water can be VERY HOT so use caution.
- (3) - 30 Gallon Torrid Electric Water Heater - This really sucks power. You must be connected to shore power with the WATER HEATER breaker on the AC panel flipped on.
- The shower sump pump breaker at the DC panel is always on and has a protective cover. Both showers drain into the same sump pump. You can access the sump pump via the hatch in the forward cabin.
- There is a freshwater handheld shower fixture in the cockpit. The access hatch is located just to the side of the transom door. This is also useful for washing off shoes after returning from the beach.
- There is also a freshwater hose on the swim step for rinsing off the marine lift. This should be used every time the lift is used.
- Water from sinks and showers are considered grey water and drain overboard.

### 13. Heads/Toilets and Holding Tanks

- The DC power switch for both heads and the freshwater pump need to be on for the heads to operate normally.
- Only what has been eaten goes into the toilet. Experienced boaters deposit toilet paper in Ziploc baggies in a wastebasket and not down the toilet because paper clogs the hoses. Everyone onboard should have a clear understanding of this. How you use a toilet at home is not appropriate on a boat.
- Both toilets are electric with freshwater flushing. Each flush creates approximately 1 gallon of waste that goes into the holding tank. Depending on the number of people onboard, you can produce a substantial volume of waste each day, and the holding tank can only hold 65 gallons. Everyone onboard should be thoroughly briefed on the limitations of a marine plumbing system and should be as conservative as possible.
- When urinating/peeing, you do not need to add water to the bowl with the up arrow on the control panel. One option is to just let the urine sit in the bowl to minimize water use. Alternatively, you can drain the bowl with the down arrow on the control panel, which will add some fresh water as part of the flush.
- When defecating/pooping, it is best to add water to the bowl **first** with the up arrow, defecate, and then flush the bowl with the down arrow.
- Flush a ½ capful of NoFlex Digestor down each head daily to help keep the lines and holding tank free of buildup.



- Both toilets flush into one holding tank. A holding tank level gauge is located in both heads. Press the switch ON to read the level. Unfortunately, these gauges are notoriously inaccurate, so do not trust them completely.
- The holding tank capacity is 65 gallons. Please empty BEFORE it's full; we would suggest when  $\frac{3}{4}$  full to play it safe. **DO NOT OVER FILL the holding tank as leaking sewage is just plain nasty and very expensive to deal with.**
- **Please note that in U.S. waters it is illegal to discharge holding tanks overboard.** While in Canadian waters, outside of bays and harbors, overboard discharge is allowed.
- San Juan Yachting staff will discuss holding tanks and pump outs on your arrival. There is a limited number of pump outs in the Islands, so you need to do some planning.



#### Emptying the Holding Tank - Pump out at a shore facility.

- I know from personal experience that I was very hesitant to do this initially, yet it really is easy and not that disgusting (really)! This is environmentally friendly, the default option, and does not require changing any valves or operating anything on Moondance. It is a good idea to wear disposal gloves during the procedure and a box of them is kept in the top starboard drawer in the pilothouse.
- The access is on the starboard side of the hull just below the pilothouse door and is clearly labeled WASTE. It is not located on the actual deck. You can use a deck cap key to initially loosen the cap and then carefully unscrew it. **When removing the cap, it is very, very important that you pay attention and do not drop the cap into the water, (never to be seen again)!!!! There is no chain attaching it to the hull.** If a chain was present it would prevent the required vacuum seal from working.
- Follow the instructions on the pump out station and insert the rubber nozzle into the access hole to the holding tank and then turn on the pump to essentially suck out and drain the holding tank.
- It is good practice to use a hose on the dock to add some water via the holding tank access and then suck that out as well to keep the tank as clean as possible.
- Make sure you replace the deck cap and close it tightly using the cap key.





**Discharging the Holding Tank Overboard Using the Macerator Pump. The San Juan Islands and Puget Sound is a no discharge zone, and this is illegal in those waters. The situation is different in Canada.**

- Open the discharge hose seacock located in the forward bilge that you access via the hatch in the forward cabin. Moondance does not have a Y valve. All black water from the heads goes directly into the holding tank.
- Turn on the macerator pump by flipping on the MACERATOR breaker on the DC panel. There is a timer switch mounted aft of the macerator pump and the seacock in the bilge to prevent burn out of the pump if you forget to turn it off at the breaker. The pump motor pitch varies as it discharges the waste. When the tank is empty, the motor pitch will quickly rise as the pump sucks air. It may take 10 minutes or more to empty the holding tank. You can monitor your progress with the tank monitor that is in the head of the forward cabin. Pay attention and turn off the timer switch followed by the breaker in the pilothouse. Running the pump too long when the tank is empty can burn out the pump.
- Immediately close the discharge seacock. This is both a safety consideration and a requirement by the Coast Guard. If this valve is open when inspected, it will result in a significant fine.



## 14. Heating/Cooling the various living spaces - two separate systems

**Heating with diesel/hydronic heating - the most efficient means of heating the boat and its water.**

- ITR Hurricane diesel furnace is in the lazarette and circulates warm water to various air fans throughout the boat. Each area is individually controlled by local thermostats and fan controls. The fans run on DC from the batteries. No shore power is needed. The Hurricane furnace does not have a breaker switch in the Pilothouse. It takes about 15 minutes for it to heat water hot enough for a shower.
- When on shore power there is the option of using electrical elements in the Hurricane to heat the boat, yet even with the 3kW higher setting it will not generate as much heat as the diesel heater. The electrical heat may be a good option when only minimal heating is needed.
- Turn thermostats down to 65 degrees or lower at night to conserve the batteries.
- Either the Hurricane Furnace or the Cummins diesel engine automatically heats the water in the domestic hot water system when the system is on.
- The primary control panel is located next to the galley, at the top of the stairs leading to the cabins. Touch the screen to activate the display. With diesel heat ON you will see the “flame” icon light up. To



use the electric heat elements, you use the arrows to toggle between OFF, 1.5kV, and 3kV. The appropriate AC breakers also must be on, and shore power is required for electric heating.

- There is a small hole next to the display where a paper clip can be inserted if the display freezes.
- The Hurricane heater exhaust is on the port side back at the swim step corner. Please ensure the area is clear of fenders and lines when the heater is running as the hot exhaust will melt these items.
- The follow locations have Heating Thermostats & Fan Switches - the fan switches should be left in the low position and can be switched to the high position if more heat is needed (very unlikely). DO NOT TURN THE FAN SWITCHES TO OFF. The furnace needs air circulation while it is in the cool down phase after you have turned it OFF at the Hurricane control panel. The fans will shut down automatically when the furnace has cooled down enough.
- Salon – Thermostat and Fan control is on the same wall as the primary control panel; there is a second fan control next to the settee. We tend to keep that fan control in the off position, since the fan circulates air under the settee, which in turn will heat whatever is stored in the drawers under the settee. These drawers are NOT a good location to store food or other items that would be ruined by heat/warm air circulating around them.
- Pilothouse – Thermostat and Fan control
- Forward Cabin – Thermostat and Fan control
- Guest Cabin – Thermostat and Fan control
- Forward Head – Thermostat and Fan control
- Guest Head – Fan control only next to head

#### Cooling and heating with Dometic Reverse Air System-

- Air Conditioning has been installed given the warming climate and the need to stay comfortable in unusual circumstances.
- The Dometic AC system will only work on 50A/240V shore power, using the stern power cable.
- The Dometic system will also heat the boat when on shore power, yet once again requires 50A/240V power, and it is not as efficient as the Hurricane system.
- Master controls are in the salon, pilothouse, and the forward cabin. There is an auxiliary control in the guest cabin, yet it has minimal effect on air flow to the guest cabin.
- Controls are straight forward: Power On/Off, Mode Heat/Cool/Dehumidify, Adjust Temp, Fan Speed.



## 15. Berths, Bedding, and Showers.

Moondance has two cabins with queen size beds, hanging lockers and storage areas. There are ample sources of lighting in each berth, with a master switch near the door and individual controls for reading lights. USB charging ports are also conveniently located near the beds for charging phones, etc. Both cabins also have fans to keep the area comfortable if it is warmer than normal. The midship guest cabin has a bunk that folds down from the wall.

The settee in the main salon converts into a bed:

- Flip open table leaves and slide out leaf supports, using wooden pegs under table.
- Loosen metal handle on table support and push table down all the way. This table has a pressure-assisted lift, so it takes some force to push it down, then tighten the metal handle.
- Use folding filler cushions over table (stored under the berth in forward cabin, lift berth up to access).
- Remove back and side cushions if needed to maximize flat space.
- To return to daytime use: put cushions back up against wall and side.
- Fold table leaves in, slide wooden supports in place, loosen metal handle and raise table to the white tape marking on the support post – once handle is loosened, table will raise automatically with air piston assist.
- Tighten metal handle on base when at correct height.



The settee in the pilothouse also converts into a small bed:

- Flip open table leaves and slide out leaf supports, using wooden pegs under table.
- Loosen metal handles on table supports and push table down until it reaches the base.
- Pull out metal free standing support leg on the starboard side of the settee before pulling wooden platform out.
- Set metal support leg on floor.
- Use two back outer cushions to fill in platform for sleeping. The middle cushion is too small, store it under the berth when using it as a bed.
- To return to daytime use: put backrest cushions up against wall.
- Pull up metal support rod at same time as pushing wooden platform in, click support rod in place. This requires 2 people.
- Fold table leaves up, slide wooden supports in place and raise table to the white marks on the support posts.



This table does not have a pressure assisted piston for raising.

Tighten metal handles on bases when at correct height.



After showering, please use squeegee to get as much water off the enclosure as possible. When it is warm enough, we also open the portholes to increase ventilation and encourage the area to dry quicker.

## 16. Lighting

- All lights are energy efficient LED's.
- Flip on the appropriate light breakers on the DC panel: i.e. Salon Lights, Cabin Lights. Due to the inherent efficiency of the LED's and the large battery bank, we advise turning the breakers on for all the lights and leave on during your charter. No need to turn them on and off on an "as needed" basis.
- Light switches are on cabinet faces or bulkheads in the various living spaces.
- There are dim "light ropes" under the stairs and in heads that can be used at night for safe movement.
- There are three wall sconces in the salon, and they are controlled by a small flush button that you tap to turn on and off as well as to dim. They are on the same breaker as the salon ceiling lights.
- Courtesy exterior lighting for the bow and the steps to the flybridge, controlled by a breaker is on the DC panel.

## 17. Refrigerator/Freezer/Galley

- The refrigerator/freezer is larger than on most boats and should offer plenty of storage. There is an icemaker in the freezer, yet its output is relatively small.
- Circuit breaker/switches are located on the AC panel in the nav station. They are always ON unless the house batteries do not have sufficient power, i.e. getting close to 20% SOC. The refrigerator is AC power only.
- Cooking onboard when cruising is one of our favorite activities and we have a good supply of spices in the slide out cabinet next to the oven. Please replace if you use a lot and we encourage you to add to our collection for use by future guests.



## 18. Salon Table, Stove, Oven, and Microwave

- When additional seating is needed around the salon table, please use the folding teak deck chairs that are stored in the lazarette. Do not pull the recliners over to the table because it scratches the floor.
- The propane solenoid switch for the stove, oven & BBQ is in the galley just forward of the window. This switch controls the propane flow for both the stove/oven and the BBQ. FOR SAFETY THIS SHOULD BE TURNED OFF WHEN NOT COOKING OR GRILLING. It is a good habit to turn off the stove knob and then immediately turn off the solenoid when finished cooking. **Make sure it is turned off before going to bed!**



- Caution: propane is heavier than air and will settle to the lowest points in a boat- the bilge. If a leak is detected, extinguish all flames, and open all hatches and doors to increase ventilation as much as possible.
- There are two propane tanks in the propane locker on the flybridge. One tank hand valve should be open, and the other closed, to keep it as a backup. SJSY staff checks these tanks after every charter. The propane locker is vented overboard for safety. If you ever have problems with the stove/oven not lighting, check to make sure the propane tank hand valve is open.
- The microwave /convection oven is 120V and there is a breaker on the AC panel in the pilothouse. We tend to leave the microwave breaker on all the time, yet keep in mind the microwave will use 150amps when in use.

### Lighting a Stove Burner:

- Make sure the solenoid valve switch is on.
- Push the corresponding burner temperature knob in and turn to the “Light” (flame symbol) position, then push the button to the right with the lightening symbol to light the burner.
- After the burner lights, hold the knob in for a few seconds to heat the safety “thermocouple”, then release and turn the knob to the desired heat level.

### Lighting the Oven Burner:

- Make sure the solenoid valve switch is on.
- Push the oven temperature knob in and turn to 300 degrees, then push the lightening button to ignite the burner.
- After the burner lights, hold the knob in for a few seconds to heat the safety “thermocouple”, then release, and turn the knob to the desired heat level.

### Microwave/Convection Oven:

- When not connected to shore power, the microwave can be powered by the inverter. Due to the 150A power draw, please only use for short cook times or you will rapidly drain the house batteries. For any extended baking or broiling the propane oven should be used.

## 19. Barbecue

- BBQ is located on the port side of the cockpit allowing easy access from the salon and galley.
- BBQ propane hose is plumbed through the solenoid valve in the galley. This valve needs to be open to operate BBQ and/or the propane oven/stove in the galley.
- Use a BBQ lighter from the galley to light the burner with the lid open. Light the BBQ lighter and turn on the propane regulator valve to the “light” position on the side of the BBQ grill.
- When you are done grilling turn off the BBQ regulator valve and the solenoid valve in the galley. Regulators often malfunction and don’t close properly so it’s important to turn off the solenoid in the galley.
- Please clean grill with the wire brush in the lowest left drawer in the galley when finished cooking.
- Please replace cover on BBQ once it has cooled to help maintain it.
- The primary propane hose isolation (Shut-off) valve is located in the propane tank locker on the port side of the flybridge just adjacent to the helm station.



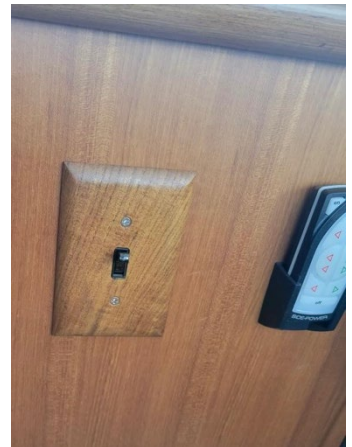
## 20. Entertainment Systems-Internet Connectivity

Moondance is equipped with a FUSION marine entertainment system for audio and a Samsung HDLCD SMART TV for watching movies and accessing streaming video services. The FUSION system has 3 zones: the salon, pilothouse and flybridge. Please be considerate of your neighbors and keep the flybridge audio level at an appropriate level for the location. Audio for the TV is provided by its own sound system. There is an onboard Wifi system with a cellular and WiFi antenna as well as Starlink to improve internet connectivity. Highlights of the entertainment system include:

- **FUSION MS-AV755:** The unit is in the salon starboard cabinet just before the stairs leading to the pilothouse. It includes AM/FM radio, Pandora, Sirius XM, DVD/CD player, USB and Bluetooth connections for audio players, as well as VHF monitoring. The audio system can be controlled from the FUSION unit in the salon and from the Garmin MFD in the pilothouse and flybridge. The unit will appear as MS-AV755 on the list of available Blue Tooth connections on your device. There is a Quick Start Guide to the Fusion in the Quick Start section of the notes.
- **Samsung 50” HDLCD “SMART” TV Monitor-** is in the ceiling on the starboard side of the salon. It is VERY heavy, and you need to use considerable strength to control its movement when being lowered even though it has hydraulic pistons to help control it. **BE CAREFULL!**



- The Smart TV gives access to online video services like Netflix and Amazon Prime Video. You'll need an internet connection to access; Wi-Fi is available in some of the marinas in the Islands (e.g., Bellingham, Roche Harbor, Deer Harbor). To connect to a WI-FI hotspot, first activate the hotspot on your phone or whatever device you are using, then select the HOME button on the Samsung remote, select SOURCE and then select NETWORK. Then select Network Type Wireless and locate your device on the list of wireless networks. You will probably have to enter your device's passcode using the remote to enter it on the onscreen keyboard. From the TV menu select SMART HUB and then OPEN SMART HUB and choose your video source, Netflix, Amazon, etc. You will then need to enter your credentials to use the service.
- **FUSION AV SYSTEM:** Another input source for the TV which allows the playing of DVD's, etc.
- **HDMI Input for TV:** Located near the floor at the corner of the settee and the galley wall.
- **Live TV via antenna:** Need to turn on the TV Antenna breaker on DC panel in PH. Home>Live TV>Guide
- **Model# UN50TU7000FXZA** if you want to download the comprehensive manual. You can access the manual on the TV Home>settings>support>Open E-manual.
- **Remote controls:** Located in the key drawer in small cabinet between the two recliners. Remotes for the Fusion unit and Samsung TV.
- **Cellular reception:** Is pretty good throughout the San Juan's and Gulf Islands and is the most convenient way to access the internet when you have good signal. Cellular towers are at the top of many of the major islands, so you can lose signal when tuck away in a protected anchorage.
- **Starlink:** Another option to maintain internet connectivity. The Bridge AC Outlets and WiFi breakers must be On. Starlink power is On/Off at a switch on the port side of the helm. You simply connect to the onboard Wi-Fi signal 'Moondance'. The password is posted inside the PH electrical panel. The Starlink system draws approx 105W/12 Amp AC, which is considerable, so you will need to monitor your overall energy usage and the SOC of the battery bank. Please turn the Starlink off when service is not needed and overnight. Reminder: service restores about five minutes after boot-up, as the system acquires satellite paths for internet connectivity. Starlink is always changing and updating. There is no guarantee regarding service.



## 21. Washer/Dryer Combo Unit

- Located in closet on starboard side of the hallway. **30A shore power is required.** The unit **MUST** complete its cycle and turn off **BEFORE** disconnecting from shore power or the door locks.
- Instructions are posted next to the machine.

- The ON buttons are somewhat touchy. Push upper button once, briefly, to turn on the power. After selecting desired cycle, push lower “Start” button and hold for two seconds. You will see a wash symbol appear on the LCD to indicate the cycle will start. May take a moment to appear.
- Keep loads on the small side. The unit cannot efficiently dry large loads. Plan on air drying anything that is bulky.
- DO NOT start a wash cycle and then leave the boat. Monitor for potential water leak.
- The water valves for the washer/dryer are located under the sink in the hallway head; turn them off if the washer/dryer has an issue with leaking water. Off is the handles inline with the spigot-very weird!

## 22. Spares and Tools

Common Spares: Located in engine room. Contents: oil absorbent pads, fuel filters, oil filter, impeller.

Heavy Duty Spares: Located in engine room. Spare float switch, spare electric bilge pump, spare domestic water pressure pump(s), spare engine starter, spare engine alternator, bag with spare oil and fuel filters, light bulbs, outboard tools, toilet one-way check valves, spare sump pump.

Common Tools: Located in drawer under settee next to the sliding glass door to the cockpit.

Comprehensive tools: Canvas bag and mechanics toolbox set. Located in the ER on the port side.

Specialized tools: Multimeter, Infrared thermometer, GFCI tester, inspection mirrors, etc. Lower step drawer to lower hallway.

## 23. Storage

Lazarette – A huge amount of storage space that is easily accessed from the cockpit. There is a locking device with a release handle located in the port rear corner of the salon, between the settee and the window. Please use that locking mechanism to secure the lazarette when off Moondance for any extended time to prevent theft, etc.

Folding Teak Deck Chairs are stored in the lazarette for use in the cockpit as well as when needed for extra seating in the salon or around the table. Adhesive padding has been attached to the bottom of the chairs to help protect the floors. Please do not slide the chairs on the floor to minimize scratches. **Do not slide the recliners!** Additional adhesive pads are stored in an organizer 2<sup>nd</sup> drawer down port side if pilothouse.

Foul-Weather Bridle: Stored under the aft bench seat on the flybridge.

Dock Lines: Forward dock lines are secured to the forward railing. All other dock lines are stored in the cockpit.

Owners’ storage: Some cabinets, drawers, and storage bins are labelled for owners use. Please respect them. They cannot be locked since Moondance routinely crosses the border and custom agents must have access to all spaces onboard. There is still plenty of storage space for guest use.

## 24. Eartec UltraLite Headphones

- We have two-way radio headsets onboard to make communication easier during docking, anchoring, fueling and emptying the holding tank. This allows you to speak normally rather than having to yell to be heard. It lowers the stress level between Captain and crew.
- These are stored in the upper drawer of the starboard side chart cabinet of the pilothouse. Their battery charger is kept plugged in on top of the starboard cabinet. The master unit is labelled main on the end that does not have the earmuff. This end also has the on/off switch. Turn on the main unit first, then pair the other units to the main by pressing and holding the white button on the earmuff for a couple of seconds.



- Manufacturer's instructions are kept in the drawer where they are stored.
- When done using them it is best if you open the battery compartment and release the batteries from the case. Simply turning the unit off does not prevent the batteries from draining and nothing is more frustrating than putting them on and they do not work.
- Please use the lanyard and clip to attach the unit to you when you are wearing it. These units can slip off your head easily and we do not want them lost to the sea.
- **Plan on charging the batteries every night after use. Rotate the batteries through the charger. They normally charge in 30-60 minutes.**

## 25. Shades and Pilothouse External Sunscreen

- There is an external sunscreen to cover the pilothouse windows. This is very helpful in reducing heat and UV exposure when anchored or docked, as well as providing some privacy.
- It should be folded in half, then carefully rolled up and stored on top of the starboard chart table.
- It is easily attached to snaps on the exterior. One person can do it, yet it is easier with two.
- The side shades in the pilothouse are down only.
- The rear shades between the salon and cockpit are top down/bottom up, yet the center blind over the door is down only.
- The side shades in the salon have a top down/bottom-up feature so that you can let in light yet still have privacy. Shades are operated by gently pulling down or up on the heading rods. When fully open, make sure to push the shade up enough to engage upper header. Handles will always stick out a bit for easy access.

## 26. Fenders

- There are 5 blue fenders which are heavy duty and should be used against the dock.
- There are additional black fenders that can be used to protect the open side.
- There is a red spherical fender that is typically used as a roving fender: stored in port chain locker.
- Do not be shy in the use of fenders—better to have too many out vs. too few.
- Forward fenders are normally just laid on the deck if the seas are pretty reasonable. With heavy seas it is advised that they are stored in the port chain locker. Midship fenders are stored on the flybridge deck and should be lowered to the appropriate level when approaching a dock. Aft fenders are stored in the cockpit.

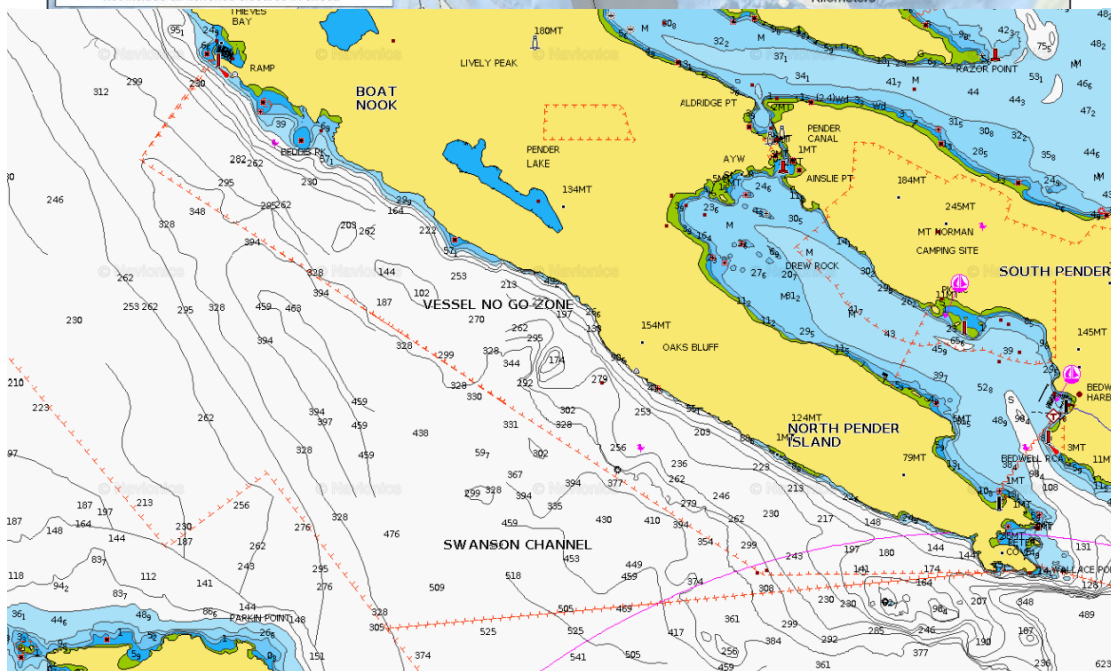
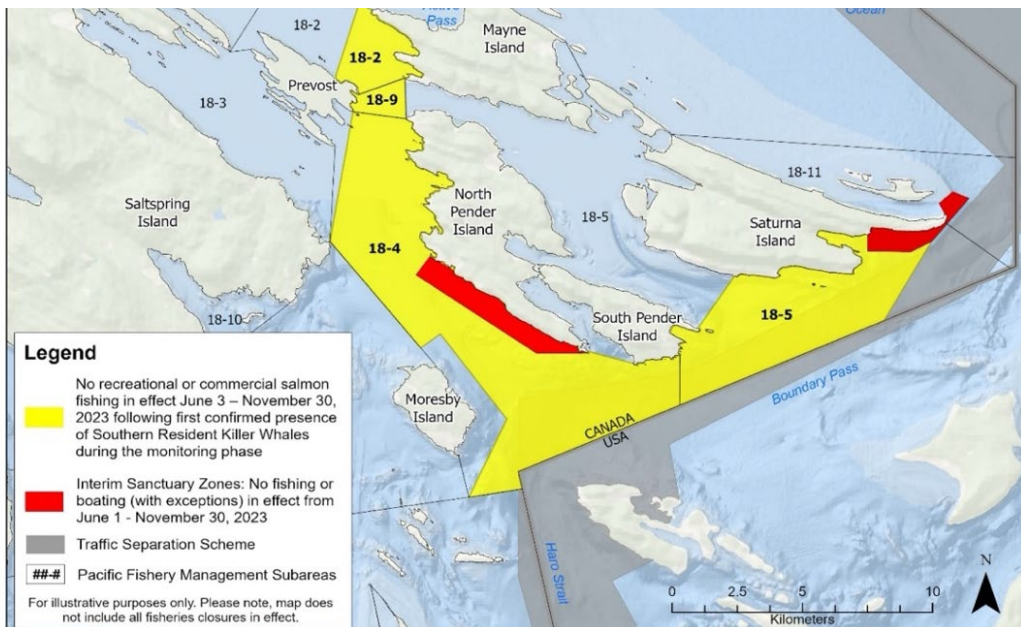
## 27. Kayaks

- There are two kayaks on the flybridge, and their paddles are stored in the lazarette.
- Please do not use the auto-inflate PFD's when using the kayaks. There are two manually actuated PFD's or you can use the standard foam PFD's.
- The kayaks are somewhat difficult to lower from the flybridge to the cockpit and it requires two people. Sliding the kayaks through the hatch in the flybridge to the cockpit to someone below is best.
- Use the kayaks at your own risk. Do not use them if you have no prior experience with kayaks and do not know how to get back into them from the water. Keep in mind the waters of the PNW are extremely cold and you will be rapidly incapacitated if you cannot get out of the water quickly.

## 28. Be Whale Wise - No Go Zones in Canada - Protecting the Orca's

The Orcas are one of the biggest attractions in the waters of the PNW, yet they are having a difficult time surviving due to declining salmon runs. These whales use echo location to find and catch their food. Therefore, noise pollution from boats and ships makes it harder for them to thrive. To decrease human impact, both the Canadian and US governments have implemented rules. You were provided a summary of these rules in the packet you receive when you arrived and there is more information in section 10 of the white reference book onboard Moondance. In general, stay at least 400 ft. away from the whales. Sometimes they come to you; if this happens, shutdown the engine and turn off the instruments (assuming this is safe to do). They can hear the pings of the depth sounder – this is why we have you turn off the instruments.

Canada has gone further in protecting Orca's by creating No Go Zones where boats are prohibited from going and infractions can result in very significant financial fines, up to \$250,000. The schematic below shows the red sanctuary zones. Below that is a chart view that also shows the borders of the sanctuary zone (red hash marks) off North Pender Island, which must be avoided after leaving Canadian Customs in Bedwell Harbor when headed north into the Gulf Islands.



## 29. Personal Safety

Always wear a PFD when on deck and moving about, particularly when docking, leaving the dock, anchoring, raising anchor, etc. You should also always wear a PFD when on the tender.

The waters of the PNW are icy cold. Cold water shock is a very real and potential deadly hazard. The cold water will incapacitate the strongest swimmer within minutes and is another reason that wearing a PFD is essential.

Whenever you are departing or arriving at the dock have a crew member designated as the “**roving fender**”. If you are going to accidentally “touch” a boat, dock, or other object, lower the fender to the point of contact to lessen the impact and potential damage. Do not use hands and feet to fend off. The large red roving fender is stored in the port anchor locker. No crew should jump to the dock. If you can’t step off calmly, back-up and try again.

It is almost impossible for people holding lines on the dock to stop the momentum of a heavy boat such as Moondance. It is also a bad idea to use dock lines on a cleat to stop movement; this can result in a sudden swing of the boat and damage to cleats, boat, and/or dock. Moondance is 58,000 lbs. with a lot of momentum. Muscling her will not work and can be hazardous to the crew.

When coming into our docks in strong winds, or if you’d just like a little assistance on arrival, hail “San Juan Sailing” on **VHF Channel 80**. They’ll be glad to offer some coaching and/or catch your lines. In fact, most marinas in the Islands will help you if you hail them and ask for assistance. Asking for docking assistance from marina staff (not bystanders) is perfectly reasonable and a sign of smart seamanship.

## 30. Fire Safety

Short of sudden and catastrophic flooding, nothing can be worse than a fire onboard a vessel. That's why professional mariners constantly train for it, and a minimum level of fire safety equipment is mandatory even for pleasure craft. We have exceeded the mandatory requirements to make Moondance as safe as possible.

Moondance has 5 handheld extinguishers, 2 more than required by the USCG. Recent fires are a stark reminder that if you cannot reach a fire extinguisher in a matter of seconds, you don't have enough extinguishers. It is also important that you know how to use the extinguishers.

Moondance also has an automatic fire system in the engine room that will shut down the engine and release fire retardant in the ER. Do not open a hatch into the ER if the fire suppression system has been activated; that allows oxygen in, which feeds the fire. If necessary, there is a manual handle for the system in the starboard rear corner of the salon. There is a camera for monitoring the engine room that can be used if needed.

CO detectors are in the salon and forward cabin.

LPG/Propane is 50% heavier than air and will find the lowest point on the boat; it will not dissipate into the environment if it's confined by walls. Anything that makes a spark can ignite it. Moondance has an LPG detector in the galley that disconnects the gas supply if it is set off. The burners on our Force 10 stove have

safety devices that turn off the gas if the burner goes out. Besides the stove, oven, and BBQ, no open flames are allowed onboard Moondance -- i.e. no smoking or candles, etc.

It is often said that most boat fires are electrical in nature, and there are countless ways an electrical fire can start. Shore power inlets are a particular source of concern; they can become scorched due to ohmic heating and that comes from a poor connection due to corrosion. Feel the connection at the bow input as well as the shore connector. If they feel warm, turn off the power, disconnect and investigate further. Report concerns ASAP to our maintenance pros. The electrical system on Moondance is brand new and built to ABYC standards.

Lithium-ion batteries have been implicated in several high-profile boat fires, including the Conception dive boat fire in California that claimed 34 lives. Lithium-ion batteries are very high energy density batteries used in many portable devices as well as things like kick scooters, e-bikes, and electric surfboards. These are NOT the same chemistry as Moondance's lithium house batteries. The former are typically lithium-cobalt-oxide, lithium-manganese-oxide, or a combination along with nickel, while the ones on Moondance are lithium-iron-phosphate (aka LiFePO<sub>4</sub>), and they have not been implicated in boat fires.

The best strategy to deal with these device batteries is to have as few onboard as possible, never keep removable ones where the terminals can be shorted, and only connect them to the charger when you are aboard and awake; this includes your laptop, cell phones, and Wi-Fi hotspots, even though these batteries are much smaller than the ones on an e-bike. Due to this risk factor, e-bikes are not allowed on Moondance. The largest lithium battery onboard is used for a small portable vacuum and a drill. Charging that battery must be done while someone is paying attention. Small portable chargers used to charge phones, cameras, laptops all have the potential to get hot. Once again, any charging should be done with supervision and the chargers unplugged when not being used. Do not do it overnight when people are sleeping.

Make sure you have an evacuation plan and that everyone onboard knows what it is. Grabbing life jackets, documents, VHF, and whatever else can be part of this plan, but when the boat is on fire is not the time to be wondering where to go or what to grab.

## 31. QUICK START- VESSEL CHECK LISTS

### BEFORE STARTING THE ENGINE

- Review the weather and float plan with crew. Fingertip navigation on a chart.
- Make sure everything below deck is secured with portholes and hatches closed, and no loose gear.
- Make sure you have adequate fuel and water for your plans.
- Visual inspection of the engine room. Everything clean, tidy, stowed with no evidence of fluid leakage.
- All lines prepared for departure where they are easily pulled aboard from the boat deck.
- Make sure that the propeller and stern of the boat are clear of any lines or other objects.
- Tender should be thoroughly secured to the marine lift.
- Cockpit secured: deck chairs secured, BBQ covered, appropriate doors closed.
- Sliding door between cockpit and salon should be opened to the first latching position where it will not close on its own yet will also allow for someone to move between the cockpit and the salon easily.
- Power on to all the instrumentation at both helms - DC breaker switch. Both helms prepared to operate Moondance. Remove covers from various instruments.
- The pilothouse has much better visibility than the flybridge. Make sure you can easily access both pilothouse doors. Rear view cameras via the Garmin MFD's are also helpful. When approaching and leaving a dock we have found that having the first mate stationed at the appropriate door of the pilothouse enables them to see the length of Moondance and inform the captain of the distances.
- The flybridge may be better when anchoring.
- Shades should be fully open in the salon to allow for as much visibility as possible.
- Shore power turned off and the appropriate power cord retracted and stored.
- Crew on deck and ready to remove lines as discussed and planned. Rover on deck with fender ready.
- Captain, first mate and additional crew should have EarTec headphones on to ease communication.
- Turn on VHF radio.

### STARTING ENGINE

- Make sure the ETS throttle is straight up in the neutral position.
- Turn key to the ON position and let the Mercury/Cummins engine monitoring system boot up.
- Turn key to the start position and the engine should start without hesitation.
- Monitor temperatures and pressures. Allow 2 minutes for these to stabilize.
- Moondance's exhaust is below the waterline so you cannot confirm exhaust water flow visually.
- Ready to go after 2 minutes at idle throttle. Extended warmup is harmful to the engine.

### LEAVING THE DOCK

- Turn ON Nav lights if conditions warrant. Make sure anchor light is OFF.
- One of the MFD's should have the rear camera displayed so you can see aft of the boat.
- Make sure rudder is centered via the autopilot display that also has rudder indicator.
- Thrusters should be activated, and each tested with a momentary burst.
- Final check of traffic and conditions before leaving dock.
- Cast off mooring lines as previously discussed, following instructions from captain.
- Roving fender should be ready to move as needed to protect against possible contact.

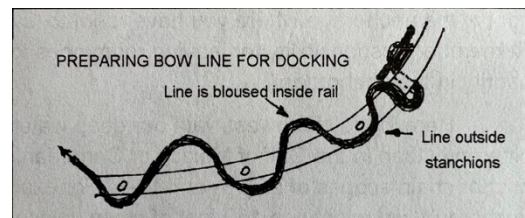
- Once clear of potential issues the fenders should be raised and stored. Doors to cockpit should be closed. EarTec headphones turned off and battery doors opened.

## UNDERWAY

- Helmsperson on watch at all times. Be alert for logs, debris, crab pots, nets, etc. that may be in the water. The amount of debris in the water is worse in the spring, yet always a potential hazard.
- Know your location at all times. Zoom in and out of the electronic chart as needed.
- Monitor Channel 16 on the VHF.
- Pay attention to AIS, yet also keep in mind that not all vessels have AIS.
- Monitor engine parameters. Keep RPM <1000 until engine temperature is 100 degrees, and below 1300 RPM until temperature is 130 degrees. Slowly increase RPM's as temp increases to 160 "normal".
- Be cognizant of your wake and the potential damage it can cause. Pay attention to "No Wake" zones.
- Cruise/Economy speed is 8 knots. Maximum speed 11 knots.
- The Mercury/Cummins Engine Monitor will display your instantaneous fuel consumption.
- Close the salon door to prevent exhaust fumes from entering.

## DOCKING AT A MARINA

- Get dock assignment before entering marina. Either call ahead or use VHF to hail them. Know where you are going and what type of tie you have - Port or Starboard, Bow In vs. Bow out.
- Captain & Crew should spend some time evaluating the wind & current conditions in the marina and discuss plan on how to safely dock.
- EarTec headsets to help with communication (check batteries). Make sure they are secured via lanyard.
- Fenders should be placed appropriately and early enough where there is no last-minute rush. You have 10 fenders. Better to have too many out than not enough.
- Mooring lines should be prepared. Bow line should run OUTSIDE the stanchions and fender lines. The line should blouse over the rail so that it can be easily reached from the dock.
- Enable Thrusters and tap momentarily to confirm operation.
- Approach with just enough speed to maintain steerage: idling or going back & forth from neutral to idling forward. Once in position, a brief reverse in idle to stop forward momentum.
- Crew should be ready to step off the stern to secure the stern line first in most circumstances and then the bow line. Midship line may be first in heavy crosswinds.
- Both thrusters at low can be used to HOLD Moondance against the dock while lines are secured.
- Minimum of 4 mooring lines: Bow, Stern, Forward and Aft spring lines
- If Bow In, make sure anchor does not protrude over the deck walkway.
- Once Moondance is secured to the dock you can turn off the engine with the key in the pilothouse.
- Turn off the flybridge breaker first, then all the other instruments that have been on.
- Attach to shore power and make sure you have at least 110V on the AC panel meter.



## **ANCHORING**

- Moondance is too big and heavy to use WA state mooring buoys. Occasionally, mooring buoys in Canada allow larger boats. If so, they will be clearly labeled, such as those at Chatterbox Falls.
- Thoroughly evaluate where you are considering anchoring, using Waggoners and other resources.
- It is a good idea to circle around the area you are considering, using the depth sounder and forward sonar as needed to evaluate and finally pick your spot. At this point you should be heading into the wind.
- The crew at the bow operating the windlass via the foot pedals should be wearing the EarTec headphones and ready to communicate with the captain at the helm.
- Turn On the windlass breaker and have the crew release the anchor from the snubber tied to the stanchion and then drop the anchor over the roller using the foot pedals. Once over the roller, drop the anchor into the water smoothly.
- The crew at the bow can monitor the length of chain using the nylon rope markers that are weaved into the chain. The captain can confirm chain length with the chain counter at the pilothouse helm.
- Once the anchor has been let out to the measured water depth, Moondance should be backed slowly while paying out the calculated amount of rode (less 20ft for bridle). Target scope of 4:1 at high tide.
- Attach the anchor bridle and drop it below the waterline so that you maximize the anchor holding. The mild weather bridle will add another 20ft of rode. The heavy weather bridle will add 25ft of rode.
- Test the anchor holding by gently reversing for just 1-2 seconds.
- Spend at least 5 minutes monitoring your position, making sure the anchor is holding.
- Once you are convinced you are holding, turn off the engine with key.
- Continue to monitor your position for at least 10 minutes using an anchor watch program or using two reference points on shore to make sure you are holding position.
- Once you are totally satisfied, then turn off the breakers for the various systems used underway.
- See the anchoring section in the owners notes regarding raising anchor.

## **DAILY/OVERNIGHT**

- If on shore power, confirm voltage is in normal range of 110-125V on the AC panel and that the house batteries are charging via the Battery Monitor on the helm or the Cerbo display in the Salon.
- Install the exterior sunscreen over the pilothouse windows if sunny and hot to moderate interior temperatures. The salon blinds can be lowered as well.
- Install covers over all the instruments to protect them from weather and light exposure.
- If in a marina that allows it, hose down the exterior to remove as much salt spray as possible. Wash it off, do not rub it off which will damage the finish.
- Check tank levels and refill or pump out as appropriate when in a marina.
- Do not allow the waste tank to exceed 75%
- Anchor light ON at night when anchored. Remember to turn OFF in the morning.
- When anchored, you must pay more attention to the batteries and the SOC.
- Visual check of the engine room.
- Charge EarTec headphones batteries.

## **LEAVING MOONDANCE - SHORE EXCURSIONS**

- Turn off all unnecessary systems at the breaker panel - Yellow dots.
- Turn off the freshwater pump breaker to eliminate possible problems with leak when away.
- Firmly attach sunscreen over the pilothouse and close the blinds to the salon for theft deterrence and UV light and heat management.
- Lock the lazarette from inside the salon (handle behind settee on port side).
- Lock all the pilothouse doors and the door to the salon.

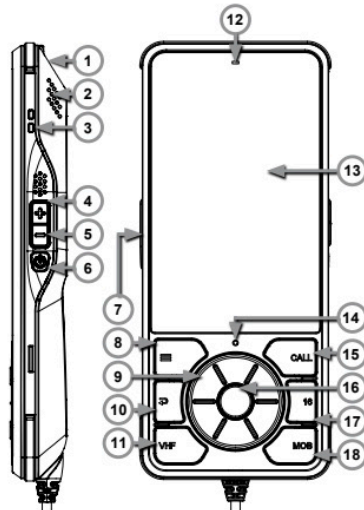
## **32. CORTEX QUICK START GUIDE**





**Getting to know the handset**

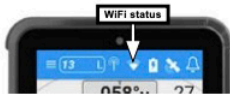
- |                        |                                                             |
|------------------------|-------------------------------------------------------------|
| 1 Distress             | 12 Power light (Red)                                        |
| 2 Speaker              | Also ambient light sensor for auto dimming.                 |
| 3 Lanyard Loop         | 13 Touchscreen                                              |
| 4 Volume Up            | 14 Microphone                                               |
| 5 Volume Down          | 15 Call* (Hold down for DSC menu shortcut)                  |
| 6 Power                | Otherwise use when a target is selected to initiate a call. |
| 7 Push to Talk PTT     | 16 Enter                                                    |
| 8 Menu                 | 17 Channel 16                                               |
| 9 Click-wheel          | 18 Man Overboard (MOB)                                      |
| 10 Back                |                                                             |
| 11 VHF (VHF Radio key) |                                                             |



2

**To connect a handset to an M1**

- Turn Cortex M1 ON  
Switch the vessel's batteries ON to power the M1.
- Turn the handset ON  
Press and hold the Power button for 2 seconds.
- Select WiFi from the Status Bar



- From the list of available WiFi, identify and select the M1 WiFi SSID.  
  
Note - The WiFi SSID is identified by the M1 serial number eg: CORTEX-95211616  
  
Note - The Cortex V1 package (M1+H1) ships with the handset pre-configured to the M1.
- Key the WiFi Password found on the label supplied with the M1.
- Select CONNECT to save.  
Text 'connected' will confirm the connection.
- Select the Back key to close the WiFi status.

**Questions and FAQ's**

Visit [www.vespermarine.com/faqs](http://www.vespermarine.com/faqs) for answers to frequently asked questions, technical support, downloads, local dealer contacts and more.

**Register Your Cortex**

Vesper Marine releases product updates from time to time. These updates often add new features. Please note the images in this guide might differ to what you see on your product. To be notified when an update is available please register your Cortex at [www.vespermarine.com/register](http://www.vespermarine.com/register).

3

**Main Menu**

Select the Main Menu button (≡) on the keypad or the Main Menu icon (≡) on the left of the Status Bar.

**Standard functions:**

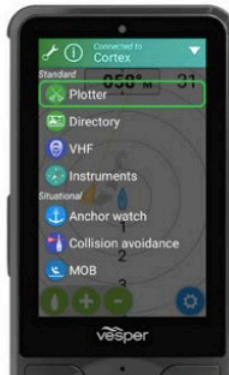
- > Plotter (Plotter view of AIS targets)
- > Directory (AIS targets and manual DSC contacts)
- > VHF (VHF Radio)
- > Instruments (GPS and NMEA data)

**Situational functions:**

- > Anchor watch (Monitor the vessel at anchor)
- > Collision avoidance (Assess and manage a potential collision scenario)
- > MOB (Man Overboard monitoring)

The Configuration Menu is used for initial setup and system monitoring including AIS programming, network settings and sensor setup.

- > Main Menu (≡) > touch on the wrench icon (🔧) to open the Configuration Menu.



4

**To make a VHF call**

- 1 Select VHF**  
Select via a keypad button (VHF) or the Main Menu.
- 2 Select the appropriate channel**  
You can also press the PTT key from any screen if the required channel is already selected to bypass steps 1 and 2.
- 3 Verify the channel is clear**  
You cannot obstruct the communications of other channel users due to Federal Communications Commission (FCC) and international guidelines.
- 4 Press the Push To Talk (PTT) key**  
'Transmitting' is displayed.
- 5 Speak into the handset**
- 6 Release the PTT key**



**To send an individual DSC call**

Note - DSC can also be swiftly accessed from the Plotter, Directory and Situational screens.  
The CALL button can also be used, hold it down to access the DSC menu.

> Select the target > CALL the target



- 1 Select the Plotter or Directory screen**
- 2 Select an AIS target (Fig.1 & 2)**
- 3 Select the Call icon (Fig.3)**
- 4 Follow the on screen instructions to confirm or change the target vessel MMSI and channel**
- 5 Select the CALL icon when ready**

Once you activate CALL, the DSC Individual Call screen monitors the status of your DSC call.

- > If your Individual DSC call is unanswered you may **RESEND**.
- > If your Individual DSC call is answered you may **CONTINUE CALL** or select **END CALL**.
- > **END CALL** ends the DSC call and opens the VHF screen on the requested channel.

**Instruments**

The M1 receives data (PGNs) from instruments on the NMEA network.

- 1 Instrument Fields**  
Each field is customizable from available sensors on board. Options include:
  - Depth
  - COG
  - SOG
  - Heading
  - Speed
  - Apparent Wind
  - True Wind
  - Ground Wind
  - Water temp
  - UTC
  - Position

- 2 Field Lock**  
Select the icon to lock and unlock each instrument view. Swipe through available instruments.

- 3 Instrument Settings**  
Select an instrument layout:



**Plotter**

View AIS targets with smartAIS filtering (adjustable).  
Select any vessel to make a direct DSC call.

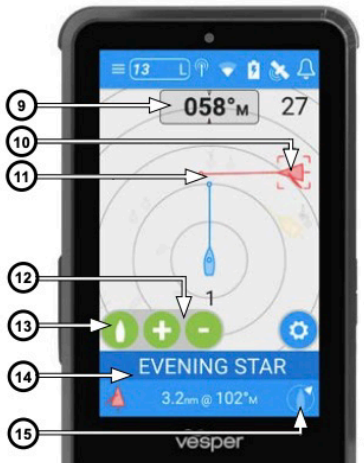
- 1 Number of Targets** <5 Knots
- 2 Class A Vessel** 5-9 Knots
- 3 Target Speed** 10-14 Knots
- 4 Class B Vessel** 15-19 Knots
- 5 Your Vessel** <20 Knots
- 6 Vector Line** Position a target will be in 10 minutes.
- 7 Range Markers** Class A
- 8 Plotter Settings** Orientation, Declutter, Collision Profile, Alarm settings



### Plotter with Target selected

A target with the highest risk of collision is highlighted in red. Select this target to display details (14) of name, range and bearing.

- 9 **Heading**  
Your vessel's heading. (Heading up orientation)
- 10 **Selected Target** (Highlighted with boxed corners)
- 11 **Crossing Situation**
- 12 **Range (zoom) IN / OUT**
- 13 **Center Boat**
- 14 **Selected Target Details**  
AIS Symbol, Name, Range and Bearing.
- 15 **Target location relevant to your vessel**  
Displayed by the lower right hand icon.



### AIS Target Detail View

The AIS Target Detail screen provides all static and dynamic AIS information. Select the following functions:

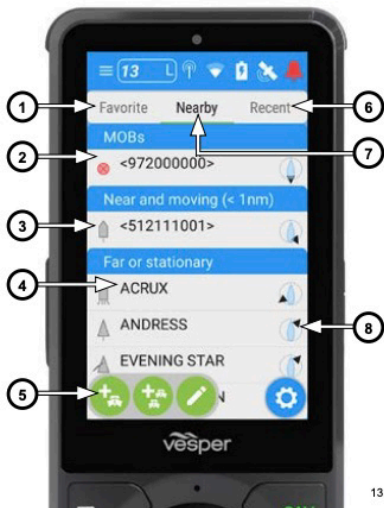
- 1 **Call**  
Initiate an individual DSC call
- 2 **Find**  
Moves to the Plotter screen to locate the target
- 3 **Add / Remove**  
Add the target to Favorites in the Directory
- 4 **Avoid**  
Moves to the Collision Avoidance screen



### Directory

The Directory screen displays nearby vessels, recent vessels or favorites.

- 1 **Favorites**
- 2 **Man Overboard**
- 3 **Target Type**
- 4 **Target Name**
- 5 **Add Vessels to Favorites**  
Manually enter individual or a group target. View in favorites.
- 6 **Recent**  
(Calls and alarms from recent targets)
- 7 **Nearby**  
(Live AIS targets)
- 8 **Target location relative to your vessel**



### Anchor watch

Select Anchor watch from the Main Menu.

Note - Before you anchor, see SOG (Speed Over Ground) and depth information to determine when it is safe to anchor.

As you drop the vessel's actual anchor, select the Drop or Weigh Anchor icon (5) at the same time to start the Anchor watch monitoring.

Once anchored, you may fine tune the anchor position by using the Anchor Move icon (6).

Change the Alarm Radius (7) or change the display orientation (14) (north-up or heading-up).

If the vessel moves (drags) outside of the Guard Zone radius, the alarm will sound alerting that your anchor is dragging.

Eg: See the position of the vessel (12). The alarm has sounded, the radius is red indicating the vessel has dragged outside of the set radius.

Select the Drop or Weigh Anchor icon (5) as you weigh anchor to deactivate Anchor watch.

#### Anchor watch via the Cortex Onboard App



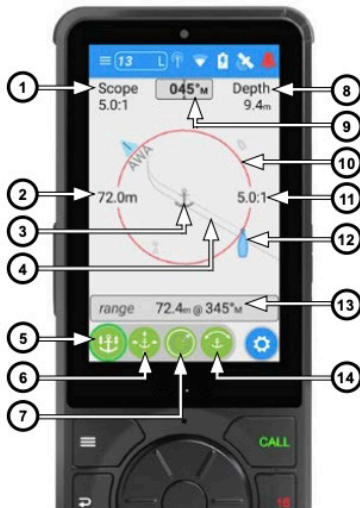
Anchor watch can be accessed and controlled from your phone with the Cortex Onboard App while on board your vessel, or remotely using the Cortex Monitor App.

Cortex Onboard uses WiFi from your M1 hub to connect. Cortex Monitor uses cellular coverage to send information from your M1 hub to your phone.

Anchor Watch is available on a Cortex Monitor Premium Subscription.

### Anchor watch

- 1 **Anchor Scope**  
Current scope, displayed for 30 minutes from anchor drop
- 2 **Guard Zone Radius**
- 3 **Anchor location**
- 4 **Your vessel track markers** (every 15 sec)
- 5 **Drop or Weigh Anchor**
- 6 **Anchor Move**
- 7 **Change Guard Zone Radius**
- 8 **Depth**  
(via NMEA input)
- 9 **Heading**
- 10 **Guard Zone**
- 11 **Equivalent Scope**  
For current guard radius
- 12 **Your vessel**
- 13 **Range and Bearing to Anchor**
- 14 **Change anchor orientation**



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### Collision avoidance

When a target is a potential collision risk, Cortex sounds an alarm and a notification pops up on the screen. The collision alarm escalates until acknowledged. Selecting the alarm opens the Collision avoidance screen and acknowledges the alarm. The vessel icon will change from Red to Grey when the target is no longer a risk. You can also navigate to the Collision avoidance screen from the Main Menu or from the AIS Target Detail View. View the target vessel's navigation light sectors (9) to help determine if it is a cross or overtaking situation, and who has the right of way. Vector Lines (3) project the relative direction the target vessel. CPA (Closest Point of Approach) and TCPA (Time to Closest Point of Approach) (11) indicate when and at what distance you will be closest to the target vessel at current course and speed. Selecting CALL TARGET (7) to make an individual DSC call to that vessel. The DSC screen will pre-populate the vessel, channel and call type. From this screen you can initiate a DSC call, add them to your Favorites or return to the Collision avoidance screen. Selecting Vessel Details (5) displays all vessel details.

#### Trial Maneuver Tool

Selecting Trial Maneuver (6) allows you to simulate the effect of adjusting your course using the Trial Maneuver Slider (10). Suggested course corrections are displayed in the top right hand side (8). Note - Observe how the vector to the target will change color from red (collision risk) to grey (all clear) as you simulate course changes. Note - Good seamanship, awareness of the position and movement of surrounding vessels and objects and COLREG right of way rules always apply before making course corrections.

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### Collision avoidance

- 1 **Current VHF channel\***
- 2 **Name of target vessel**
- 3 **Crossing situation**
- 4 **Range ring**
- 5 **Vessel details**
- 6 **Trial Maneuver Slider**
- 7 **Call selected vessel**
- 8 **Suggested correction**
- 9 **Selected target**
- 10 **Trial maneuver slider**
- 11 **Crossing situation**  
Range with current distance and bearing. Passing with CPA and TCPA.

\*Note - Use the Click-wheel to change VHF channel. Use PTT to make the call. (No need to navigate back to the VHF screen).



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### Man Overboard



If a person falls overboard, press the Man Overboard (MOB) key on the handset to instantly drop a waypoint (Red flag icon) (3) to mark the current position of your vessel.



Similarly, if an AIS MOB beacon is detected the handset's MOB alarm will sound and the beacon will be marked by a red circle with an X. (4)



An MOB alarm is repeated every 30 seconds until the alarm is acknowledged or canceled. An MOB data bar providing Name, Range and Bearing to the MOB since the MOB was initiated, is displayed along the bottom of the screen. (12) The MOB data bar persists across all pages and remains visible until the MOB alarm is canceled. The track back will automatically treat the MOB target (4) position with a higher priority than the MOB waypoint.(3) Note - (7) The MOB alarm does NOT initiate a DSC call automatically. Note - the DSC distress button must always be used to send the distress call.

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