NEUBOAT

Installation Manual Ver 1.0

The way to experience a new water life

NEUBOAT

Avikus

Contents

1   Legal Notice

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Compliance with Applicable Standards

When installing and using this product, you must adhere to all applicable regulations and standards specific to the region that you are operating this system. Always research and understand local laws, regulatory requirements, and safety standards for the region that you intend to operate this system.

CE Compliance: This product meets the essential requirements of the European Union's EMC Directive 2014/30/EU.

UKCA Compliance: This product meets the essential requirements of the UK Regulation, Electromagnetic Compatibility Regulations 2016.

RoHS Compliance: This product conforms to the Restriction of Hazardous Substances Directive 2011/65/EU.

Radio Frequency Statement

This system uses license-exempt transmitters / receivers / systems that operate on a radio frequency that complies with Part 15 of the Federal Communications Commission (FCC) rules and with Innovation, Science and Economic Development (ISED) Canada's license-exempt RSS(s) / RSP-100 / ICES-GEN.

Operation is subject to the following two conditions:

1. The device may not cause harmful interference.

2. The device must accept any interference received, including interference that may cause undesired operation of the device.

This Class A digital apparatus complies with Canadian ICES-003. Changes or modifications to this system by any entity other than an Avikus authorized service center could void authorization to use this equipment.

🖾 Disposal

Dispose of this product in accordance with the WEEE Directive. The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment which contains materials, components and substances that may be hazardous and present a risk to human health and the environment when WEEE is not handled correctly.

2   Introduction

Purpose of the Manual

This manual is designed to provide guidance on the installation, maintenance, and troubleshooting of our products. It can assist with providing an understanding of the product's features and limitations, essential safety precautions, correctly install hardware through detailed instructions, optimize product usage with thorough setup and configuration guidelines, perform regular maintenance for optimal performance, and resolve common issues with comprehensive troubleshooting guides.

Additionally, it ensures compliance with legal and regulatory requirements in each country. Intended for end-users, technicians, and installers, this manual ensures that using the products is as safe, efficient, and user-friendly as possible.

When installing and using this product, you must adhere to all applicable regulations and standards specific to each country. Compliance with local laws, regulatory requirements, and safety standards is mandatory.

How to Use This Manual

Begin by reading the Introduction to understand the manual's purpose and structure. Review the Safety Warnings to ensure you follow all safety protocols. Use the table of contents to navigate to relevant sections as needed, following instructions for installation and setup. Refer to diagrams for visual guidance, consult the troubleshooting section for resolving issues, and check for updates regularly to keep your information current.

For the latest updates and additional information regarding the use of this product, please visit www.avikus.us.

Customer Service

For further assistance, our customer support team is available to help with any questions or concerns between.

Operating Hours: Monday to Friday, 9:00 AM – 5:00 PM (EST)

Customer Service and Technical Support

– Phone Numbers: (888) 414–9151

– Email Address: supportUSA@avikus.ai

Disclaimer

The information provided in this manual is intended to be informative and is subject to change without notice. While Avikus strives to ensure accuracy, we cannot accept responsibility for any potential damages or issues arising from the use of this product or manual. Specifications are subject to change; please refer to the website (www.avikus.us) for the most current manuals.

Users are encouraged to use the product in accordance with all applicable laws and regulations for the region they are currently operating the system. Users are responsible to always maintain a proper lookout, to remain and the controls, and to focus on the driving task when using the Pilot Assist system and must undergo proper training beforehand. Similarly, when the Pilot Assist system is not active, it is the responsibility of the driver to drive the boat and to always maintain a proper lookout, to remain and the controls, and to focus on the driving task.

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⚠ **WARNING**
This system is only intended to assist the vessel driver with maneuvering. It is not a fully autonomous driving system.
The driver must always stay at the controls, scan for potential hazards in the water, and monitor the system's display to prevent serious injury or death. The driver assumes all risks with the use of this system while operating the vessel.

3 Important Safety Information

Always read and follow all instructions in this manual before installing NEUBOAT components and related wiring.

Installation Hazards

⚠️ **To prevent DEATH, SERIOUS INJURY, or PROPERTY DAMAGE:**

Intended Use: Only install and use this system on a vessel and in accordance with the manufacturer's instructions.

Supervision Required: Keep children and unauthorized individuals away from the system or any system components.

Third-Party Products and Services: The manufacturer is not responsible for any inaccuracies in data resulting from the use of third-party products and services.

Compliance with Applicable Regulations: Always ensure compliance with all relevant regulations and standards during installation and troubleshooting.

Laser Product: The FVM module incorporates a Class 1 laser product. Failure to use, control, adjust or operate LiDAR as specified herein can result in serious radiation exposures.

The system also incorporates a Class 4 fiber laser system which, by itself, may be hazardous. This device incorporates a protective housing and a scan failure safeguard in the design such that there is no exposure or human access to laser radiation generated by the fiber laser during operation or maintenance.

NEVER attempt to operate the laser with protective housing removed or the scan failure safeguards overridden.

Radio frequency interference: The product's design, testing, and manufacturing comply with the relevant provisions of RF energy radiation, the radiation from the product may still lead to the failure of other electronic equipment.

Product Cleaning: When cleaning products, lightly rinse or flush with clean, cool fresh water. Do not use: abrasive, acidic, ammonia, solvent based cleaning products, or high pressure water. Additionally, please ensure that cameras, LiDAR, and other equipment are thoroughly cleaned with fresh water and wiped with a soft cloth before and after boat trips. Failure to do so may result in reduced performance or malfunction of the equipment.

⚡ Electrical Hazards

⚠ **To prevent DEATH, SERIOUS INJURY, or PROPERTY DAMAGE:**

- **Proper Wiring**
  Ensure that all electrical connections are correctly made and securely fastened.

- **Qualified Personnel**
  Electrical installation and maintenance should ideally be carried out by qualified personnel.

Power Supply: Always turn OFF the vessel's power supply before starting the installation of this system. Do NOT connect or disconnect any equipment before disconnecting the electrical power supply, unless explicitly directed by the instructions in this manual.

Risk of Ignition: This system is NOT designed for use in hazardous or flammable environments. Avoid installing it in areas such as engine rooms or near fuel tanks where flammable conditions might exist.

Environmental Considerations

Water Resistance: The CCU(Camera Conversion Unit) and ORU(Object Recognition Unit) have no water resistance. These components must be kept in a dry, protected area, and away from moisture, rain, and salt spray.
While other components are designed to be water-resistant, it is still important to handle them with care and to avoid them with care and to avoid unnecessary exposure to water.

⚠️ **Do not submerge any component unless it is explicitly stated to be waterproof. Use the product in conditions typical of marine environments, such as exposure to saltwater and varying weather conditions, as specified.**

Ventilation: Ensure proper ventilation around the product to prevent overheating, especially in enclosed spaces inside the vessel. Do not install near flammable and explosive materials.

⚠️ **Do not install in areas with potentially explosive atmosphere, such as areas with a high concentration of flammable chemicals or saturated vapor.**

Corrosion: To avoid accelerated galvanic corrosion, always use a non-metallic isolation mount when installing directly to large stainless steel platforms/mounts, or directly to steel vessel components.
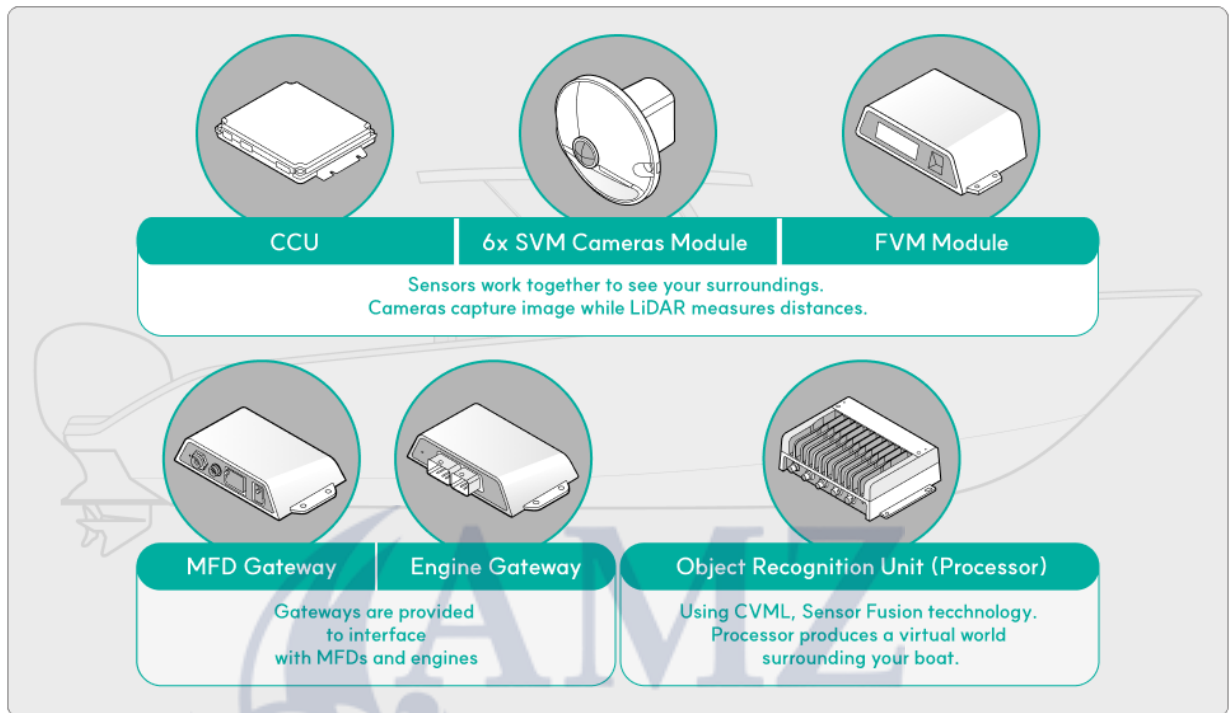
Grounding and Power Supply

Proper Grounding: Ensure the product is properly grounded to reduce the risk of electrical shock.

Power Supply: Only use the power supply specified for the product.

4   Configuration Overview

4.1   Hardware Configuration and Functions

| CCU | 6x SVM Cameras Module | FVM Module |

Sensors work together to see your surroundings.
Cameras capture image while LiDAR measures distances.

| MFD Gateway | Engine Gateway | Object Recognition Unit (Processor) |

Gateways are provided to interface with MFDs and engines

Using CVML, Sensor Fusion tecchnology. Processor produces a virtual world surrounding your boat.

NEUBOAT is composed of ORU, FVM Module, SVM camera with CCU, MFD gateway, and Engine gateway.

− **Object Recognition Unit (ORU):** The main processor of the NEUBOAT system. Typically located below deck, it connects to an Ethernet Switch to exchange data with other devices.

− **FVM Module:** A sensor that detects obstacles at the front of the boat using a camera and LiDAR. Usually located on the front top of the boat, and it connects to the Ethernet switch.

- **Surround View Monitoring (SVM) Camera and Camera Conversion Unit (CCU):** Composed of six fisheye cameras and CCU(s) that converts camera footage. The six cameras connect to the CCU, which then connects to the Ethernet switch.

- **Multi-Function Display (MFD) gateway:** Displays system images on an MFD and receives user touch inputs from an MFD. It connects to the MFD via HDMI and USB cables and to the Ethernet switch.

- **Engine gateway:** Transmits commands calculated by the ORU to the engine, steering, and joystick controller. Connects to the ORU via the CANBUS.

4.2 Product Configuration – NEUBOAT NAVI
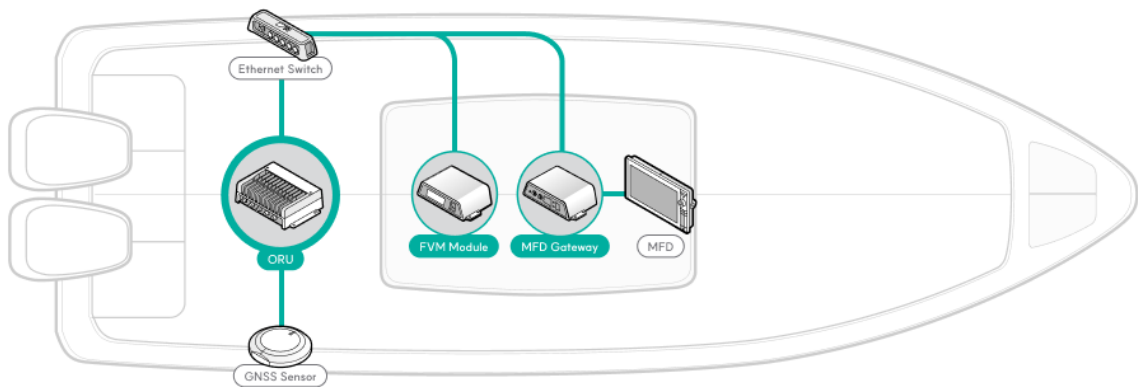
Object Classification	Moving Object, Static Object
Detection Distance/Range	Distance: Over 650 feet(200m) Range (Horizontal Field of View(HFOV)): 120 degrees forward
Route Planning	Based on ENC, depth
Hazard Zone Customization	Hazard and marker customization

4.4 Product Configuration – NEUBOAT CONTROL
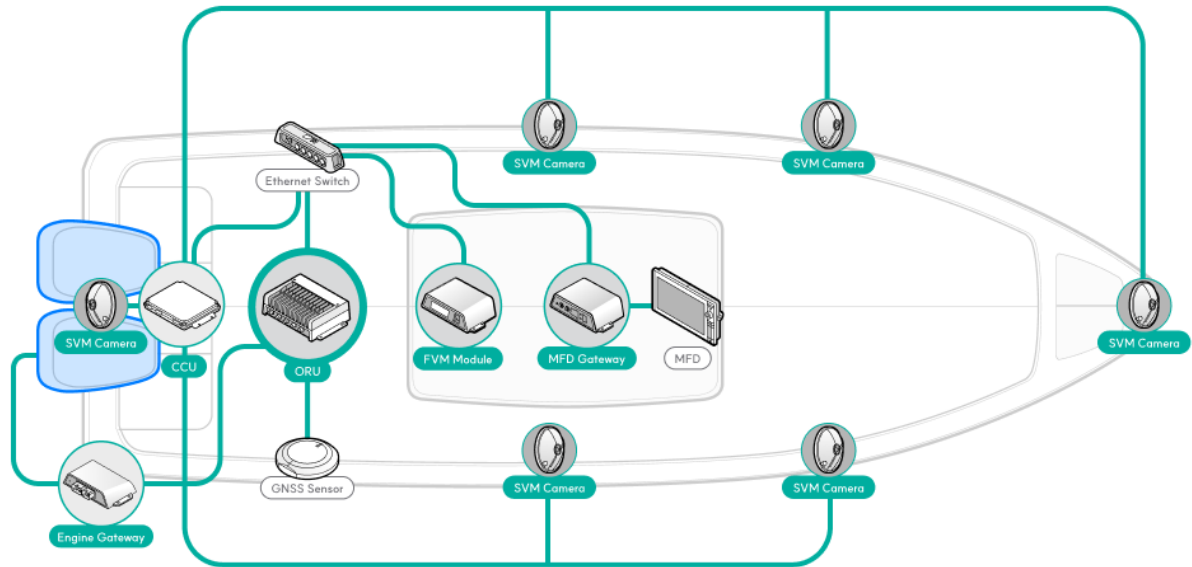
Adaptive Autopilot	Maintain distance and speed between vessel ahead and your vessel
Collision Avoidance	Passive (Speed Control) slow-down
Maximum Speed	10 kn
Auto docking	Stern-side only. Preset home position only.
Environmental	Maximum external forces (wind and current): 6kn

5   Hardware Specifications

5.1   Contents

Unpack your system components carefully to prevent damage or loss of parts. Check the box contents against the list below. Retain the packaging and documentation for future reference.

ORU – Parts Supplied

The parts supplied with the ORU are shown below.
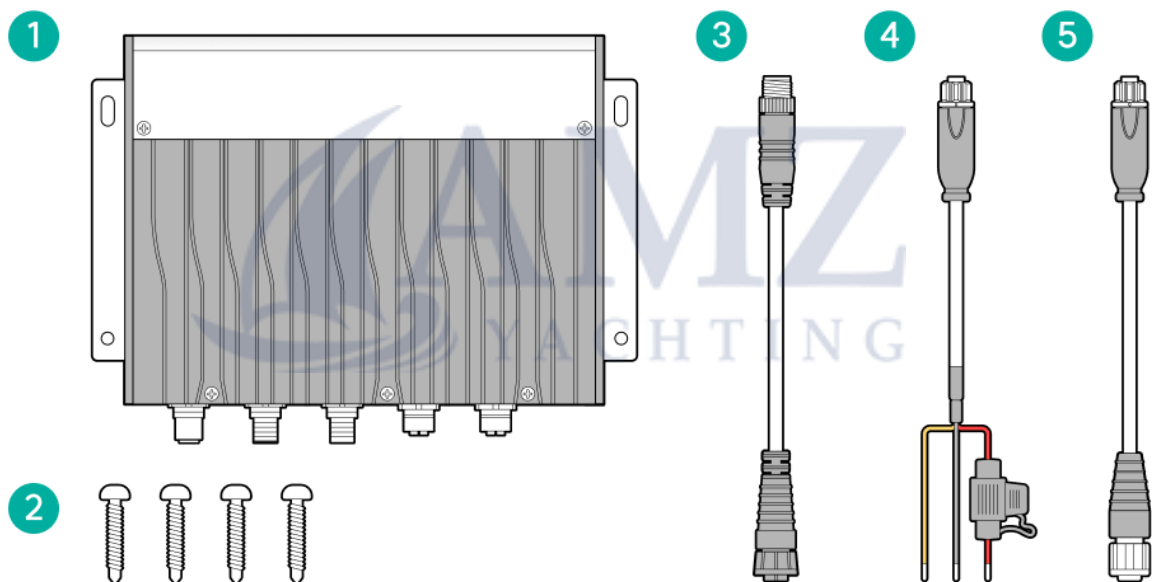
Item	Description
1	(1x) ORU
2	(4x) Fixing Screws
3	(1x) ORU Ethernet Cable (CB020XR)
4	(1x) ORU Power Cable (CA020SZ)
5	(1x) NMEA2000 Cable (CC050AA)

CCU – Parts Supplied

The parts supplied with the CCU are shown below.
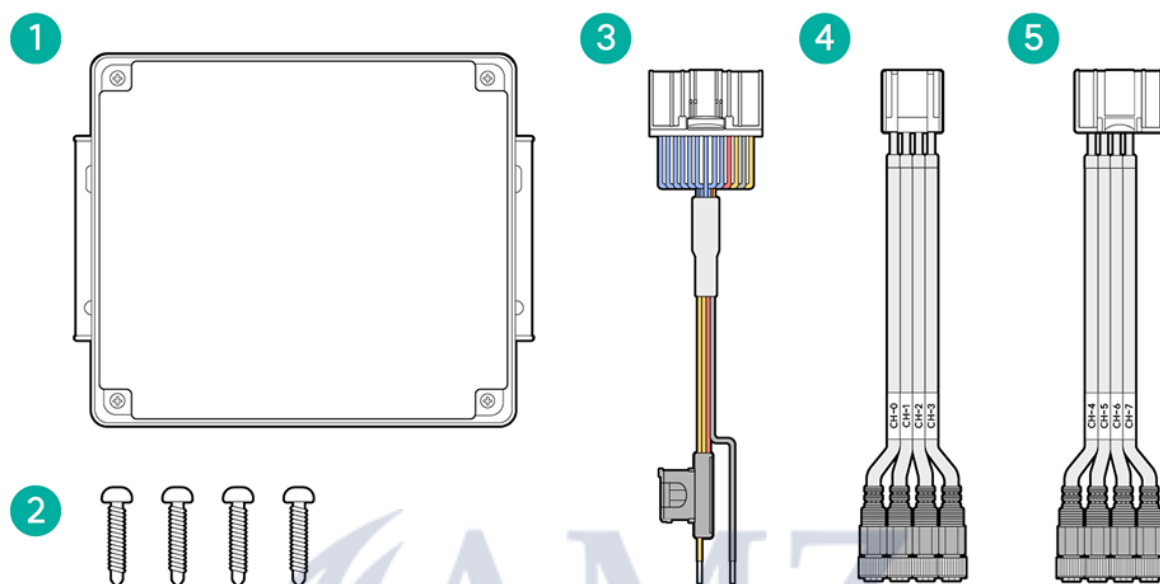
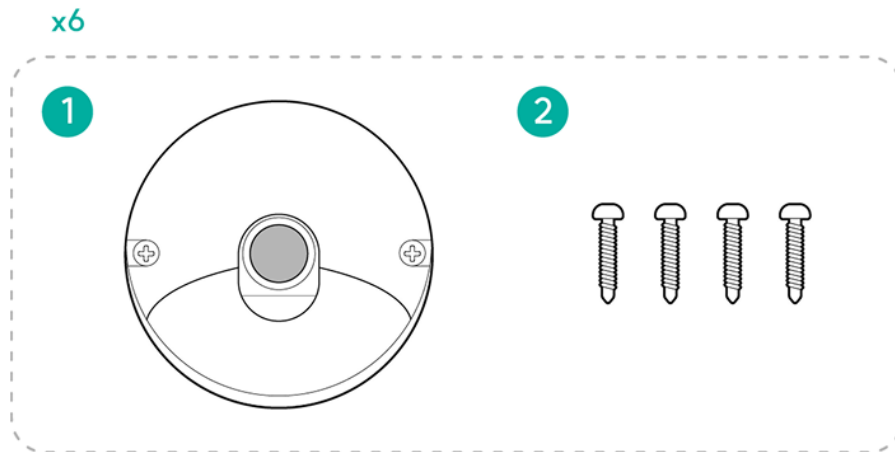| Item	Description
1	(1x) CCU
2	(4x) Fixing Screws
3	(1x) CCU Power Cable (CA010LZ)
4	(1x) CCU Camera Input1 Cable (CF002MZ)
5	(1x) CCU Camera Input2 Cable (CF002NZ)

CCU Cable – Parts Supplied

The parts supplied with the CCU Cable are shown below.
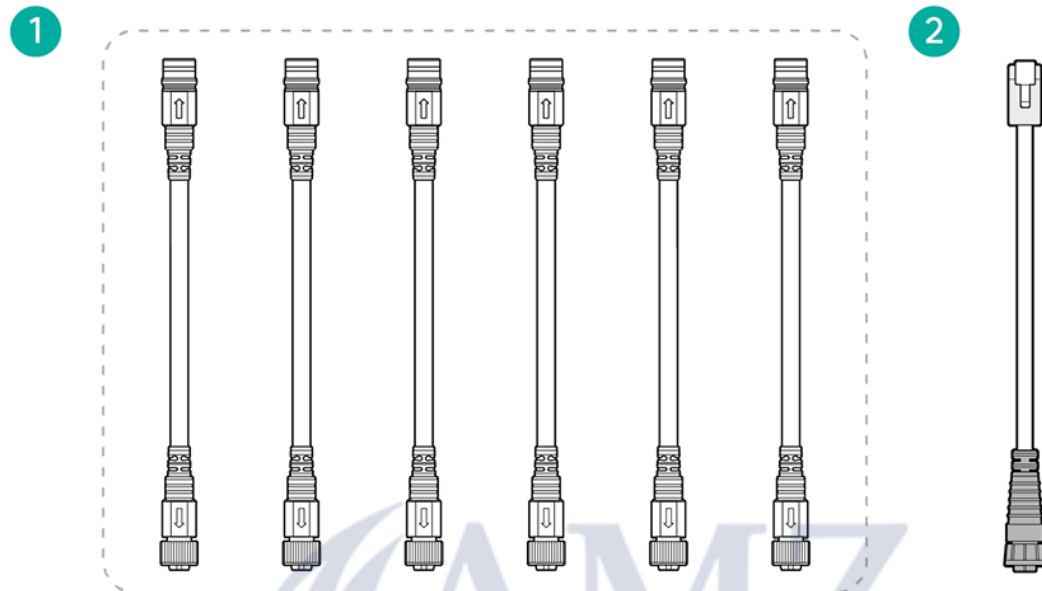
Item	Description
1	(x6) Camera Extension Cable (CF150VV)
2	(x1) CCU Ethernet Cable (CB020ER)

SVM Camera – Parts Supplied

The parts supplied with the SVM are shown below.

x6

Item	Description
1	(6x) SVM Camera
2	(24x) Fixing Screws

FVM Module – Parts Supplied

The parts supplied with the FVM are shown below.
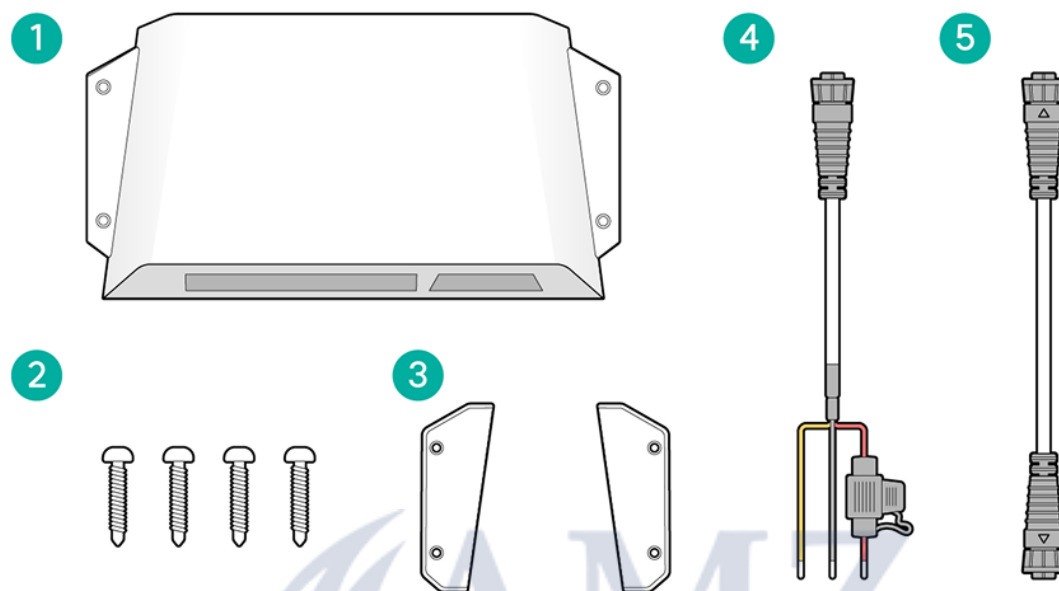
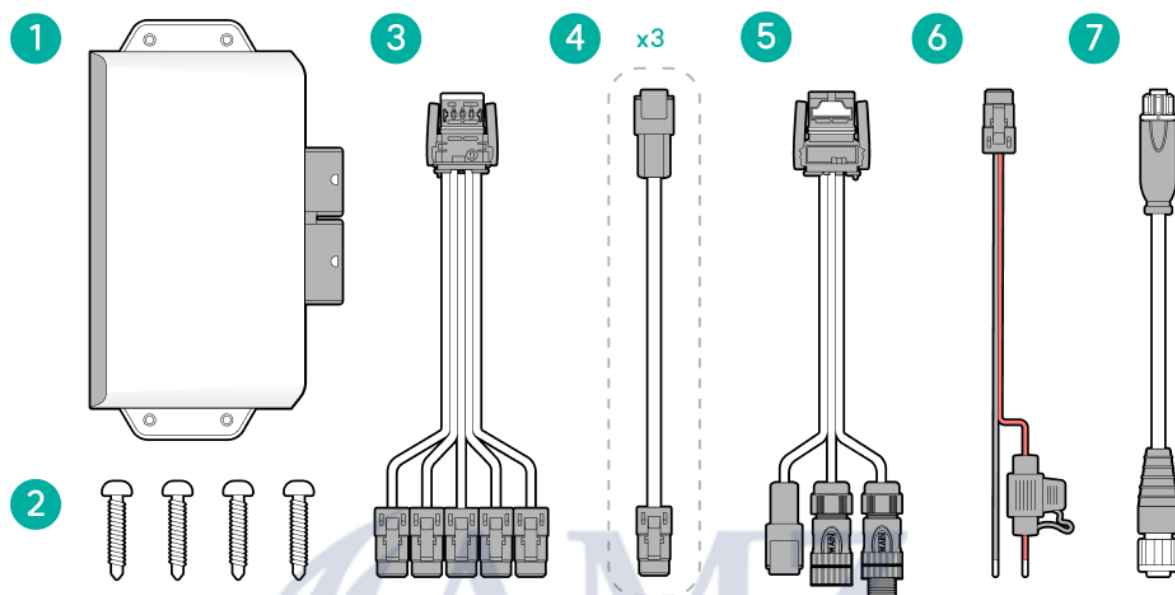| Item	Description
1	(1x) FVM Module
2	(4x) Fixing Screw
3	(1x) FVM Module Bracket
4	(1x) FVM Module Power Cable (CA150PZ)
5	(1x) FVM Module Ethernet Cable (CB150CR)

MFD Gateway – Parts Supplied

The parts supplied with the Gateway are shown below.
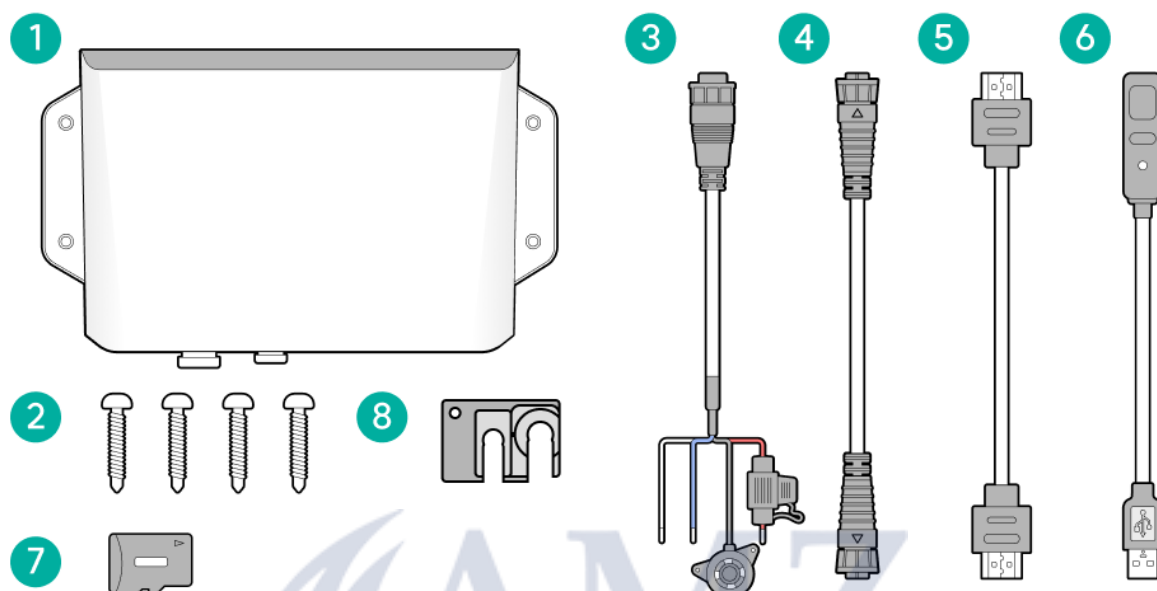
Item	Description
1	(1x) MFD Gateway
2	(4x) Fixing Screw
3	(1x) MFD Gateway Power Cable (CA020CZ)
4	(1x) MFD Gateway Ethernet Cable (CB020CR)
5	(1x) HDMI Cable
6	(1x) USB Extension Cable
7	(1x) uSD Card (64G)
8	(1x) I/O Connector Cover

Engine Gateway – Parts Supplied

The parts supplied with the EIU are shown below.

Item	Description
1	(1x) Engine Gateway
2	(4x) Fixing Screw
3	(1x) Engine Gateway CN1 Cable Module (CM003FD)
4	(3x) Engine Extension Cable (CC050DD)
5	(1x) Engine Gateway CN2 Cable Module (CM002FZ)
6	(1x) Engine Gateway CN2 Power Cable (CA020DZ)
7	(1x) NMEA2000 Cable (CC050AA)

Engine Gateway Cable (Suzuki/Dometic) – Parts Supplied

The parts supplied with the EIU Cable are shown below.
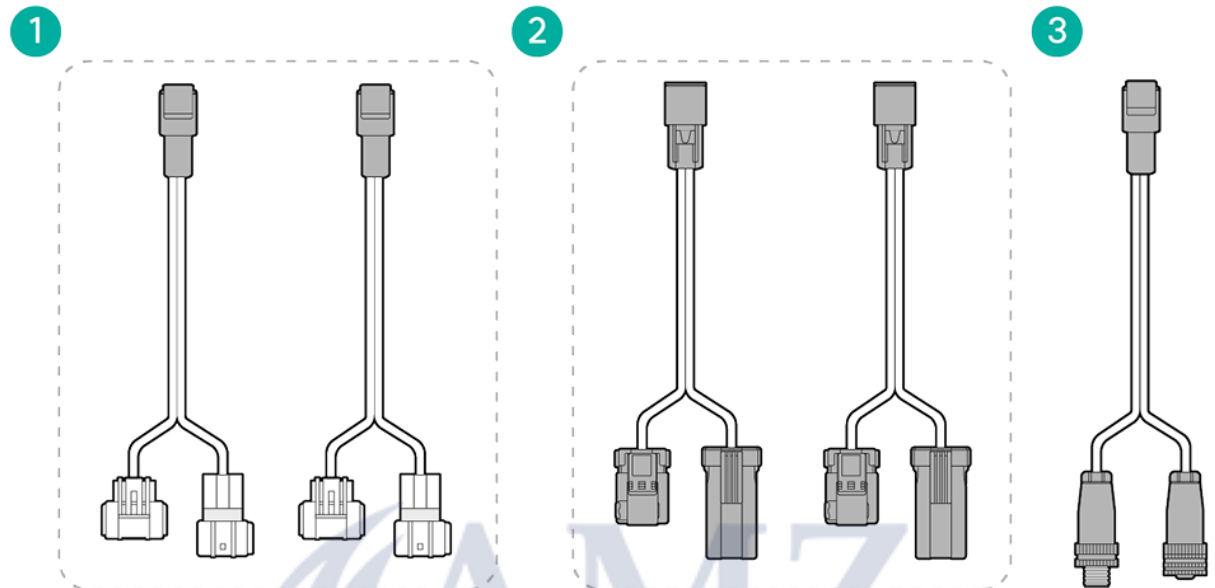
Item	Description
1	(2x) Suzuki Interface Cable (CC030DW)
2	(2x) Dometic Interface Cable (CC030DT)
3	(1x) M12 CAN Interface Cable (CC030DA)

Ethernet Switch, GNSS Sensor – Parts Supplied

The parts supplied with the Ethernet Switch (RNS–5 by Raymarine), GNSS Sensor (AR200 by Raymarine) are included as specified. For detailed information, please refer to the Raymarine Installation manual.
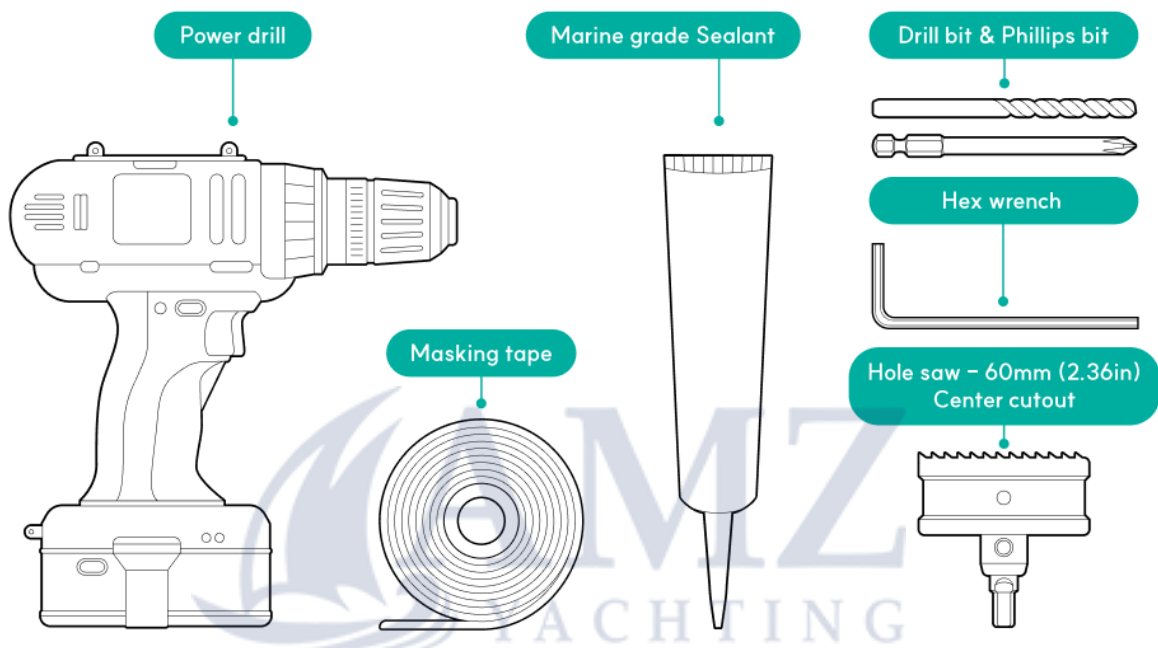
Cable List

Equipment	Cable Name	Part No.	Length(m)	Quantity
Engine Gateway	Engine Gateway CN1 Cable module	CM003FD	0.3	1
	Engine Extension Cable	CC050DD	5	3
	Engine Gateway CN2 Cable module	CM002FZ	0.3	1
	Engine Gateway CN2 Power Cable	CA020DZ	2	1
	NMEA2000 Cable	CC050AA	5	1
Engine Gateway Cable	Suzuki Interface Cable	CC030DW	3	2
	Dometic Interface Cable	CC030DT	3	2
	M12 CAN Interface Cable	CC030DA	3	1
MFD Gateway	MFD Gateway Power Cable	CA020CZ	2	1
	MFD Gateway Ethernet Cable	CB020CR	2	1
	HDMI Cable	CH050ZZF	5	1
	USB Extension Cable	CU050AAF	5	1
FVM Module	FVM Module Power Cable	CA150PZ	15	1
	FVM Module Ethernet Cable	CB150CR	15	1
ORU	ORU Ethernet Cable	CB020XR	2	1
	ORU Power Cable	CA020SZ	2	1
	NMEA2000 Cable	CC050AA	5	1
CCU	CCU Power Cable	CA010LZ	1	1
	CCU Camera Input 1 Cable	CF002MZ	0.2	1
	CCU Camera Input 2 Cable	CF002NZ	0.2	1
CCU Cable	Camera Extension Cable	CF150VV	15	6
	CCU Ethernet	CB020ER	2	1

6   Installation Overview

6.1   Tools and Materials Required

The following tools are required for installation

Power drill

Marine grade Sealant

Drill bit & Phillips bit

Hex wrench

Masking tape

Hole saw – 60mm (2.36in)
Center cutout

6.2   Location Requirement

Ensure each component is adequately supported on a secure surface.

–   **Mounting Surface**

> **⚠ WARNING**
>
> Do not mount units or cut holes in places which may damage the structure of the vessel.

–   **Cabling**

Ensure each component is mounted in a location which allows proper routing, support and connection of cables. Minimum bend radius of 100 mm (3.94 in) unless otherwise stated. Do not kink or bend cable too far. Use cable clips to prevent stress on connectors.

–   **Power Supply**

Select a location that is as close as possible to the vessel's DC power source to minimize the length of the cable runs.

–   **Ventilation**

Ensure each component is mounted in a compartment of suitable size. Ensure that ventilation holes are not obstructed. Allow adequate distance between all components.

–   **Electrical Interference**

Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters/receivers.

–   **Electromagnetic Compatibility (EMC)**

To avoid compromising EMC performance, always follow the equipment installation instructions provided with the equipment. The equipment is designed to minimize electromagnetic interference with other devices.

- **Distance from Compasses**

To prevent potential interference with the vessel's magnetic compasses, always install components at least 3.3 ft (1m) away in all directions from any compasses.

- **Corrosion**

Always install a nonmetallic isolation mount when fitting the product directly to large stainless-steel platforms/mounts, or directly to steel construction vessels to avoid accelerated galvanic corrosion.

- **Explosive**

Do not install near flammable and explosive materials. Do not install in areas with explosive atmospheres, such as areas with a high concentration or flammable chemicals or saturated vapors.

SVM Camera

- **Line of Sight**

The SVM camera must be mounted in a position where the camera lens has an unobstructed field of view. There should be no objects within the camera's FOV (Field of View) that obstruct visibility, such as the hull, rail, or brackets.

- **Height of Installation**

Always install the SVM camera as high as possible above the waterline to ensure optimal performance. If the camera is near waterline, saltwater may cause a whitening effect on the camera lens.

– Mounting Surface

The mounting surface for the SVM camera should be flat and smooth. If the surface aluminum or steel, a rubber or plastic gasktet should be placed between the SVM camera and the metal surface.

– Equipment Damage

If the SVM camera is installed on the exterior of the boat, it must be positioned where it will not be damaged or crushed during normal operation of the vessel. For example, the SVM camera should not be mounted on the boat's fender.
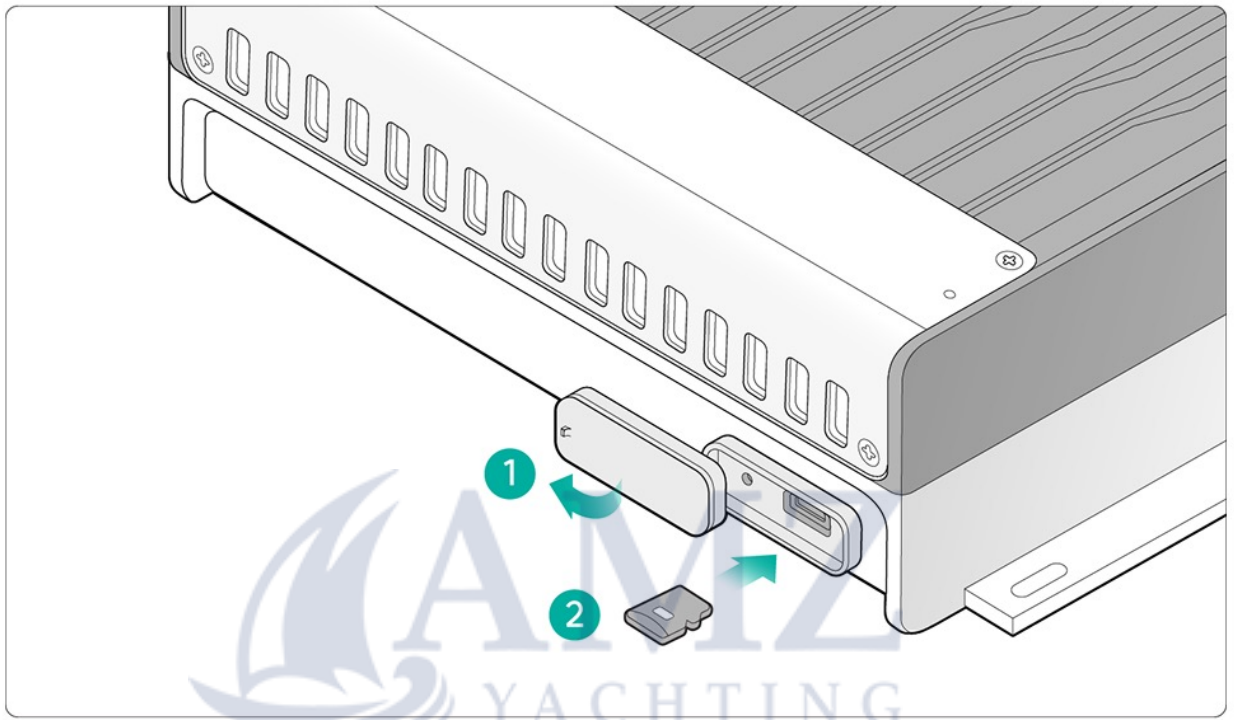
ORU/Engine Gateway

– Water Ingress

The ORU and Engine Gateway meet the IPX6 waterproof rating. Prolonged exposure to moisture, rain, or salt spray may still cause damage. It is recommended to install the ORU in a protected area to minimize potential risks from humidity and salt exposure.
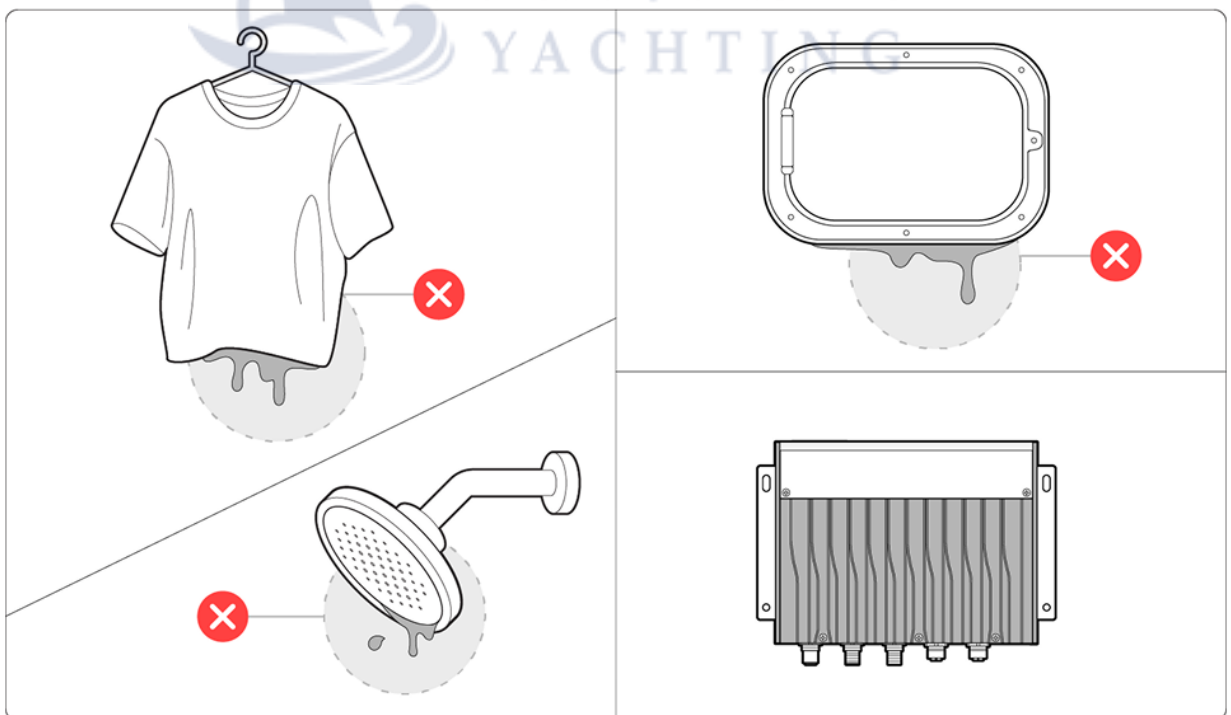
– Micro SD Access

Ensure that the ORU installed in a location with a minimum clearance of 80 mm (3.15 in) above the MicroSD card slot, to allow insertion and removal of MicroSD cards.

− **Blow Inlet Protection**

The inlet for the cooling fan inside the ORU must not be blokced or obstructed. It should be installed in an appropriate location such that foreign substances do not enter the ORU.
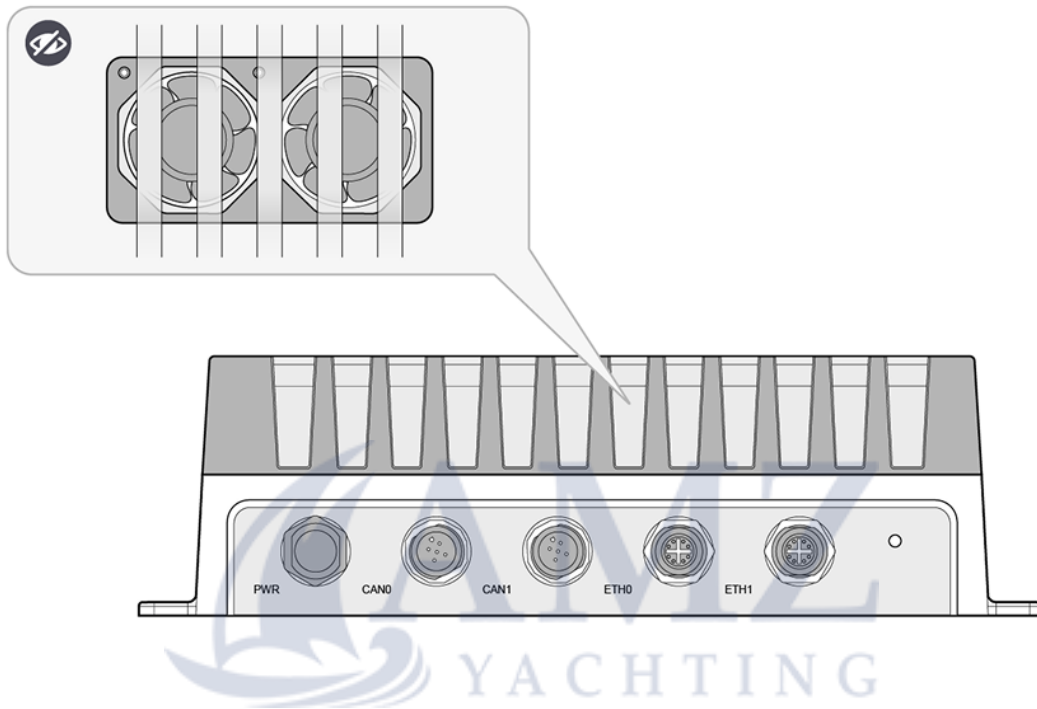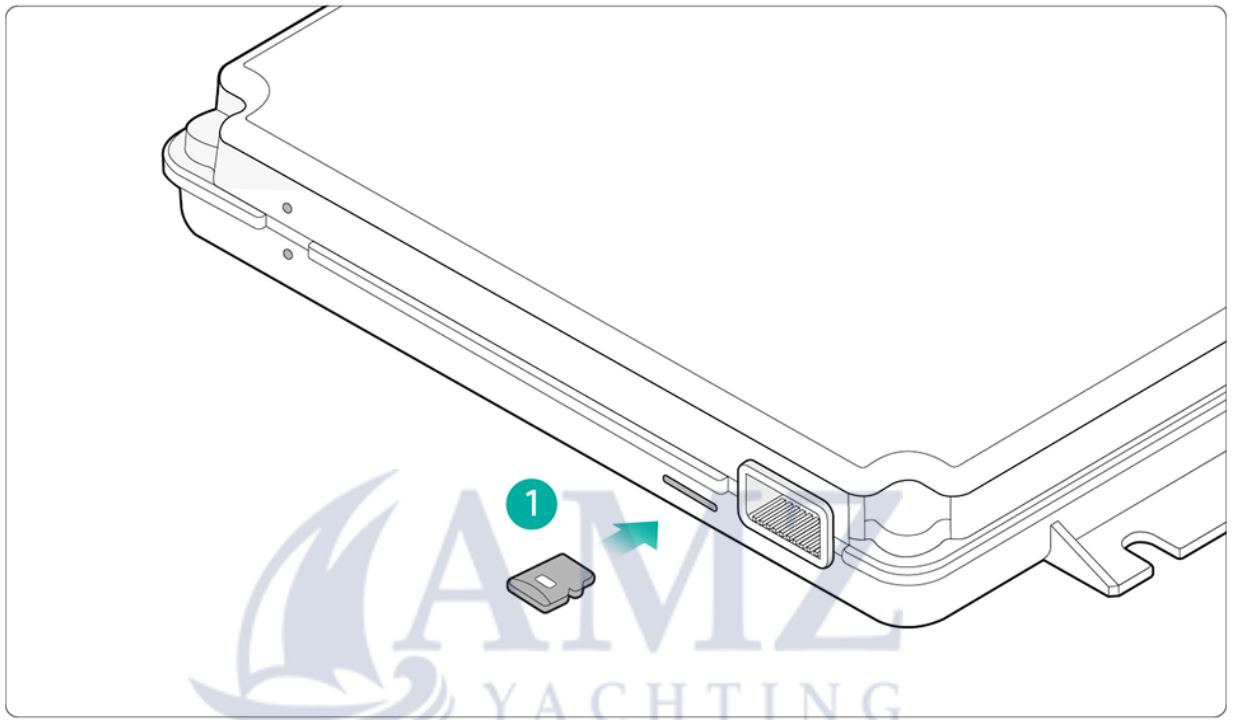
CCU / Engine Gateway

– Water Ingress

The CCU is NOT protected against the damage from moisture or other liquids. It should be mounted in a protected area away from moisture and exposure to rain and salt spray.
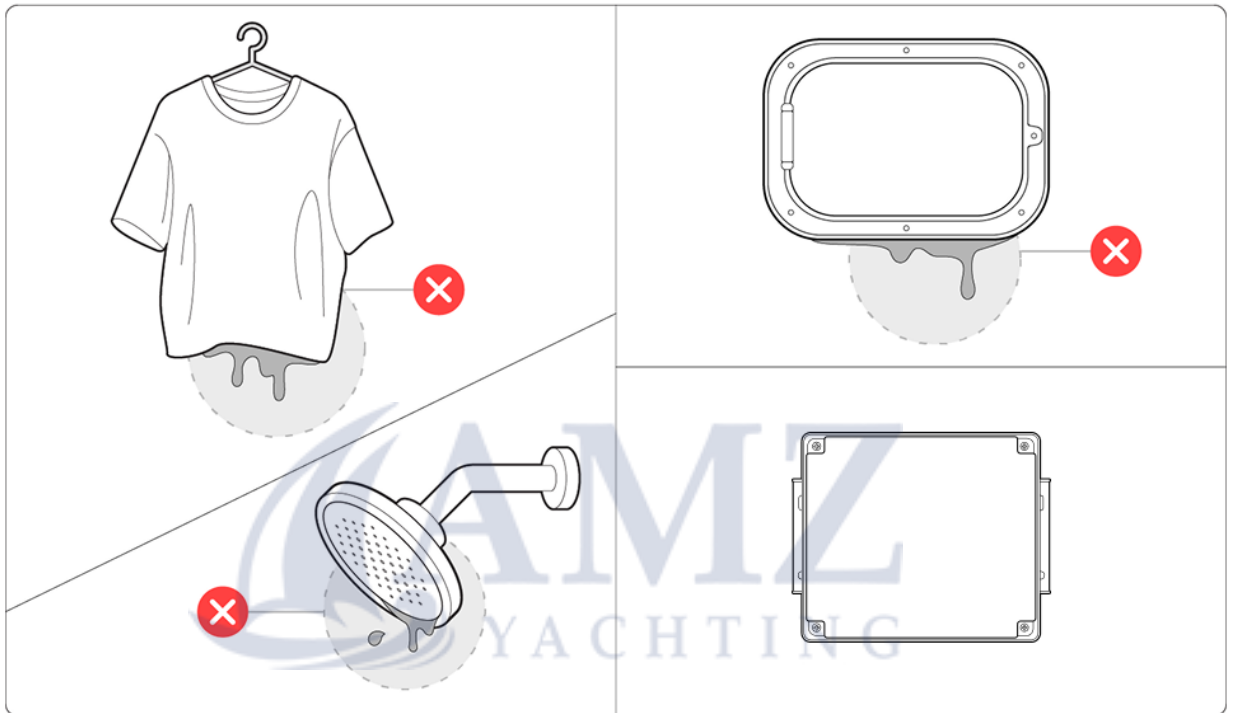
- **Micro SD Access**

Ensure that the CCU installed in a location with a minimum clearance of 80 mm (3.15 in) above the MicroSD card slot, to allow insertion and removal of MicroSD cards.

- **Cable Length**

The maximum length of the SVM Camera cable is 15 meters, and the distance between the CCU and each camera should not exceed the maximum cable length. The Engine Gateway cable should not be extended beyond 25 feet (8 meters), as exceeding this length may cause connectivity issues between the Engine Gateway and the Target Engine Controller. The maximum length of the Ethernet Switch cable is about 50 feet (15 meters), and the distance between the Ethernet Switch and the connected device should not exceed the maximum cable length.

MFD Gateway

− Distance

The Gateway must be installed near the MFD, as it connects via HDMI and USB cables. Since the provided cables are about 16 feet (5 meters) long, ensure the Gateway is positioned within this cable length to maintain a stable connection.

Additionally, devices that connect to the MFD Gateway must be within 16 feet (5 meters), as wireless functionality is not available in the current version, and all connections need to be established through the provided cables.

− Line of Sight

The MFD Gateway should have a clear and direct line of sight to the connected devices. Any physical obstacles in the path may reduce the wireless performance.

− Water Ingress

The MFD Gateway meets the IPX5 waterproof rating. Prolonged exposure to moisture, rain, or salt spray may still cause damage. It is recommended to install the MFD Gateway in a protected area to minimize potential risks from humidity and salt exposure.

− Micro SD Access

Ensure that the MFD Gateway installed in a location with a minimum clearance of 3.15 inches (80 mm) above the MicroSD card slot, to allow insertion and removal of MicroSD cards.

GNSS

As this product is a Raymarine device, please refer to the Raymarine installation manual for detailed installation instructions. Do not install indoors on the boat to ensure optimal performance.

FVM Module

- Line of Sight

The FVM should be positioned at the front part of the upper deck of the vessel. The FVM must have an unobstructed forward view and should be installed at a location that away from nearby structures or equipment. It may be adversely affected by objects such as radar, searchlights, horns, and masts. The FVM must have no objects within its Field of View (FOV) of 127.5 horizontal by 72.7 vertical.

- Camera FOV : (Horizontal) 127.5°, (Vertical) 72.7

- LiDAR FOV : (Horizontal) 120°, (Vertical) 25°
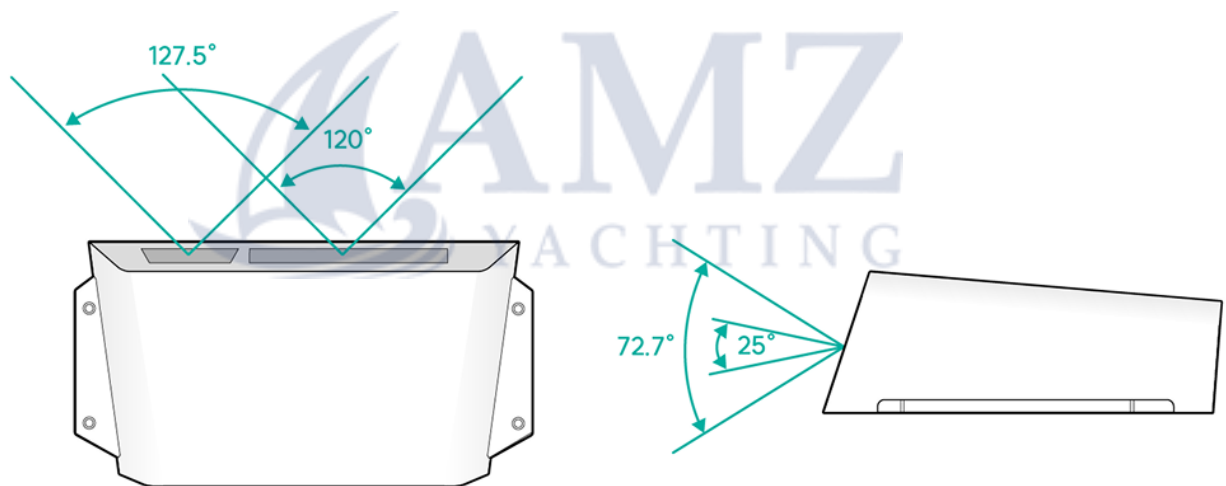
- Centerline

The FVM module must be mounted as near as possible to the vessel's centerline.

– Vertical Inclination Angle

Ensure the FVM rotates parallel to the water line. The LiDAR from the FVM is approximately 25° wide in the vertical direction, to give good target detection even when your vessel pitches and rolls. To ensure that the FVM remains parallel to the waterline at cruising speed, a separate wedge or bracket should be used. This will allow the FVM to maintain a parallel alignment when the bow of the vessel rises during cruising.
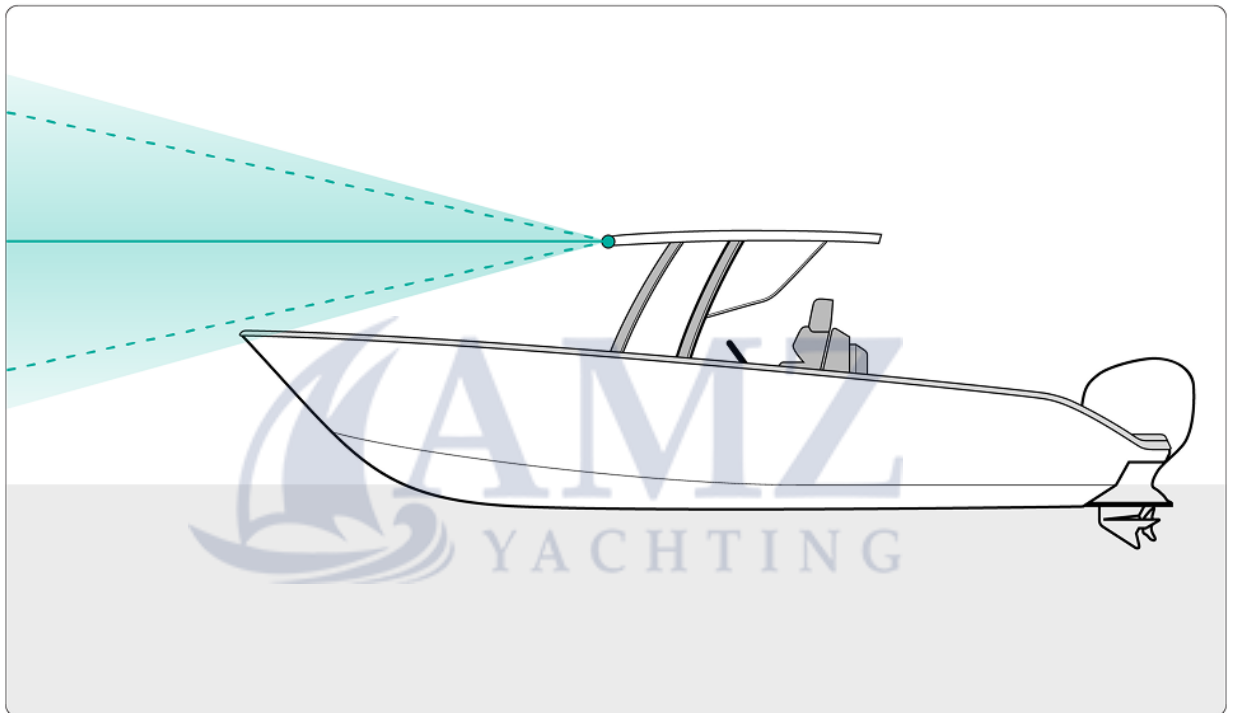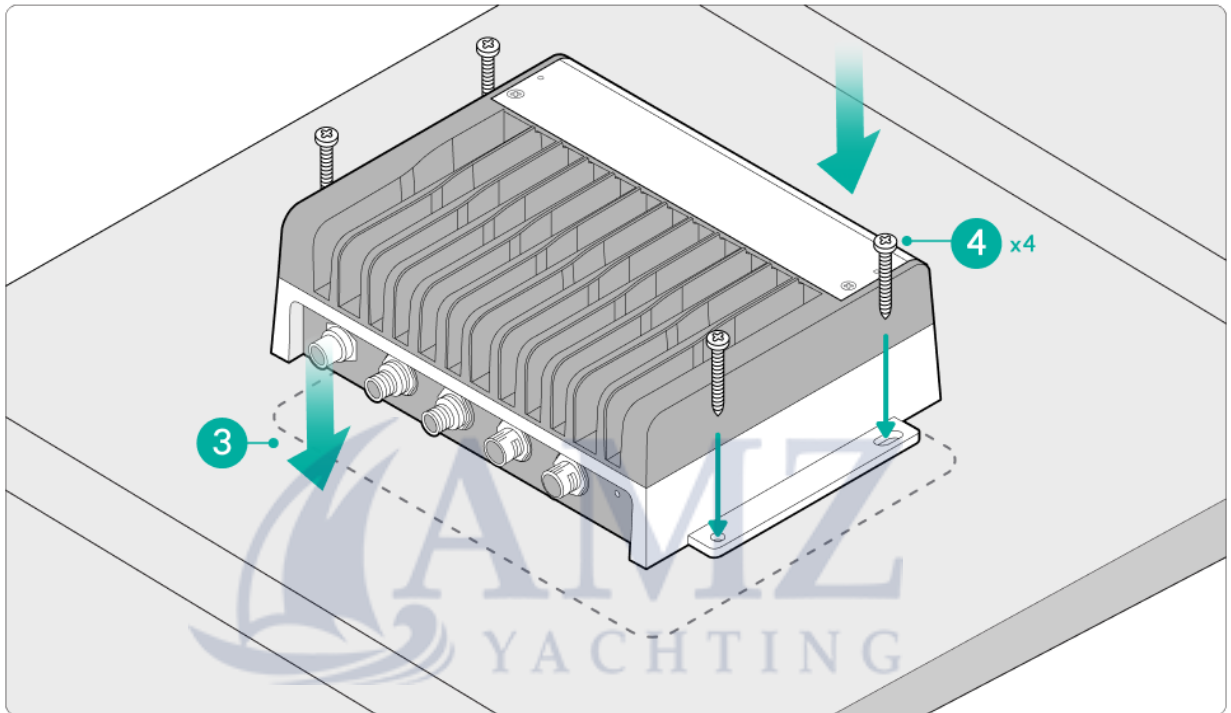

– Separate Bracket

The packaging of the FVM provides a seperate mounting bracket, which should be properly secured to the boat top.

6.3 Assembly Instructions

6.3.1 ORU

The ORU should be installed near the helm for easy access and the front of unit is accessible for harness connections.

1. Attach the provided ORU Mounting Template to the desired installation location.

2. Drill four holes at the marked positions and then remove the Mounting Template.

3. Place the ORU unit over the drilled holes.

4. Using the included screws, secure the unit by aligning them with the drilled hole positions.

5. After fully tightening all four screws, check the ORU is securely fixed in place.

6.3.2   CCU

The CCU should be installed near the helm for easy access, ensuring clearance for harness connections.
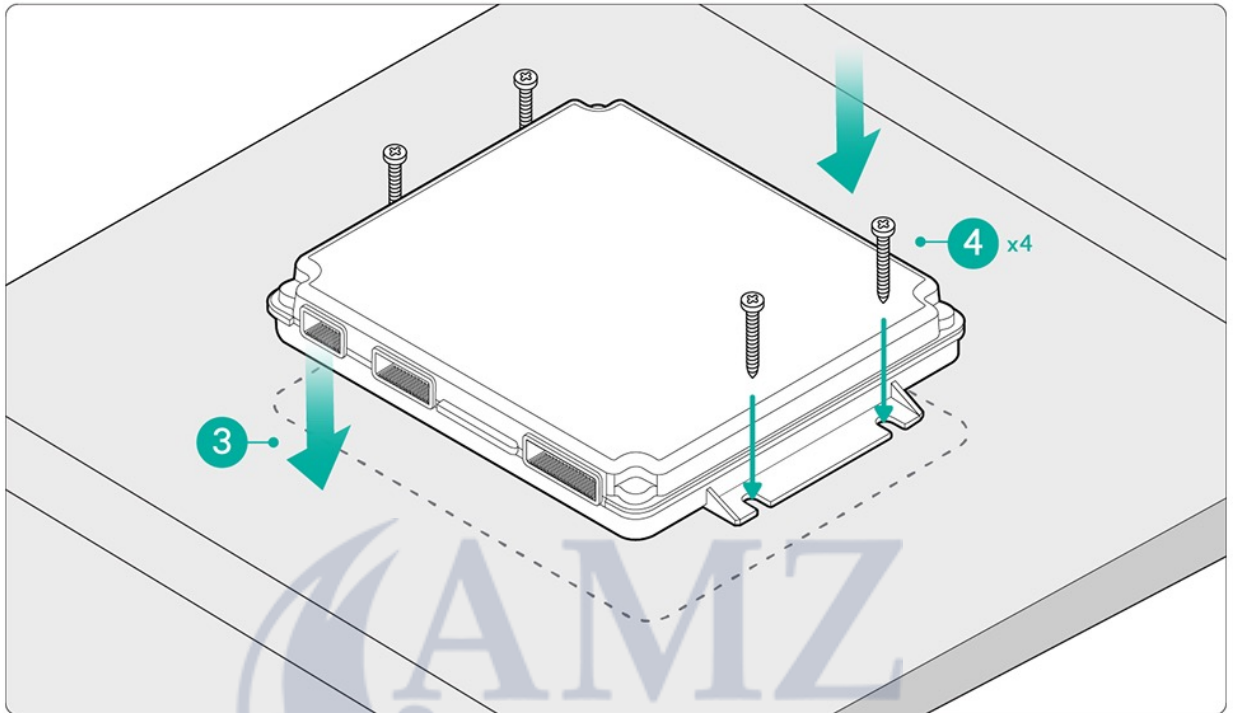

1.   Attach the provided CCU Mounting Template to the desired installation location.

2.   Drill four holes at the marked positions, then remove the Mounting Template.

3.   Place the CCU unit over the drilled holes.

4.   Using the included screws, align and secure the unit with the drilled holes.

5.   After fully tightening all four screws, check the CCU is securely fixed in place.

6.3.3   SVM Camera

The SVM cameras should be installed in six positions around the vessel: bow, sides, and stern.

* The installation location directly impacts the performance of the NEUBOAT system. Contact Avikus unless installed by a trained or certified installer.
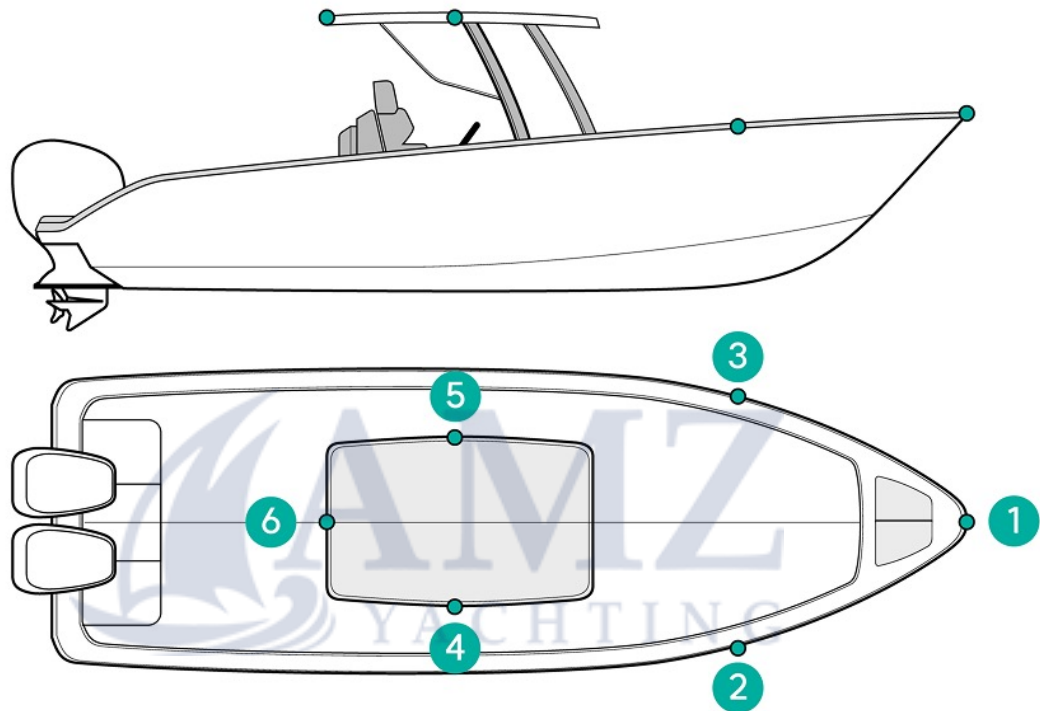
1.   Bow (FF)

– Install as close to the bow as possible.

– Check the mounting location will not interfere with the anchor (if equipped near this location).

– Install as high as possible. If installed closer to the waterline, performance may degrade.

– Recommended to face the horizon, but slightly downward (recommended 15 degrees, up to a maximum of 30 degrees).

– For catamarans, it is recommended to install at 30 degrees downward.

2.   **Front Right (FR)**

–   At least 3 1/4 feet (1.0m) above the waterline.

–   The preferred location covers the blind spot monohulls.

–   Same distance from the centerline as the front left camera.

–   All cameras should be installed so that the horizon is visible.

–   A part of the vessel should be visible on the camera.

3.   **Front Left (FL)**

–   (Same content as FR camera.)

–   It shall be installed on the same line as the FR camera.

4.   **Starboard (SB)**

–   Install parallel to the waterline.

–   As close to the vessel's centerline as possible.

5.   **Port (PO)**

–   Install parallel to the waterline.

–   As close to the vessel's centerline as possible.

6.   **Stern (RR)**

–   Install parallel to the waterline and near the transverse centerline of the vessel's roof.

–   Check there is no interference with any previously installed fishing rod holder, hanger, or rails.

–   For monohulls and catamarans, 30 degrees downward is recommended.

## Consider the following

Selected a suitable location, based on location requirements found in this document.
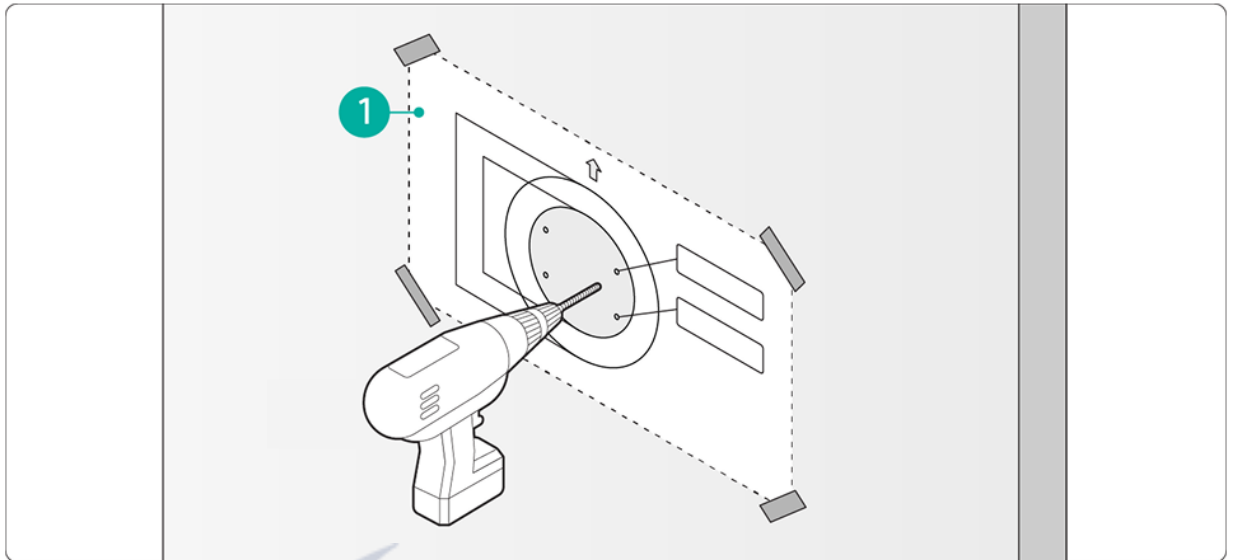
1. Attach the provided SVM Camera Mounting Template to the desired installation position.
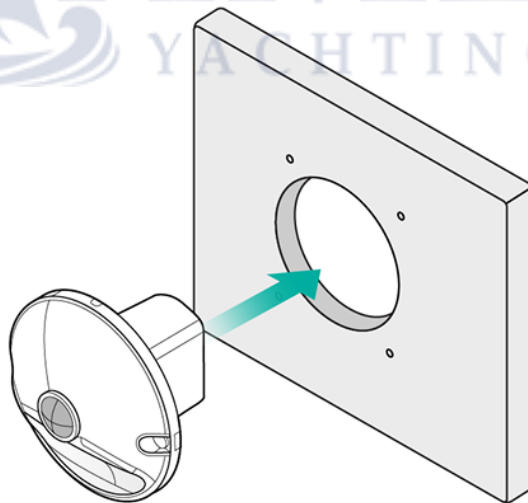

2. Drill four holes at the marked positions.

3. Use a hole cutter to drill the center cutout hole on the mounting template.

4. Remove the Mounting Template.

5. Use a half-round file or sandpaper to smooth rough edges of the cutout hole.
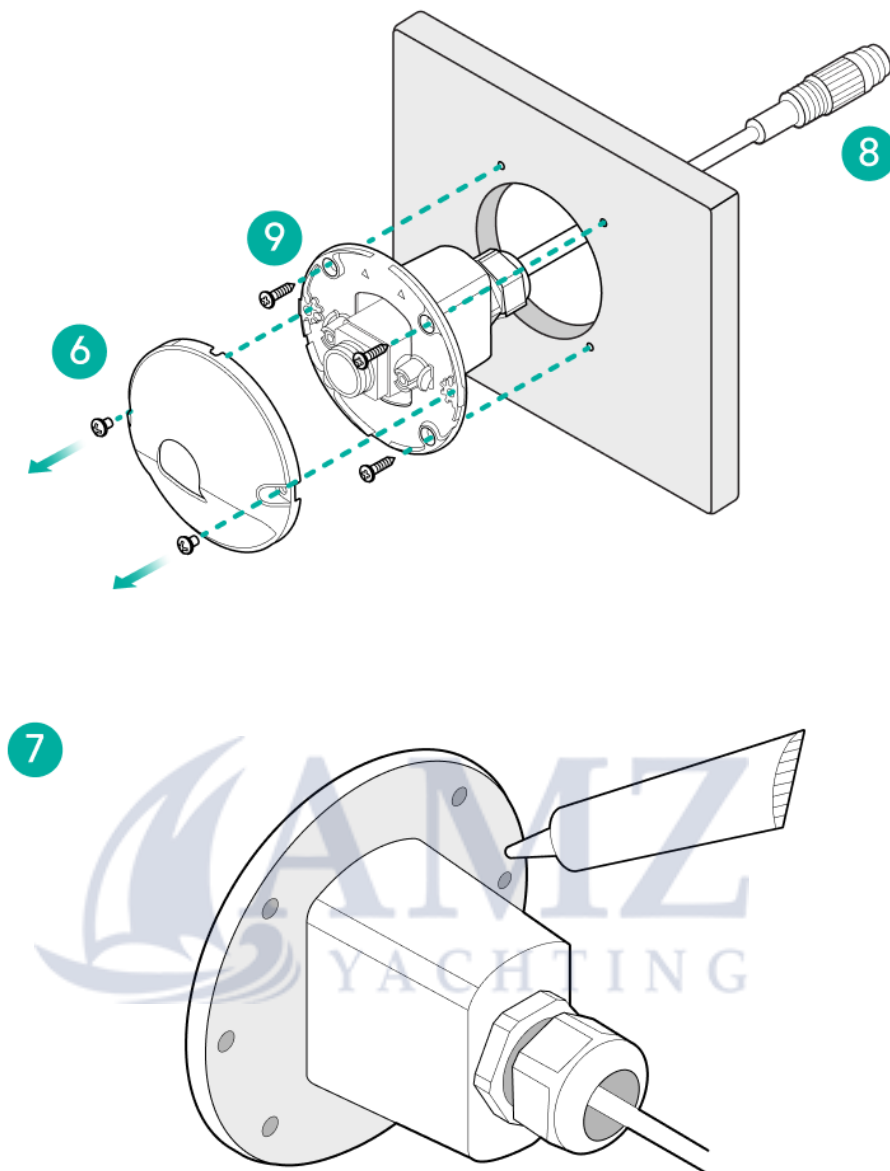
6. Unscrew and remove the front cover screws

7. Apply marine-grade sealant (e.g., Alpha 132 PU Sealant) to the back of the camera's front plate.

8. Position the camera with the cable fed through the cutout hole.

9.   Check the arrows are facing directly upward and that the drill holes are aligned with the fixing holes on the SVM's front plate, insert the unit's body into the cutout hole and secure using the fixing screws provided.

10.   [If needed] Loosen the hex bolts on the sides with a wrench.

11.   [If needed] Vertically adjust the camera lens to the recommended angle that has been specified in the supplied placement position file.
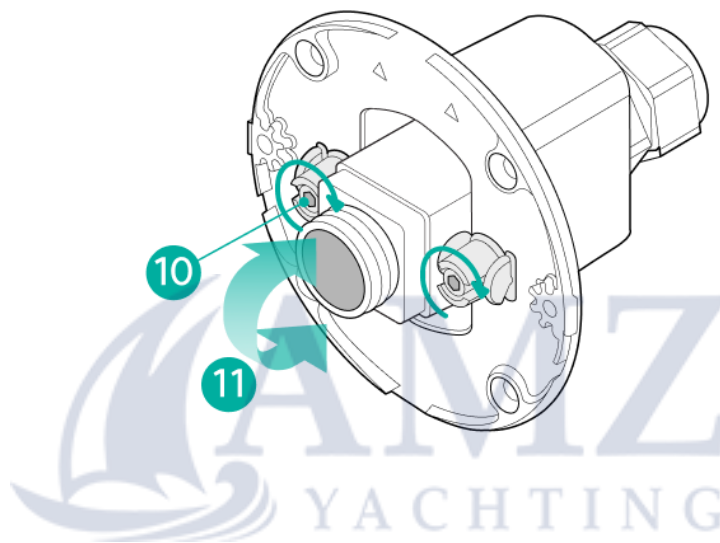

12.   Tighten the hex bolts after adjustment.

13.   Assemble the front cover and tighten the screws.

14.   Ensure the camera is firmly fixed.

15.   Check for gaps between the camera and the vessel; use sealant if necessary

6.3.4 FVM

The FVM should be installed on the vessel's top section with a clear line of sight and sturdy enough to handle seagoing conditions.
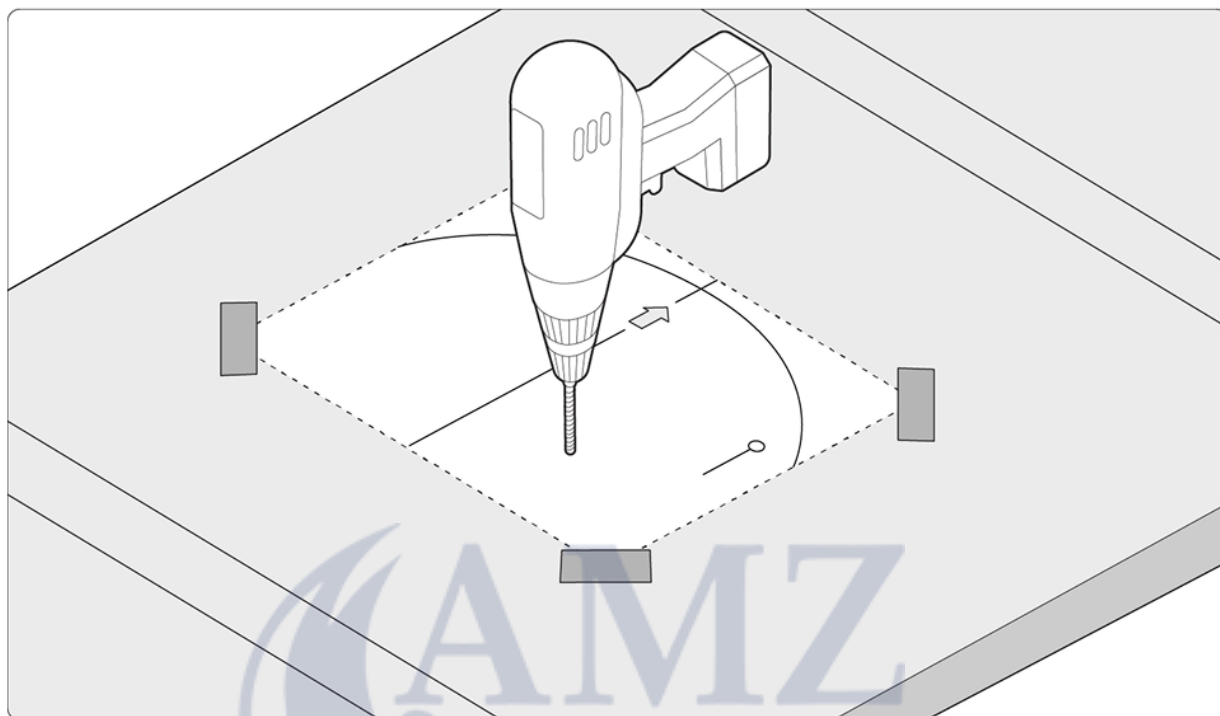
1.   Attach the provided Mounting Template to the desired location, check that the arrow points in the same direction as the vessel's bow.

2.   Drill four pilot holes (5mm) at the marked template positions.

3.   Position the FVM bracket over the pilot holes.
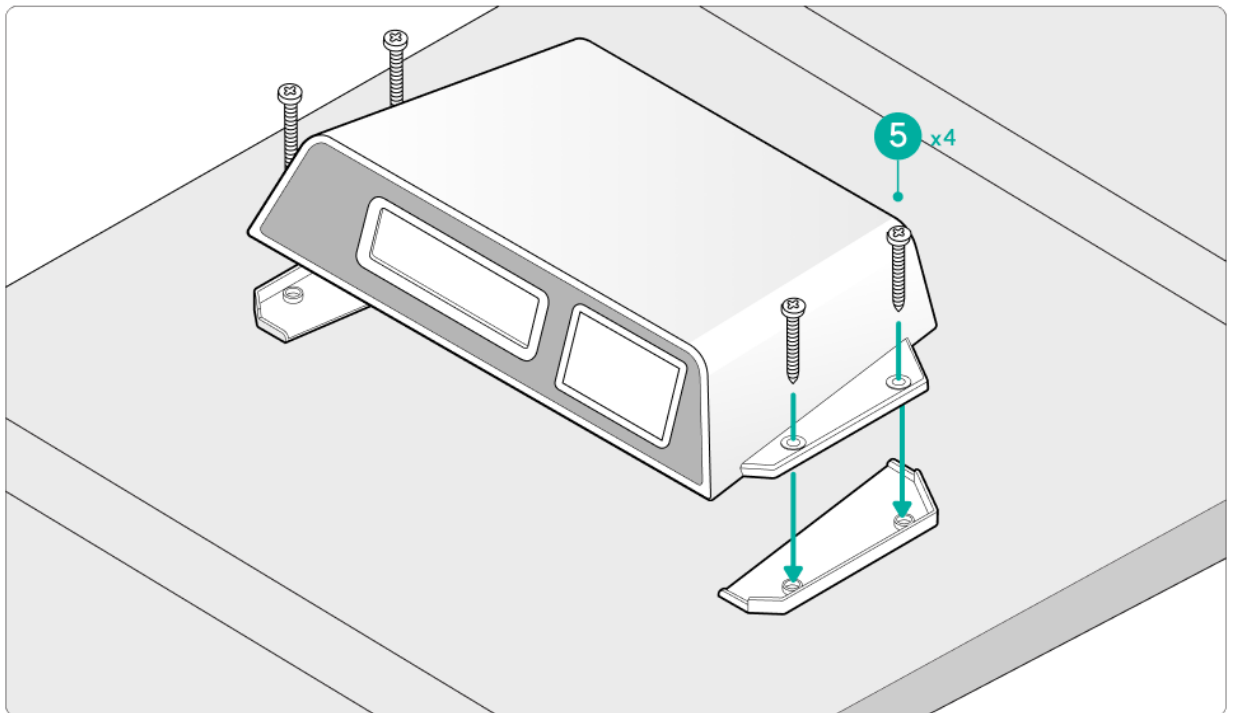
4.   Position the FVM over the FVM bracket.

5.   Secure the FVM and the FVM bracket simultaneously using the provided screws. Apply thread sealant to the screws for water ingress protection.

6.   Check that the FVM is securely installed.

6.3.5 MFD Gateway

The MFD Gateway should be installed close to the MFD on the helm, ensuring easy access and following the location requirements outlined in this document.

Consider the following

−   Ensure front access for harness connections.
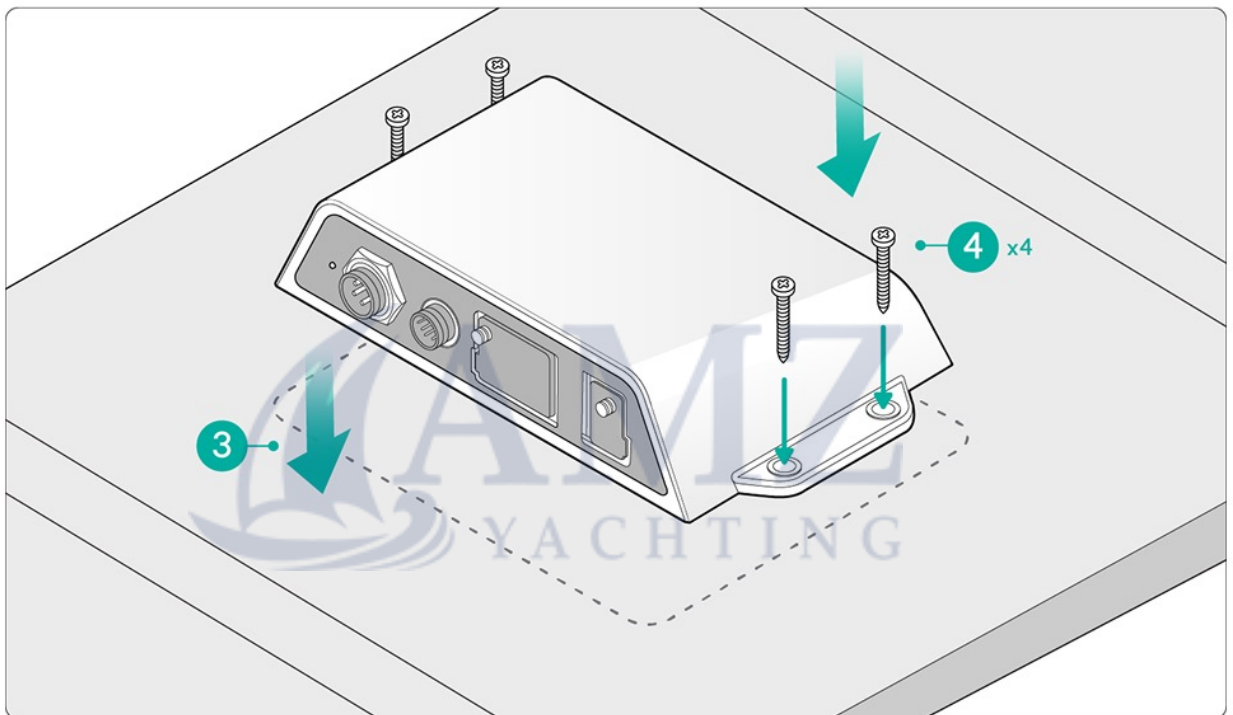
1.   Attach the provided MFD Gateway Mounting Template to the desired location.

2.   Drill four holes at the marked positions and remove the template.

3.   Place the unit over the drilled holes.

4.   Secure it using the included screws.

5.   Ensure the unit is firmly fixed.
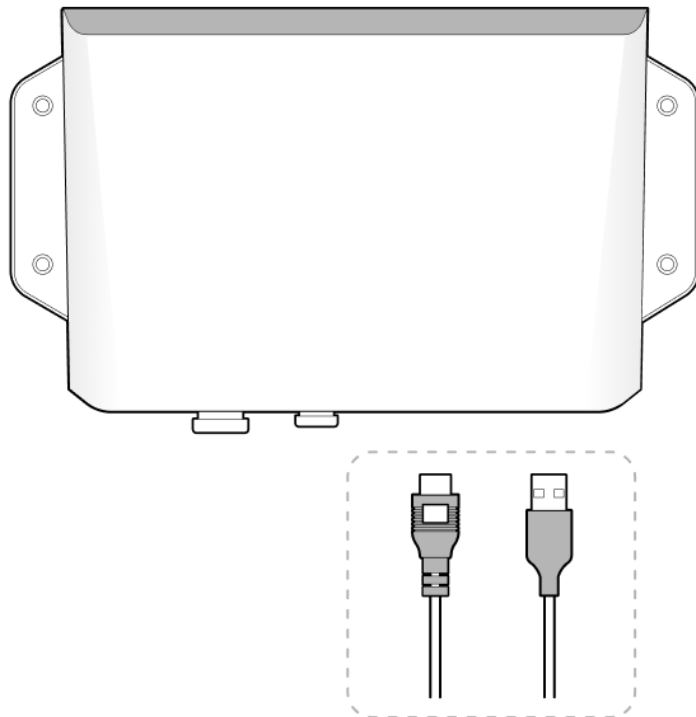
6. Apply the provided I/O Connector Cover to secure the HDMI and USB connectors.

7. Use the included cable clips to secure the HDMI and USB cables.

6.3.6   Engine Gateway

The Engine Gateway should be installed near the ORU for easy access and the rear of the unit is accessible for harness connections.
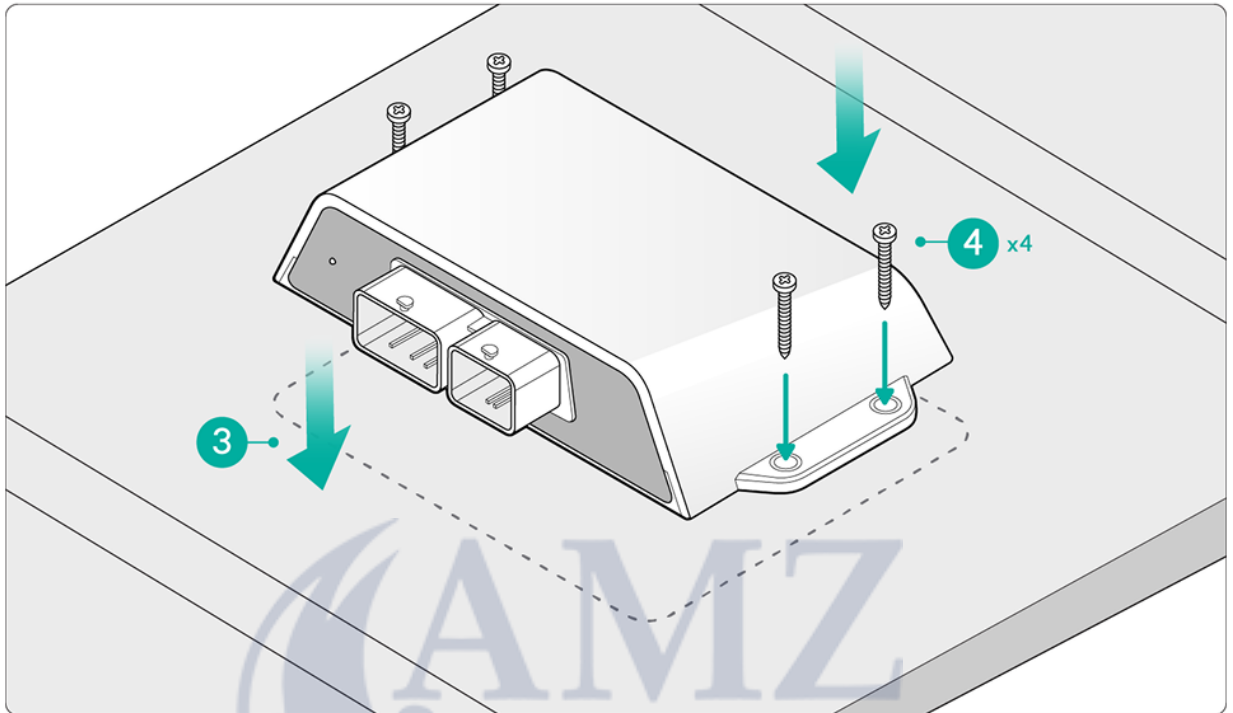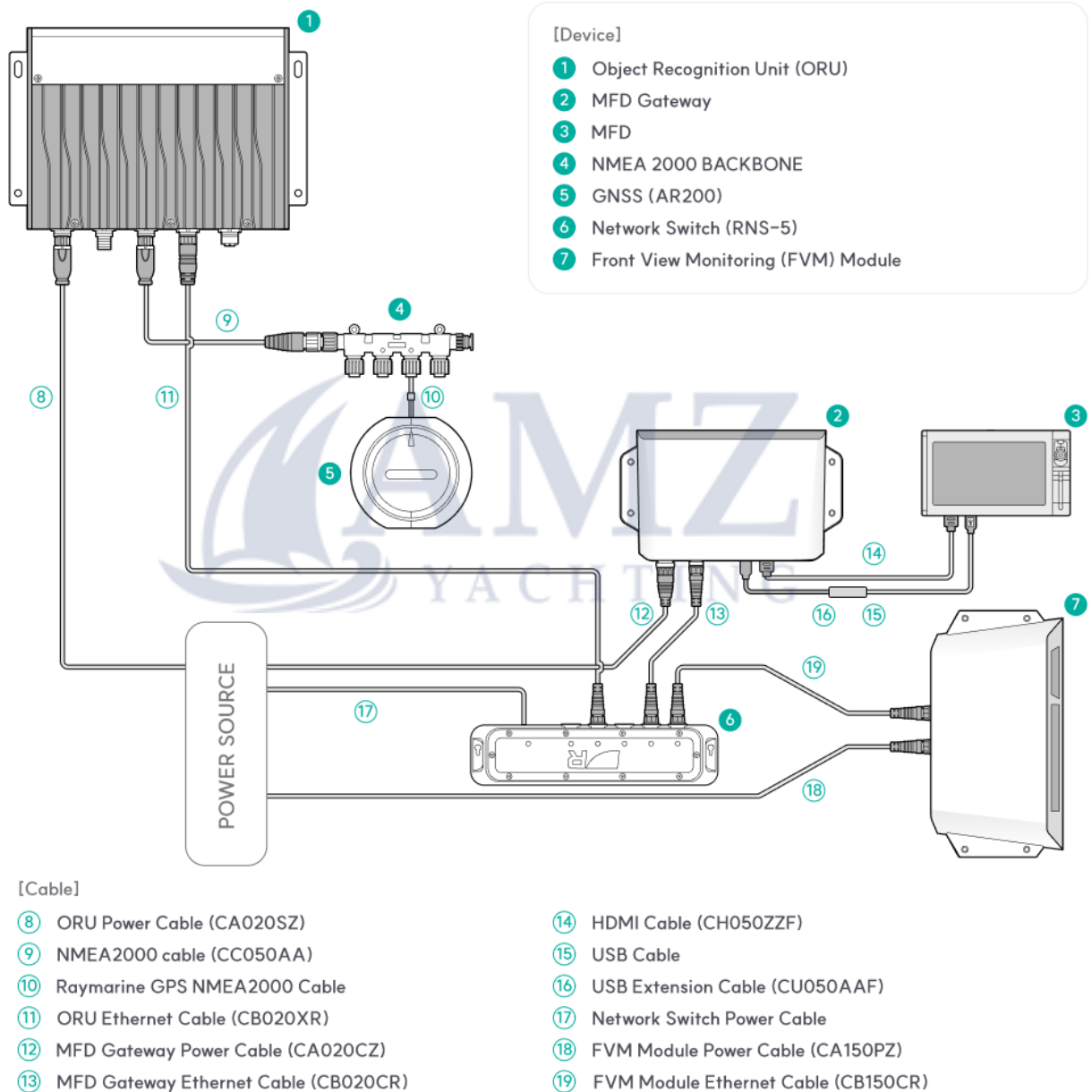

1.   Attach the provided Engine Gateway Mounting Template to the desired installation position.

2.   Drill four holes at the marked positions and remove the template.

3.   Place the unit over the drilled holes.

4.   Secure it using the included screws, aligning them properly.

5.   After tightening all four screws, check the unit is securely fixed.
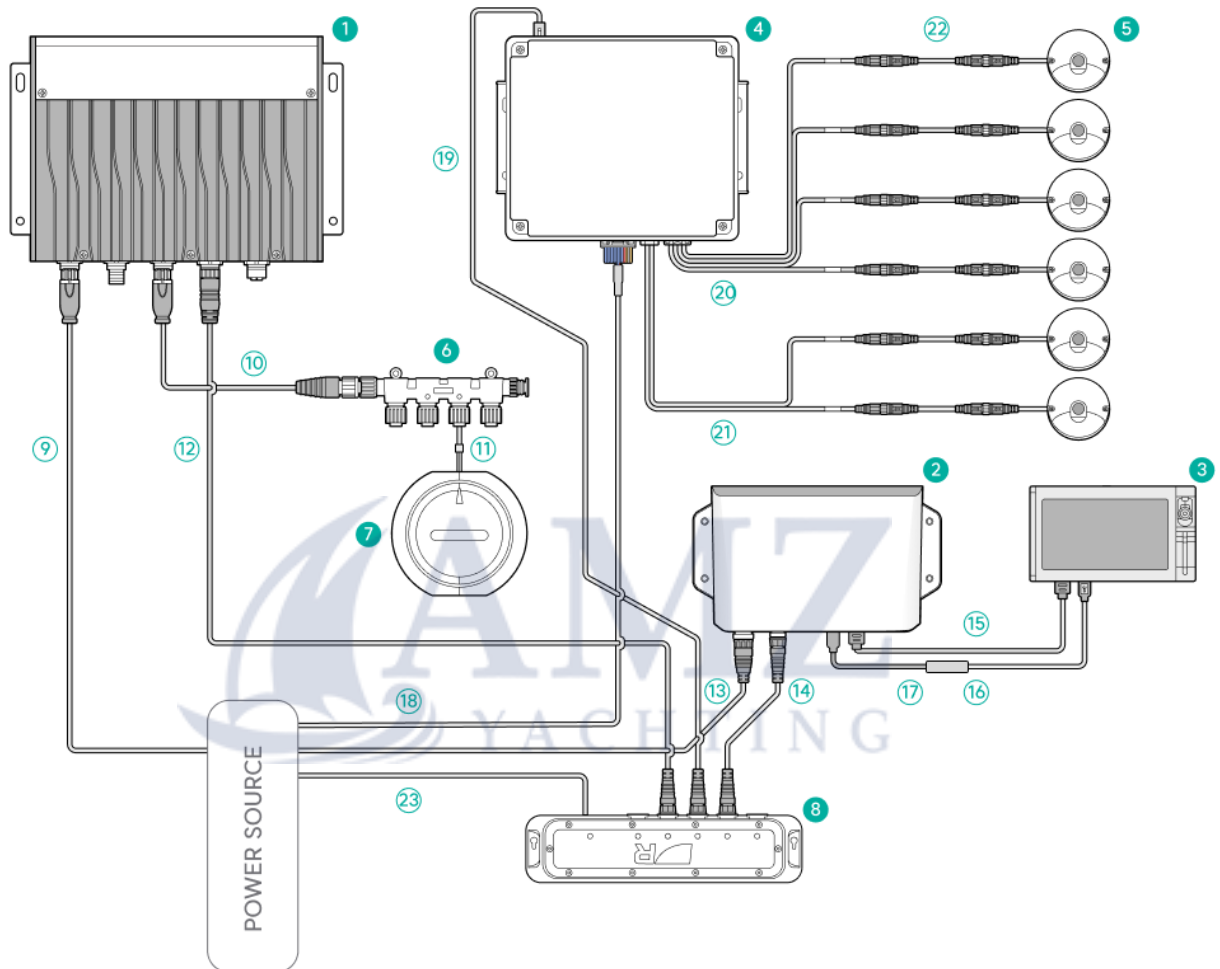
6.4 Wiring Connections

6.4.1 System Diagram – NEUBOAT NAVI

The complete system consists of 1 x FVM module and other components all connected to Object Recognition Unit (ORU), which is then connected to MFD Gateway which sends the data to the display unit.

[Device]
1. Object Recognition Unit (ORU)
2. MFD Gateway
3. MFD
4. NMEA 2000 BACKBONE
5. GNSS (AR200)
6. Network Switch (RNS-5)
7. Front View Monitoring (FVM) Module

POWER SOURCE

[Cable]

8. ORU Power Cable (CA020SZ)	14. HDMI Cable (CH050ZZF)
9. NMEA2000 cable (CC050AA)	15. USB Cable
10. Raymarine GPS NMEA2000 Cable	16. USB Extension Cable (CU050AAF)
11. ORU Ethernet Cable (CB020XR)	17. Network Switch Power Cable
12. MFD Gateway Power Cable (CA020CZ)	18. FVM Module Power Cable (CA150PZ)
13. MFD Gateway Ethernet Cable (CB020CR)	19. FVM Module Ethernet Cable (CB150CR)

6.4.2   System Diagram – NEUBOAT DOCK II

The complete system consists of 6 x Surround View Monitoring cameras, Object Recognition Unit and the Camera Conversion Unit connected seamlessly to an MFD display at the helm.

[Device]

①	Object Recognition Unit (ORU)		⑥	NMEA 2000 BACKBONE
②	MFD Gateway		⑦	GNSS (AR200)
③	MFD		⑧	Network Switch (RNS-5)
④	Camera Conversion Unit (CCU)			
⑤	Surround View Monitoring (SVM) Camera			

[Cable]

⑨	ORU Power Cable (CA020SZ)		⑰	USB Extension Cable (CU050AAF)
⑩	NMEA2000 cable (CC050AA)		⑱	CCU Power Cable (CA010LZ)
⑪	Raymarine GPS NMEA2000 Cable		⑲	CCU Ethernet Cable (CB020ER)
⑫	ORU Ethernet Cable (CB020XR)		⑳	CCU Camera Input 1 Cable (CF002MZ)
⑬	MFD Gateway Power Cable (CA020CZ)		㉑	CCU Camera Input 2 Cable (CF002NZ)
⑭	MFD Gateway Ethernet Cable (CB020CR)		㉒	Camera Extension Cable (CF150VV)
⑮	HDMI Cable (CH050ZZF)		㉓	Network Switch Power Cable
⑯	USB Cable			

6.4.3   System Diagram – NEUBOAT CONTROL

The complete system consists of NEUBOAT NAVI, DOCK II, or both and the Engine Gateway connected to your engine.

to Dometic, PORT CAN1

to Dometic, STBD CAN1

to Dometic, STBD CAN2

to SUZUKI, PORT MAIN CAN

to SUZUKI, STBD MAIN CAN

[Device]

1 Object Recognition Unit (ORU)
2 MFD Gateway
3 MFD
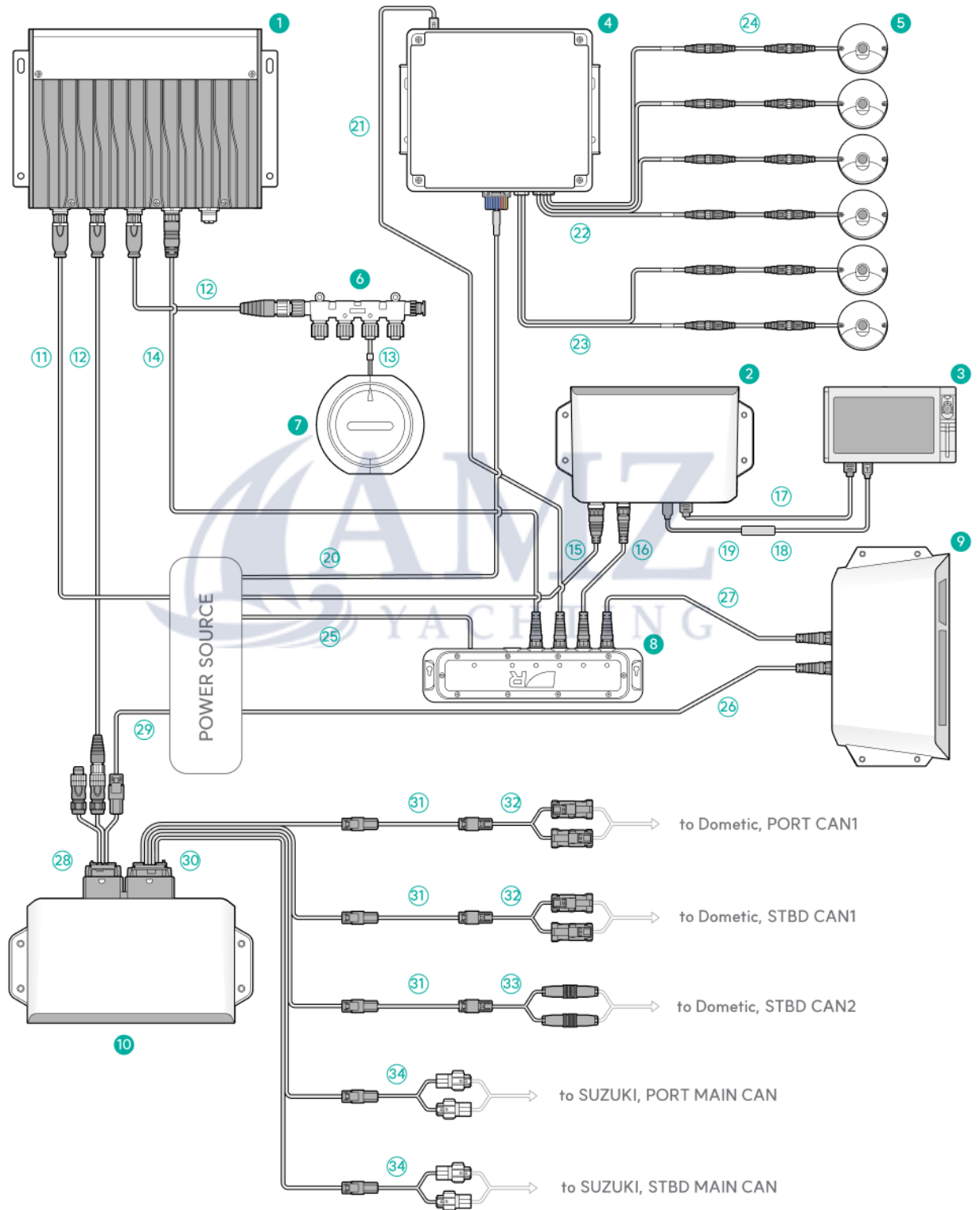4 Camera Conversion Unit (CCU)
5 Surround View Monitoring (SVM) Camera

6 NMEA 2000 BACKBONE
7 GNSS (AR200)
8 Network Switch (RNS-5)
9 Front View Monitoring (FVM) Module
10 Engine Gateway

[Cable]

⑪ ORU Power Cable (CA020SZ)
⑫ NMEA2000 Cable (CC050AA)
⑬ Raymarine GPS NMEA2000 Cable
⑭ ORU Ethernet Cable (CB020XR)
⑮ MFD Gateway Power Cable (CA020CZ)
⑯ MFD Gateway Ethernet Cable (CB020CR)
⑰ HDMI Cable (CH050ZZF)
⑱ USB Cable
⑲ USB Extension Cable (CU050AAF)
⑳ CCU Power Cable (CA010LZ)
㉑ CCU Ethernet Cable (CB020ER)
㉒ CCU Camera Input 1 Cable (CF002MZ)
㉓ CCU Camera Input 2 Cable (CF002NZ)

㉔ Camera Extension Cable (CF150VV)
㉕ Network Switch Power Cable
㉖ FVM Module Power Cable (CA150PZ)
㉗ FVM Module Ethernet Cable (CB150CR)
㉘ Engine Gateway CN1 Cable module (CM003FD)
㉙ Engine Gateway CN2 Power Cable (CA020DZ)
㉚ Engine Gateway CN2 Cable module (CM002FZ)
㉛ Engine Extension Cable (CC050DD)
㉜ Dometic Interface Cable (CC030DT)
㉝ M12 CAN Interface Cable (CC030DA)
㉞ Suzuki Interface Cable (CC030DW)

6.4.4　ORU
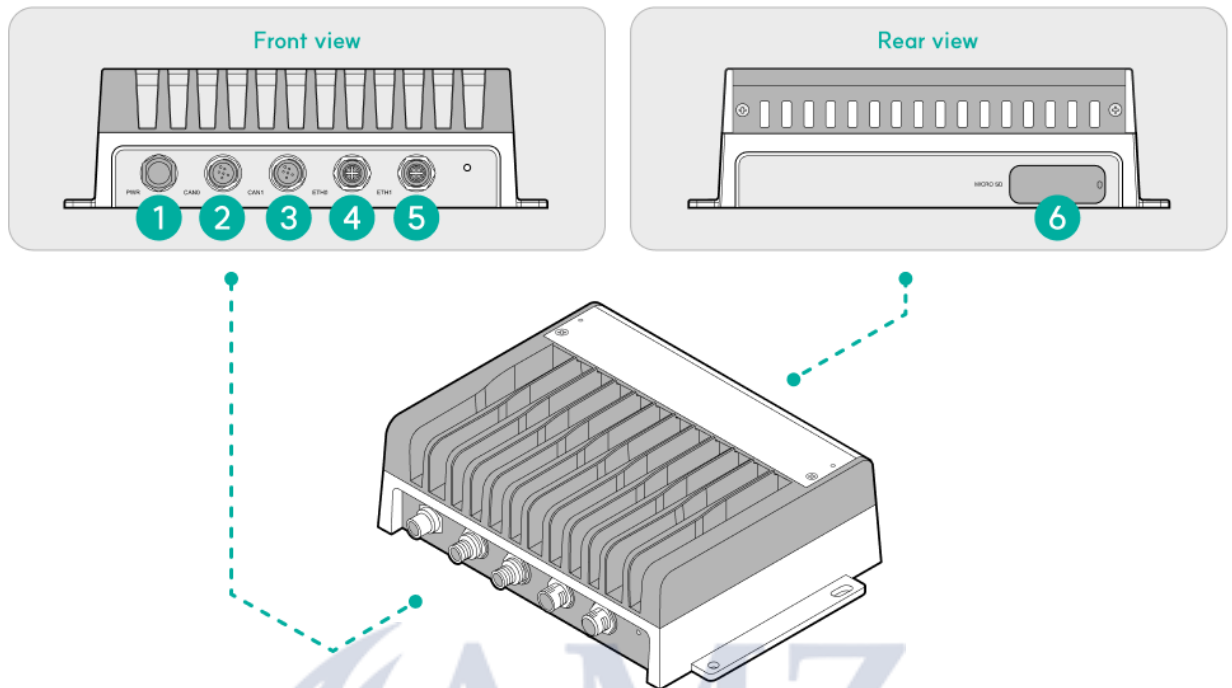
1.　PWR : Power Connection

– Connects to Boat DC power source (12/24 VDC) power supply, using ORU Power Cable (CA020SZ)

– 12VDC wire(positive) : Connects to power supply's positive terminal

– GND wire(negative) : Connects to power supply's negative terminal

– Yellow/Green wire(Ground) : Connects to vessel chassis ground point or negative battery terminal

2.   **CAN0 : Engine Gateway Connection**

–   CAN0 Connector is only available on NEUBOAT CONTROL. NEUBOAT NAVI, DOCK II will block it with Connector Cap.

–   Connects to Engine Gateway, using NMEA2000 Cable (CC050AA)

–   NMEA2000 Cable (CC050AA) is included with the Engine Gateway Giftbox.

3.   **CAN1 : NMEA2000 Connection.**

–   Connects to NMEA2000 Backbone, using NMEA2000 Cable (CC050AA)

–   Connectors on CAN1 are compatible with NMEA2000 Cable in accordance with the guidelines of the NMEA2000 Standard Appendix I (Cable and Connector Specification).
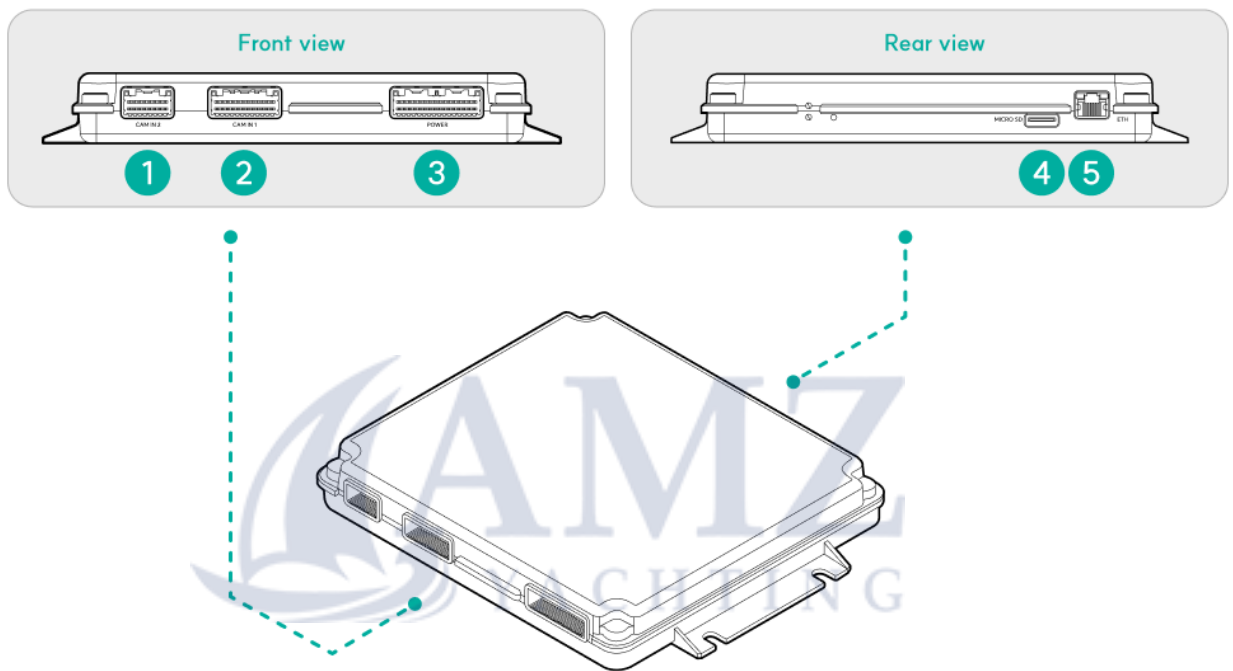
4.   **ETH0 : Network Connection**

–   Connects to Network Switch (RNS-5), using ORU Ethernet Cable (CB020XR)

5. ETH1 : Not applicable

6. MicroSD : Micro SD Card Slot

− ORU SD card contains chart data. Removing it will disable the system.

6.4.5 CCU

1. CAM IN 1(Camera Input 1)

− Connects to SVM Camera CH−0, CH−1, CH−2, CH−3 using CCU Camera Input 1 Cable (CF002MZ)

2. CAM IN 2(Camera Input 2)

− Connects to SVM Camera CH−4, CH−5, using CCU Camera Input 2 Cable (CF002NZ)

3. **POWER : Power Connection**

– Connects to Boat DC power source (12/24 VDC) power supply, using CCU Power Cable (CA010LZ)
– 12VDC wire (positive) : Connects to power supply's positive terminal
– GND wire (negative) : Connects to power supply's negative terminal
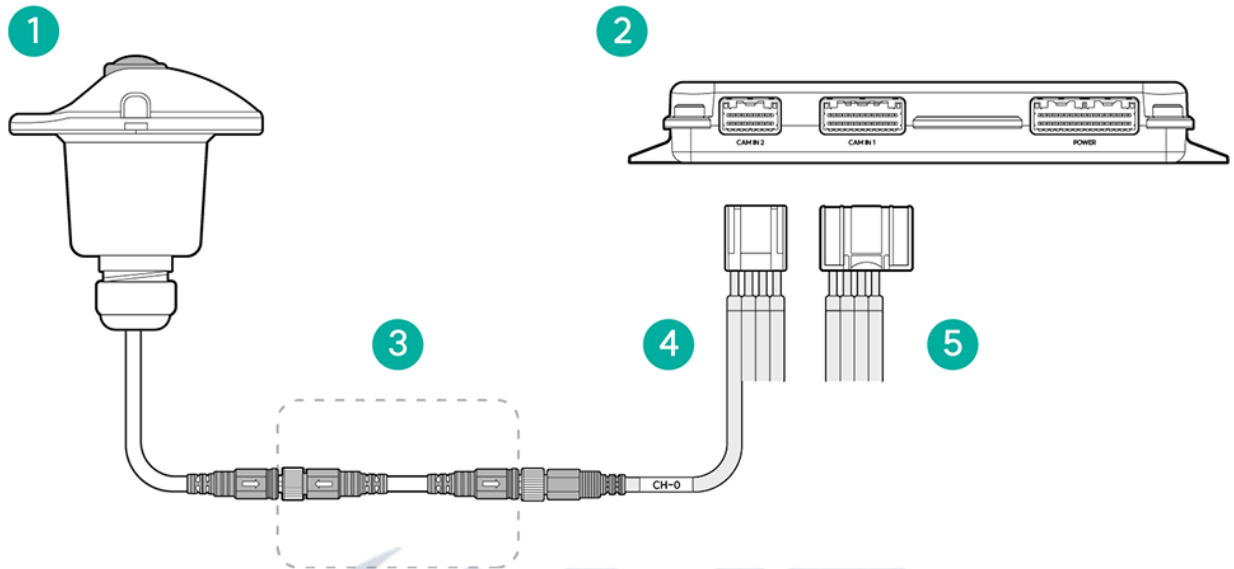
4. **MicroSD : Micro SD Card Slot**

– ORU SD card contains chart data. Removing it will disable the system.

5. **ETH(Ethernet) : Network Connection**

– Connects to Network Switch (RNS-5), using CCU Ethernet Cable (CB020ER)
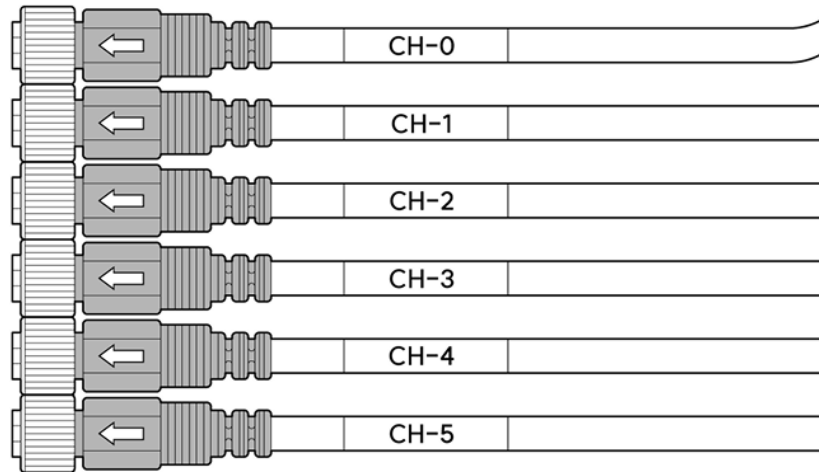
6.4.6   SVM Camera

Each camera should be connected to a specific CCU input cable channel, according to its installation location.
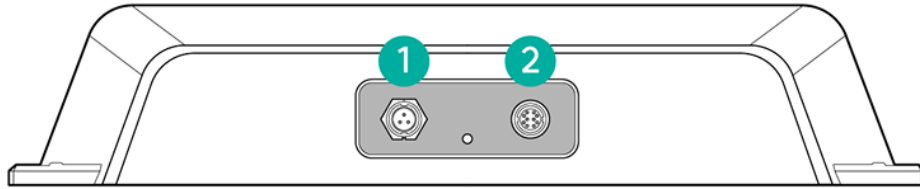The SVM Camera is powered directly from the CCU.

1.   SVM Camera

2.   Camera Conversion Unit (CCU)

3.   Camera Extension Cable (CF150VV)

4.   CCU Camera Input 1 Cable (CF002MZ)

5.   CCU Camera Input 2 Cable (CF002NZ)

Avikus

| Camera Location	Input Channel
Bow	CH-0
Blind-Starboard	CH-1
Blind-Port	CH-2
Starboard	CH-3
Port	CH-4
Stern	CH-5
-	CH-6, CH-7 (Not available)

6.4.7 FVM module

1. **PWR : Power Connection**

  - Connects to Boat DC power source (12/24 VDC) power supply, using FVM Module Power Cable (CA150PZ)

  - 12VDC wire(positive) : Connects to power supply's positive terminal

  - GND wire(negative) : Connects to power supply's negative terminal

2. **ETH(Ethernet) : Network Connection**

  - Connects to Network Switch (RNS-5), using FVM Module Ethernet Cable (CB150CR)

6.4.8 MFD Gateway
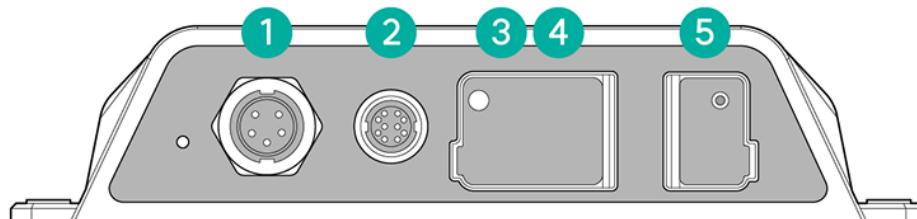
1. **PWR : Power Connection**

  - Connects to Boat DC power source (12/24 VDC) power supply, using MFD Gateway Power Cable (CA020CZ)

  - 12VDC wire(positive) : Connects to power supply's positive terminal

  - GND wire(negative) : Connects to power supply's negative terminal

2. ETH(Ethernet) : Network Connection

-   Connects to Network Switch (RNS-5), using MFD Gateway Ethernet Cable (CB020CR)

3. HDMI : MFD Video Input Connection

-   Connect to MFD HDMI Input port, using supported HDMI Cable(CH050ZZF).
-   Through this connection, video is transmitted to the MFD.

4. USB : MFD Touch Output Connection

-   Connect to MFD USB output port, using supported USB Extension Cable (CU050AAF). Since each MFD model requires a specific type of USB cable, make sure to prepare the appropriate cable in advance and connect it securely.
-   If you have a USB cable (A, B, Micro-C, C-type) suitable for MFD, you should connect to MFD using the provided USB Active Cable.
-   If the distance between MFD and MFD Gateway is close enough, you can connect the cable you have directly. (Not recommended because your cables does not have a separate cover to secure the connector and the connection may not be stable).
-   Through this connection, touch input from the MFD is transmitted to the MFD Gateway.

5. MicroSD : Micro SD Card Slot

-   Access for software updates.

6.4.9 Engine Gateway
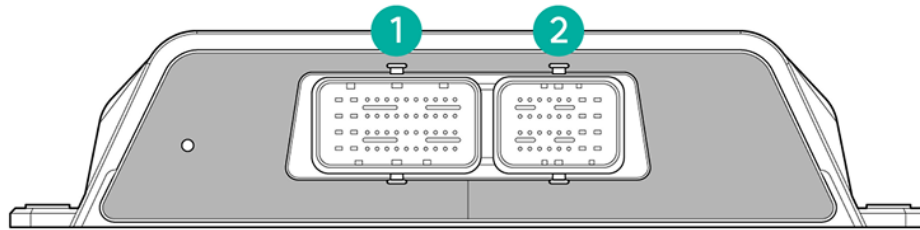
1. **CN1 : Engine Connection**

   – Connect to Engine, using Engine Gateway CN1 Cable module (CM003FD). Engine Gateway(CN1) is supplied with Engine Gateway CN1 Cable module(CM003FD), which can be connected to a Dometic Optimus Steering System & Suzuki Engine via Dometic Interface Cable (CC030DT) / M12 CAN Interface Cable (CC030DA) / Suzuki Interface Cable (CC030DW).

2. **CN2 : Power & ORU Connection**

   – Connect to Power & ORU, using Engine Gateway CN2 Cable module (CM002FZ).

   – For the extension cable going from the CN2 Cable to the Power, use the Engine Gateway CN2 Power Cable (CA020DZ).

   – For the extension cable going from the CN2 Cable to the ORU CAN 0 Port, use the NMEA2000 Cable (CC050AA).

3. **Engine Connection**

   – Dometic Interface Cable (CC030DT)

   – M12 CAN Interface Cable (CC030DA)

   – Suzuki Interface Cable (CC030DW)

   – Engine Extension Cable (CC050DD), if you want to extend the cable length.

4. Engine Connection – System Diagram (Suzuki and Dometic)
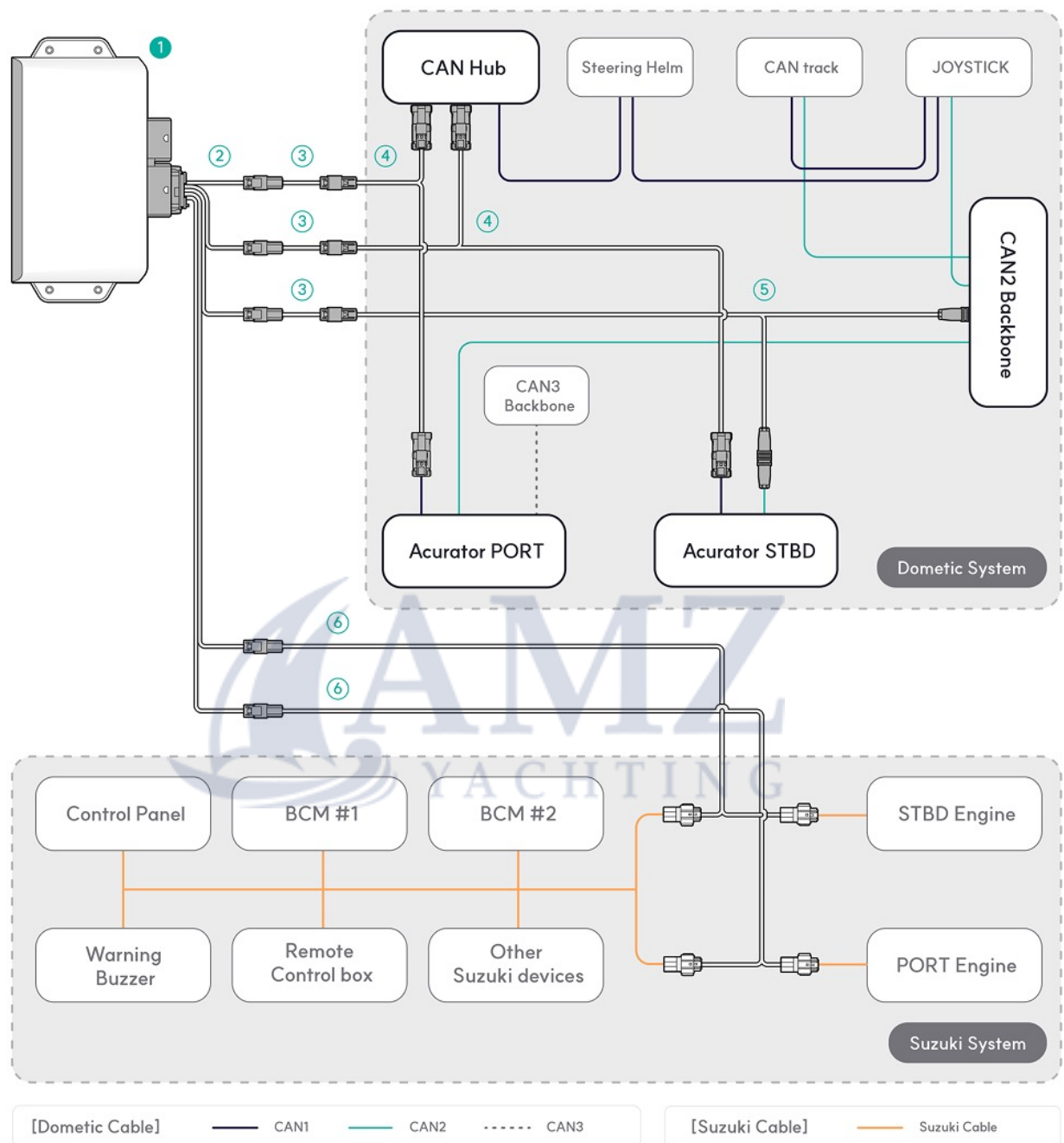
[Dometic Cable] ——— CAN1 ——— CAN2 ······ CAN3   [Suzuki Cable] ——— Suzuki Cable

[Device]

① Engine Gateway

[Cable]

② Engine Gateway CN1 Cable Module (CM003FD)   ⑤ M12 CAN Interface Cable (CC030DA)

③ Engine Extension Cable (CC050DD)   ⑥ Suzuki Interface Cable (CC030DW)

④ Dometic Interface Cable (CC030DT)

1)   Optimus EPS w/o Joystick
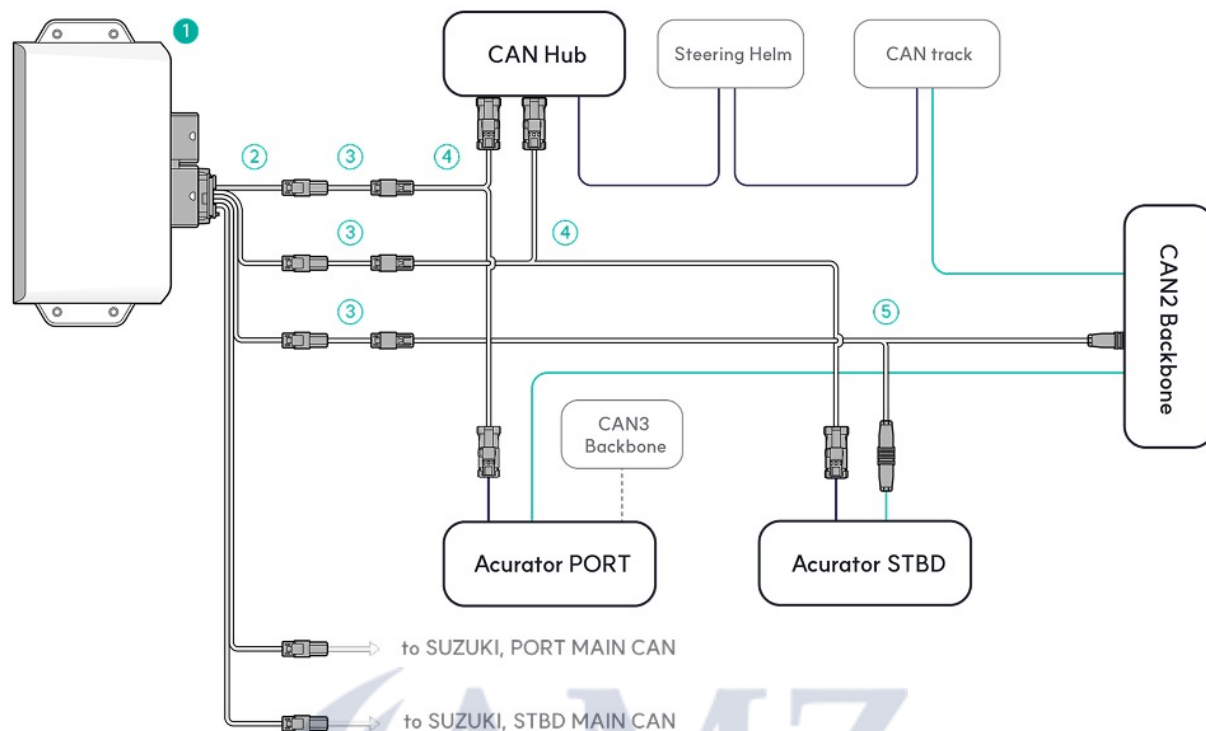
[Device]

1 Engine Gateway

[Cable]

② Engine Gateway CN1 Cable Module (CM003FD)
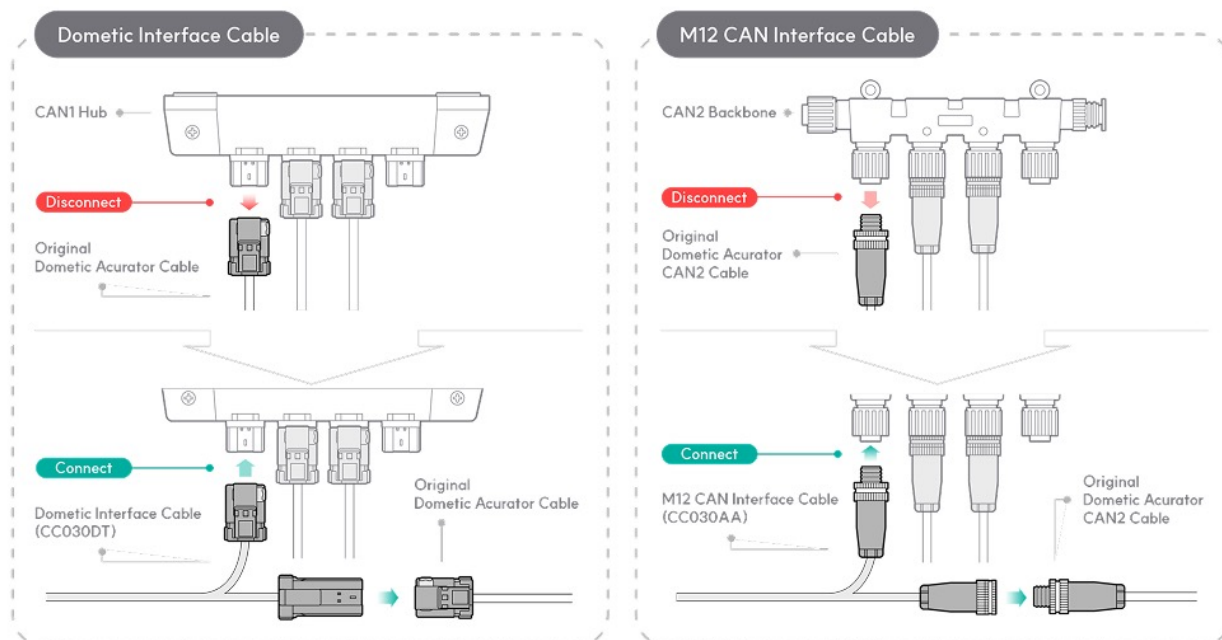
③ Engine Extension Cable (CC050DD)

④ Dometic Interface Cable (CC030DT)

⑤ M12 CAN Interface Cable (CC030DA)

[Dometic Cable] —— CAN1 —— CAN2 ······ CAN3

2) Optimus EPS w/ Joystick

[Device]

1 Engine Gateway

[Cable]

2 Engine Gateway CN1 Cable Module (CM003FD)

3 Engine Extension Cable (CC050DD)
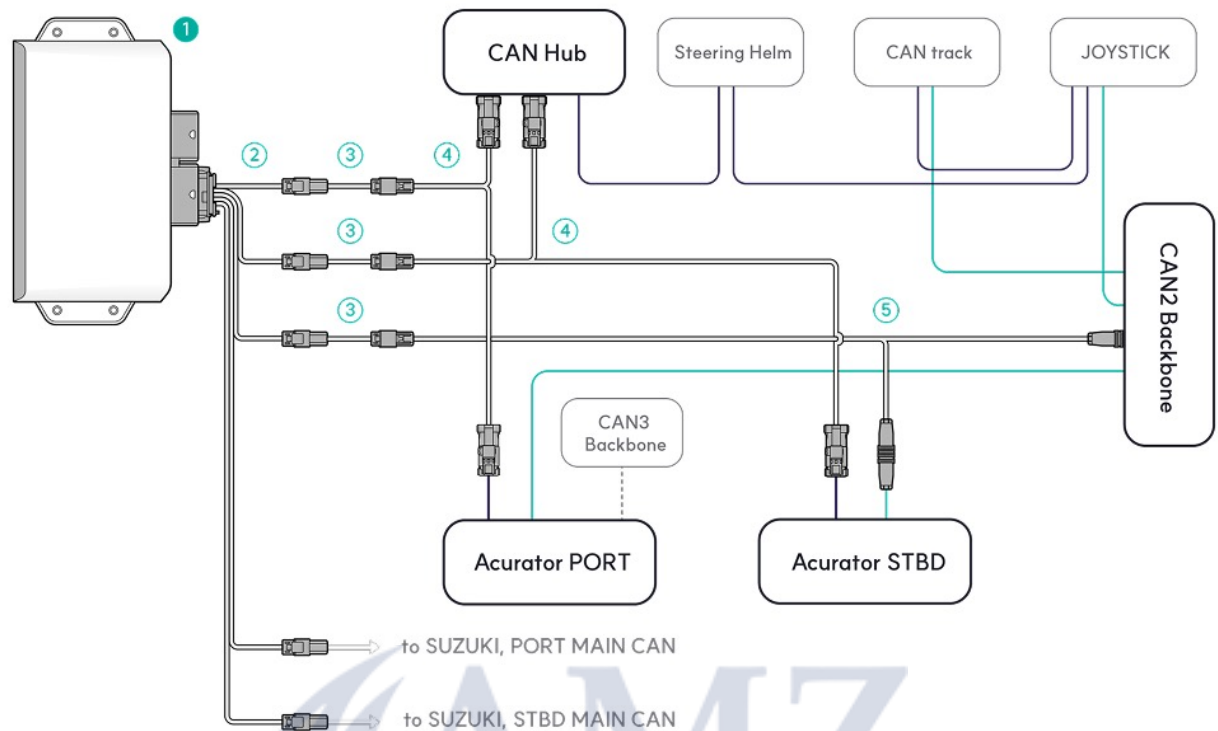
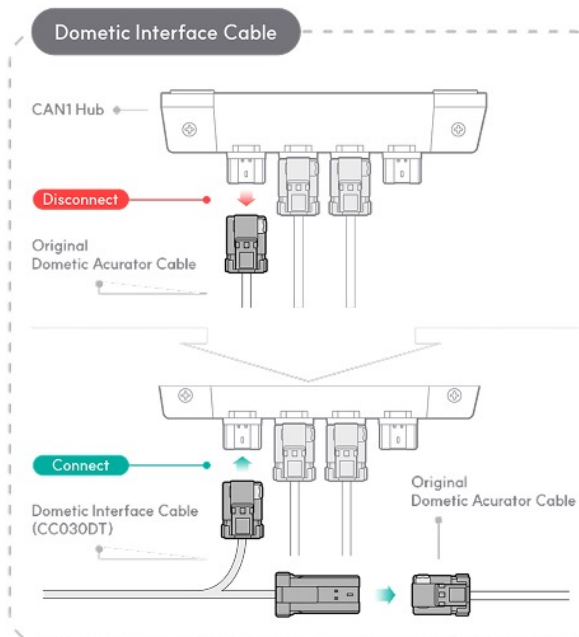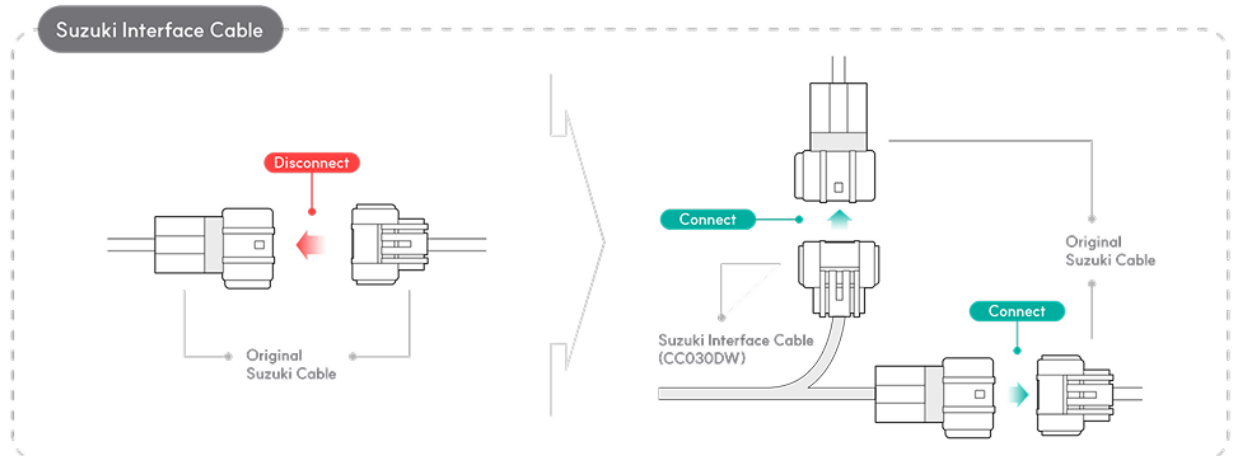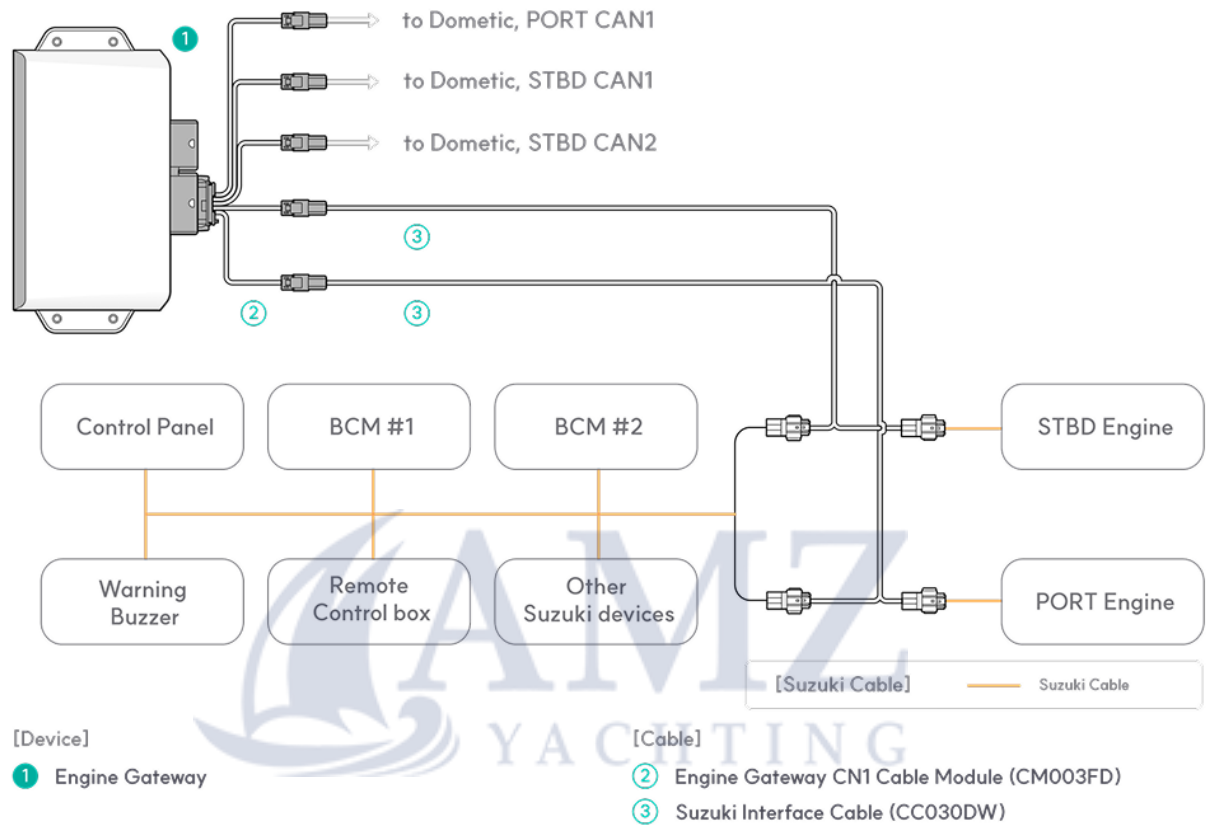**4** Dometic Interface Cable (CC030DT)

5 M12 CAN Interface Cable (CC030DA)
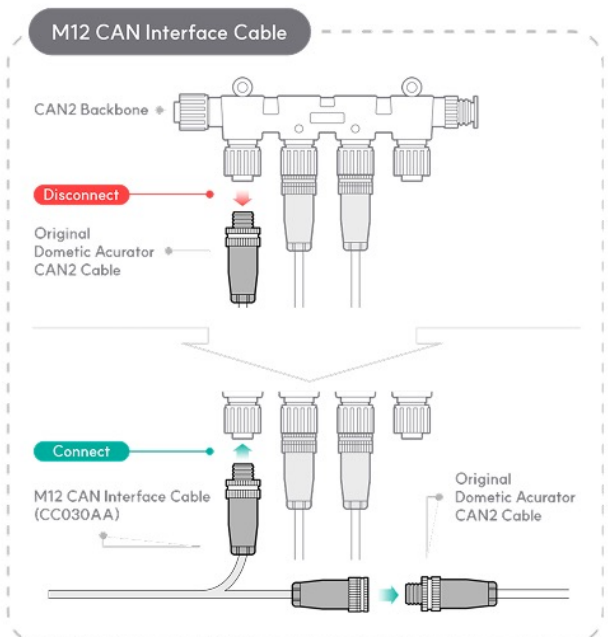
3)   Suzuki SPC 2

The Engine Gateway of the NEUBOAT CONTROL system supports Suzuki SPC2. To complete the system installation you need to:

[Device]
❶ Engine Gateway

[Cable]
② Engine Gateway CN1 Cable Module (CM003FD)
③ Suzuki Interface Cable (CC030DW)

6.5   Regular Maintenance

Please refer all maintenance and repair to authorized Avikus dealers. It is recommended that you perform the following on a routine basis.

Maintenance Schedule

– You must clean the lens and glass of externally installed sensors (such as SVM cameras and FVM) before and after boat operation.

Cleaning Instructions

– Use a soft, dry cloth (like an eyeglass cleaning cloth) to wipe the surfaces.
– Avoid using cleaning products that contain harsh or abrasive chemicals.
– Always ensure the power is off before performing any cleaning tasks.
– Do not use high pressure water for cleaning as it may damage the equipment.

Inspection Guidelines

– Equipment Connection Checks

  • Check the boat power switch is in the "on" position.
  • Verify the connection status of connectors.
  • Inspect cables for any signs of damage.

– SVM Camera Checks

  • Confirm the CCU power status (check the LED indicator).
  • Ensure the camera connector is properly connected.
  • Inspect the camera cables for damage.
  • Inspect the camera lens for damage and dirty

– FVM Equipment Check

  • Confirm the FVM power status (check the LED indicator).
  • Ensure the FVM power and ethernet connector is properly connected.
  • Inspect the lidar lens for damage and dirty
  • Inspect the camera lens for damage and dirty

- General Software Issues

  - Review alerts in the NEUBOAT APP to diagnose potential software problems.
  - Refer to Troubleshooting topic in the Operation Manual.
  - Follow specific care instructions provided for each component to ensure longevity and reliable performance.

- Component Care

  - Follow specific care instructions provided for each component to ensure longevity and reliable performance.

## 6.6   Running the NEUBOAT APP

The method for launching an app varies depending on the MFD model. Please refer to the instructions below for specific details. For further guidance, please refer to the respective MFD section in the appropriate Operation Manual.

1)   SIMRAD – NSOevo3

- The video panel can be set up as a single panel or as one of the panels on a multi-panel page.

- NSS evo3 supports two video input channels. Users can select one channel to view or cycle between available video cameras.

- Video settings such as NTSC and PAL are not supported.

2)   Garmin – GPSMap 8000 Series, GPSMap 9000 Series

- Access the video feed through the "Vessel > Video" path in the menu to display the video feed from connected cameras.

- The manual explains how to control video sources, adjust video settings, and manage multiple video inputs.

- It includes steps for configuring the video layout and optimizing video appearance, including brightness, contrast, and color adjustments.

3) Raymarine – Axiom XL, Axiom2 XL

- The Video app is opened by selecting an app page icon from the Homescreen that includes the Video app.

- Ensure your video feed is compatible by checking the latest details available on the Raymarine website against your device's specification.

- When opened, the Video app will be in one of three states: displaying the video feed, showing a 'Camera not yet available' message, or displaying a 'No camera detected' message.

- The video image can be set up as a single panel or as one of the panels on a multi-panel page. Depending on your setup, you can select from multiple video feeds available on the system and switch between them.

6.7   Hardware Spec. – ORU
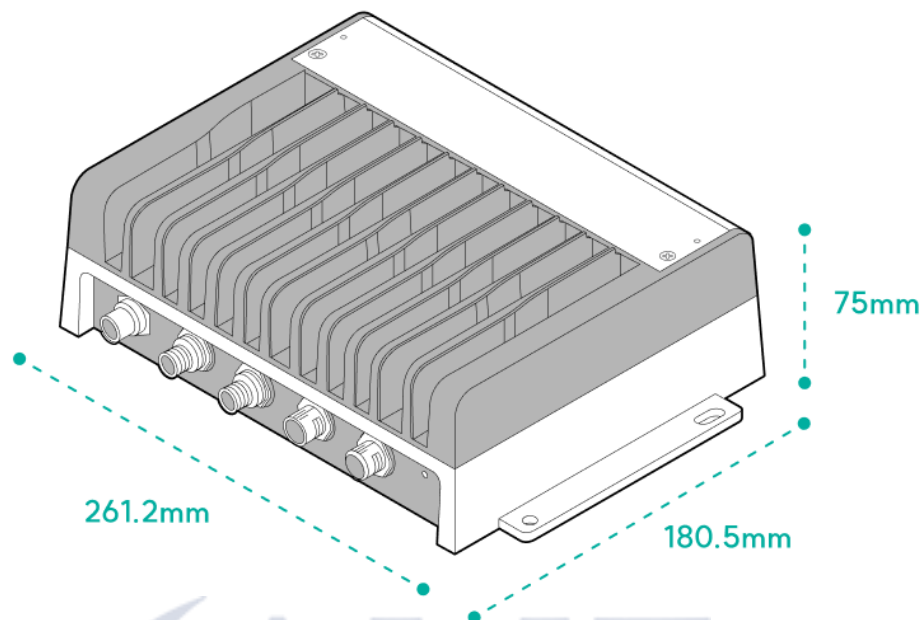
System Specification	
Dimension	261.2 x 180.5 x 75.0 mm (10.28 x 7.11 x 7.40 in)
Weight	3.10 kg
Operating Voltage	10.8 ~ 32 VDC
Power Consumption	45 W (maximum)
Rated Current	3.0 A @ 12 VDC / 1.6 A @ 24 VDC
Operating Temp.	−15°C (+5°F) to +55°C (131°F)
Storage Temp.	−30°C (−22°F) to +70°C (158°F)
Water Resistance	IPx6
Humidity	+40°C (+104°F), 93 % RH
Vibration	EN 60945:2002 Compliant
Corrosion	EN 60945:2002 Compliant
Shock	IEC 60068−2−27: 15g for 15ms, 800 cycle and 30g for 18ms, 30 cycle (half−sine pulse, 3 axes)

Processor	
Processor	NVIDIA Jetson Xavier 32G

Connection	
External Interfaces	1x NMEA2000 1x CAN (A/B) 2x Ethernet (Gigabit) 1x uSD card

Compliance	
Product Marking	CE, UKCA, FCC, ISED
Standards	EN 60945:2002 EN 62368-1:2014 Directive 2014/30/EU (EMC) FCC Part 15 ICES-003 Issue 7

6.8   Hardware Spec. – FVM Module

78mm

440mm

270mm
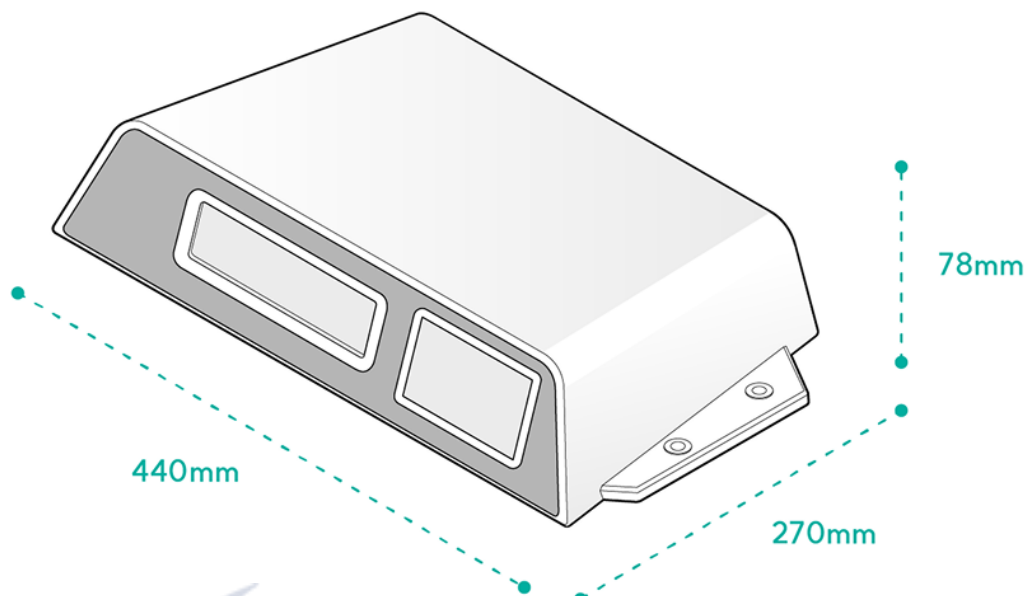
I/O Camera	
Field of View	127.49º(H), 72.71º(V), 141.98º(D)
Video Refresh Rate	10FPS
Focal Length	2.62mm
Video Streaming	RTSP, H264
Image Resolution	1920 x 1080

LiDAR	
Range	2m ~ 500m (250m@10%)
Resolution	Up to 0.06º
Horizontal FOV	120º
Vertical FOV	25º
Refresh Rate	10FPS

Range Performance (Clear water performance)	
Detect a 26-foot vessel	> 200m
Detect a channel marker	> 100m

System Specification	
Dimension	470.0 x 254.5 x 90.7 mm
Weight	5.97kg
Operating Voltage	9 ~ 32VDC
Power Consumption	72W (maximum)
Rated Current	4.0A @ 12 VDC / 2.0A @ 24 VDC
Operating Temp.	-25°C (-13°F) to +55°C (131°F)
Storage Temp.	-30°C (-22°F) to +70°C (158°F)
Waterproof rating	IPx6
Humidity	+40°C (+104°F), 93 % RH
Vibration	EN 60945:2002 Compliant
Corrosion	EN 60945:2002 Compliant
Shock	-

Connection	
Network Interfaces	1x Ethernet

Compliance	
Markings	CE, UKCA, FCC, ISED, Class 1 Laser Product
Standards	EN 60945:2002 EN 62368-1:2014 Directive 2014/30/EU (EMC) FCC Part 15 ICES-003 Issue 7

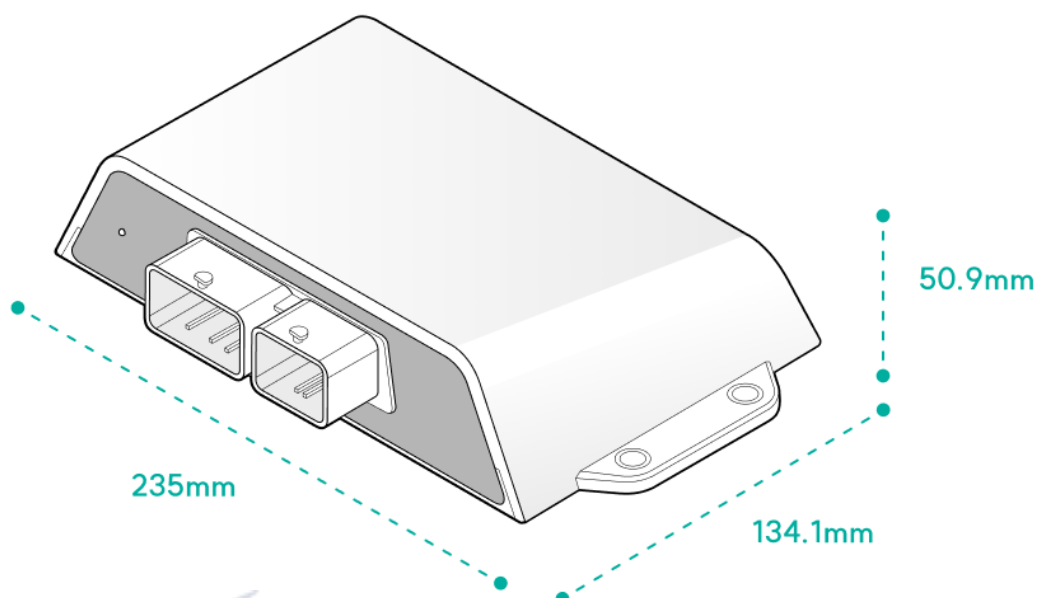## 6.9   Hardware Spec. – SVM camera and CCU
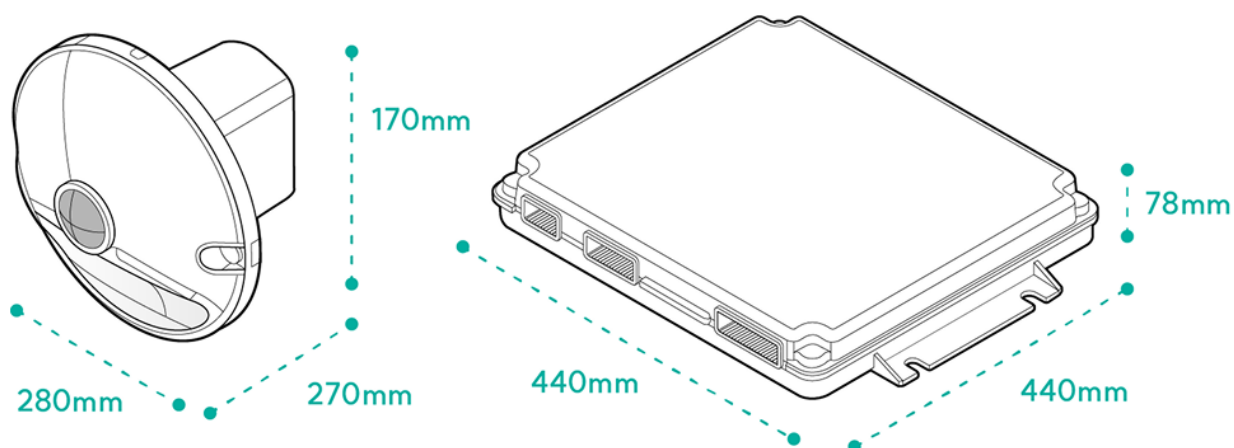
Video	SVM Camera	Camera Control Unit (CCU)
Sensor / DSP	IMX290	–
Luminance	1 lux	–
Field of View	185° Horizontal FOV x 120° Vertical FOV	–
Video Refresh Rate	30 fps	10 fps to 30 fps
Resolution	1920 x 1080 (1080p)	1280 x 720 (720p)
Output	TVI Differential	RTSP (H.265)
Bitrate	–	1 MB to 12 MB (CBR)

Range Performance (Clear water performance)	
Detect slip, land contours	Up to 30m (depends on camera installation position)
Detect obstacles on water	Up to 30m (depends on camera installation position)

System Specification	SVM Camera	Camera Control Unit (CCU)
Dimension	Φ90.0 x 72.0 mm	226.0 x 180.0 x 30.0 mm
Weight	0.4 kg	0.7 kg
Operating Voltage	4.5 ~ 5.5 VDC	10.8 ~ 32 VDC
Power Consumption	1.4 W (maximum)	25 W (Maximum)
Current	240 mA @ 5VDC	2.1 A @ 12 VDC 1.0 A @ 24 VDC
Operating Temp.	−30°C (−22°F) to +75°C (167°F)	−30°C (−22°F) to + 75°C (167°F)
Storage Temp.	−40°C (−40°F) to +85°C (185°F)	−40°C (−40°F) to +85°C (185°F)
Relative Humidity	Up to 90% @ 40°C (104°F)	Up to 90% @ 40°C (104°F)
Water Resistance	IPx7	No IP Rating
Humidity	+40°C (+104°F), 95 % RH	+40°C (+104°F), 95 % RH
Vibration	EN 60945:2002 Compliant	EN 60945:2002 Compliant
Corrosion	EN 60945:2002 Compliant	–
Shock	–	–

Connection	SVM Camera	Camera Control Unit (CCU)
Network Interfaces	1x Camera Output	1x Ethernet 1x Camera Input (1) – 4 SVM cameras connectable 1x Camera input (2) – 2 SVM cameras connectable

| Compliance		
Markings	CE, UKCA, FCC, ISED	
Standards	EN 60945:2002 EN 62368−1:2014 Directive 2014/30/EU (EMC) FCC Part 15 ICES−003 Issue 7	

6.10 Hardware Spec. – Engine Gateway

235mm

50.9mm

134.1mm

System Specification	
Dimension	235.0 x 134.1 x 50.9 mm
Weight	1.07 kg
Operating Voltage	8 ~ 32 VDC
Power Consumption	18W (maximum)
Rated Current	1.0A @ 12 VDC / 0.5A @ 24 VDC
Operating Temp.	−15°C (5°F) to +55°C (131°F)
Storage Temp.	−30°C (−22°F) to +70°C (158°F)
Water Resistance	IPx6
Humidity	+40°C (+104°F), 93 % RH
Vibration	EN 60945:2002 Compliant
Corrosion	EN 60945:2002 Compliant
Shock	−15g(peak) at 15ms half sine pulse, 800 shock pulse, interval 2 sec., in all three axes −30g(peak) at 18ms half sine pulse, 30 shock pulse, interval 5 sec., in all three axes

Connection	
External Interfaces	12x CANBUS

Compatibility	
Engine	SUZUKI DF series with Dometic Electric Steering system

| Compliance	
Markings	CE, UKCA, FCC, ISED
Standards	EN 60945:2002 EN 62368-1:2014 Directive 2014/30/EU (EMC) FCC Part 15 ICES-003 Issue 7

6.11   Hardware Spec. – MFD Gateway
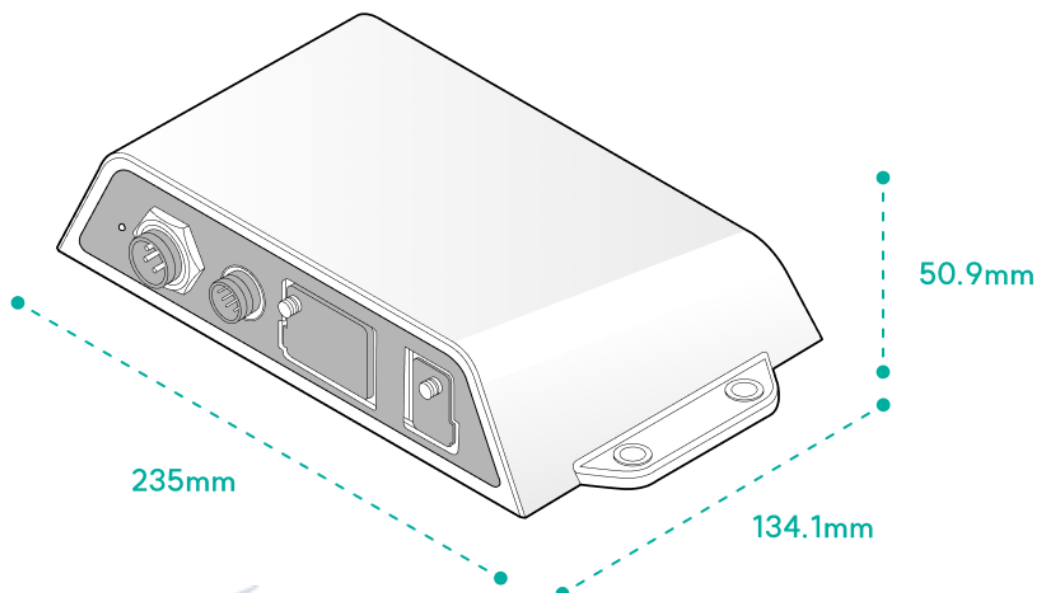
System Specification	
Dimension	235 x 134.1 x 50.9 mm
Weight	1.22 kg
Operating Voltage	8 ~ 32 VDC
Power Consumption	36W (maximum)
Rated Current	2.0A @ 12 VDC / 1.0A @ 24 VDC
Operating Temp.	−15°C (5°F) to +55°C (131°F)
Storage Temp.	−30°C (−22°F) to +70°C (158°F)
Water Resistance	IPx5
Humidity	+40°C (+104°F), 93 % RH
Vibration	EN 60945:2002 Compliant
Corrosion	EN 60945:2002 Compliant
Shock	–

Connection	
External Interfaces	1x Ethernet 1x HDMI (for video output to MFD) 1x USB (for touch input from MFD) 1x uSD card

Compatibility	
MFD	Garmin GPSMAP 8000 series, 9000 series Raymarine Axiom XL, Axiom 2 XL Simrad NEOevo3S Furuno TZT16F / 16X / 19F / 22X / 24X / BBX
Other Display	Need an HDMI input and a touch output or USB input device

Compliance	
Markings	CE, UKCA, FCC, ISED
Standards	EN 60945:2002 EN 62368-1:2014 Directive 2014/30/EU (EMC) FCC Part 15 ICES-003 Issue 7
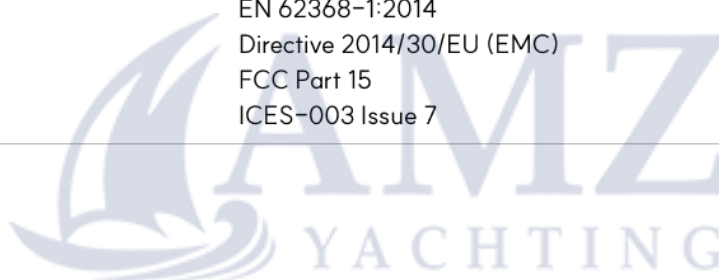
6.12 Compatibility and System Requirements

This product forms part of a system of electronics and requires the following additional components to function:

1) Compatible MFD

NEUBOAT can be connected to the MFDs listed below. These MFDs are not provided with the product:

SIMRAD: NSOevo3

GARMIN: GPSMap 8000 series, GPSMap 9000 series

Raymarine: Axiom XL, Axiom2 XL

Furuno : TZT16F/16X/19F/22X/24X/BBX

To function properly, the MFD (Multi-Function Display) must meet the following input and output conditions:

- HDMI Input: An HDMI input must be connected to the MFD.
- USB Output: A USB output must be connected to the MFD.

Failure to meet these conditions may result in improper operation of the device.

2) GNSS and IMU Sensor

NEUBOAT requires the following GNSS and IMU sensors. These will be provided with the NEUBOAT product:

Raymarine AR200 (E70537)

3) Compatible Ethernet Switch

NEUBOAT requires the following Ethernet Switch. These will be provided with the NEUBOAT product:

Raymarine RNS-5 (A80731)

4) Compatible Chart

NEUBOAT requires the following Chart. These will be provided with the NEUBOAT product:

Savvy Charts (United States)

5) Compatible Engine & Steering System

NEUBOAT can be connected to the following engine and steering systems. These are not provided with the NEUBOAT product:

Suzuki: DF Engine

–   Suzuki Precision Control(SPC1)

–   Suzuki Precision Control(SPC2)

Dometic:

–   Optimus 360 Electronic Steering, w/ Electronic Actuator

–   Optimus 360 Joystick Control System.

7 Troubleshooting

This section outlines potential issues and the necessary steps to resolve common problems related to the installation and operation of your system. If you encounter any issues, this section should assist you in identifying and addressing them effectively, ensuring that your system resumes normal functionality.

7.1 LED Diagnostic Guidance

The LED indicator on the components provides visual feedback to identify the device's current status and assist in troubleshooting any potential issues. This section explains how to interpret the LED indicators during various operational states.

1. LED Diagnostics – CCU

The Camera Conversion Unit (CCU) features two diagnostic LEDs positioned at the front of the unit, near the RJ45 (Ethernet) connector. These LEDs provide visual indicators for monitoring the unit's status.
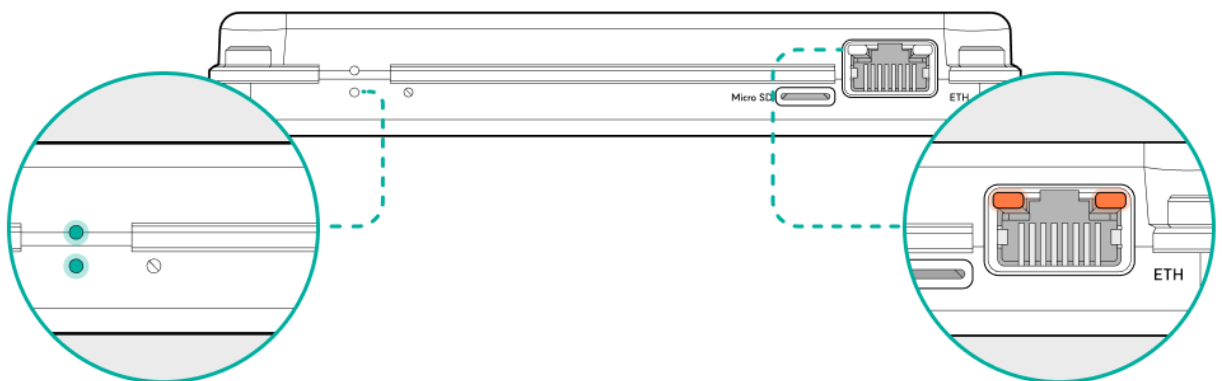
LED indicator	Status and Solutions
● ○	Status: Device powered on and functioning normally. Action: No user intervention needed.
● ○	Status: Device is updating. Action: Normal operation — no action is required.
○ ○	Status: No power detected. Action: Refer to the 7.2 Power Troubleshooting section

2. LED Diagnostics – ORU/FVM Module/Engine Gateway/MFD Gateway

The Object Recognition Unit (ORU)/Front View Monitoring (FVM) Module/ Engine Gateway/MFD Gatway feature two diagnostic LEDs positioned at the top of the unit, near the RJ45 (Ethernet) connector. These LEDs provide visual indicators for monitoring the unit's status.

LED Status	Meaning	Behavior
Off	Device powered off or not operating	LED remains completely off
Solid Green	Booting in progress	LED remains solid green
Flashing Green	Normal operating	LED flashes at 1-second intervals

2.1 LED Off

- **Description**: The LED is completely off, indicating that the device is either powered down or not functioning.

- **Corrective Action**: Verify the power connection and ensure the system is receiving the proper power supply.

2.2 Booting (Solid Green LED)

- **Description**: During the boot-up process, the LED will remain solid green. This indicates the system is initializing and preparing for operation.

- **Meaning**: The device is powered on, and the startup process is in progress.
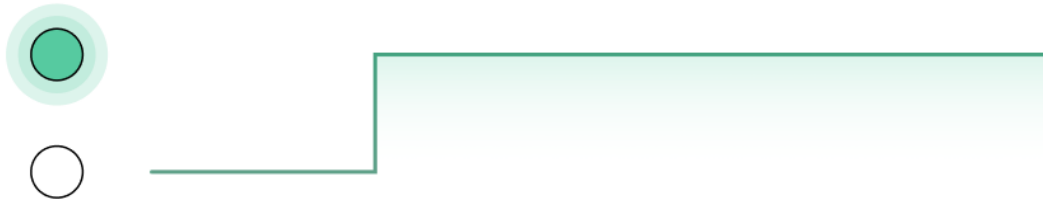
## 2.3 Boot Complete and Operating (Flashing Green LED)

- **Description**: Once the boot-up process is complete and the system is operating normally, the LED will flash green at regular intervals.

- **Diagnostic Pattern**:

• **Flash Interval**: The LED turns on (peak) and off (trough) in a 1-second cycle.

• **Meaning**: The device has successfully booted and is functioning correctly
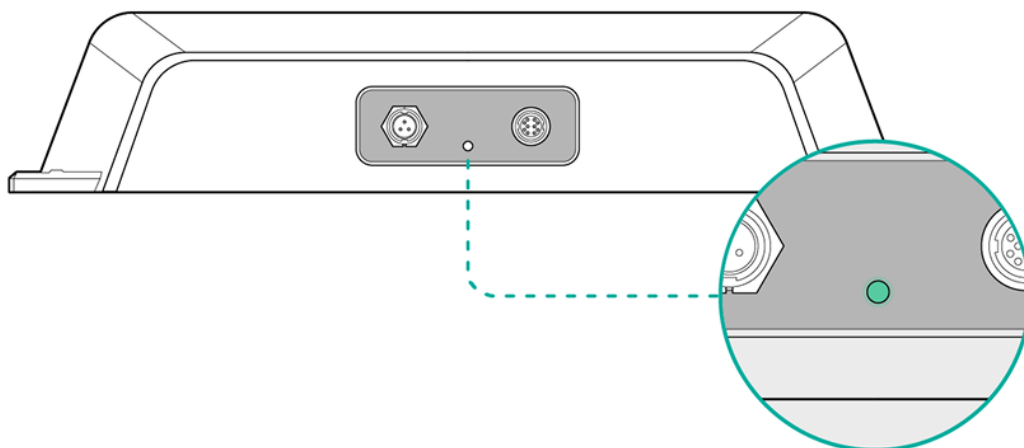
3. LED Location

3.1 ORU

The Object Recognition Unit (ORU) includes a single diagnostic LED situated at the bottom of the unit, which indicates the unit's power status.
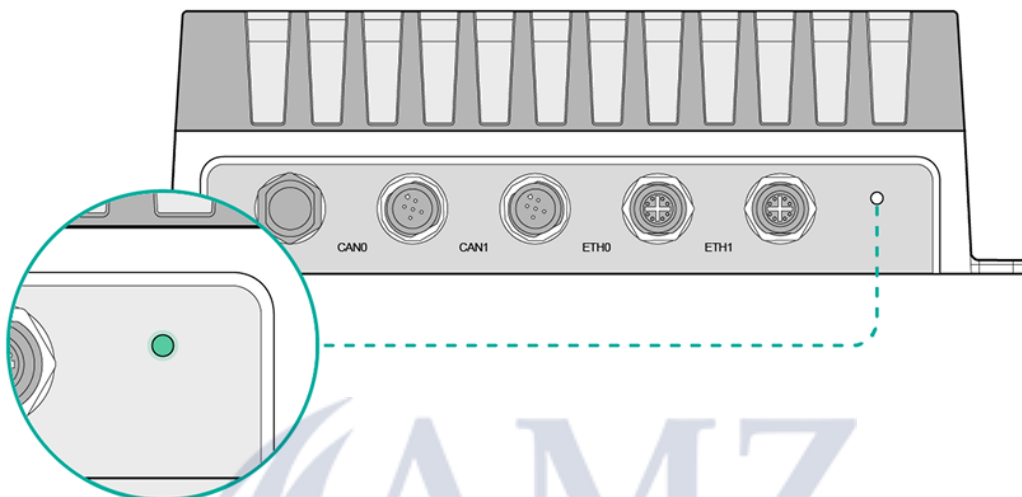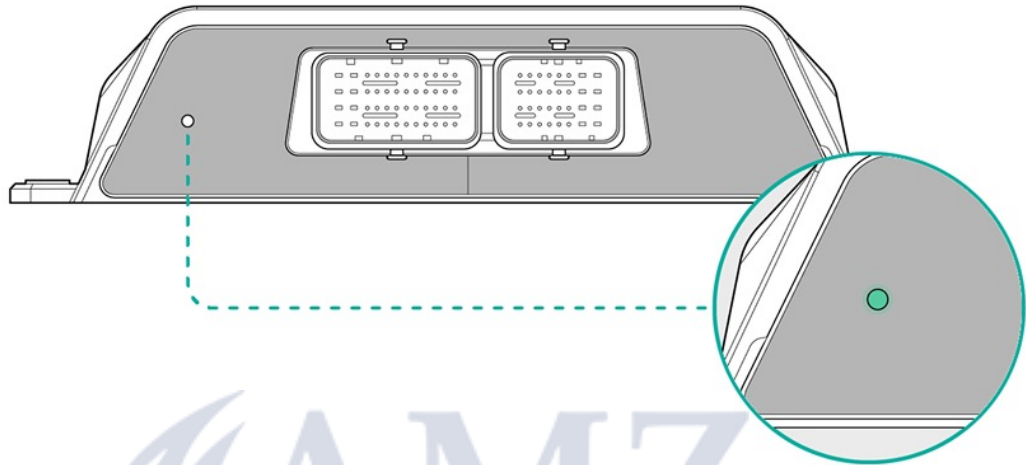

3.2 FVM

The Front View Monitoring (FVM) unit has a diagnostic LED located at the rear of the unit. This LED provides a visual indication of the unit's operational status.
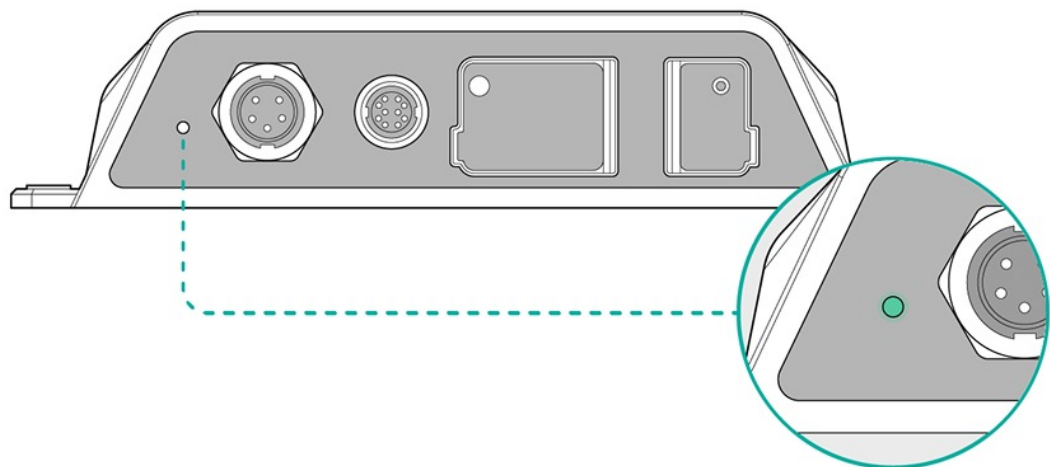
3.3   Engine Gateway

The Engine Gateway features a diagnostic LED located at the front of the unit. This LED provides a visual indication of the gateway's operational and connection status.

3.4   MFD Gateway

The MFD Gateway has a diagnostic LED located at the front of the unit. This LED provides a visual indication of the unit's operational status and connectivity.

7.2   Power Troubleshooting

Always check confirm that the power connection guidelines in this manual have been followed, and cycle or reboot of the device before further troubleshooting. If the component still fails to power up, refer to the troubleshooting guidance below.

1.   Product Does Not Turn On or Keeps Powering Off

1.1   Blown Fuse / Tripped Breaker

(1)   Inspect the fuse located along the power cable. Ensure it matches the specified rating. Replace if blown.

(2)   Examine additional fuses, breakers, and connections for damage; replace as needed.

(3)   If a fuse continues to blow, check for damaged cables, broken pins, or wiring errors.

1.2   Poor / Damaged / Loose Power Supply Cable / Connections

(1)   Check battery voltage, terminals, and cables. Connections should be clean, secure, and corrosion-free. Replace if necessary.

(2)   Inspect power cables and connectors for signs of wear or damage; replace if required.

(3)   Check the power cable is securely connected to the device.

(4)   With the device powered on, gently move the power cable near the connection point to check for interruptions. Replace the cable if any issues are observed.

(5)   Use a multimeter to check for significant voltage drops across connectors and fuses under load; replace components as needed.

1.3   Incorrect Power Connection

Check power supply wiring matches the installation instructions and is connected correctly.

4)   Insufficient Power Source

Ensure that the power source (battery or distribution panel) supplies the appropriate voltage required for each connected component, as specified in their respective operating voltage ranges.

2.   Product Fails to Start or Enters Restart Loop

1)   Power Supply and Connection Issues

Refer to the "Product does not turn on or keeps powering off" solutions listed above.

2)   Software Corruption

If software corruption is suspected, download and install the latest software version from the manufacturer's website. Follow the operational instructions of your multifunction display or chartplotter for proper software updates.

7.3   Miscellaneous Troubleshooting

1.   Display Behaves Erratically

1.1   Intermittent Power Issues

(1)   Verify fuses and circuit breakers are intact. Replace if necessary.

(2)   Inspect the power cable and ensure all connections are tight, undamaged, and corrosion-free.

(3)   Confirm the power source is delivering the proper voltage and current.

1.2   Software Version Mismatch

Ensure all devices are running the latest software version to avoid compatibility issues. Always keep the software up to date.

1.3   Corrupted Data or Unknown Issues

(1)   If a software issue is suspected, download and install the latest software update from the AVIKUS website. Follow the instructions for updating connected devices.

(2)   Check the data source for proper operation and accuracy.

2.   HDMI Input Not Displayed on the Multifunction Display

2.1   Network or Cabling Issues

(1)   Inspect network cables, connections, and ports for any signs of damage or corrosion. Replace faulty components as needed.

(2)   Ensure all connections are secure and correctly configured.

3.   General Troubleshooting Notes

–   Always start by checking the power supply and cabling.

–   Ensure all firmware and software updates are installed.

–   If problems persist, consult the AVIKUS technical support team for additional assistance.

NEUBOAT

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