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DREDGEPACK®

INSTALLATION MANUAL FOR CRANES

Revision A, May 2025

HYPACK
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INSTALLATION MANUAL FOR CRANES

DREDGEPACK®

Thank you for your purchase of this Crane System. Every effort has been made to ensure this system is ready for installation directly from the case in which it has been shipped to you. All components have been bench tested for complete functionality of the system. It is our desire to provide you with the best system possible and to fully support all aspects of your new HYPACK Crane System.

The purpose of this manual is to guide you in the installation of the DREDGEPACK® system for cranes. Due to the complexity of the installation, please follow the steps described in this guide. If you have questions, please contact HYPACK Technical Support at help@hypack.com or +1 (860) 635-1500.

The installation of all equipment is the sole responsibility of the client or the reseller. HYPACK personnel may recommend device placement for the best configuration, but it is up to the installer to make sure that the sensors and interface boxes are set up in a safe and effective manner.

Best Regards,
The HYPACK Technical Support Team
help@hypack.com
+1 (860) 635-1500

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Revision History

DATE	REVISION	CHANGE DESCRIPTION
August-06-2024	N/A	Initial release
May 28, 2025	A	Added Minimum Installation Required Checklist

Minimum Installation Required Checklist

Use this checklist to ensure your equipment has been installed prior to the arrival of the HYPACK On-site Support Technician to help maximize the time available for interfacing, calibration, and training.

Cranes - Minimum Installation Required:

NOTE: The HYPACK On-site Support Technician will be in charge of the final connection of the cables.

- ☐ Screws welded on top of the cabin for installing the antennas in accordance with the installation manual.
- ☐ GNSS cables run properly inside the cabin with proper cable pass through or isolation.
- ☐ Welded plate for the inclinometer in accordance with the installation manual.
- ☐ Fabricated and welded supports for the HD25A encoders.
- ☐ Run the cables from the inclinometer and the HD25A encoders to where the crane box is going to be installed.
- ☐ Power supply ready for connecting the sensors, GNSS, and computer.

Sonar Systems - Minimum Installation Required:

- ☐ Transducer Installation:
  - Sonar system installed (single beam, multibeam, sub-bottom, side scan, magnetometer).
  - Installed locations: Sea chest, moon pool, side/bow mount, towed.
  - Ensure proper cable routing.

- ☐ Positioning Device Installation:
  - GPS or inertial system installed.
  - Antennas and IMU mounted securely.
  - Ensure proper cable routing.

- ☐ Motion and Heading Device Installation:
  - MRU, IMU, or AHRS installed.
  - Antennas and motion device mounted securely.
  - Ensure proper cable routing.

- ☐ LiDAR Installation:
  - Mounting bracket securely installed.
  - Ensure proper cable routing.

- ☐ Offsets Measured: Pre-measure offsets from the Boat Reference Point, if possible.
- ☐ Photo Documentation: If assistance is needed, please provide pictures taken inside and outside of the boat so we can provide our recommendations prior to arrival.

I. Safety Precautions

General Safety Precautions:

- Conduct a thorough risk assessment before starting the installation.
- Ensure that all personnel involved are properly trained in handling equipment and working at heights.
- Use appropriate personal protective equipment (PPE) such as helmets, gloves, safety goggles, and harnesses.
- Communicate clearly with all team members about their roles, the potential hazards, and the safety protocols to be followed.

Working at Heights:

- Use appropriate fall protection equipment such as safety harnesses, lanyards, and anchor points.

Running Cables:

- Plan cable routes to avoid trip hazards.
- Use cable trays, conduits, or cable ties to secure and organize cables.
- Ensure that cables are properly labeled for easy identification and maintenance in the future.
- Follow electrical safety standards and regulations when working with power cables.

Welding Metal Plates:

- Provide proper ventilation in the welding area to prevent exposure to fumes and gases. Use welding screens or curtains to shield nearby workers from the welding arc.
- Train personnel in safe welding practices and the proper use of welding equipment.
- Inspect all ladders, scaffolds, and elevated work platforms before use.
- Secure tools and materials to prevent them from falling and causing injuries to workers below.

II. Equipment Overview

Each DREDGEPACK® system for cranes is individually designed to fit the customer's needs. The following sensors are required for the correct operation of the Crane System with DREDGEPACK®. There are some optional sensors presented that are needed only in special cases. When you receive your equipment, please verify it is complete. If you have any questions, please let us know.

A. Main Interface Box: The main interface box is the hub for everything in the Crane System with DREDGEPACK®. This box powers and receives data from all of the sensors covered in this manual. All connection parameters for your sensors, antennas, and computers will be labeled inside the main interface box.

B. Dual Antenna GNSS Receiver: This device is used to determine the position and heading of the dredge. The main antenna is used to calculate positions and elevations (RTK tides). The receiver uses the secondary antenna to calculate the dredge heading. This solution includes two antennas, the GNSS receiver, and the cables.

C. Angle Sensor: This device is used to calculate the angle of the boom, which enables DREDGEPACK® to determine the position and heading of the bucket. This solution includes the cables and interface for the sensor.

D. Rotation Sensor: The rotation sensor calculates the payout of the holding cable, which enables DREDGEPACK® to determine the depth of the cutting tool. This device needs to be installed with the wheel of the sensor in constant contact with the holding drum.

III. Installation Instructions

A: Main Interface Box

The main interface box connects to the monitor, so it should be installed near the cab. When it cannot be installed inside the cabin, it is necessary to add some extra protection to increase its lifespan and avoid damaging any sensors.

The main interface box is designed to be powered by the dredge's batteries (24V). All connection parameters for the sensors and computers are labeled inside. Cable ports are labeled on the bottom side of the main interface box.

Item 1 – Crane box

Item 2 – Cab box

Item 3 – Cat 6 Crane to cab box cable with coupler

Item 4/5 – Power Crane to cab box cable

Item 6 – T7 Sensor

Item 7 – T7 Sensor Cable

Item 8 – Wireless keyboard/mouse combo

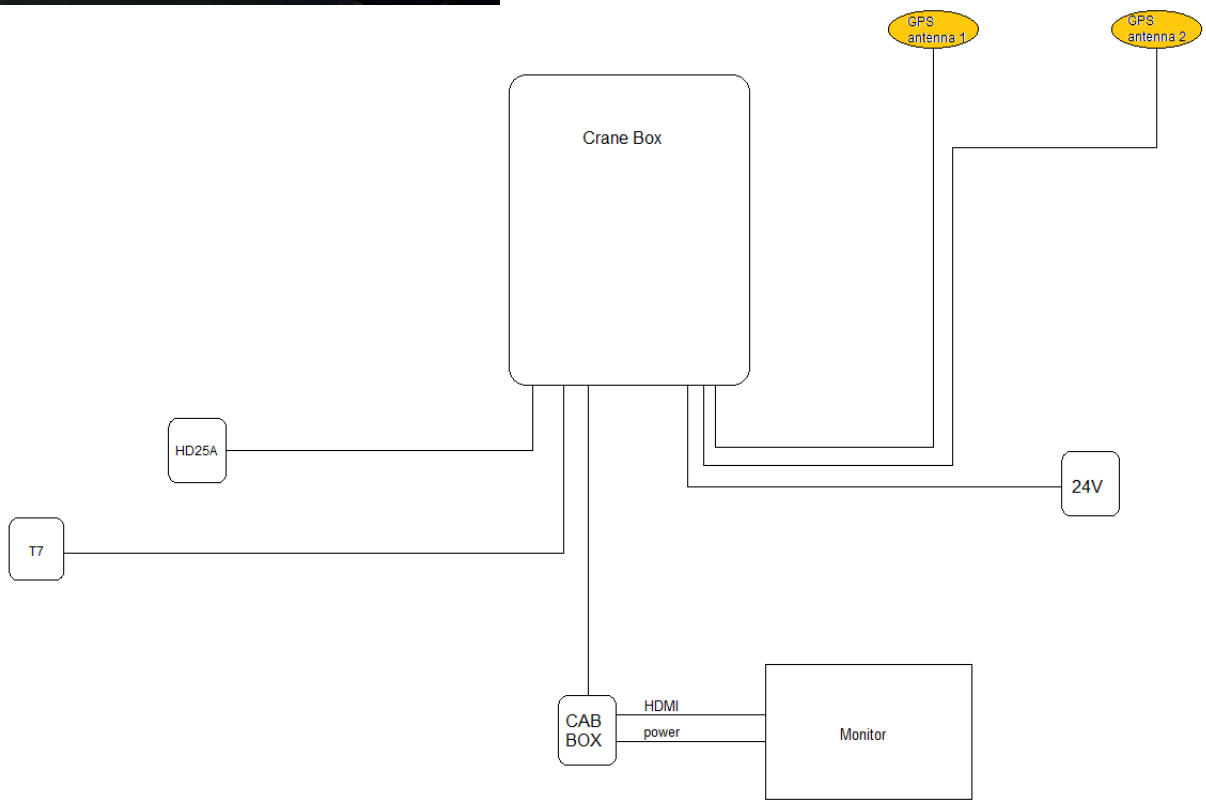
Item 9 – 13 inch cab monitor w/power cable and HDMI cable

Item 10 – HD25a rotation sensor

Item 11 – HD25a Cable

Item 12/13 – GA830 GPS antenna with antenna cables

Item 14 – System power cable with external panel mount switch



B: Dual Antenna GNSS Receiver

DREDGEPACK® requires the crane's position and heading. The best method to obtain this data is to use a dual antenna GNSS receiver.

- Crane Position: The main antenna can be used for calculating the position and elevation of the crane. For the best performance, the GNSS receiver can be upgraded to have a low uncertainty using RTK (Real Time Kinematic) calculations and should be be combined with a source of corrections (RTCM or CMR). The GNSS receiver will come pre-installed in the main interface box, but the supporting antennas and cables will require installation.

The necessary cables, antennas, and interfaces are included in the package. We can also provide a radio modem and RTK base station upon request.

- Crane Heading: We offer a GNSS receiver that can calculate the heading using the secondary antenna.

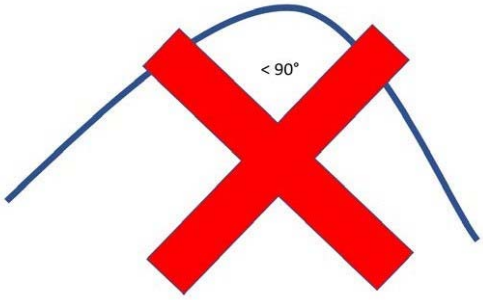
For better satellite coverage, we recommend installing the GNSS antennas at the rear of the crane body to avoid obstructions and allow a clear connection with GNSS satellites. To avoid measuring complicated offsets, install the antennas so they are aligned with each other and a reference axis, such as the central axis of the crane as shown in the accompanying figures.

In some cases, installing additional pipes to raise the antennas will reduce obstacles and obstructions that may affect the signal.

The antennas require a 5/8-11 UNC bolt or threaded rod.

WARNING: DO NOT WELD THE SCREW WHILE THE ANTENNA IS SCREWED IN. THAT COULD DAMAGE THE ANTENNA SERIOUSLY.

Either antenna can be assigned as the main antenna. It is important to identify the cable of the main antenna because it must be connected to Port 1 of the GNSS receiver. When measuring the offsets, we need to know the distance from the trunnion to the main antenna.



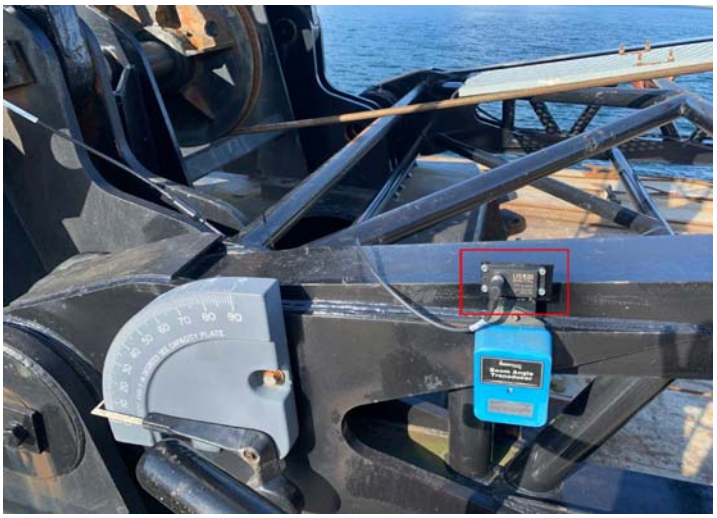
WARNING: AVOID BENDING THE ANTENNA CABLES MORE THAN 90 DEGREES DURING INSTALLATION. THIS COULD BREAK THE INTERNAL CORES IN THE CABLE.

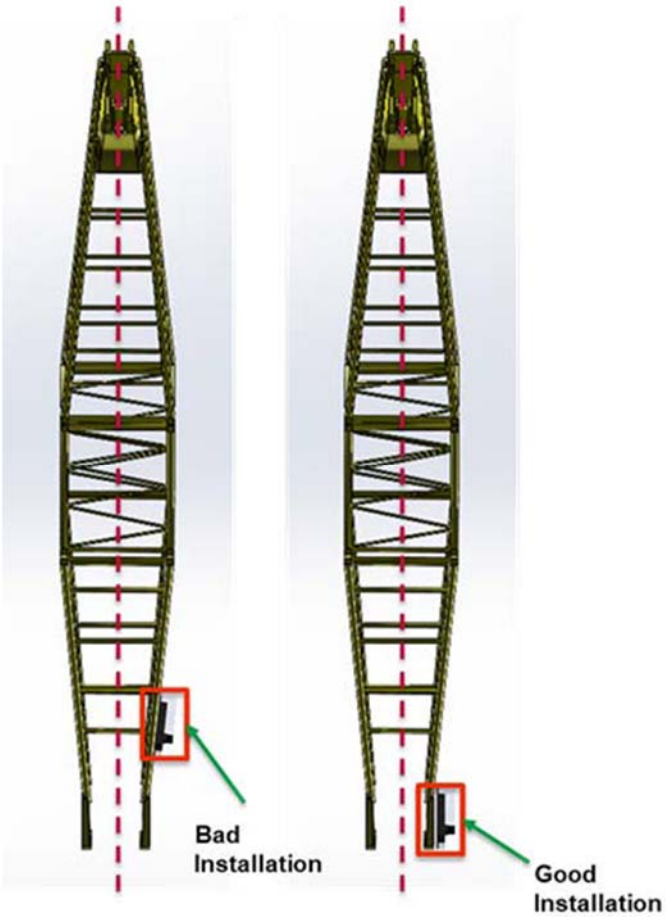
You will need to run the cables from the antenna to the Interface Box. The installation could last longer if a proper pass through and insulation is installed before running the antennas to the cabin.

The GNSS receiver can be placed anywhere in the cabin because the connection to the computer uses a network cable (UTPCAT5E or CAT6), however we recommend placing the GNSS receiver as close as possible to the PC.

C: Angle Sensor (Port T7):

This device is used to calculate the angle of the boom. It should be installed in a protected location parallel with the centerline of the boom. The cable for the Angle Sensor should be run down the boom to the main interface box such that it is protected. It connects to Port T7.





D: Rotation Sensor (Port HD25A):

The rotation sensor calculates the payout of the holding cable, which in turn calculates the depth of the cutting tool. This device needs to be installed with the wheel of the sensor in constant contact with the holding drum. It is often necessary to utilize a hinge and spring to keep tension on the wheel and drum. The cable powering this sensor will also need to be run back to the main interface box to the port labeled HD25A.

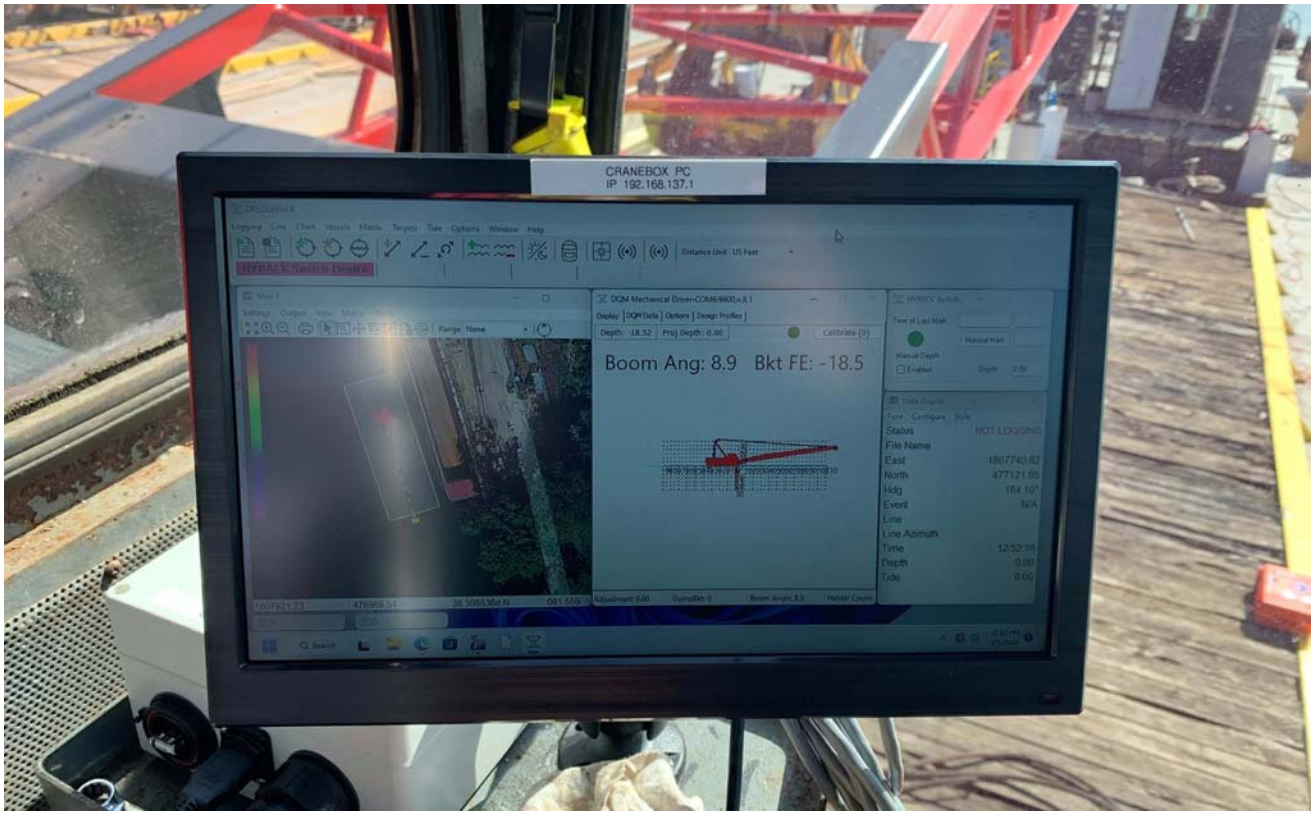
WARNING: DO NOT WELD ANYTHING WITH THE SENSOR ATTACHED. THIS CAN BURN THE SENSOR OR DAMAGE THE CASE.

E. Cab Box and Monitor

The cab box powers the monitor and connects the mouse and keyboard to the main interface box. This box should be installed in the cab of the crane, close to the monitor. The monitor comes with a monitor stand that will sit flat on a desktop surface. Depending on the size and layout of your cab, it may be beneficial to purchase a mount to install the monitor on a handrail or other location that is out of the way.

Two cables will connect the cab box to the main interface box: A power cable that should be plugged into the main interface box in the port labeled 'cab box cable', and an Ethernet cable that should be plugged in to the port labeled 'KVM Cat 6 only'.

The monitor will be powered by a small cable coming from the cab box, along with an HDMI cable controlling the display.

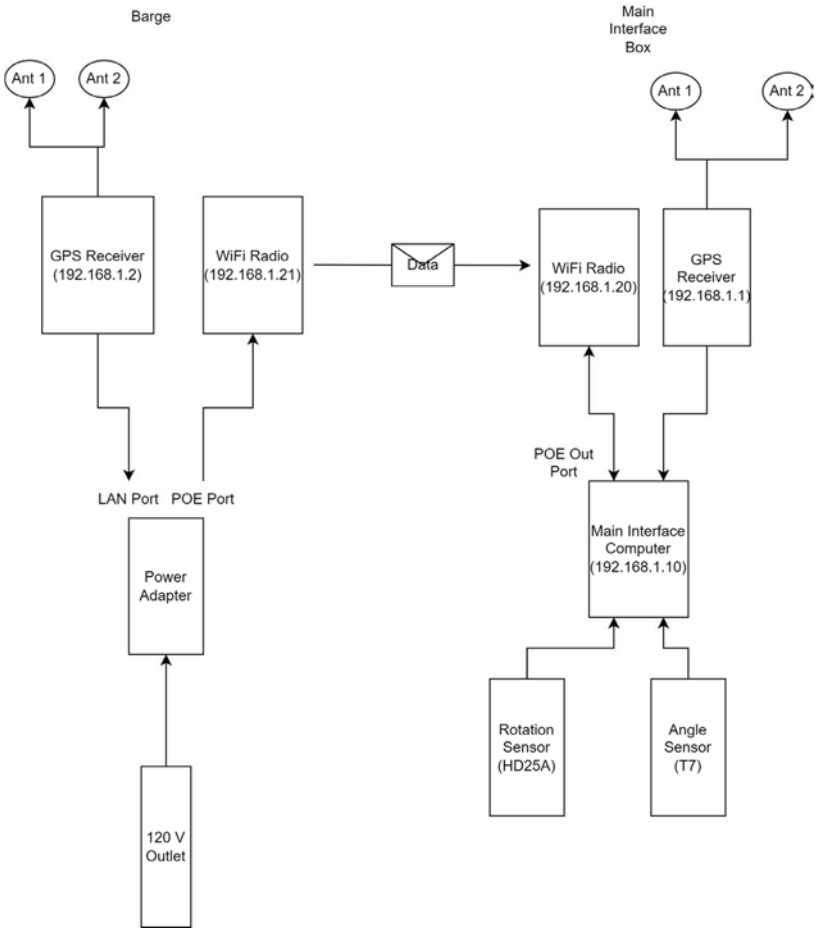


F: Barge Positioning System (Optional)

If the position and heading of the barge is needed, a separate dual GNSS system will need to be purchased, as well as two Wi-Fi radios. One radio will connect to the main interface box and one radio will connect to the GNSS system. Wireless communications will send the barge's position and heading back to the DREDGEPACK® computer.

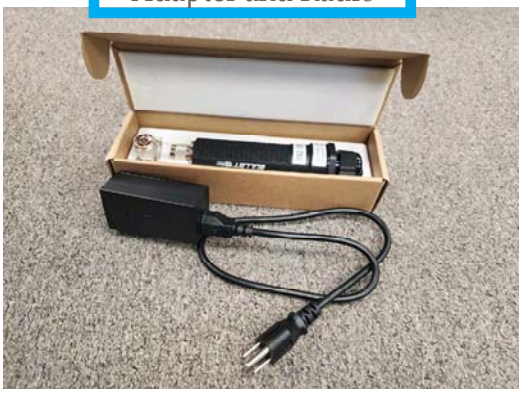
The Wi-Fi radios will come with a power cable and adapter, an antenna, and two Ethernet cables. For the barge, one Ethernet cable will connect the radio to the adapter port labeled POE. The other Ethernet cable will connect the adapter port labeled LAN to the GNSS receiver. For the main interface box's radio, you will only need one Ethernet cable which will connect the radio to the port on the main interface box labeled POE. This cable will power the radio and receive communications from the barge's radio.

The GNSS system for the barge will need to have its own power supply, and the GNSS receiver and Wi-Fi radios will need to be on the same network as the crane's computer and GPS. An example of the connection is below.



Wi-Fi Radio

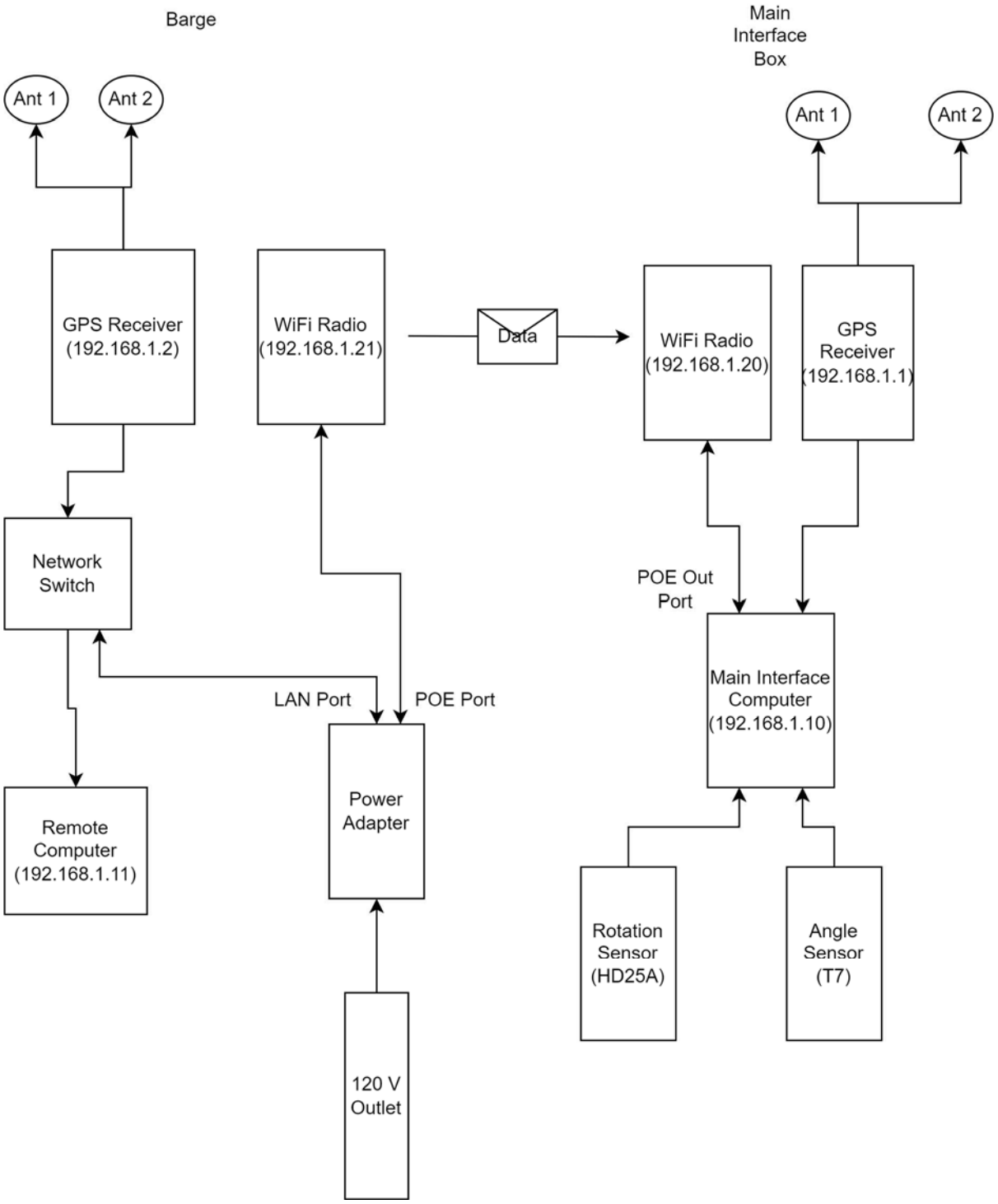
Adapter and Radio



LAN and POE Port

G. Remote Viewing Computer

It is also possible for a remote computer to access the DREDGEPACK® network. For example, a tug captain may want to see the DREDGPACK® screen to adjust their path or position the crane in a certain location. This is also possible through the Wi-Fi radios if you have another unrestricted computer. The set up is similar to the barge positioning system in Chapter F, and you can use that same system with only the addition of a network switch. A diagram of that connection is below, but there are many ways to set the remote viewing computer up on the network.



IV. Maintenance and Care

- Regular cleaning: Wipe down the GNSS receiver, cables, and antennas with a soft, dry cloth to remove dust, dirt, and debris. This can help prevent damage and ensure proper functionality.
- Cable inspection: Check the cables for any signs of wear, fraying, or damage. Replace any damaged cables to prevent signal loss or data errors.
- Line inspection: Check each of the channels and the main pressure line to identify leaks that affect the proper system performance.
- Antenna alignment: Periodically check the alignment of the GPS antennas to ensure they are oriented correctly for optimal signal reception.
- Environmental protection: Protect the GPS receiver, cables, and antennas from extreme temperatures, moisture, and physical impact to prevent damage.
- Performance testing: Periodically test the GPS receiver to ensure it provides accurate positioning and navigation data.

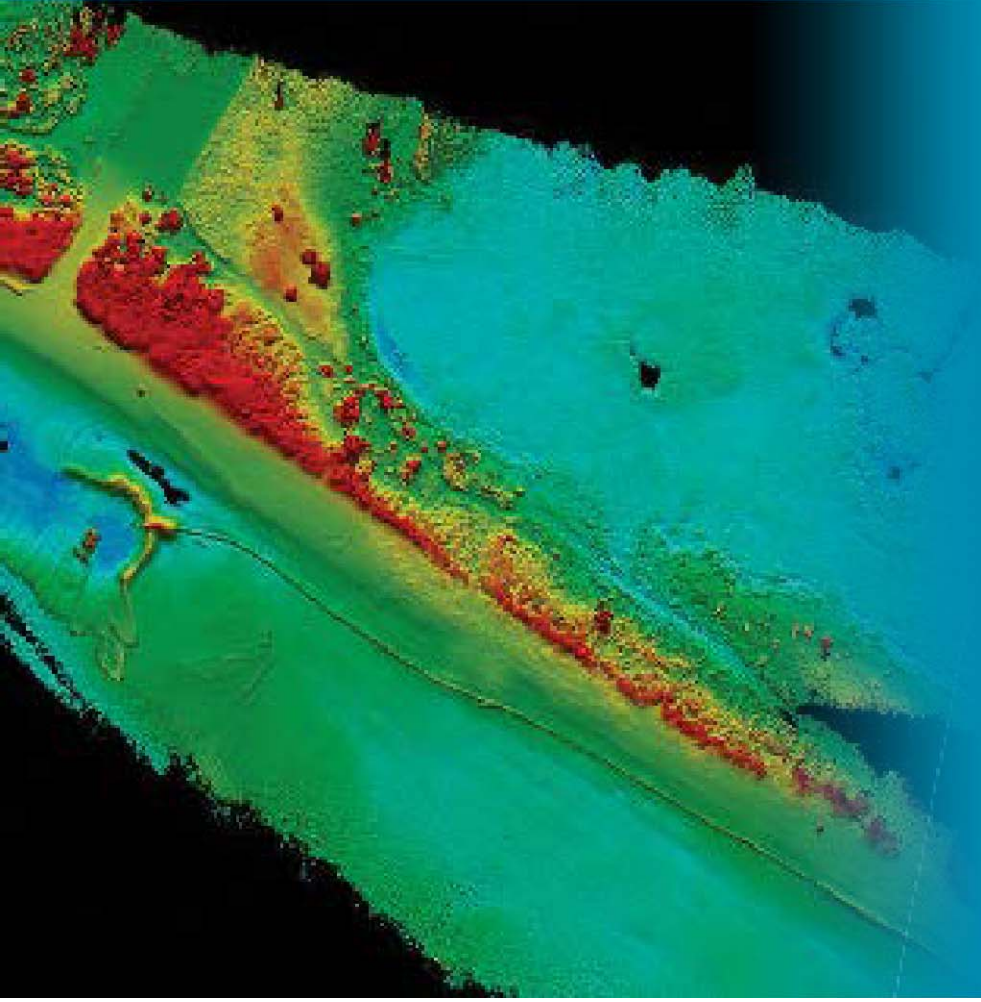
V. FAQ

Q: Does the user need to open the boxes when they are delivered?

A: Yes. Verify that all the equipment was received by checking if everything requested is included in the box. We also recommend carefully putting all accessories and cables back in the box to avoid any issues during the installation and integration procedures.

Q: Can the installer call support for additional instructions?

A: Yes. HYPACK can provide additional details in order to perform the best installation possible. Call +1 (860) 635 - 1500 or send an email to help@hypack.com.



Why Choose HYPACK

- Simple and intuitive to use
- Industry-leading software solutions
- Interfaces with a variety of sensors
- Unparalleled technical support

HYPACK – A Xylem brand has been a world leader in software development for the hydrographic and dredging industry since 1984. Our software is one of the most widely used hydrographic software packages in the world, with more than 10,000 users in over 140 countries.

Our commitment to the industry, and partnership with manufacturers, allows us to provide a solution for all your surveying needs; from a simple area to the most complex project, our software solution can help.

Our suite of software packages will provide you the tools needed to design your survey or dredging operation, collect your data, apply corrections to soundings, remove outliers and invalid points, plot field sheets, and export data to CAD. It also allows you to compute volume quantities, generate contours, create side-scan mosaics and create/update electronic charts. Our hundreds of sensor inputs provide the connection for positioning GNSS and inertial systems, single beam and multibeam echosounders, side scan and sub-bottom sonars, magnetometers, velocity sensors, and more. Whether you are collecting hydrographic survey data, environmental data, or just positioning your vessel in an engineering project, the software will provide the tools needed.

Our mission is not just to provide the tools needed for surveying applications, but to educate and train folks that need to do survey work.

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