



DREDGEPACK®

INSTALLATION MANUAL FOR EXCAVATORS

Revision A, May 2025



HYPACK
a xylem brand

Thank you for your purchase of this Excavator 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 Excavator System.

The purpose of this manual is to guide you in the installation of the DREDGEPACK® system for excavators. 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

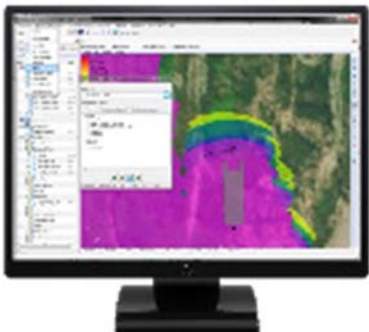


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Revision History

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.

Excavators - Minimum Installation Required:

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

- ☐ GNSS antennas welded on top of the cabin in accordance with the installation manual.
- ☐ GNSS cables run properly inside the cabin with proper cable pass through or isolation.
- ☐ Welded plates for the inclinometers in accordance with the installation manual.
- ☐ Inclinometer cable run from the inclinometer to the cabin.
- ☐ Additional protection for the cable connected to the bucket inclinometer.
- ☐ 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 excavators is individually designed to fit each customer's needs. The following sensors are required for the correct operation of the Excavator 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. Dual Antenna GNSS Receiver: This device is used to determine the position and heading of the excavator. The main antenna is used to calculate positions and elevations (RTK tides). The receiver uses the secondary antenna to calculate the excavator heading. This solution includes two antennas, the GNSS receiver, and the cables.



B. Arm Inclinometers: These devices are used to calculate the inclination angle of the boom, stick, and bucket in order to calculate the position and depth of the teeth. The solution includes the inclinometers, cables, and interface box.



C. Pitch and Roll Sensors (Optional): To improve an excavator's performance for certain applications, we can provide a set of inclinometers to measure its pitch and roll. The solution includes the sensors, cables, and interface box.



After checking your equipment, put everything back in the box to avoid losing cables.

III. Installation Instructions

A. Dual Antenna GNSS Receiver

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

- Excavator position: The main antenna can be used for calculating the position and elevation of the excavator. For increased performance, the GNSS receiver can be upgraded to have a low uncertainty using RTK (Real Time Kinematic) calculations and should be combined with a source of corrections (RTCM or CMR). The GNSS receiver is provided with all of the accessories (i.e. antennas, cables and interfaces). We can also provide a radio modem and RTK base station upon request.

- Excavator 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 in the back of the cabin free of obstacles. To avoid measuring complicated offsets, install the antennas perpendicular to the center axis of the excavator, as shown in the following images. 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. They can be installed directly on top of the cabin or at the end of a pipe.

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



Either antenna can be assigned as the main antenna. It is very 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. During installation, identify which cable is connected to which antenna.



You will need to run the cables inside the cabin. The installation could last longer if a proper passthrough and insulation is installed before running the antennas to the cabin. We recommend organizing the cable properly along the back of the excavator and inside the cabin.

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

The GNSS receiver can be placed anywhere in the cabin because the connection to the computer uses a network cable (UTP CAT5E or 6E).



We recommend identifying an area in the cabin to house the computer and GNSS receiver before beginning the installation. This will be beneficial to avoid moving the equipment in the future. In some cases, a stand for the PC is necessary to provide a better view for the operator.

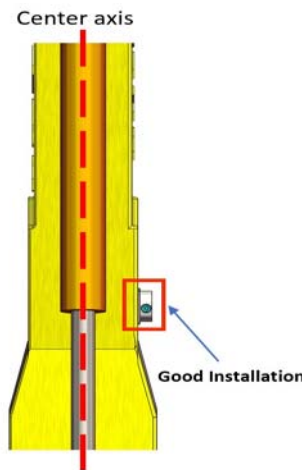
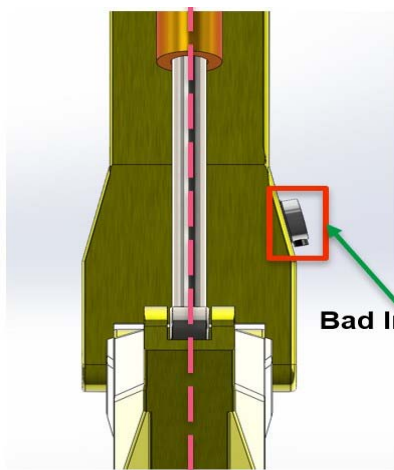
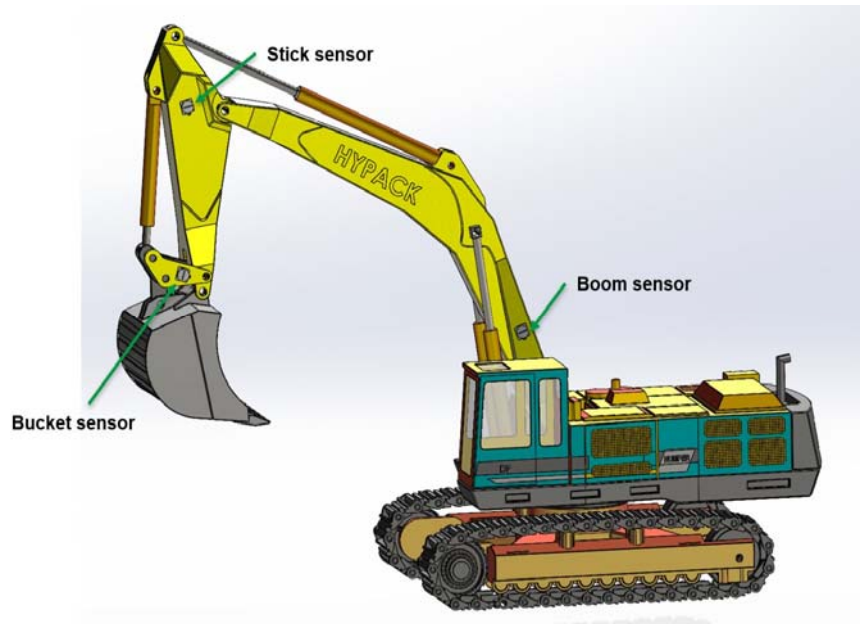
The GNSS receiver, inclinometers, and computer come with power adapters that transform from AC to DC voltage. It is necessary to have an outlet that delivers 110VAC~120VAC or 220VAC~240VAC. We recommend installing a UPS (Universal Power Supply) to prevent damage to the equipment.



B. Arm Inclinometers

There are several options when installing the inclinometers, however, the key factor is that they must be properly aligned with the arm. Conventionally, the sensors are installed on the side of the cabin so they are visible to the operator.

The inclinometers are fully water and dust proof as long as the cables are properly connected. If you are using a dual connector inclinometer, ensure the connectors are covered by the cable or dummy plug before it goes in the water.



The rotation of the inclinometer needs to be parallel with the center axis of the excavator. Make sure the flat surface you are using for placing the inclinometer is parallel. If it is not parallel, try to weld an additional plate to correct the angle of the attachment surface.

The kit includes plates and bolts for placing and tightening the inclinometers.

These plates are usually welded to the arm.

Plate dimensions are: 11.25" X 7" (28.57 cm X 17.78 cm).

WARNING: DO NOT WELD THE PLATE WHILE THE INCLINOMETER IS ATTACHED. THIS CAN BURN THE SENSOR OR DAMAGE THE CASE.



Boom Inclinometer

Install this inclinometer on a flat surface close to the cabin. The cable with the open wires needs to be run from the sensor to the cabin and connected to the main interface box.



Stick Inclinometer

Install this inclinometer close to the hydraulic lines to better organize the cable coming from the boom inclinometer. To protect the cable, attach it to the hydraulic lines and surround it with a protective hose.

WARNING: ENSURE THE CABLES CAN MOVE FREELY THROUGH THE EXCAVATOR'S FULL RANGE OF MOTION TO PREVENT THEM FROM BREAKING.



Bucket Inclinometer

Protect this sensor by installing it on the dog bone (side link). DREDGEPACK® calculates the rotation of the bucket using the segments around the bucket. To protect the cable, run it along the hydraulic hose and install additional supports as shown.



IMPORTANT: Each inclinometer has a sacrificial anode - do not paint or seal it. It is designed to protect the inclinometer and the cable.

C. Pitch/Roll Sensors (Optional)

These sensors need to be installed in the back of the cabin with one parallel and the other perpendicular with respect to the center axis of the excavator. The cable needs to be run to the cabin to connect it to the main interface box.



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.
- 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.

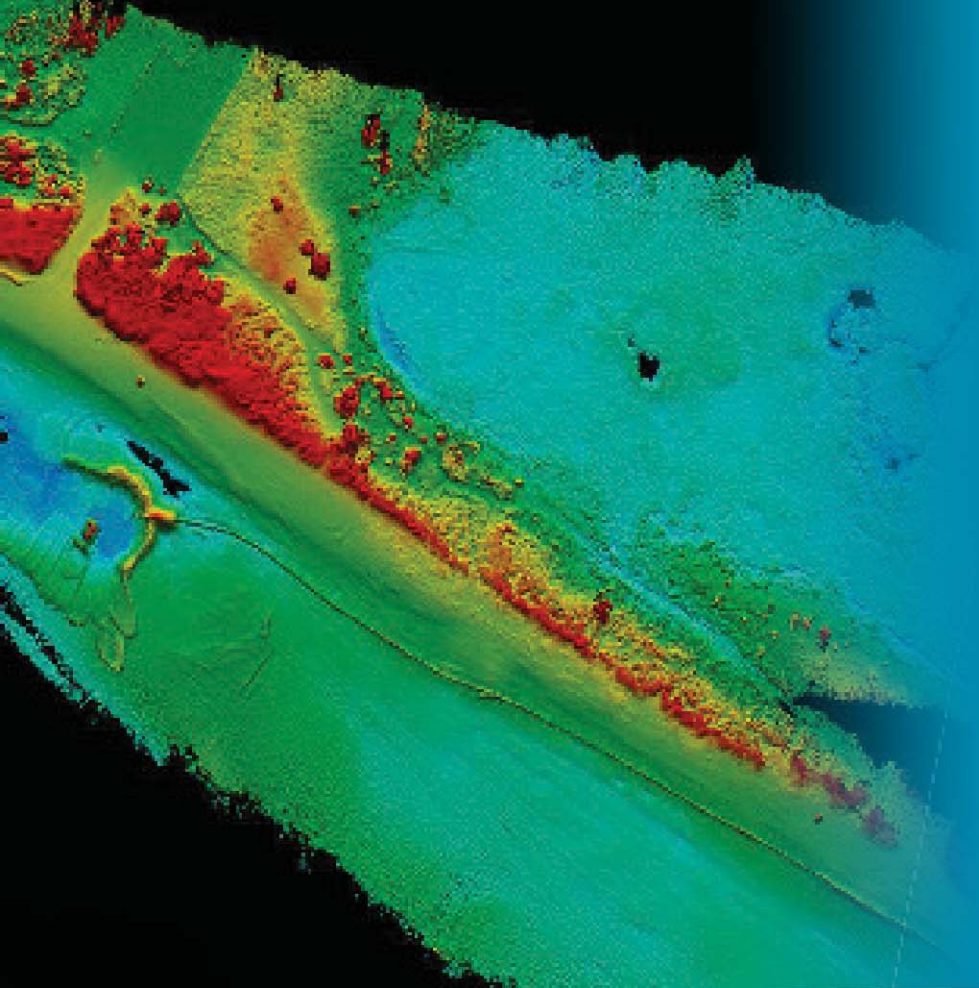
V. FAQ

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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