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Crane DREDGEPACK System - Installation and Setup Part 1

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In this article, I am going to describe the basics of the installation of the sensors we provide for a crane system. I am going to write a second one explaining the configuration and calibration using the same sensors.

First, I am going to list the elements you commonly receive with the DREDGEPACK® Crane System. In this, article I am including the full list of devices and sensors; however, the solution for you can be different. If you want to receive more information about the system, please contact sales@hypack.com or help@hypack.com.

1. **Boom angle sensor:** It measures the inclination of the boom.
2. **Two Antenna GPS:** The GPS will send the position and heading of the crane and the barge.
3. **Two rotation sensors:** One rotation sensor is used to calculate the depth of the cutting tool; the other is used to calculate when the bucket opens/closes.
4. **Main interface box:** This box contains a computer running DREDGEPACK® and all of the sensor connection interfaces.
5. **Wi-Fi Radio Link:** With this device, you will send the position and heading of the barge and have remote access to the system.
6. **Reset/Bucket Mark**

BOOM ANGLE SENSOR

The inclinometer is used to measure the angle of the boom accurately. This is a waterproof unit sealed to work properly in the most hostile environments. It should be mounted to a flat surface on either side of the boom. The inclination is the same along the boom. This is why you can install the sensor taking the length of the cable into account— it must be connected to the main interface box.

As you can see in [Figure 1](#), you can weld additional parts to the boom in order to secure the inclinometer. It is also important to run the cable in such a way that it will not be damaged when changing the tilt of the boom.

FIGURE 1. *Installation of the Inclinometer*



TWO ANTENNA GPS

DREDGEPACK® needs the position and heading of the crane to display and to get the bucket positioned accurately. These antennas need to be installed in the crane cabin to calculate the position and heading in real time based on the reference point. Our recommendation is to install these antennas as high as possible avoiding obstacles that affect the accuracy of the GPS.

We provide a Trimble, dual GPS antenna. This unit needs at least 2 meters of separation between the antennas to calculate the heading accurately. On a crane, you should have enough space for the installation of these antennas with the recommended separation.

As you can see in [Figure 2](#), the antennas were installed as high as possible avoiding obstacles to have an accurate position.

FIGURE 2. *GPS Antennas Installation*



It this example, both crane and barge were using a Trimble SPS 461. This is why the installation was almost the same.

FIGURE 3. *GPS Antennas in the Barge*



ROTATION SENSOR

The rotation sensor must be mounted to have constant contact with the drum. With this sensor, it is possible to calculate the cable out and thus determine the depth of the digging tool. For this installation, it is necessary to find a suitable place to locate the sensor; usually a flat surface inside or outside the drum.

The second rotation sensor should be mounted in the same way as the one used to calculate the depth.

In the following figures, you can see some examples of the installation. [Figure 6](#) is the sensor used to calculate the open/close of the bucket.

FIGURE 4. *Rotation Sensor to Calculate the Depth*

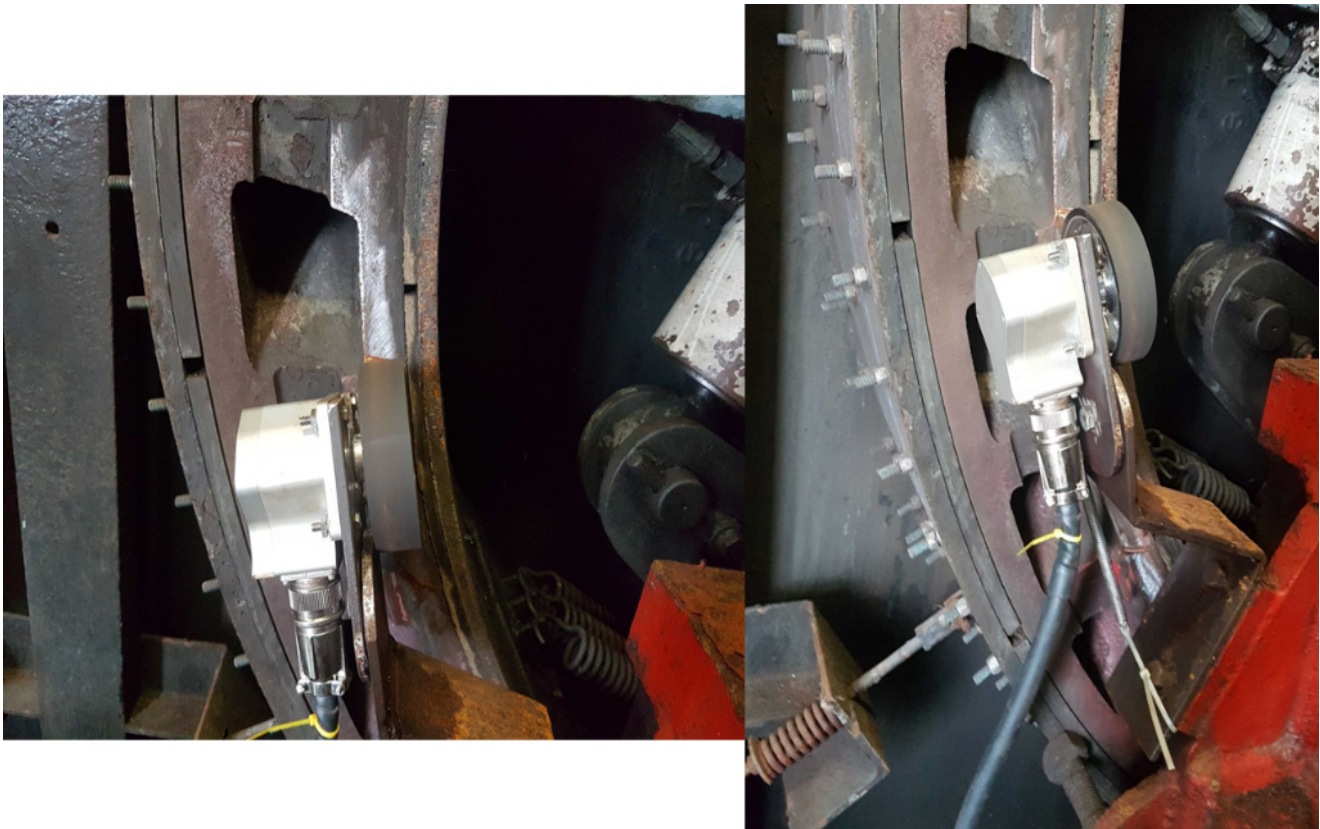
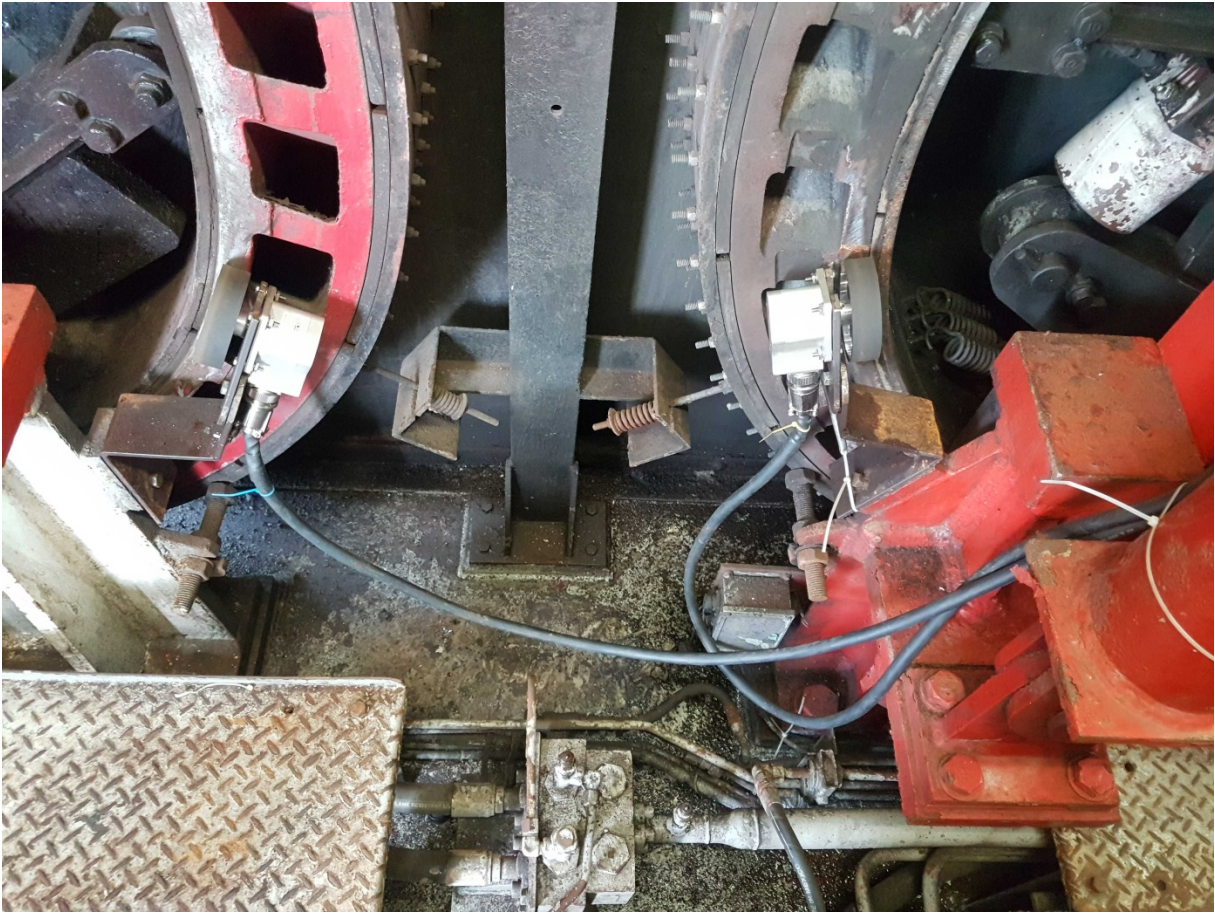


FIGURE 5. *Another Possible Way to Install the Rotation Sensor*



FIGURE 6. *Rotation Sensor Open/Close (left), Rotation Sensor for the Depth Calculation (right)*



IMPORTANT: It is important to use a spring to generate tension between the wheel of the sensor and the drum, to prevent the wheel from slipping up and sending a bad reading.

MAIN INTERFACE BOX

This box is designed to receive the data from all the sensors (GPS, rotation sensors, etc). Inside the box, there is a computer, switch, serial-to-USB converter, PoE(Power over Ethernet), and all of the interfaces for the sensors. This box should be installed in the crane cabin, since it also connects the peripherals that the operator will need: screen, keyboard and mouse.

FIGURE 7. Main Interface Box



FIGURE 8. Interfaces on the Box



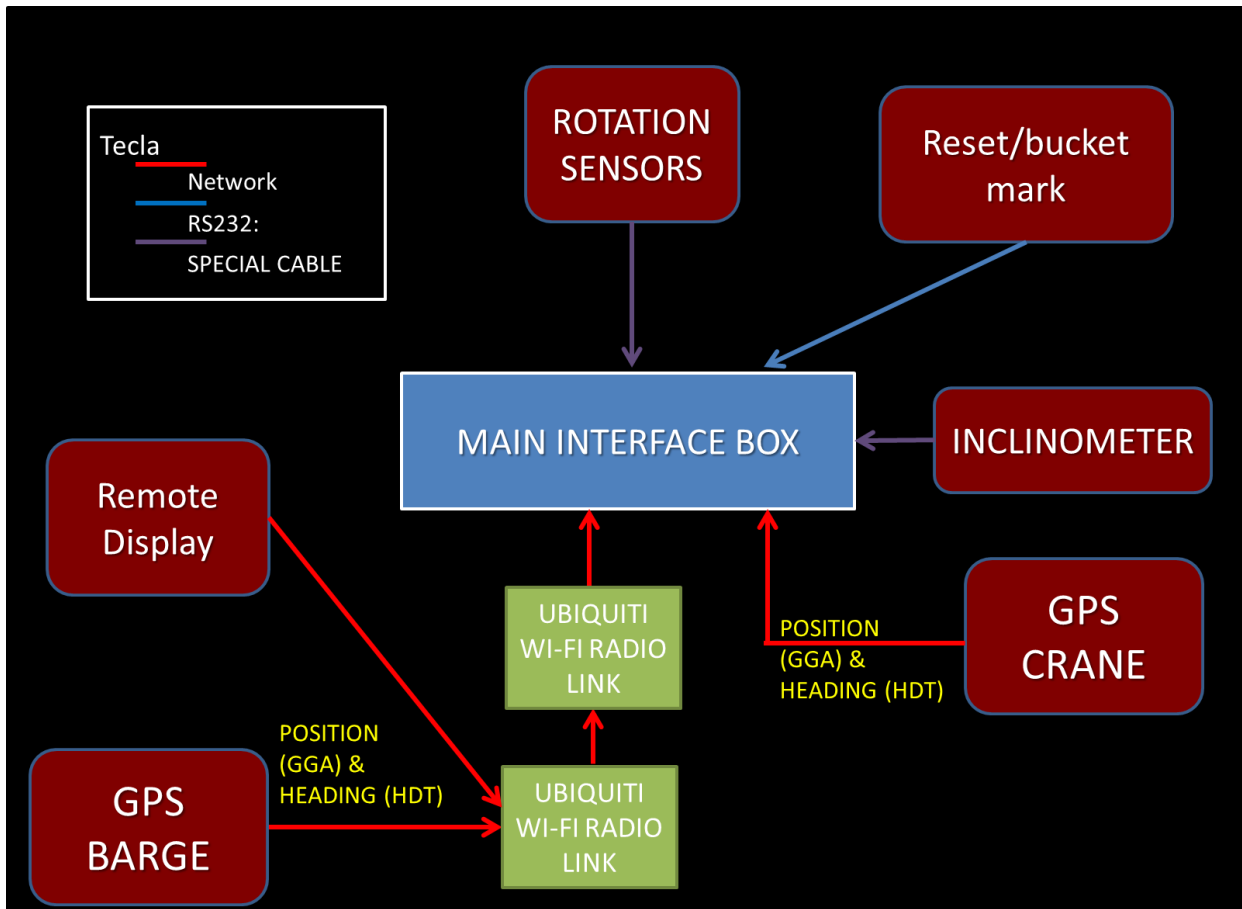
Wi-Fi RADIO LINK

The radio link allows you to receive the position of the barge and use a remote display on the bridge of the vessel. The preferred place for the installation of this system, should be a high place with line of sight between the two antennas to ensure communication.

FIGURE 9. *Radio Link*



FIGURE 10. Wiring Diagram



FINAL THOUGHTS

If you want to monitor an extra barge, you will need to get an extra radio link and a Dual Antenna GPS to display it accurately in DREDGEPACK®.