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INSTRUCTION SHEET FOR:
HINIKER GPS GROUND SPEED SENSOR

INSTRUCTION SHEET NO: 39308072 Rev. B

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SPECIFICATIONS:

WAAS enabled; 12 parallel channel GPS receiver continuously tracks and uses up to 12 satellites.
Speed Update Rate: 1 second
Operating Temperature: -22 to +176 degrees F
Storage Temperature: -40 to +194 degrees F
Velocity Accuracy: .115 MPH RMS steady state
Hiniker Output: 2.0 pulses / foot (2.93Hz/MPH)
Hiniker Speed input compatible
Output #2: 40.0 pulses / foot (58.67Hz/MPH)
Output Levels: Ground +.3V to Vin - .7V
Impedance: 1000 ohms to Vin
Minimum Speed: .3 MPH
Operating Voltage: 9 to 16 Volts DC
Operating Current (typ.): 97ma@13.8 Volt
Acquisition Times:

Reacquisition:	Less than 2 seconds
Warm start:	Approx. 15 seconds
Cold Start:	Approx. 45 seconds
Sky Search:	5 minutes

Sensor cable length: 16 feet
Sensor: Waterproof to IEC 60529IPX7 level
Magnetic mount: Standard

INSTALLATION:

LOCATION: The sensor should be placed as high as possible with the least obstructed view of the horizon. Placing the sensor along the centerline of the tractor cab (front to back and side to side) will provide for optimal reception when traveling on hilly ground. The sensor has a 16-foot cable that will need to be routed to the console(s) using the GPS speed sensor. Route the cable before mounting your sensor. After determining the location, select the sensor mounting method best suited for your application.

MAGNETIC MOUNT: A magnet incorporated into the back of the GPS sensor can be used for attaching the sensor to metal surfaces. Simply place the sensor on the metal structure and check for proper holding force. If the sensor is easily removed from the structure, then select an alternative method for mounting.

VELCRO MOUNT: A 1 1/2 x 4 1/2 inch piece of hook and loop Velcro is included for attaching the sensor and Hiniker module. Cut a piece of Velcro 1 1/2 x 2 inches long for mounting the sensor. Clean the mounting location of all dirt and oils.

All surfaces must be clean and dry. Do not apply to cold surfaces. Apply the hook and loop to the back of the sensor after first removing the backing from one side. Remove the backing from the other side then press the sensor, with the hook and loop attached, against the clean mounting location.

ADHESIVE MOUNT: The sensor may be mounted using an adhesive designated for outside use. Follow the adhesive manufacturer's recommendations for using their product. Allow enough time for the adhesive to cure fully before putting vehicle into service.

RIGID MOUNT: The sensor has a threaded insert centrally located in its back. It will accept a metric M3 threaded bolt. The depth of the insert is approximately 4mm (5/32-inch). Select the proper length of a M3 bolt based on the thickness of the material the sensor is being mounted to. Drill a 9/64-inch hole in the center of the selected mounting area. Thread the bolt through the hole and into the threaded insert and tighten. Use washers under the head of the bolt to prevent the bolt from bottoming out in the insert.

IMPORTANT: Do not over-tighten the bolt. Over-tightening will cause the insert to be pulled from the plastic housing

CONNECTIONS: Route the cable from the sensor down to the location of the console(s) using the speed signal. Secure the cable with cable ties (supplied) to prevent it from being entangled or pulled loose.

Mount the Hiniker module to allow for direct viewing of the indicator lights. The supplied Velcro may be used for mounting the Hiniker module to the top or sides of your console.

HINIKER SPEED OUTPUT:
8150, 8160, 8605, 8200: The Hiniker speed output can be connected directly to the Hiniker 8150, 8160, 8605 and 8200 console's speed input.

8200: Power is always supplied to the speed connection of the 8200 even when the console power switch is off. It is recommended to connect the 8200 power connection to a switched battery source. This will prevent battery drain when not used for long periods of time.

8100, Spray Commander: The 8100 and Spray Commander consoles remove power from the speed connections when placed into "HOLD" using the "RUN / HOLD" switch on the console. Power is not removed from the speed connector when only using the "REMOTE RUN / HOLD" switch. Another source of battery power must be supplied to the Hiniker module for 8100 and Spray Commander console applications. If an additional console is connected to the Second Speed Output Channel, AND if it is powered on, it will supply the needed power. If the Hiniker module is only connected to the 8100 or Spray Commander then a switched battery source needs to be connected to the RED wire on the Second Speed Output Cable.

SECOND OUTPUT CHANNEL: A second speed output is provided for connecting to the speed inputs of other manufacturer's consoles. The output consists of three wires. Connect them according to the following information.

Black wire to Ground
Tan wire to the Speed Signal input
Red wire to +12 volts
Connector kits for most applications are available from your Hiniker dealer.

Weather-Pack square 4-pin. Kit # 36028003
Weather-Pack 3-pin…….Kit # 36028004
Weather-Pack 2-pin…….Kit # 36028005
Deutsch 4 pin……Kit # 36028006
Amp 4 pin CPC…… Kit # 36028007
Conxall 3 Pin 2 Wire……. Kit # 36028008

Refer to the console's Operating and Installation Manuals for the proper connector pin-out.

OPERATION:

There are two indicator lights on the Hiniker module. The green light is the satellite lock indicator. It flashes once per second when the module is communicating with the GPS sensor, but the sensor has not yet obtained a position lock on the satellites. The green indicator will stop blinking and stay on when the sensor starts sending speed information to the module.

The red indicator flashes when the module is outputting speed pulses on the two speed outputs. At higher speeds this indicator may look as if it is always on. Speed pulses are not output for speeds below .3 MPH.

When first powered on, the module attempts to communicate with the GPS sensor. This causes both indicators to alternately flash. The red indicator will go off (no speed output) and the green will flash once per second until the GPS sensor sends the module valid speed information (including 0 mph). The green indicator light will then be on steady. This is the satellite lock condition indicator. This process may take up to five minutes depending on how much valid information the GPS sensor has from the last time the sensor was operating. If it was last operated recently and in close proximity to the current position, it may only take a few seconds. Always check for the green satellite lock indicator to be on steady before driving.

CALIBRATION:

There is no need to perform the distance Calibration procedure on Hiniker consoles, just enter the calibration number listed below during setup or calibration.

If the calibration procedure is performed for a Hiniker console, then the distance calibration number should be within 2% of 2.00 or 84 inches. See the note concerning precautions when performing the procedure while using GPS as a speed sensor.

For Hiniker Consoles 8160 and 8605 use 2.00 as the Distance Calibration number. For Spray Commander, 8100, 8200 and 8150 use 84 inches as the Distance Calibration number. For the 8200, enter 14 as the number of Target the speed sensor is counting per revolution of a wheel with a circumference of 84 inches.

The calibration number for consoles connected to the second output channel can be calculated using 40 pulses per foot or 58.67 Hz./MPH as the output frequency. If a distance calibration is required then note the following information.

NOTE:
Follow the manufacturer's recommendations for performing proper distance / speed calibration with the following exceptions: Keep in mind that it could take up to 1 second to start sending speed pulses (1-second update rate). Also no pulses are output for speeds under .3 MPH. Based on this, it is important to be moving before and throughout, the calibration run. Keeping a constant speed will improve the calibration process.

TROUBLESHOOTING:

Speed pulses while not moving: Interference from other equipment may cause the GPS receiver to interpret the noise as valid signal. This is usually only .1 or .2 MPH. To prevent this, speeds under .3 MPH are masked to 0 MPH. Some common causes of interference are CD players, two way radios, and computers. Cell phones usually are not a problem. Never mount the GPS sensor close to another antenna or in the vicinity of one of these noise sources. Try repositioning the equipment relative to each other to eliminate the problem.

Losing satellite lock: The GPS receiver must have a clear view of the sky. The receiver can continually track twelve satellites. The receiver only needs three to determine speed. Buildings, hills, or dense foliage can block GPS signals. To allow for short periods of signal interruptions the GPS receiver will continue to output the last known speed for 3 seconds after losing satellite lock.

What is GPS?

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS.

How it works

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and speed.

A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

Today's GPS receivers are extremely accurate, thanks to their parallel multi-channel design. Twelve parallel channel receivers are quick to lock onto satellites when first turned on and they maintain strong locks, even in dense foliage. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. Garmin® GPS receivers are accurate to within 15 meters on average.

WAAS stands for the "Wide Area Augmentation System". WAAS is an FAA-funded project designed to improve the overall accuracy and integrity of GPS signals for flying in instrument meteorological conditions, primarily during the approach and landing phases of flight. It is a space-based system that broadcasts integrity information and correction data as determined by ground reference stations. Tests show the actual accuracy to be on the order of 2-3 meters 95+% of the time. A second antenna is not necessary to receive the signal.