DEPTH RAIDER

SPEED AND TEMPERATURE MONITOR FOR DOWNRIGGER FISHING

OWNER'S MANUAL

Model DR1000

Kell Laboratories, Inc.

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REV A

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Introduction

Fellow Fishermen,

Congratulations on your purchase of the **Depth Raider** Speed and Temperature Monitor. We would like to thank you for purchasing our product.

The **Depth Raider** Speed and Temperature Monitor has been designed using state-of-the art electronics and therefore offers high accuracy and ultra-low power consumption in a compact design. In fact, the Depth Raider's sensor/transmitter probe is the smallest speed and temperature underwater probe on the market.

We hope the **Depth Raider** Speed and Temperature Monitor will help you make the most of your downrigger fishing experience.

Good Fishing!
Kell Laboratories, Inc.

Package Contents

Prior to the start of installation, please take a moment to verify the contents of your Depth Raider package. The **Depth Raider** system includes everything necessary to install on your downrigger equipped boat except the mounting hardware to mount the receiver to your dash.

The system includes the following (in three main packages):

Poly Bag:

- 1 - Receiving antenna
- 1 - 25' antenna-to-receiver coaxial cable
- 2 - Black nylon cable ties (to attach antenna to downrigger boom)
- 1 - 6' DC power cable with in-line fuse holder and power plug
- 1 - 200' coated downrigger cable (150# break strength)
- 1 - Owner's Manual
- 1 - Warranty registration card

Probe Box:

- 1 - Underwater sensor/transmitter probe unit
- 1 - Cannonball drop leader kit (85-90# break strength)
- 1 - Probe termination kit (1-thimble, 1-coastlock swivel, 3-barrel crimps, 1-12" roll rubberized tape)
- 1 - O-ring lubrication notice

Receiver Box:

- 1 - Receiver/display unit

Please make sure that your package contains the above listed items before you continue. If you are missing any item contact us at:

Kell Laboratories, Inc.

P.O. Box 753
Burlington, WI 53105
Phone: 262-534-2202

Theory of Operation

Professional downrigger fishermen understand that different species of game fish prefer different temperature ranges. Additionally, they understand that maintaining a specific range of trolling speeds is not only important to attract game fish but is also important to ensure the lure is running with the proper action.

However, it can be very difficult to predict the speed and temperature of a lure when trolled at varying depths below the water surface. Surface speed and temperature gauges are ineffective at predicting sub-surface conditions since day-to-day environmental effects such as wind speed and wind direction can create underwater currents and drastically alter the sub-surface water temperature.

The Depth Raider system measures and displays this vital speed and temperature information with digital precision. The Depth Raider speed and temperature monitor tells you the ***speed*** and the ***temperature*** of your lure ***at its running depth***.

Theory of Operation - Upon entry into the water, the underwater sensor/transmitter probe unit automatically turns itself on then continuously measures speed and temperature and periodically (approximately once per second) transmits a digitally encoded RF signal onto the coated downrigger cable. The signal is received by a receiving antenna mounted on the downrigger boom. This signal is then routed to the receiver/display unit via a coaxial cable.

The receiver/display unit continuously monitors for data transmissions from the underwater probe unit. Once a transmission is detected and received, data is decoded from the RF signal and converted into speed and temperature which is then displayed on the LCD display.

Coated downrigger cable is necessary to prevent the lake water from absorbing (attenuating) the signal transmitted from the sensor/transmitter unit. The coating provides electrical isolation from the water since water is a conductor of electricity. Without the coating (or electrical isolation), a portion of the signal is absorbed by the water thereby reducing the signal level at the receiving antenna. Without the coating, as the depth of the probe continues to increase, the signal level at the antenna continues to degrade until it is no longer adequate for proper interpretation by the receiver/display unit. It should be noted that the actual depth of operation without a coated cable can vary greatly from installation to installation, boat to boat, water conditions, etc.

While the Depth Raider system will operate to varying depths without the coated cable; installation of the coated cable is highly recommended to provide proper operation down to 200 feet.

INSTALLATION

Proper installation of the Depth Raider system is vital in achieving the best performance. Please read the directions carefully and thoroughly prior to starting the installation process. If you do not feel comfortable installing the system, contact your dealer or a professional installer.

Please follow the 9 steps below to install your Depth Raider system.

STEP 1: Mounting the Receiver/Display Unit

Your Depth Raider speed and temperature receiver/display unit has been designed to be mounted to a flat surface using the included gimbal mount.

The Gimbal mount has four holes in the base to allow for installation of screws or through-hole bolts (not included).

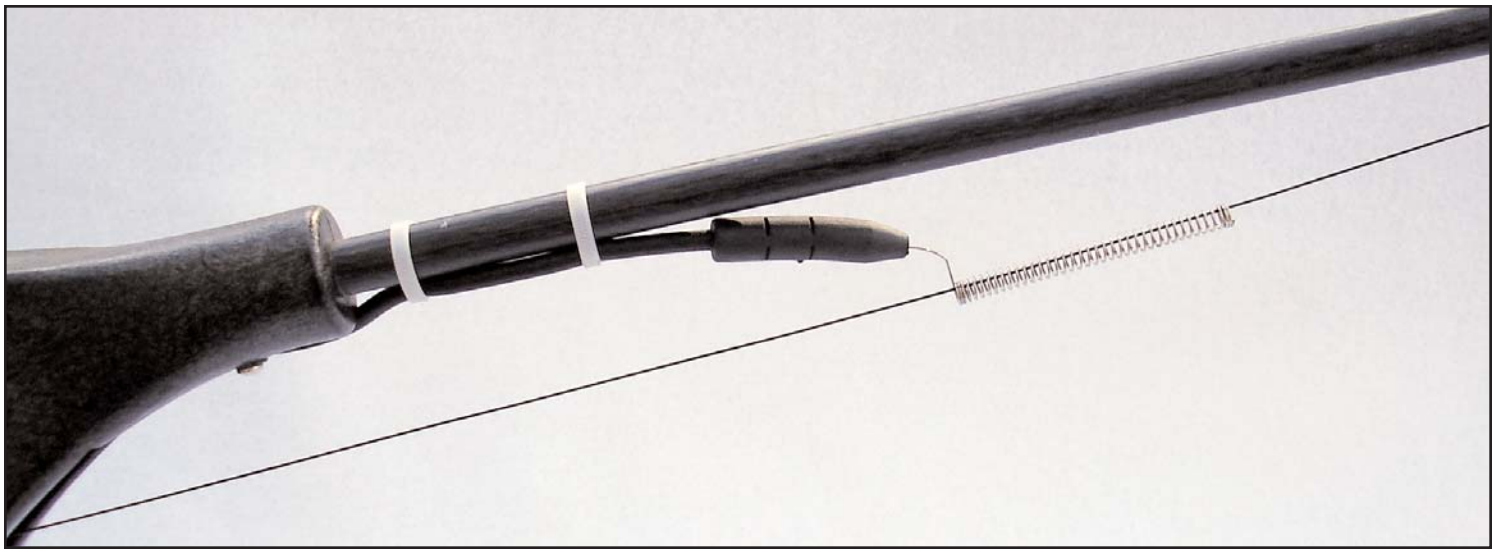
Please follow these guidelines when installing the receiver/display unit.

- Pick a location that will give you the proper viewing angle from the helm as well as the cockpit if at all possible.
- Ensure that the mounting surface is sturdy enough to prevent the receiver/display unit from bouncing and/or vibrating excessively during rough riding conditions.
- Check for interference before drilling holes and mounting the unit next to two-way radios or other electronics.
- Do not mount close to two-way radio antennas or the unit may not operate properly when transmitting on the two-way radio.
- Be sure that the receiver/display unit is within 25 feet of the downrigger mounted receiving antenna.
- When adjusting the receiver/display head within the gimbal mount be sure the mounting knobs are loosened completely so that the display head can be adjusted without excessive force.
- The receiver/display unit should be sheltered from the weather and out of direct rays of the sun for longest life.

Note: The receiver/display unit has been designed to be in-dash mounted using an optional in-dash mounting kit. Unfortunately, the in-dash mounting kit will not be available until the fall of 2005.

STEP 2: Mounting the Spring Antenna

The spring antenna is designed to be mounted to your downrigger's boom using nylon cable ties. Additionally, it must be mounted in a fashion that allows the coated downrigger cable to freely pass through the center of the spring. The location of the antenna should be selected such that it isn't prone to damage from movement of the downrigger boom or movement of the downrigger cable.



Using two nylon cable ties, install the antenna to the downrigger boom allowing enough coax cable to extend downward from the boom such that the center line of the spring antenna is directly in the center-line of the downrigger cable. This 2-4" of freeplay in the coax cable allows the antenna to freely move with movements of the downrigger cable. **Caution:** Do not overtighten the nylon cable ties as they can crush the coax cable and cause permanent damage. Only tighten the straps enough to hold the antenna in position. Additionally, at least 2" of space should be allowed between the first nylon cable tie and the overmolded rubber housing that attaches the coax cable to the spring antenna.

On downriggers such as Big Jon or Fishlander where the boom can swing upward for cannonball retrieval, it is of utmost importance that the location you choose will not damage the spring antenna when swinging the boom. On these types of downriggers, the spring antenna will most need to be mounted closer to the outward end of the boom to prevent damage to the antenna when swinging the downrigger boom. Temporarly tape the antenna into position then carefully move the downrigger boom through its entire swing of motion (with a cannonball attached to keep the cable tight) to verify the antenna will not be damaged by being pulled out of position by the downrigger cable. Once you are satisfied with the antenna position install the nylon cable ties.

Caution: The motors on electric downriggers generate a significant amount of electrical interference and due care must be taken when mounting the spring antenna onto electric downriggers. Keep the spring antenna as far away as possible from the electric motors. Additionally, it is not advisable to mount the Depth Raider to an electric downrigger that will automatically cycle the cannonball up or down in depth. This continuous up and down motion is hard on the coated cable and may damage the coating quickly. Also, the frequent on/off control of the motor may cause interference to the Depth Raider system preventing it from operating properly. If you decide to mount the Depth Raider system to an auto cycling downrigger be sure to test the operation of the system prior to permanent installation.

Scotty Downriggers - Users with Scotty electric downriggers employing the mechanical stop using a bead attached to the downrigger cable. Be sure to mount the antenna in a position that will allow the stop bead to freely pass through the antenna or damage to the antenna will result.

STEP 3: Routing and Connecting the Antenna-to-Receiver/Display Cable

Route the antenna-to-receiver coaxial cable while observing the following guidelines:

- Route the cable away from areas that allow the cable to be stepped on.
- Prevent troublesome electrical interference by routing the cable away from other electronic intruments and associated wiring.
- Do not coil excess cable. Instead, use a figure 8 pattern which is less prone to reception of noise and electrical interference.

Once the cable is routed, plug one end onto the antenna cable connector and the other end onto the receiver/display connector. **Caution:** When the cable connector is pushed onto the antenna cable connector or the receiver/display connector this interconnect should feel a bit snug. If it does not feel snug, carefully bend the 4 outer ground tabs of the 25' cable connectors inward toward the center post and then re-install the connectors onto their associated mating connectors. These outer tabs provide the shielding ground for the coax cable and a good ground is essential to minimizing interference from noise sources.

STEP 4: Routing and Connecting the Recevier/Display Power Cable

Route the power cable from the receiver/display unit to your boat's 12 VDC power source. It is recommended that your receiver/display unit be connected directly to your boat's main battery to minimize interference from other electrical and electronic devices on the boat. However, you may install power cable into your accessory panel and test the system for interference to determine if you will need to move the power cable connections directly to the boat's battery.

When installing the cable please observe the following:

- Red wire to positive (+) terminal
- Black wire to negative (-) terminal

Your power cable includes an in-line fuse holder equipped with a 1 amp fast blow fuse.

Caution: Many boats have an accessory battery installed which is used to run downriggers and electronics on the vessel. If you plan on wiring the Depth Raider into an accessory battery and not the main boat battery, please ensure that there is a ground cable connecting the accessory battery's ground (-) terminal to the boat's main battery ground (-) terminal. Proper operation of the Depth Raider system depends on the receiver/display units ground wire be connected to the main battery ground, which in turn is grounded to the water through the I/O unit, the outboard, or the inboard drive. If the Depth Raider's ground wire is not grounded to the water it may be prone to interference or may not operate properly.

STEP 5: Installing the Coated Downrigger Cable

First, remove the existing downrigger cable from your downrigger.

Follow the instructions provided with your downrigger to install the coated cable. It will install onto the downrigger just like ordinary cable. Be sure that you route the new cable through the center of the spring antenna.

Most downriggers require that you push the end of the cable through the spool then install a barrel crimp to ensure the cable will not pull back through the spool. If you need to install a barrel crimp, be sure to strip off a bit of coating from the end of the cable such that the barrel crimp is installed on bare cable.

For Cannon downriggers with PIC or shortstop features, you will need to strip off the coating for the first several wraps around the spool. Make sure the bare wraps rest on the set screw as you wind it on.

Note: The best way to remove the coating from the cable is to scrape the coating on one side using a utility knife then peel the coating back and cut it off. Be carefull not to damage the cable by appling too much pressure with the knife or you could create a weak spot. **Do not burn coating off!**

Over time the coating on the cable coating may wear or get damaged as it rubs against a sharp surface or the edge of the boat. Excessive wear may decrease the maximum operating depth of the Depth Raider system. However, there is no need to replace cable with damaged coating until it prevents you from operating the Depth Raider system at the depths you typically fish.

STEP 6: Preparing the Sensor/Transmitter Probe

The Depth Raider sensor/transmitter probe requires a standard 9V alkaline battery for operation. The Depth Raider probe is the first probe on the market to eliminate the wires and snap connection to the 9V battery. The Depth Raider probe features stainless steel battery contacts and a spring loaded screw cap to make the electical connection to the battery thereby eliminating the possiblity of wire breakage as seen in competitive probes. Additionally the probe design features a dual O-ring seal to virtually illiminate leakage problems. Finally, the probe electronics are completely sealed in epoxy such that in the event a leak does occur the electronics are not damaged.

To prepare the probe for operation, first liberally apply a lubricant such as Vasiline to the two O-rings. One O-ring is located on the inside bottom of the screw cap, the other O-ring is located on the main body. Be sure not to get lubricant on the battery contacts. **Caution:** Improper lubrication or lack of lubrication of the O-rings may cause damage to the O-rings which will result in water leakage.

Install a fresh alkaline 9V battery (not included) into the probe battery compartment observing the polarity as shown on the label located on the inside rim of the probe body. Screw the cap into position until the screw cap meets the main body using only hand pressure.

Caution: The Depth Raider Probe body and screw cap were designed to be tightened by hand power only. Never use pliers, vise grips or other tools to tighten or remove the screw cap or damage to the probe may result. Damage to the probe caused by use of any tools such as pliers, vise grips, etc. is not covered under the warranty.

STEP 7: Attaching the Probe to the Coated Downrigger Cable

The Depth Raider system uses the downrigger cable as a means to send the signal from the probe to the receiver/display unit. Therefore, proper system operation depends proper installation of the probe to the coated downrigger cable.

There are two methods of attaching the probe to the downrigger cable.

Method #1: Direct Connect Method - This method requires the probe to be directly terminated to the coated cable without a snap swivel. While this method ensures the best system performance, the downside is that the probe must remain attached to the downrigger cable and removal will require cutting it from the cable.

To install the probe using method #1:

1) Strip back approximately 6" of coating from the downrigger cable. The easiest way to remove the coating is to scrape one side of the coating with a utility knife using caution not to apply so much pressure as to damage the cable, which would cause a weak spot and be prone to breakage. Then peel back the coating and cut it off.

2) Route the thimble through the upper connection tab on the probe. The upper connection tab is the tab that has a plastic boss surrounding the base of the tab as it exits the probe body. If you are unclear as to which is the upper connection tab please refer to the probe functions and features page.

3) Slide 2 silver barrel crimps onto the bare end of the coated cable then route the cable through the thimble. Slide the barrel crimps over both pieces of bare cable ensuring the barrel crimps are as close to the thimble as possible. Crimp the barrel crimps into place using a barrel crimping tool. Cut off excess cable to within 1/2" from the barrel crimp (see photo on next page).

4) Apply the rubberized electrical tape. It is best if you have a helper for this step. Have your helper hold the probe in one hand and the downrigger cable in the other then have them pull the cable tight straight away from the probe as it would be in a normal trolling situation. Now apply the rubberized electrical tape. The raised boss is designed to provide a good starting point for the tape. Start wrapping the tape on the raised boss while stretching the tape somewhat. Continue wrapping until the complete connection and all bare cable are covered. You will probably only use about 1/2 of the tape that is provided in the kit so be sure to place the remainder in back in the plastic bag for use at a later date. If you do not have a helper, after the barrel crimps are installed, you may suspend the probe from the downrigger with the cannonball suspended below using the drop leader. This will hold the interconnect tight and allow you to install the rubberized electrical tape by yourself.

Note: If you are installing the probe on a Cannon downrigger with PIC or shortstop, you must leave about 1/2 of cable bare and un-taped to ensure proper operation of these features. It is best to leave this bare cable exposed ***above*** the barrel crimps.

Method #2: Snap Swivel Interconnect Method - This method uses a downrigger rated snap swivel (not included) to attach the probe to the coated downrigger cable. This method is much more convenient as it allows the user to quickly remove or install the probe, however we must caution you that maximum depth performance may not be achieved since part of the interconnect is left uncoated and exposed to the water. Since water conducts electricity it absorbs some of the signal which reduces the signal strength at the receiving antenna thereby reducing maximum depth performance. Additionally, reduced probe battery life can be expected as the probe will use more power since the water is absorbing some of the signal.

Note: Our testing showed that we consistently achieved depths of greater than 150' with this method, however individual results may vary and your maximum operating depth could be less.

To install the probe using method #2:

1) Strip back approximately 6" of coating from the downrigger cable. The easiest way to remove the coating is to scrape one side of the coating with a utility knife using caution not to apply so much pressure as to damage the cable, which would cause a weak spot and be prone to breakage. Then peel back the coating and cut it off.

2) Route the thimble through a downrigger rated silver snap swivel (not included). Do not use the black snap swivels (see caution below).

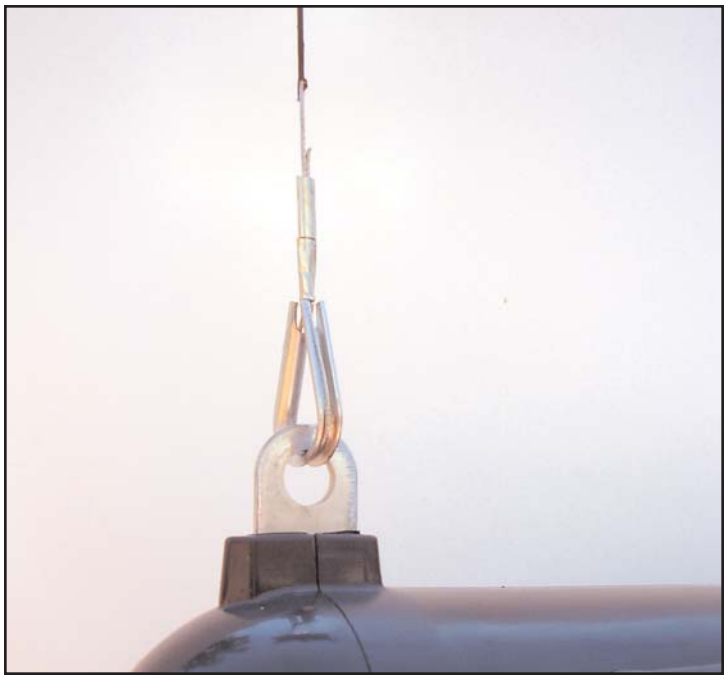
3) Slide 2 silver barrel crimps onto the bare end of the coated cable then route the cable through the thimble. Slide the barrel crimps over both pieces of bare cable ensuring the barrel crimps are as close to the thimble as possible. Crimp the barrel crimps into place using a barrel crimping tool. Do not use pliers. This could cause the loss of the probe. Cut off excess cable to within 1/2" from the thimble. Do not use the black barrel crimps (see caution below).

4) Apply the rubberized electrical tape to all of the bare wire and as much of the swivel as possible. Again, stretch the tape slightly as you apply it to the connection.

Note: This installation method leaves some conductive surfaces exposed so this installation method will also work with Cannon downriggers that include PIC or shortstop features.

Tip: Some fishermen have dip coated the upper connection tab on the Depth Raider probe with liquid electrical tape and allow it to dry. They then cut a small portion of the coating away right where the swivel will ride in the upper tab. This method helps to reduce exposed conductive surfaces to the water thereby increasing maximum depth performance yet still provides the necessary electrical interconnect.

Caution: When using this method use only silver barrel crimps and downrigger rated silver snap swivels. The black coated barrel crimps and snap swivels may not conduct electricity due to the coating and prevent the system from operating. Also, do not use the Cannon snap swivels or any swivels that do not provide a means for electrical contact between the bare cable and the upper probe connnection tab. Do not use liquid electrical tape on the swivel. This liquid (prior to drying) can work its way into the swivel itself and prevent proper electrical contact.



Properly installed probe using the direct connect method prior to installing the rubberized electrical tape. Note the two barrel crimps are installed tight up to the thimble.

Properly installed probe using the direct connect method after application of rubberized electrical tape. Note that the tape is started at the plastic boss and wrapped upward.

STEP 8: Fabricating the Cannonball Drop Leader

The cannonball drop leader is used to suspend the cannonball below the Depth Raider probe. The cable supplied is of lower test than the main downrigger cable such that if the cannonball happens to snag the bottom the drop leader will break instead breaking the main downrigger cable. This allows you to retrieve the probe as long as your main downrigger cable isn't damaged and still has more strength than the drop leader. The cannonball drop leader is approximately 85-90 lb. break strength.

To fabricate the cannonball drop leader:

1) Determine a length for your drop leader somewhere between 12-18". Once you've determined a lenth, add about 8" to compensate for the cable used in the interconnects. Cut the supplied cable to length.

2) Thread a thimble through each of the snap swivels.

3) Place 4 barrel crimps onto the cable then route the cable through one of the thimbles. Slide 2 of the barrel crimps into position as close to the thimble as possible, leaving about 1/2" of cable past the barrel crimps. Crimp the barrels into place. Follow this procedure for the other end as well.

Note: The drop cable supplied is coated cable and it is not necessary to remove the coating prior to crimping the barrel crimps into position.

Caution: The bottom connection tab on the probe is the ground return for the probe so do not apply rubberized electrical tape or any electrically isolating material such as liquid tape, liquid rubber, etc. to the bottom tab.

STEP 9: Testing and Operation of the Depth Raider System

Congratulations! You've successfully installed the Depth Raider system.

Now its time to test the system for proper operation. It is best if you test the system with your boat in the water.

1) Press the ON button on the receiver/display unit. All segments of the display should activate and the LCD backlight should illuminate for a period of about 3-5 seconds. If you would like the backlight to stay on, press the backlight button. If you do not press the backlight button it will go off automatically. The backlight automatically comes on so that if you are turning the system on in the dark you can see the display and the buttons. Your display should show all bars --.- for the temp, -.- for the speed. This indicates there is no data being received from the probe. Anytime there is no data from the probe (the probe is not in the water) or data from the probe is lost (bad cable, bad connection, too deep of water, etc), the 'all bars' indication will come up on the screen. If you've activated the LCD backlight you can now adjust the intensity to your liking by pressing the up or down arrows. The up and down arrows will do nothing if the backlight is off.

2) Now use your downrigger to lower the probe in the water about 5 -10 feet. Within a few seconds the display should start showing speed and temperature. It may take up to 15 seconds for the data to appear after you've first lowered the probe in the water.

3) If you are able to move the boat, carefully move the boat forward to verify the speed changes on the display.

4) After your boat has come to a stop, use your downrigger to raise the probe out of the water. After about 40 seconds or less your display should go back to 'all bars' (--.- for temp, -.- for speed). This verifies that the probe has automatically shut off after being removed from the water.

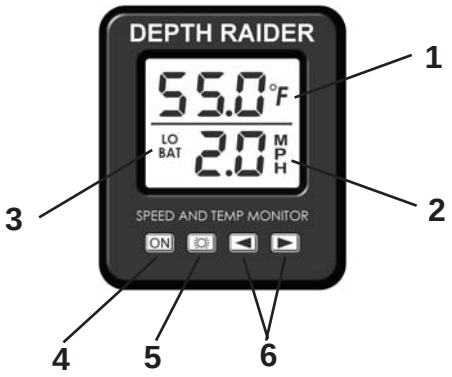
Here are a few notes:

1) You will notice that the Depth Raider speed readout is very stable. Much more stable than most digital speed displays. When most other displays are bouncing from 1.8 to 2.3 to 1.9 to 2.0 MPH in only the slightest of wave conditions, the Depth Raider display will appear very steady and may only move by +/- 0.1 MPH from time to time. This stable speed display readout is due to an advanced software damping algorithm that processes the speed data from the probe prior to displaying it on the LCD. With this in mind, when making trolling speed adjustments, wait about 10 or so seconds after adjusting the trolling speed to allow the display to stabilize to the new speed before making further speed adjustments.

2) When first starting to fish for the day, many fishermen use the speed and temperature system to determine water temperatures at varying depths . They will drop the probe down to a depth, take a temperature reading, drop it down further and take another temperature reading, and so on to find the optimal temperature for the specific species of fish they are seeking. As with all temperature sensors, it takes a bit of time for the temperature sensor to stabilize to its surrounding water temperature so for the most accurate readings, it is best to wait until the temperature display stops changing prior to moving to another depth.

*Best of Luck fishing with your new **Depth Raider** speed and temperature monitor!*

Receiver/Display Functions, Features and Specifications



1) Displays temperature at the probe from 32.0 degrees to 99.9 degrees F.

2) Displays speed at the probe from 0.0 to 9.9 miles per hour (MPH)

3) LO BAT icon - when illuminated, the 9V battery in the probe is low and should be replaced soon. The low battery indicator is calibrated to ensure you have a minum of 8 hrs of use prior to battery replacement. If this indicator illuminates during an outing the user may continue to use the system for up to 8 hours. Just be sure to replace the battery at the end of the day so you are ready for the next outing.

4) ON/OFF button - Press this switch momentarily to turn the unit on. When the unit is on, press and hold this button until the unit shuts off. Remember, the receiver/display unit has an auto-off feature, so if you forget to turn it off, the unit will turn itself off if no probe transmissions are received in a 30 minute period.

5) Backlight button - Press this switch momentarily to turn on the backlight. If the back light is on, press this switch again to turn the backlight off.

6) Backlight control - Press the > arrow button to increase the backlight intensity. Press the < arrow key to decrease the backlight intensity. The up and down arrow buttons will not do anything if the backlight is off.

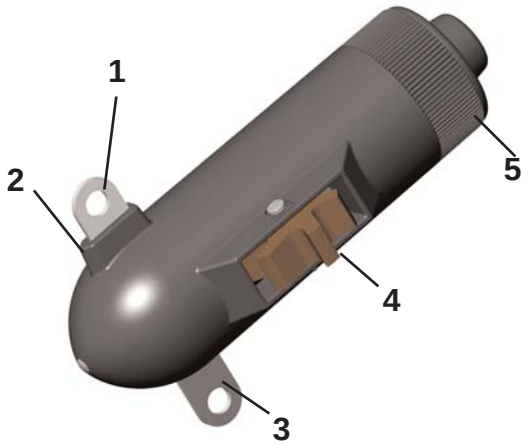
Caution: Unit may not operate properly if the outside temperature is below 14^{o}F (-10^{o}C) or heat exposure that causes the case to reach 140^{o}F (60^{o}C). Permanent damage will occur to the digital display if stored or used where the temperature is below -4^{o}F (-20^{o}C) or if the case reached anexposed temperature of 158^{o}F (70^{o}C). This type of damage is not covered under the warranty.

Facing the display screen toward the sun for long periods of time may cause the display to reach its upper temperature limits and turn black. If this happens immediately cover the screen or turn it away from the sun.

Receiver/Display Unit Specifications

Power Source	12VDC Boat Power
Current Consumption	< 75 ma with LCD backlight off < 500 ma with LCD backlight on
Pysical Size	3.25” X 3.75”
Housing Construction	Custom injection molded housing
LCD Display	Custom LCD with large .59” tall digits. User adjustable LED backlighting
Temperature	32.0 to 99.9 degrees F
Speed	0.0 to 9.9 MPH
Power Down Mode	Auto shut-off in 30 minutes if no transmissions detected
Silicone Keypad Configuration	4 user pushbuttons. Power On/Off button, Backlight On/Off button, Backlight intensity increase & Backlight intensity decrease. Buttons are illuminated when LCD backlight is on.
Low Probe Battery Warning	LO BAT icon is activated when probe battery is low.

Sensor/Transmitter Probe Functions, Features and Specifications



1) **Upper connection tab -** The probe unit transmits the RF signal onto this stainless steel tab. Attach the downrigger cable to this tab. This connection must be isolated from the water with rubberized electrical tape to prevent the transmitted signal from being absorbed in the water. Rubberized electrical tape is included with the Depth Raider system.
2) **Raised Boss -** This raised boss is part of the injection molded housing. Its purpose is to provide an electrically isolated flange that the rubberized tape can adhere to ensuring a good seal. This boss is also handy to quickly determine which side of the probe unit connects to the downrigger cable.
3) **Lower Connection Tab -** This tab is used to connect the downrigger cannonball. Be sure to use an 18"-24" drop leader of lower test. If the cannonball gets snagged on the bottom, its better to lose the cannonball than the *probe and cannonball*. This tab is internally electrically isolated from the upper connection tab. Therefore, there is no need to use rubberized electrical tape on this interconnect.
4) **Ferromagnetic Rotor -** We call it a 'Paddle Wheel'. This is device that is molded of plastic and magnetic particles. It has 6 teeth or 'paddles' around the circumference. Every time a tooth passes by the magnetic sensor located inside the unit, an electrical pulse is generated. The probe unit measures speed by counting these magnetic pulses over a specific period of time.
5) **Battery Cap -** Remove this screw-on cap to access the battery compartment. The cap features a two-O-ring seal to prevent water entry into the unit. Also, this cap has an aggressive knurled exterior that aids the user in removing the cap with wet, slippery hands. Be sure to keep the O-rings well lubricated with Vaseline or similar lubricants. Tightening the cap without lubricant can quickly damage O-rings. Only use hand power to tighten or loosen the cap. The use of tools is not necessary and will damage the housing.

Caution: To prevent battery acid leakage and terminal corrosion avoid leaving the battery in the probe when not used for extended periods of time.

Sensor/Transmitter Probe Specifications

Power Source	9V Alkaline Battery
Battery Life	Greater than 225 hours, typical
Battery Access	Screw-on cap with dual O-ring seal
Turn On	Automatic turn-on when Probe enters the water
Turn Off	Automatic turn-off after Probe is removed from water
Physical Size	6.375" Long x 1.89" body diameter
Body Construction	Custom injection molded housing
Internal Construction	Electronics 100% sealed in epoxy to prevent water damage
Electronics	Microcontroller based
Speed Sensor	6 tooth ferromagnetic rotor w/internal magnetic sensor
Temperature Sensor	Precision temperature sensing device

Maintenance

Your Depth Raider Speed and Temperature Monitoring System should work reliably for many years, however, there are a few things that you may want to check periodically:

- When cleaning the display lens do not use ammonia, alcohol-based or abrasive cleaners.

- In harsh environments consider using commonly available corrosion inhibitors on the back-panel connectors of the display.

- Perriodically check the condition of the O-rings in the cap and on the body of the probe.

- Remove probe battery in extended periods of non-use to avoid acid leakage and terminal corrosion.

- Periodically check the condition of the coated downrigger cable for nicks, scrapes, general areas of missing coating, etc. Replace coated cable if the strength of the cable is in question. Only change the coated cable for damage to the coating when system performance is degraded at the depths you typically fish.

Troubleshooting

Problem: ***Display unit won't turn on***.

- Check power cable installation and verify proper connections to 12VDC boat power.
- Verify power is reaching the plug that plugs into the receiver/display unit with a volt meter.
- Check to see that the fuse in the power cable is not blown (use 1amp fast blow type)
- Make sure that unit is within normal temperature range limits.

Problem: ***Display shows 'all bars' (--.- for temp, -.- for speed)***

- No signal from the probe. Verify probe is in the water. Replace probe battery.
- Poor connection from probe to coated rigger cable. Lightly sand metal tab, clean & re-terminate.
- Probe is installed upside down. Make sure coated downrigger cable is connected to upper tab on probe.
- Coating was not stripped off cable prior to terminating the cable to the probe tab.
- Coating on downrigger cable is severly damaged. Replace coated cable.
- You used black barrel crimps, thimbles, or snap swivels. Replace with the silver type.
- Poor boat ground. Depth Raider running off auxiliary battery not grounded to main boat ground, or poor boat-to-water ground.
- You used plastic cable terminations such as Cannon or others. Replace with silver metal terminations.
- Poor grounding on antenna coax. Tighten RCA jacks on cable by pinching the 4 ground tabs or replace the cable.
- Other electronics on boat causing interference. Turn them off one at a time to find the source.
- Damaged antenna or crushed, kinked or otherwise damaged antenna-to-receiver/display coax cable.

Problem: ***Temperature OK but no speed reading.***

- The rotor may be jammed with weeds, sand, etc. or possible bent rotor axle. Rotor should turn freely.

Problem: ***Display turns off when I crank my engine.***

- This will occur if the voltage at the display unit drops below its minimum operating voltage which is around 6-7 VDC.

Problem: ***Water in Probe.***

- Damaged O-Rings
- Lack of lubrication on O-rings
- Cracked probe housing or cracked battery cap.
- Excessive depth. Lowering probe deeper than 200 feet of water.

LIMITED WARRANTY

The Depth Raider Speed and Temperature Monitor system is warranted to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. The warranty registration card included with the Depth Raider system must be completed and returned at time of purchase to validate the warranty. In the event of a malfunction, the complete system must be returned with shipping charges prepaid to Kell Laboratories, Inc. The returned product must also be accompanied by proof of purchase and $8.50 for return shipping and handling. Kell Laboratories, Inc. will assume no liability for the costs associated with the installation or removal of the equipment for repair under this warranty. This warranty does not cover the coated downrigger cable, O-ring seals, loss, misuse, abuse or improper installation of components of the system. Any repairs necessary as a result of misuse, or abuse will be performed at the current hourly rate in place at the time of repair and charged to the customer. Customers will be notified of any charges prior to performing the services. This warranty is valid for the original purchaser only and is not transferable. Kell Laboratories, Inc. assumes no other liability except as stated above.

For Your Information:

Model Number: _____
Date of Purchase: _____
Store Where Purchased: _____
Purchase Price: _____

NOTE: *Keep your Proof of Purchase and /or sales receipt for your records.*

The following parts are available for the Depth Raider from Kell Laboratories, Inc.

Please contact us for the latest pricing on these parts.

200’ coated downrigger cable
300’ coated downrgger cable
Rubberized Electrical Tape, 12” strip
O-Ring Seal Kit (large and small O-ring)
Replacement Probe
Antenna Assembly
Cannonball Drop Leader Kit
25’ Antenna-to-Display Cable

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