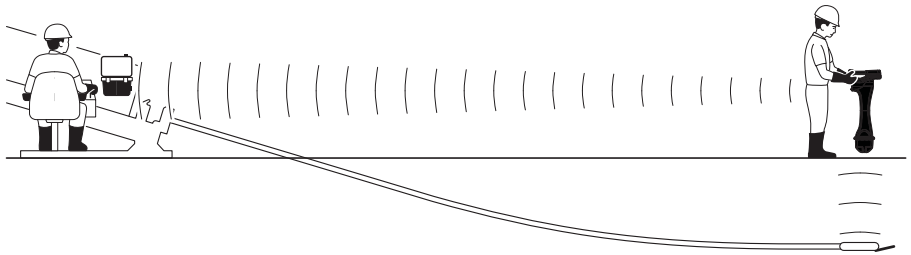
A CHARLES MACHINE WORKS COMPANY

15T1/17T1(H) Series Beacons

Intended Use

The Subsite® Electronics single frequency 15T1 and 17T1(H) series beacons are designed to function as one part of a guidance system for horizontal directional drilling units.



These 29 kHz beacons transmit roll angle, beacon temperature, beacon battery status, and pitch information and perform best in Subsite® Electronics approved downhole tool housings.

To prolong battery life, these beacons sleep after 20 minutes with no roll and wake when rolled. To allow beacon to enter sleep mode after five minutes, roll beacon to 5 o'clock.

790-1124(C) 10/18

ORIGINAL INSTRUCTION

Foreword

This manual is an important part of your product. It provides safety information and operation instructions to help you use your Subsite Electronics product.

Read this manual before using your product. Keep it available at all times for future reference.

If you need a replacement copy, contact your Subsite Electronics dealer. If you need assistance in locating a dealer, visit our website at www.subsite.com, email info@subsite.com or write to the following address:

Subsite® Electronics
Attn: Product Support
1950 W. Fir
Perry, OK 73077
USA

The descriptions and specifications in this manual are subject to change without notice. Subsite Electronics reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Subsite Electronics equipment, see your dealer.

Thank you for buying and using Subsite Electronics equipment.

Support

Procedure

Notify your dealer immediately of any malfunction or failure of Subsite® Electronics equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged unit to dealer for inspection and warranty consideration if in warranty time frame.

All repairs must be done by an authorized Subsite Electronics repair facility. Repairs done elsewhere will void warranty.

Resources

Contact your Ditch Witch® dealer for publications and videos covering safety, operation, service, and repair of your equipment.

Training

For information about on-site, individualized training, contact your Ditch Witch dealer.

- Should it be determined that applicable law prohibits enforcement of any provision of this Warranty Policy, then to the extent it is necessary to comply with the applicable law, this Warranty Policy shall be deemed amended.
- This Warranty Policy shall be the entire agreement between Manufacturer and the Purchaser. Any statements that purport to be different than or modify or expand the terms set forth in this written policy are not effective for any purpose. ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL SUBSITE® ELECTRONICS, THE CHARLES MACHINE WORKS, INC., OR ANY AUTHORIZED SERVICING AUTHORITY BE RESPONSIBLE FOR ANY LOSSES, INCLUDING CONSEQUENTIAL AND INCIDENTAL DAMAGES, EXCEPT AS EXPRESSLY PROVIDED HEREIN.

SERVICE AND REPAIR

- Units repaired at Manufacturer's location or an authorized service center will carry a 90-day warranty on all replaced components/parts and labor commencing on the date of repair.
- HDD guidance beacons, T-Series repairs: If a lower assembly is replaced on any T-Series beacons the 750-hour count will start over at zero (0) hours. The warranty years will continue from date of product registration.
- TX Series beacons that are updated to T-Series beacons will have a 90-day repair warranty.
- T-Series beacons that are past the three (3) year warranty will have a 90-day repair warranty.

EXTENDED WARRANTY

Consult your local Subsite dealer for extended warranty options.

WARRANTY DETAILS

For information regarding this warranty policy, contact Subsite Product Support Department at (800)846-2713 ext. 1; mail us at Subsite Electronics Product Support, 1950 W. Fir, Perry, OK 73077; or contact your local dealer.

March 2018

Safety

Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins.
- Replace missing or damaged safety signs.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Contact your equipment dealer if you have any question about operation, maintenance, or equipment use.

Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders, or your equipment. When you see these words and icons in the book or on the unit, carefully read and follow all instructions. YOUR SAFETY IS AT STAKE.

Watch for the three safety alert levels: **DANGER**, **WARNING**, and **CAUTION**. Learn what each level means.

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Watch for two other words: ***NOTICE*** and **IMPORTANT**.

NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

IMPORTANT can help you do a better job or make your job easier in some way.

Communication Features

Roll angle transmission: 24 positions

Beacon temperature: sent in 3°C/5.4°F steps

NOTICE: Operating beacon at temperatures above 105°C/221°F will cause beacon overheating and failure and will void beacon warranty. If temperature goes above 69°C/156°F:

- Tracker alarm will sound.
- Stop drilling, pull back 3’ (0.9 m), and pump fluid into hole until beacon cools down.
- Monitor beacon temperature carefully.

Pitch: sent in 1% increments from -100% (45° down) to +100% (45° up)*

Beacon battery status: sent in 25% increments

*15T1 pitch is sent in 0.1% increments up to 45%.

Warranty

Electronics Limited Warranty Policy

Subject to the limitation and exclusions herein, free replacement parts and labor will be provided when a unit fails due to a defect in material or workmanship within one (1) year of first commercial use (see “Exceptions” below for specific products). Defects shall be determined through inspection by Manufacturer or authorized repair centers. An inspection must occur within thirty (30) days of the date of failure of the product or part by Manufacturer or its authorized repair facility. Manufacturer will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. Manufacturer reserves the right to supply remanufactured replacement parts under this warranty as it deems appropriate. Each warranty repair carries the remainder of the factory warranty or 90 days, whichever is longer, for all repaired components and labor.

Product Warranty Exceptions:

- HDD guidance beacons, Locate beacons, and Accessories carry a six (6) month warranty.
- HDD guidance beacons, T-Series, carry a three (3) year 750-hour warranty.
- All Used (Cosmetic) Electronics products sold from Manufacturer carry a six (6) month warranty from date of sale to dealer.

EXCLUSIONS FROM PRODUCT WARRANTY

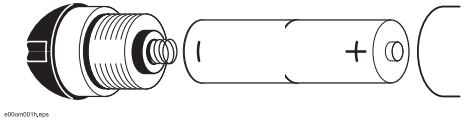
- All defects or damages caused by misuse, abuse, improper installation, alteration, neglect, modification, lack of maintenance, or uses other than those for which products were intended.
- All defects, damages, or injuries caused by improper training, operation, or servicing of products in a manner inconsistent with manufacturer’s recommendations.
- All batteries, which are considered consumable and therefore not covered under this warranty.
- All damaged plastics are considered to be the result of misuse or neglect unless Manufacturer has deemed otherwise.
- All repairs or attempted repairs by non-certified repair facilities or personnel will void the warranty.
- All incoming duties and freight charges.
- Manufacturer reserves the right to make changes in design, and/or improvements to products from time to time, and user understands that Manufacturer shall have no obligation to upgrade any previously manufactured product to include any such changes.
- In no event shall Manufacturer or its agents, assigns, or parent company be liable for any indirect, special, incidental, or consequential damages or for any cover, loss of information, profit, revenue, or use based upon any claim by user for breach of warranty, breach of contract, negligence, strict liability or any other legal theory. In no event shall Manufacturer liability exceed the amount user has paid for the Manufacturer product.
- Manufacturer will not be responsible for loss of accessories or loss or erasure of data storage media.

Declaration of Conformity

Hereby, Charles Machine Works declares that the radio equipment type *TK RECON HDD tracking and guidance equipment* is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available by visiting https://subsite.com/about-us/contact-us or by emailing a request to service@subsite.com.

Changes or modifications not expressly approved by **The Charles Machine Works, Inc.** could void the user's authority to operate the equipment.

Install Battery



1. Unscrew cap.
2. Check for and correct the following conditions:
   - dirty or damaged threads
   - missing, dirty, or worn foam washer on battery cap and bottom of battery chamber
   - missing, worn, or damaged springs
   - missing, damaged or dirty o-ring
3. Insert battery positive end first.

IMPORTANT:

- For maximum performance, use only adequately charged Power Stick battery (p/n 222-1369) or Electrochem CC 3.67V lithium cell. Standard "C" cell batteries can cause intermittent operation and beacon signal errors.
- Use only lithium batteries in AT downhole tool housings.

4. Install battery cap. Keep beacon steady while hand tightening cap firmly.

Test Operation

Use a tracker to test beacon function before leaving for jobsite and after every battery change.

To test beacon function:

1. Turn on tracker and adjust gain so that signal strength is approximately 50%. See tracker operator's manual.
2. Roll beacon and look at display for corresponding roll positions.

IMPORTANT: When flat top on front isolator is at 12 o'clock, beacon should be sending 3 o'clock to tracker.

3. Tilt beacon and look at display for corresponding pitch positions.
4. Check beacon battery status and temperature.

Install Beacon in Downhole Tool Housing

IMPORTANT: Check beacon operation and condition of both isolators before installing beacon into downhole tool housing.

1. Lay beacon into downhole tool housing. See “Isolation Method in Downhole Tool Housings” on page 7.
2. Check for proper beacon alignment by rolling housing on the ground and watching for corresponding roll positions on tracker display.

Calibrate Tracker to Beacon

NOTICE: For drilling safety information, see horizontal directional drill operator’s manual.

IMPORTANT: Calibrate tracker to beacon for each frequency after changing batteries or drill head.

1. Install beacon into drill head and place on ground exactly 10’ (3 m) away from tracker.

   IMPORTANT:

   - Ensure no metal objects, including drilling unit and drill pipe, are within 20’ (6 m) of tracker and drill head.
   - Allow beacon to stabilize in housing for two minutes before proceeding.

2. Position tracker parallel to center of drill head.
3. Turn tracker on and enter the depth calibration menu. See tracker manual for details.
4. Verify calibration by moving tracker 15’ (4.5 m) away from drill head. Check depth. If reading is not 15’ (4.5 m), recalibrate tracker.

   IMPORTANT: When verifying calibration above ground, be sure to stay in the calibration screen.

FCC Statement

U.S.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the operator’s manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This device complies with Industry Canada *license-exempt* RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Specifications

Dimensions		U.S.	Metric
Size			
	15T1	1.25 in	31.75 mm
	17T1(H)	1.5 in	38.1 mm
Weight (with battery)			
	15T1	2.0 lb	907 g
	17T1(H)	2.3 lb	1.04 kg

Environmental	U.S.	Metric
IP Rating	IP67	
Operating temperature	-4° to 221°F	-20° to 105°C
Storage temperature	-22° to 221°F	-30° to 105°C

Operation
Product contains Bluetooth® radio

Battery		
Recommended battery type		
	Electrochem CC 3.67V lithium thionyl chloride	
	Alkaline-Manganese dioxide power stick battery (p/n 222-1369)	
Battery life*		
	15T1 with Electrochem CC 3.67V	110 hours
	17T1 with Electrochem CC 3.67V	130 hours
	15T1 with Electrochem CC 3.67V	90 hours
Battery rating		
	Electrochem CC 3.67V lithium	15 Ah
	Power stick battery (p/n 222-1369)	8 Ah

*Unless otherwise specified, battery life hours were obtained when using a Lithium Thionyl Chloride battery. When using alkaline power stick batteries, expect the battery hours to be approximately one-third of the specification above.

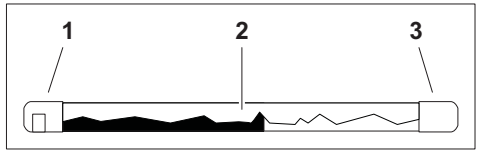
Isolation Method in Downhole Tool Housings

Downhole tool housings are designed to accept various sizes of beacons with or without end isolators.

Use one of the appropriate isolation methods below for optimal performance and wear. Use the table below to determine which parts are required for appropriate housing.

Ref.	P/N	Description
1	908-4304	isolator, 1.5” univ front
2	906-2624	17” x 1 3/8” sleeve
2	906-2702	15” x 1 1/4” sleeve
3	908-4295	isolator, univ rear
4		electrical tape
5	222-5467	1.25 to BHL adapter, top
6	222-5468	1.25 to BHL adapter, bottom
7	222-5485	4 inch adapter

Third Party Housing



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Housing is designed for multiple beacon sizes. The slots are not epoxied.

1. If space allows, install a nylon sleeve (2), heat shrink tubing, or electrical tape to cover the entire length of the beacon.
2. If applicable, install end isolators (1,3).

Low Profile AT Housing (15T1 only)

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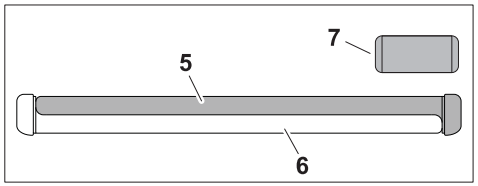
Housing (p/n 400-1200) is designed to accept 1.25” diameter x 15” long beacons.

Wrap two to four layers of electrical tape (4) in the positions shown or the entire length of the beacon.

Ditch Witch® BHL Housing (15T1 only)



BHLadapter2.eps

Housing is designed for 86 BHL size beacons. The slots may or may not be epoxied.

1. Lay beacon into top adapter (5), ensuring beacon slot is aligned with adapter tab.
2. Align and insert mating slots and tabs of bottom adapter (6) with top adapter.
3. Install 4 inch adapter (7) in the end of the housing toward the drill bit.

Remove Beacon from Downhole Tool Housing

NOTICE: Remove beacon before mud in beacon chamber hardens and locks beacon into housing. If beacon will not come out, **do not use force**. Try soaking housing in water until dried mud inside housing softens. If beacon still will not come out, contact your Ditch Witch dealer for advice.

1. Remove beacon from downhole tool housing.
2. Clean beacon and remove battery.
3. Wash and lubricate downhole tool housing.

Troubleshooting

NOTICE: High temperature is the primary cause of beacon failure. Monitor beacon temperature carefully.

Beacon Signal Error

If beacon is unable to maintain regulation of antenna power level over battery life, it will indicate a beacon signal error.

NOTICE: Do not attempt depth estimates. See tracker manual for more information.

Possible reasons for this warning are:

- ignoring low battery warning
- not using recommended batteries
- beacon damage
- bad downhole tool housing
- incorrectly installing beacon into downhole tool housing

Memory Sensor Error

If beacon memory is damaged, beacon will transmit alternating plus and minus signals instead of pitch readings.

NOTICE: Return for service if this error message is received.