

Digitrak[®] **MFCB**

Multi-Function Cable Box

Operator's Manual



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Limited Warranty

All products manufactured and sold by Digital Control Incorporated (DCI) are subject to the terms of a Limited Warranty. A copy of the Limited Warranty is included at the end of this manual; it can also be obtained by contacting DCI Customer Service, 425-251-0559 or 800-288-3610, or by connecting to DCI's website, www.digitrak.com.

Important Notice

All statements, technical information, and recommendations related to the products of DCI are based on information believed to be reliable, but the accuracy or completeness thereof is not warranted. Before utilizing any DCI product, the user should determine the suitability of the product for its intended use. All statements herein refer to DCI products as delivered by DCI and do not apply to any user customizations not authorized by DCI nor to any third-party products. Nothing herein shall constitute any warranty by DCI nor will anything herein be deemed to modify the terms of DCI's existing Limited Warranty applicable to all DCI products.

FCC Compliance Statement

This device complies with Part 15 of the Rules of the FCC. 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. DCI is responsible for FCC compliance in the United States: Digital Control Incorporated, 19625 62nd Ave. S., Suite B-103, Kent, WA 98032; phone 425-251-0559 or 800-288-3610.

Changes or modifications to the DCI equipment not expressly approved and carried out by DCI will void the user's Limited Warranty and the FCC's authorization to operate the equipment.

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Safety Precautions and Warnings

IMPORTANT NOTE: All operators must read and understand the following Safety Precautions and Warnings and must review this operator's manual as well as the operator's manual(s) for your DigiTrak[®] locating system and remote display.

☠ Serious injury and death can result if underground drilling equipment makes contact with an underground utility such as a high-voltage electrical cable or a natural gas line.

▽ Substantial property damage and liability can result if underground drilling equipment makes contact with an underground utility such as a telephone, cable TV, fiber-optic, water, or sewer line.

⚡ DCI equipment is not explosion-proof and should never be used near flammable or explosive substances.

- DigiTrak locating systems cannot be used to locate utilities.
- Continued exposure of the transmitter to heat, due to frictional heating of the drill head, can cause inaccurate information to be displayed and may permanently damage the transmitter.



CAUTION: Hot surfaces can occur on the FC, ECP, and SST cable transmitters if housing requirements are not met. Always ensure that the transmitter is installed properly in the housing during use.

- The battery charger provided with your DigiTrak locating system is designed with adequate safeguards to protect you from shock and other hazards when used as specified within the operator's manual provided with your system. If you use the battery charger in a manner not specified by that document, the protection provided may be impaired. Do not attempt to disassemble the battery charger. It contains no user-serviceable parts. The battery charger is not to be installed into caravans, recreational vehicles, or similar vehicles.
- Remove the batteries from all system components during shipping and prolonged storage.

Safety Precautions and Warnings (Continued)

- Before each drilling run, test your DigiTrak locating system with the transmitter inside the drill head to confirm that it is operating properly and is providing accurate drill head location and heading information and accurate transmitter depth, pitch, and roll information.

- During drilling, the depth displayed on the receiver will not be accurate unless:
 - The receiver has been properly calibrated and the calibration has been checked for accuracy so that the receiver shows the correct depth.
 - The transmitter has been located correctly and accurately and the receiver is directly above the transmitter in the drill head underground or at the front locate point.
 - The receiver is kept level and the height-above-ground has been set correctly.

- Interference can cause inaccuracies in the measurement of depth and loss of the transmitter's pitch, roll, or heading. You should always perform a background noise check prior to drilling.
 - Sources of interference include but are not limited to traffic signal loops, invisible dog fences, cable TV, power lines, fiber-trace lines, metal structures, cathodic protection, telephone lines, cell phones, transmission towers, conductive earth, salt, salt water, rebar, radio frequencies, and other unknown sources of interference.
 - Interference with communication to the remote display may also occur from other sources operating nearby on the same frequency, such as car rental agencies using their remote check-in modules, other directional drilling locating equipment, etc.
 - Background noise must be minimal and signal strength must be at least 150 points above the background noise during all locating operations.

- Carefully review this manual and be sure you always operate your DigiTrak locating system properly to obtain accurate depth, pitch, roll, and locate points. If you have any questions about the operation of the system, please call DCI's Customer Service Department at any of the phone numbers provided on the cover, and we will do our best to assist you.

Dear Customer:

Thank you for choosing DigiTrak[®] locating systems. We are proud of the equipment that we have been designing and building in Washington State since 1990. We believe in providing a unique, high-quality product *and* standing behind it with superior customer service and training.

Please take the time to read this entire manual—especially the section on safety. Also, please fill in the product registration card provided with this equipment, and mail it to DCI headquarters or fax it to us at 253-395-2800; you can also complete and submit the form online at our website. We will put you on the Digital Control mailing list and send you product upgrade information and our *FasTrak*[™] newsletter.

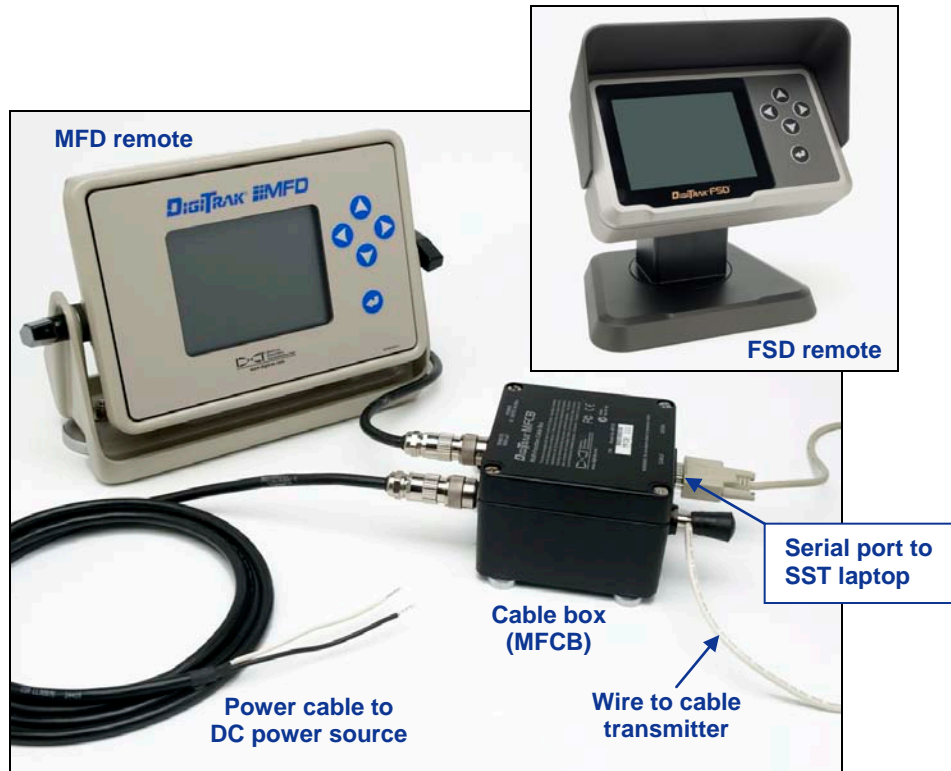
Feel free to contact us at any of our global offices listed on the front cover if you have any problems or questions. Our Customer Service Department is available 24 hours a day, 7 days a week to provide assistance.

As the horizontal directional drilling industry grows, we're keeping an eye on the future to develop equipment that will make your job faster and easier. Stay current by visiting our web site at **www.digitrak.com** or by giving us a call.

We welcome questions, comments, and ideas.

Digital Control Incorporated
Kent, Washington
2011

Introduction



DigiTrak Multi-Function Cable Box (MFCB) Connected to MFD Remote, Cable Transmitter, and SST Laptop Computer, with Inset Showing FSD Remote

The DigiTrak Multi-Function Cable Box (MFCB) is used as an interface unit with a variety of DigiTrak cable transmitter systems. The cable box provides power to the cable transmitter and the multifunction remote, and it sends transmitter data to the remote unit for display.

The cable box can be used with the following DigiTrak transmitters:

- Eclipse cable transmitter (ECP)
- F Series cable transmitter (FC)
- Eclipse steering tool transmitter (SST)

The cable box can be used with the following DigiTrak multifunction remotes:

- Multi-Function Display (MFD), both panel-mounted and freestanding models
- F Series Display (FSD)

This manual provides instructions for setting up and connecting the cable box and cable system components. Then it describes how to operate the cable transmitter system using the cable mode menu on your remote display. System specifications and maintenance requirements are provided in

Appendix A. For full system compatibility, updates to the software in the cable box and/or remote display may be required. Contact DCI Customer Service for support.

NOTE: The SST system has very specific requirements for the transmitter housing and includes a laptop computer that is integral to the system. Although some information regarding the SST is provided in this manual, please refer to the operator's manual provided with your Eclipse or F5 SST system for complete setup and operation information.

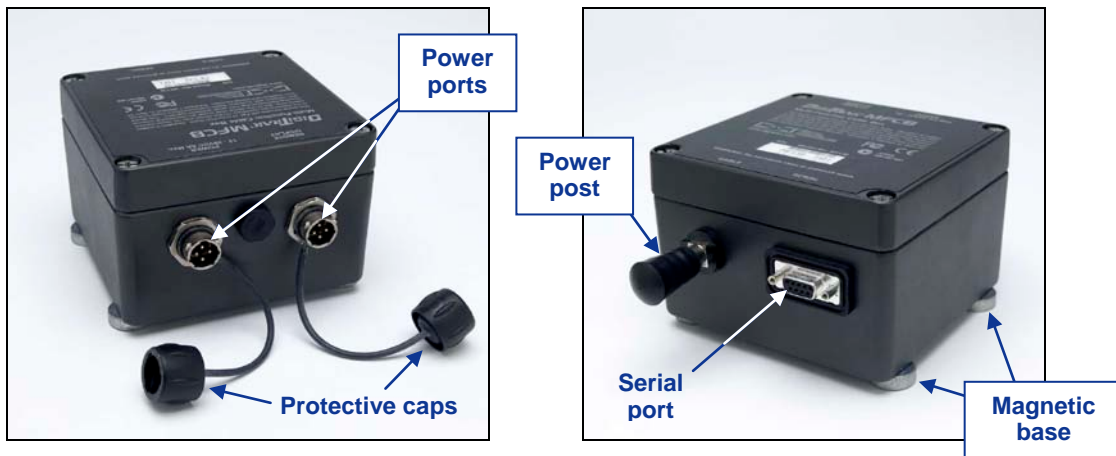
This manual does not give instructions on how to operate your locating system. You must read the operator's manual for your locating system and remote display before you use the cable box with your MFD or FSD remote.

Items such as compression fittings, 10-gauge copper wire, heat shrink, butt splices, and collector ring or mud swivel assemblies are not available from DCI. Drill manufacturers or tooling manufacturers will have information on collector ring (slip-ring) assemblies, mud swivels, and compression fittings. Electrical supply houses will carry the rest of the equipment needed to connect the wires as drill rods are added to the drill string.

An option available from DCI is a product called the CableLink connection system, which eliminates the need for butt splices and heat shrinks. The CableLink system is permanently installed into the drill pipe, and the wire connection occurs automatically when the pipe ends are threaded together. For more information, contact DCI.

Cable System Setup

The primary cable system components, the transmitter and the remote display, are connected through the cable box. One side of the cable box has two identical power ports that connect to the DC power source and the remote display's DC power port. The other side of the unit has a power post for connecting the transmitter wire and a serial port for use with the Eclipse SST system.

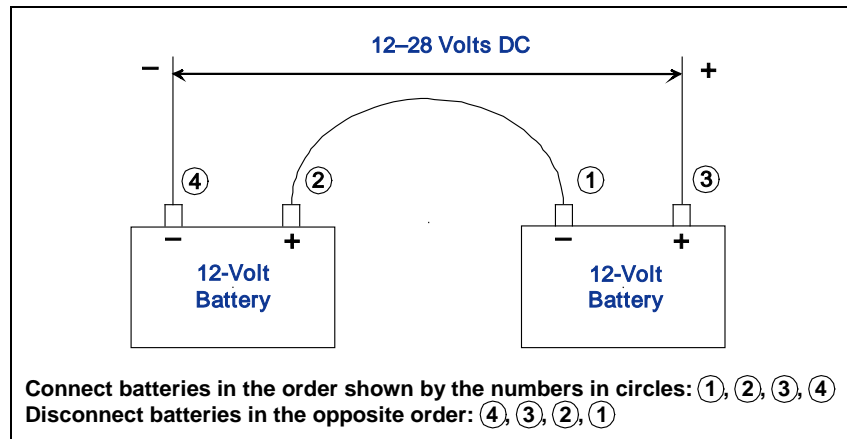


DigiTrak Multi-Function Cable Box (MFCB)

NOTE: Although the power ports on the cable box are labeled “Power” and “Remote Display”, they are identical and can be used interchangeably.

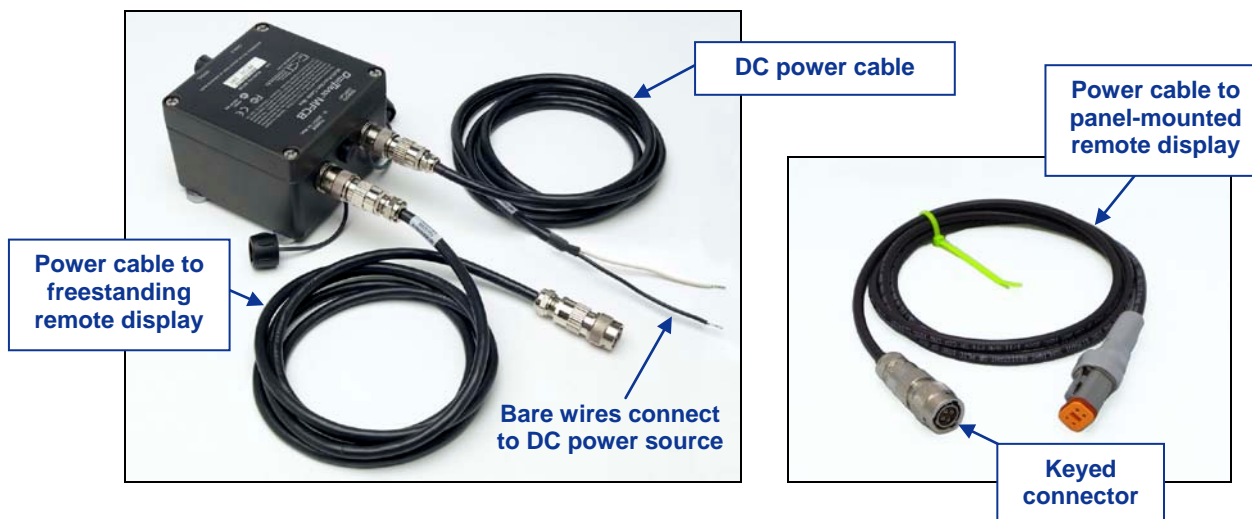
Connecting the Power Source

DCI recommends that you connect the cable box directly to an independent automotive battery or other 12-28 V DC battery or power source. For bores shorter than 1000 ft (305 m), one 12-V battery will suffice. If the bore length increases beyond 1000 ft (305 m), an additional battery may be added in series (see diagram below).



Adding Batteries in Series

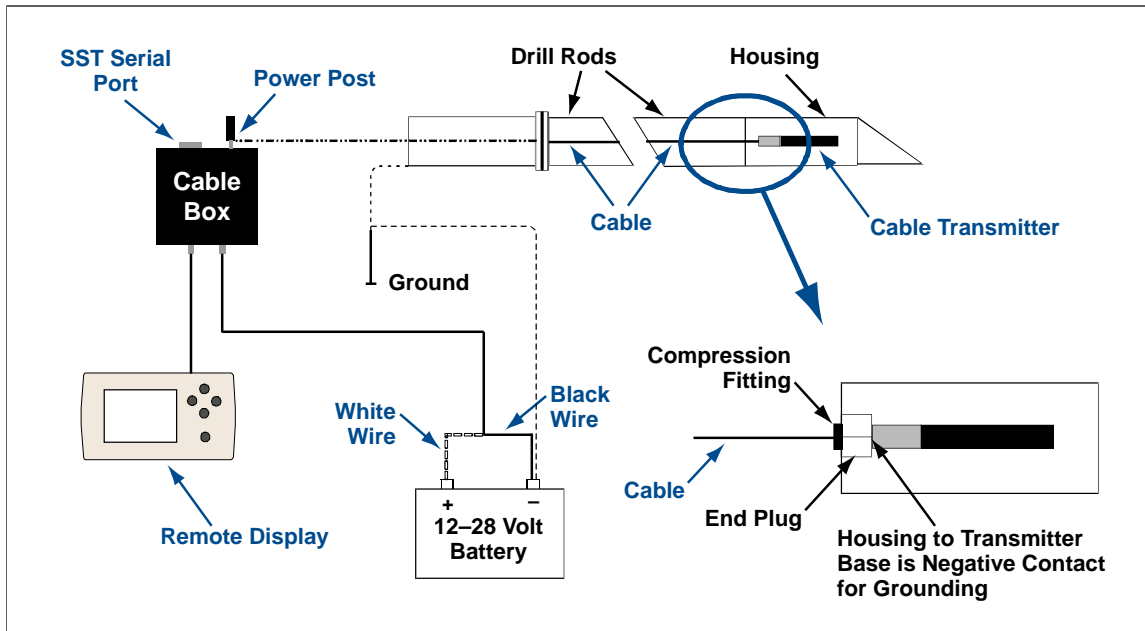
The necessary power cables are provided with the cable box (see photos below). The power cable with bare wires at one end is used to connect the cable box to an independent DC power source. The power cable with the 4-hole keyed connectors at both ends is used to connect the cable box and a freestanding remote display. The power cable with a 4-hole keyed connector at one end and a square connector at the other end is used for the panel-mounted remote display.



Cable Box Power Cables

The power ports and cable connectors are keyed for proper alignment. To make a connection, align the key marks in the connector with the key slots in the power port. Push in and rotate the connector clockwise until the connector locks into place.

To provide power to the cable system when using a freestanding remote, connect the 4-hole keyed connector on the DC power cable to a power port on the cable box. Then connect the bare wires on the other end to the DC power source. The white wire is connected to the positive terminal, and the black wire to the negative terminal, as shown in the sketch below.



Connecting Cable System Components

The compression fitting shown in the diagram is a non-DCI part required to seal the transmitter from the drilling fluid. Contact a drill or tooling manufacturer for information on compression fittings.

Connecting the Remote Display

To connect a freestanding remote display to the cable box, use the cable with identical 4-hole keyed connectors at both ends. Connect one end to the cable box power port and the other end to the remote display's DC power port. When using an FSD remote, the battery pack should be removed and a brace insert should be installed; see the operator's manual for your FSD remote.

When connecting to a panel-mounted remote display, use the cable with a 4-hole keyed connector at one end and a square connector at the other end. Open the drill rig's console to access the power port, and then unplug the panel-mounted remote cord from the drill rig's power port; contact your drill rig dealer if you need assistance. Plug the square connector of the power cable into the remote's power port and plug the other end into the cable box's power port.

Once the remote display is connected to a power source, power up the remote and check to ensure it is compatible with the receiver you are using and that both are programmed to the same telemetry channel.

Connecting and Grounding the Cable Transmitter

Before the cable transmitter can be connected to the cable box it must be grounded. The cable transmitter will not work if it is not grounded—no signal or data will be sent to the remote display. The ground point on the cable transmitter is the metal end cap (where the wire extends). When the cable transmitter is properly fitted into the housing, the ground connection will occur automatically, because it is grounded through the drill. When testing the cable transmitter outside of the housing, you can make a ground connection by taking a piece of wire and touching the negative terminal of the battery with one end and touching the other end of the wire to the metal end cap of the cable transmitter.



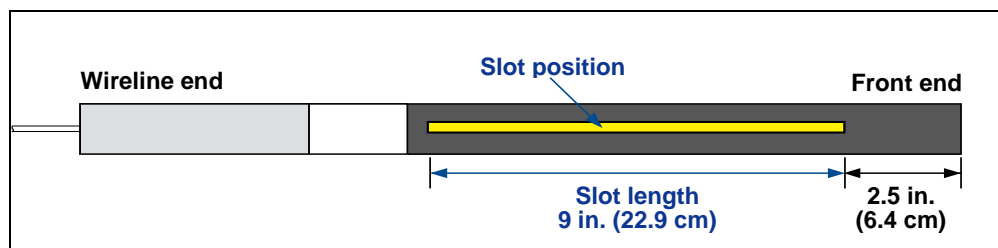
FC Cable Transmitter

Installing Transmitter in Housing

Cable transmitters require special rear-load drill housings. To prevent overheating and for optimum performance, it is critical for the transmitter to be installed correctly in the housing. An extraction/insertion tool is provided with the cable transmitter for use in properly installing it into and removing it from the housing.

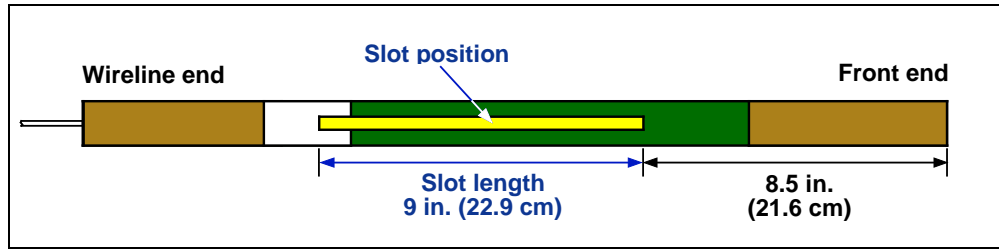
It is also critical for the slots in the drill housing to meet minimum length and width requirements and be correctly positioned. DCI recommends at least three slots equally spaced around the circumference of the housing. Each slot must be at least 1/16 or 0.0625 in. (1.6 mm) wide. For accuracy, slot measurements must be taken from the inside of the housing.

For the FC and ECP cable transmitters (19 in./48.26 cm long), the slots must be at least 9 in. (22.9 cm) long and begin at least 2.5 in. (6.4 cm) from the front end of the transmitter, as shown below.



ECP/FC Transmitter Housing Slot Requirements

For the SST cable transmitter (24 in./60.96 cm long), a non-magnetic housing is required. The slots in the housing must be at least 9 in. (22.9 cm) long and begin at least 8.5 in. (21.6 cm) from the front end of the transmitter, as shown below. Please refer to the operator's manual provided with your Eclipse or F5 SST system for complete information and instructions regarding the non-magnetic housing and operation of the SST system.



SST Transmitter Housing Slot Requirements

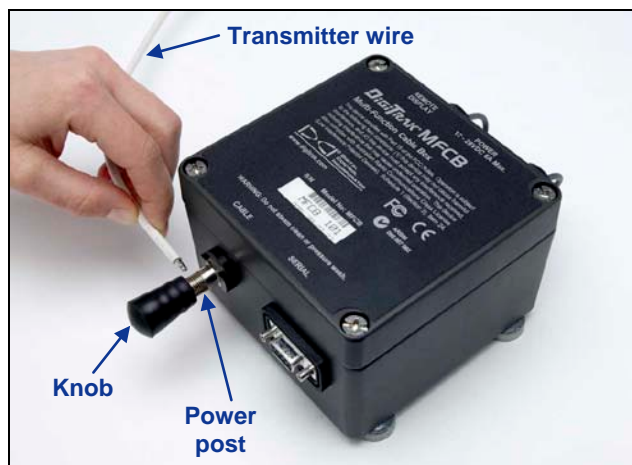
To install an ECP or FC transmitter into its housing, screw the threaded end of the extraction/insertion tool into one of the two threaded holes (1/4"-20 thread) in the wireline end of the cable transmitter. Insert the front end of the transmitter into the back end of the housing and gently push it in using the extraction/insertion tool until you feel the index slot engage onto the housing key. When the transmitter is properly keyed it will not rotate. Never push or pull on the transmitter cable or you could damage it. If the cable becomes damaged, it will need to be repaired or replaced. See Appendix B for more information.

NOTE: Always use the extraction/insertion tool to install or remove the cable transmitter. Do not ever try to remove the transmitter from the housing by pulling on the transmitter wire.

If, after the cable transmitter has been properly installed, it is found that the drill head's 12 o'clock position does not match that of the transmitter, you will need to use the roll offset function. See "Roll Offset Function" in the *Cable Mode Operation* section for complete instructions on using the roll offset function.

Connecting Transmitter Wire to Cable Box

Once the cable transmitter is properly grounded or installed in a grounded housing, it can be connected to the cable box as shown below. Rotate the knob on the power post counterclockwise until the hole in the post is exposed. Insert the stripped end of the transmitter wire into the hole and gently tighten the knob.



Connecting Cable Transmitter to Cable Box

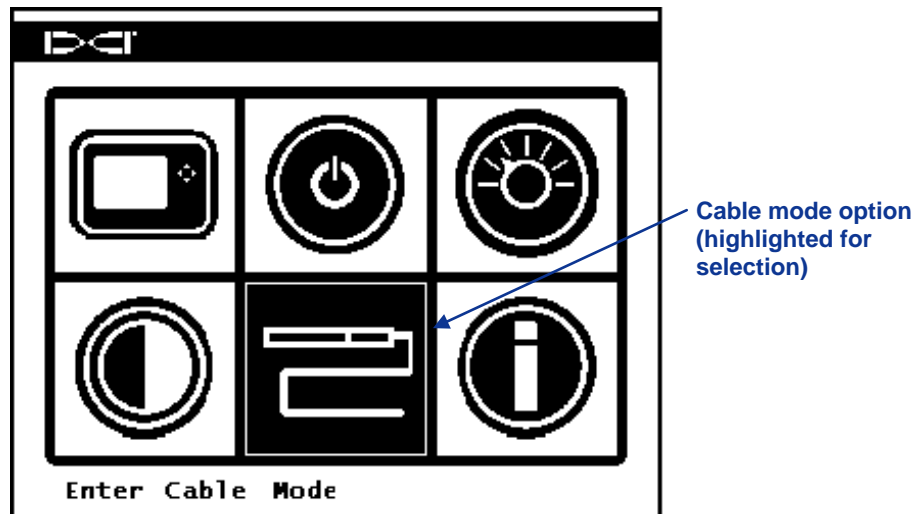
Calibrating and Locating

All DigiTrak cable transmitters are calibrated using the 1-point calibration procedure at a distance of 10 ft (3 m). DCI recommends that you always check the depth readings at various locations against a tape measure to confirm good calibration.

The procedure for locating a cable transmitter is essentially the same as that for locating a battery-operated transmitter. The receiver is positioned at the front locate point or the locate line, and the trigger is held in to display the predicted depth or depth, respectively. The remote must be receiving telemetry data (bars appear in the update meter) to display the depth or predicted depth data. The data will remain on the remote display as long as the receiver's trigger is held in and for 10 seconds after it is released.

Cable Mode Operation

The cable mode menu on the remote display is used to operate the cable transmitter system. This menu option is located on the remote display's main menu, shown below. The cable system components must be properly connected with power supplied before you can access this menu option.



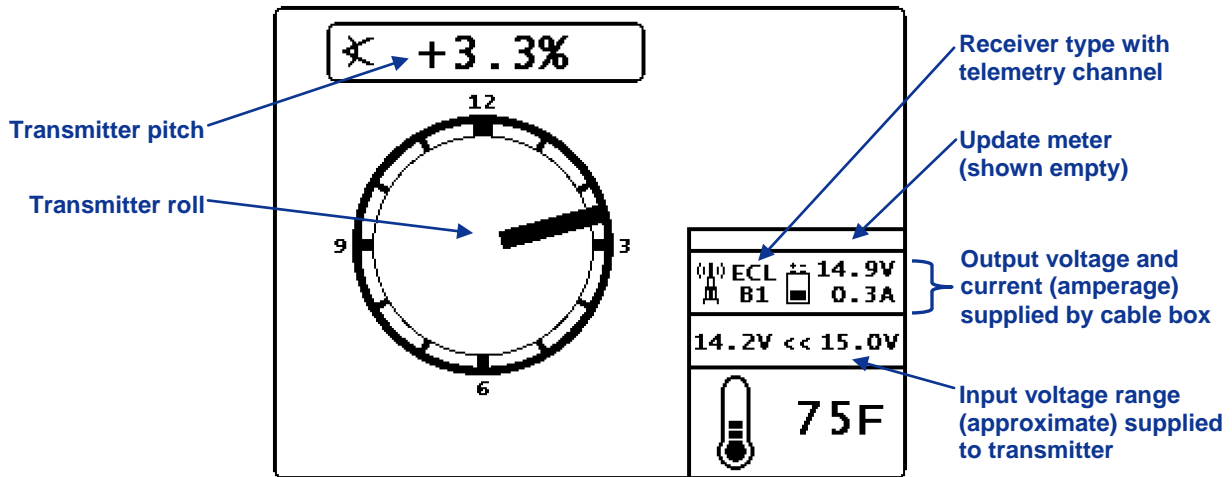
Main Menu with Cable Mode Highlighted

Please refer to the operator's manual for your remote display if you have any questions about how to use the remote's menu system. If you do not see the cable mode option on the remote's main menu, then you will need a software upgrade. Please contact DCI Customer Service.

The display screens and menus for the Eclipse and F Series cable transmitters, which are similar, are discussed below. The display screens, menus, and complete instructions for the SST system are discussed fully in the operator's manual provided with your Eclipse or F5 SST system.

Cable Mode Display Screen

When an Eclipse or F Series cable transmitter is used, the cable mode screen will display when you enter cable mode. The receiver type will be identified. The Eclipse and F Series modes have essentially the same screen display. The only significant difference between the Eclipse and the F Series display screens is that the Eclipse mode will display roll at the ½ clock positions (as shown below where the transmitter roll is at 2:30) as well as the standard 12 clock positions. The number of clock positions that display is a function of the transmitter.



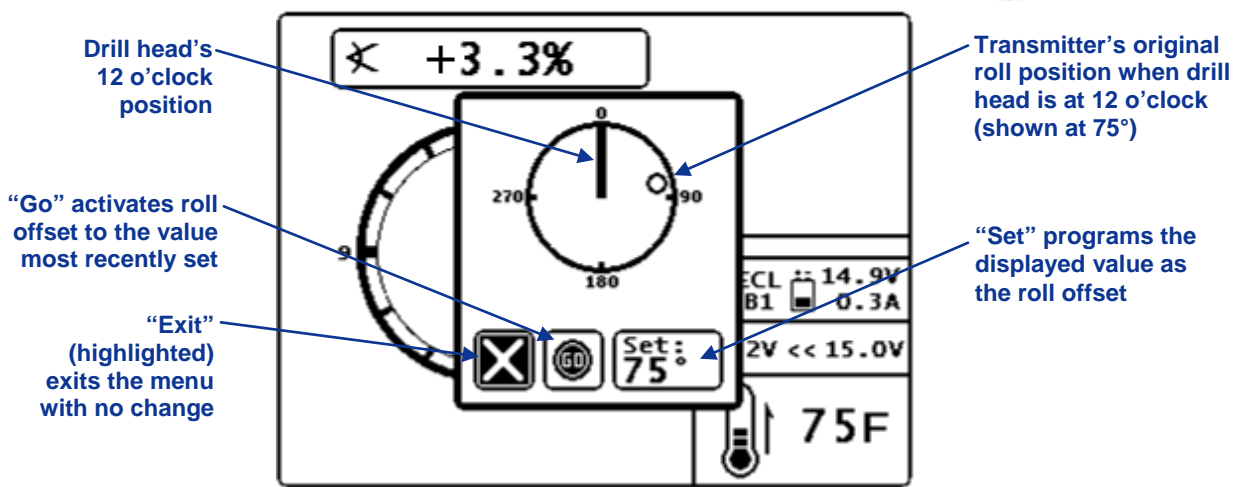
Eclipse Cable Mode Display

The above screen shows an empty update meter, which means the remote is not receiving telemetry data. The roll, pitch, and temperature are provided through the cable. Depth information will display only when the remote is receiving telemetry data, as indicated by bars in the update meter, and the receiver is used to take a depth reading.

Roll Offset Function

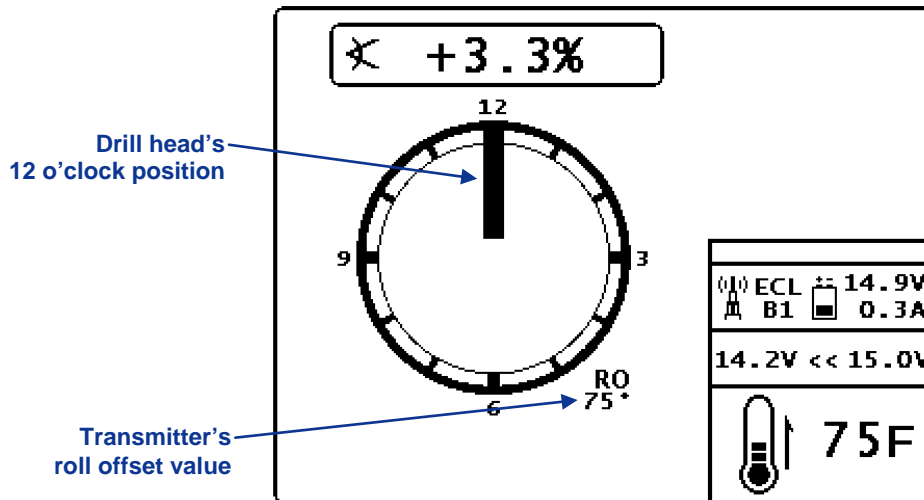
The roll offset function is used when the transmitter's 12 o'clock position does not match the drill head's 12 o'clock position. If the roll offset is required, it must be set on both the receiver and the remote display. For instructions on setting the roll offset on the Eclipse, F2, or F5 receivers, please see the operator's manual for your system.

To access the roll offset popup menu on the remote display, push the right direction button from the cable mode display screen. The roll offset popup menu will appear with three options: Exit, Go, and Set. Use the direction buttons to highlight the desired option and press the execute button to select it.



Eclipse and F Series Roll Offset Popup Menu

Once the roll offset is programmed, the following screen will display.

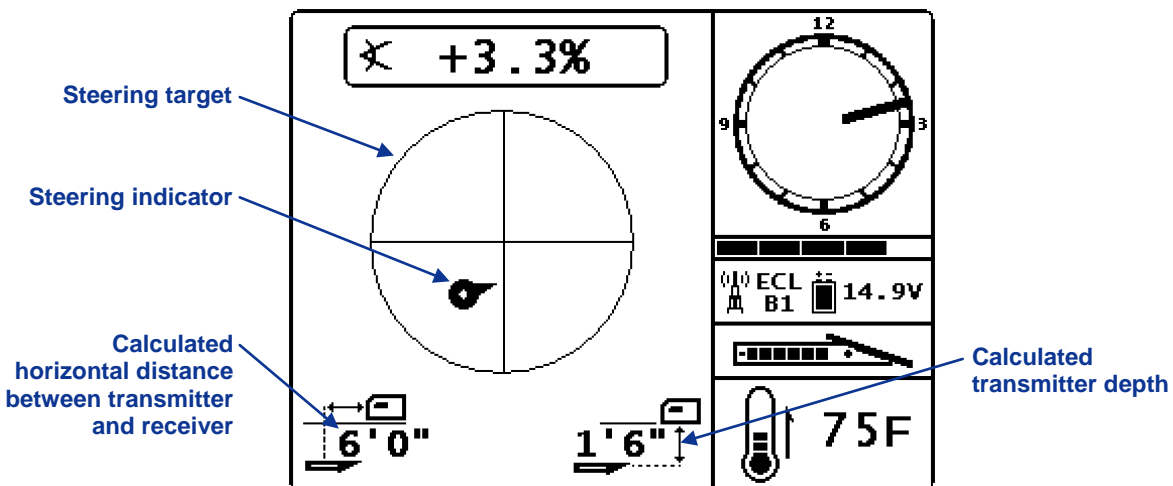


Eclipse and F Series Cable Mode Screen with Roll Offset

Selecting Stop will disable roll offset and return you to the standard cable mode display screen. The value displayed for roll in the Set option will be that of the transmitter after roll offset is disabled. Selecting Set will program the roll offset to the displayed value.

Target Steering Function

When a target depth has been programmed into the receiver and the remote is receiving telemetry data, the *Target Steering* display screen will appear.



Eclipse and F Series Target Steering Display



3-3400-00-B

Appendix: A

System Specifications and Maintenance Requirements

The power requirements and environmental requirements for the DigiTrak Multi-Function Cable Box and remote displays are listed below. The Declaration of Conformity is provided on the following page.

Power Requirements

Device (Model Number)	Operational Voltage	Operational Current
DigiTrak Multi-Function Cable Box	12 - 28 V $\overline{\text{---}}$ (nominal)	6 A max
DigiTrak MFD Remote Display (MFD)	14.4 V $\overline{\text{---}}$ (nominal)	220 mA max
DigiTrak F Series Remote Display (FSD)	14.4 V $\overline{\text{---}}$ (nominal)	220 mA max
DigiTrak Eclipse and F Series Cable Transmitter (ECP, FC)	9 - 28 V $\overline{\text{---}}$ (nominal)	10 W max
DigiTrak Eclipse Steering Tool (SST)	9 - 28 V $\overline{\text{---}}$ (nominal)	10 W max

Environmental Requirements

Device	Relative Humidity	Operating Temperature
DigiTrak Multi-Function Cable Box	<90%	-4° to 140°F (-20° to 60°C)
DigiTrak MFD Remote Display (MFD)	<90%	-4° to 140°F (-20° to 60°C)
DigiTrak F Series Remote Display (FSD)	<90%	-4° to 140°F (-20° to 60°C)
DigiTrak Eclipse and F Series Transmitter (ECP, FC)	<100%	-4° to 180°F (-20° to 82°C)
DigiTrak Eclipse Steering Tool (SST)	<100%	-4° to 180°F (-20° to 82°C)

General Cable Box Care Instructions

- Do not disassemble. The cable box contains no user-serviceable parts.
- Clean exterior with a damp cloth.
- Do not submerge.
- Do not pressure wash.
- Ensure all ports remain clean and clear of debris by keeping protective caps on power ports and power post when not in use. Pressurized air or a soft brush may be used to remove debris from the power ports. A wire brush may be used to clean the power post.
- Send in the Product Registration Card for the 1-year Limited Warranty.

General Transmitter Care Instructions

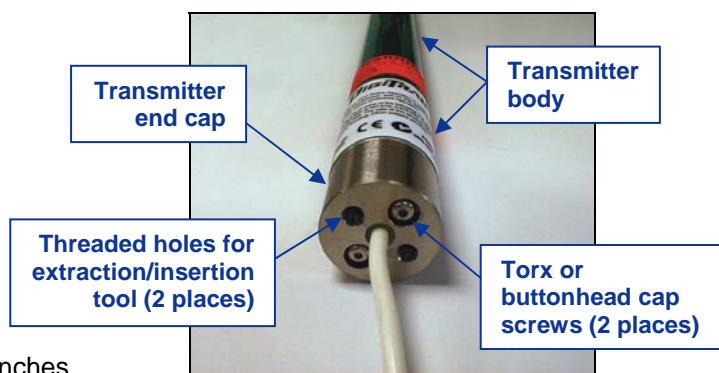
- If the cable wire becomes exposed at the base of the transmitter, the cable should be trimmed and reinstalled or replaced. Parts for repairing or replacing the cable are provided in the repair kit provided with the system. See Appendix B for more information.
- The SST transmitter must be kept at least 5 ft (1.5 m) away from all magnets including the remote display and cable box, which have magnetic mounts that will damage the transmitter. A protective magnetic shield, which is essentially a copper sleeve, is provided with the SST transmitter and is available through any authorized DigiTrak dealer. The magnetic shield should be placed on the end of the SST transmitter at all times when the transmitter is not in use.
- Send in the Product Registration Card for the 90-day Limited Warranty.

Appendix B: Transmitter Wire Repair or Replacement

You will need to replace the cable lead and other end cap components in the cable transmitter when the wire shows wear, twists, or abrasions. This involves removing the transmitter end cap to access the cable lead connection to the transmitter base. The Replaceable Wire Kit (DCKIT) includes enough parts to replace the cable lead two times. You will also need a standard screw driver.

The DCKIT contains:

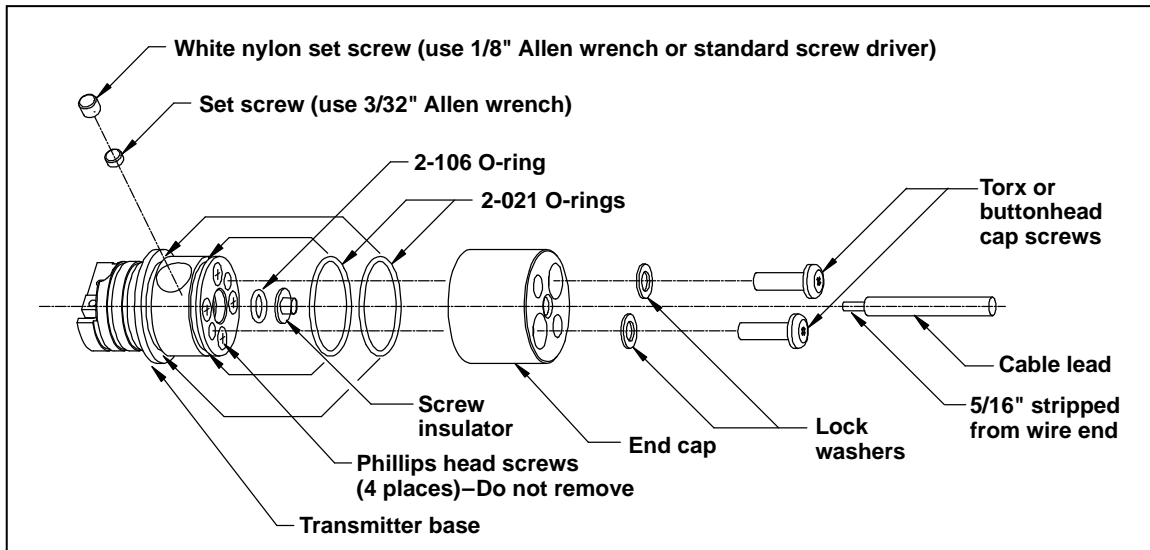
- Two cable leads
- Four Torx screws
- Four lock washers
- Four 2-021 O-rings
- Two screw insulators
- Two 2-106 O-rings
- Two brass set screws
- Three white nylon set screws
- One T15 Torx wrench
- One each 5/64", 1/8", and 3/32" Allen wrenches
- One tube of Noalox anti-oxidant compound



Wireline End of Cable Transmitter

To disassemble and reassemble the transmitter end cap:

1. Using the 5/64" Allen wrench or the T15 Torx wrench, depending on the screw type installed, remove the two Torx or buttonhead cap screws and lock washers.
2. Pull the end cap from the transmitter base.
3. Identify the deepest set screw depression in the base. Using the 1/8" Allen wrench or a standard screw driver, remove the white nylon set screw. There will be a brass set screw behind the nylon screw that holds the cable in place. NOTE: Do not tamper with the brass set screw and O-ring located on the opposite side of the base in the shallow depression.
4. Using the 3/32" Allen wrench, remove the brass set screw inside the transmitter base that holds the cable lead to the base.
5. Remove the old wire, the 2-106 O-ring, and the screw insulator. Removing the old wire from the base may require some force.
6. Install a new insulator and 2-106 O-ring onto a new cable lead, and insert the wire in the base. (Be sure that only 5/16" of the wire coating is stripped back from the end of the tinned cable lead.)
7. Install a new brass set screw using the 3/32" Allen wrench. Push the cable lead in while tightening the set screw to ensure a good connection.
8. Using the standard screw driver or the 1/8" Allen wrench, install a new white nylon set screw into the side of the transmitter base.



Exploded View of Cable Transmitter Base and End Cap Assemblies

9. Install two new 2-021 O-rings.
10. Coat the top and sides of the base with a thin layer of Noalox to prevent electrical corrosion (do not substitute with standard grease).
11. Replace end cap and line up the screw holes on the base with the nonthreaded holes on the cap.
12. Install two new lock washers and Torx screws, and tighten the screws in place using the T15 Torx wrench.

NOTE: Use care when threading the Torx screws into the base to avoid cross threading.

LIMITED WARRANTY

Digital Control Incorporated ("DCI") warrants that when shipped from DCI each DCI Product will conform to DCI's current published specifications in existence at the time of shipment and will be free, for the warranty period ("Warranty Period") described below, from defects in materials and workmanship. The limited warranty described herein ("Limited Warranty") is not transferable, shall extend only to the first end-user ("User") purchasing the DCI Product from either DCI or a dealer expressly authorized by DCI to sell DCI Products ("Authorized DCI Dealer"), and is subject to the following terms, conditions and limitations:

1. A Warranty Period of twelve (12) months shall apply to the following new DCI Products: receivers/locators, remote displays, battery chargers and rechargeable batteries, and DataLog[®] modules and interfaces. A Warranty Period of ninety (90) days shall apply to all other new DCI Products, including transmitters, accessories, and software programs and modules. Unless otherwise stated by DCI, a Warranty Period of ninety (90) days shall apply to: (a) a used DCI Product sold either by DCI or by an Authorized DCI Dealer who has been expressly authorized by DCI to sell such used DCI Product; and (b) services provided by DCI, including testing, servicing, and repairing an out-of-warranty DCI Product. The Warranty Period shall begin from the later of: (i) the date of shipment of the DCI Product from DCI, or (ii) the date of shipment (or other delivery) of the DCI Product from an Authorized DCI Dealer to User.

2. DCI's sole obligation under this Limited Warranty shall be limited to either repairing, replacing, or adjusting, at DCI's option, a covered DCI Product that has been determined by DCI, after reasonable inspection, to be defective during the foregoing Warranty Period. All warranty inspections, repairs and adjustments must be performed either by DCI or by a warranty claim service authorized in writing by DCI. All warranty claims must include proof of purchase, including proof of purchase date, identifying the DCI Product by serial number.

3. The Limited Warranty shall only be effective if: (i) within fourteen (14) days of receipt of the DCI Product, User mails a fully completed Product Registration Card to DCI; (ii) User makes a reasonable inspection upon first receipt of the DCI Product and immediately notifies DCI of any apparent defect; and (iii) User complies with all of the Warranty Claim Procedures described below.

WHAT IS NOT COVERED

This Limited Warranty excludes all damage, including damage to any DCI Product, due to: failure to follow DCI's operator's manual and other DCI instructions; abuse; misuse; neglect; accident; fire; flood; Acts of God; improper applications; connection to incorrect line voltages and improper power sources; use of incorrect fuses; overheating; contact with high voltages or injurious substances; use of batteries or other products or components not manufactured or supplied by DCI; or other events beyond the control of DCI. This Limited Warranty does not apply to any equipment not manufactured or supplied by DCI nor, if applicable, to any damage or loss resulting from use of any DCI Product outside the designated country of use. By accepting a DCI Product and not returning it for a refund within thirty (30) days of purchase, User agrees to the terms of this Limited Warranty, including without limitation the Limitation of Remedies and Liability described below, and agrees to carefully evaluate the suitability of the DCI Product for User's intended use and to thoroughly read and strictly follow all instructions supplied by DCI (including any updated DCI Product information which may be obtained at the above DCI website). In no event shall this Limited Warranty cover any damage arising during shipment of the DCI Product to or from DCI.

User agrees that the following will render the above Limited Warranty void: (i) alteration, removal or tampering with any serial number, identification, instructional, or sealing labels on the DCI Product, or (ii) any unauthorized disassembly, repair or modification of the DCI Product. In no event shall DCI be responsible for the cost of or any damage resulting from any changes, modifications, or repairs to the DCI Product not expressly authorized in writing by DCI, and DCI shall not be responsible for the loss of or damage to the DCI Product or any other equipment while in the possession of any service agency not authorized by DCI.

DCI reserves the right to make changes in design and improvements upon DCI Products from time to time, and User understands that DCI shall have no obligation to upgrade any previously manufactured DCI Product to include any such changes.

THE FOREGOING LIMITED WARRANTY IS DCI'S SOLE WARRANTY AND IS MADE IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING, OR USAGE OF TRADE, ALL OF WHICH ARE HEREBY DISCLAIMED AND EXCLUDED. If DCI has substantially complied with the warranty claim procedures described below, such procedures shall constitute User's sole and exclusive remedy for breach of the Limited Warranty.

LIMITATION OF REMEDIES AND LIABILITY

In no event shall DCI or anyone else involved in the creation, production, or delivery of the DCI Product be liable for any damages arising out of the use or inability to use the DCI Product, including but not limited to 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, even if DCI has been advised of the possibility of such damages. In no event shall DCI's liability exceed the amount User has paid for the DCI Product. To the extent that any applicable law does not allow the exclusion or limitation of incidental, consequential or similar damages, the foregoing limitations regarding such damages shall not apply.

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This Limited Warranty shall be governed by the laws of the State of Washington.

WARRANTY CLAIM PROCEDURES

1. If you are having problems with your DCI Product, you must first contact the Authorized DCI Dealer where it was purchased. If you are unable to resolve the problem through your Authorized DCI Dealer, contact DCI's Customer Service Department in Kent, Washington, USA at the above telephone number between 6:00 a.m. and 6:00 p.m. Pacific Time and ask to speak with a customer service representative. (The above "800" number is available for use only in the USA and Canada.) Prior to returning any DCI Product to DCI for service, you must obtain a Return Merchandise Authorization (RMA) number. Failure to obtain an RMA may result in delays or return to you of the DCI Product without repair.

2. After contacting a DCI customer service representative by telephone, the representative will attempt to assist you in troubleshooting while you are using the DCI Product during actual field operations. Please have all related equipment available together with a list of all DCI Product serial numbers. It is important that field troubleshooting be conducted because many problems do not result from a defective DCI Product, but instead are due to either operational errors or adverse conditions occurring in the User's drilling environment.

3. If a DCI Product problem is confirmed as a result of field troubleshooting discussions with a DCI customer service representative, the representative will issue an RMA number authorizing the return of the DCI Product and will provide shipping directions. You will be responsible for all shipping costs, including any insurance. If, after receiving the DCI Product and performing diagnostic testing, DCI determines the problem is covered by the Limited Warranty, required repairs and/or adjustments will be made, and a properly functioning DCI Product will be promptly shipped to you. If the problem is not covered by the Limited Warranty, you will be informed of the reason and be provided an estimate of repair costs. If you authorize DCI to service or repair the DCI Product, the work will be promptly performed and the DCI Product will be shipped to you. You will be billed for any costs for testing, repairs and adjustments not covered by the Limited Warranty and for shipping costs. In most cases, repairs are accomplished within 1 to 2 weeks.

4. DCI has a limited supply of loaner equipment available. If loaner equipment is required by you and is available, DCI will attempt to ship loaner equipment to you by overnight delivery for your use while your equipment is being serviced by DCI. DCI will make reasonable efforts to minimize your downtime on warranty claims, limited by circumstances not within DCI's control. If DCI provides you loaner equipment, your equipment must be received by DCI no later than the second business day after your receipt of loaner equipment. You must return the loaner equipment by overnight delivery for receipt by DCI no later than the second business day after your receipt of the repaired DCI Product. Any failure to meet these deadlines will result in a rental charge for use of the loaner equipment for each extra day the return of the loaner equipment to DCI is delayed.