

***DigiTRAK***<sup>®</sup> **FSD**<sup>™</sup>

**F Series Display for  
Directional Drilling Locating System**

**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 your regional office listed on page iii, or DCI U.S. Customer Service at 1.425.251.0559, or at [www.DigiTrak.com](http://www.DigiTrak.com).

### **Important Notice**

All statements, technical information, and recommendations related to DCI products are based on information believed to be reliable. However, DCI does not warrant or guarantee the accuracy or completeness of such information. Before using 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 for use with horizontal directional drilling in the ordinary course, and do not apply to any user customizations, third-party products, or any usage of the DCI product outside of the ordinary course. Nothing herein shall constitute a warranty by DCI nor will anything herein be deemed to modify the terms of DCI's existing Limited Warranty applicable to all DCI products. DCI may update or correct the information in this manual from time to time. You may find the most recent version of this manual on DCI's website, [www.DigiTrak.com](http://www.DigiTrak.com). Under **Service & Support**, click **Documentation** and select from the **Manuals** drop-down menu.

### **Compliance Statement**

This equipment complies with Part 15 of the Rules of the FCC and with Industry Canada license-exempt RSS standards and with Australia Class License 2000 for LIPD (low interference potential devices). Operation is subject to the following two conditions: (1) this equipment may not cause harmful interference, and (2) this equipment 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 B103, Kent WA 98032; phone 425-251-0559 or 800-288-3610.

Changes or modifications to any 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.

### **CE Requirements**



DigiTrak receivers are classified as Class 2 radio equipment per the R&TTE Directive and may not be legal to operate or require a user license to operate in some countries. The list of restrictions and the required declarations of conformity are available on DCI's website, [www.DigiTrak.com](http://www.DigiTrak.com). Under **Service & Support**, click **Documentation** and select from the **CE Documents** drop-down menu.

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## Dear Customer,

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Thank you for choosing a DigiTrak locating system. We are proud of the equipment 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 world-class customer service and training.

Please take the time to read this entire manual, especially the section on safety. Please also register your equipment online at [access.DigiTrak.com](http://access.DigiTrak.com). Or, fill in the product registration card provided with this equipment and either fax it to us at 1.253.395.2800 or fax/mail it to your regional DCI office.

Product registration entitles you to free telephone support (in the USA and Canada), notification of product and instruction manual updates, and helps us provide you with future product upgrade information.

Our Customer Service department is available 24 hours a day, 7 days a week in the U.S. to help with problems or questions. International contact information is available in this document and on our website.

As the horizontal directional drilling industry grows, we're keeping our eye on the future to develop equipment that will make your job faster and easier. Visit us online any time to see what we're up to.

We welcome your questions, comments, and ideas.

Digital Control Incorporated  
Kent, Washington  
2015

Watch our DigiTrak® Training Videos at [www.youtube.com/dcikent](http://www.youtube.com/dcikent)

For system component name and model information, refer to [Appendix A](#) on page 16.

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<b>LIMITED WARRANTY</b>	

## Important Safety Instructions

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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 contact DCI Customer Service for assistance.

This manual is a companion to your locating system operator's manual, which contains a more thorough list of warnings regarding the potential for serious injury and death, work slowdowns, property damage, and other hazards and warnings regarding the operation of horizontal drilling equipment. Please read and understand your system operator's manual completely before operating the equipment described in this manual.

## Introduction



**DigiTrak FSD shown with F5 Locating System**

A DigiTrak locating system is used during horizontal directional drilling operations to locate and track a transmitter installed in the drill head. A complete system such as the F5 system shown above consists of a handheld receiver, a transmitter, a remote display, a battery charger, and rechargeable battery packs for powering the receiver and remote display.

This manual discusses only operation of the F Series Display (FSD). For additional information on other components of a DigiTrak locating system noted above, such as batteries and charger, transmitters, and helpful information on drilling and locating, please see the corresponding DigiTrak Operator's Manual, available at [www.DigiTrak.com](http://www.DigiTrak.com).

This manual assumes the receiver is an F5®. When using the FSD with other compatible DigiTrak receivers, such as SE®, F2®, Eclipse®, or Mark Series, small differences in screen elements or behavior will exist, but the primary functionality remains the same, within the capabilities of your receiver.

## Overview



**DigiTrak F Series Display (FSD) Front and Back**

The DigiTrak F Series Display (FSD) is a multifunction remote display used with a variety of DigiTrak receivers. It provides the drill rig operator with information from the receiver about the depth, orientation, and status of the transmitter. The FSD remote can be powered through either a DC cable source or an F Series battery pack.

The supplied external telemetry antenna provides signal reception up to 1800 ft. (550 m) with line of sight to the receiver. An optional antenna is available to increase reception for even longer bores.

## Installing the Battery Pack or Brace Insert

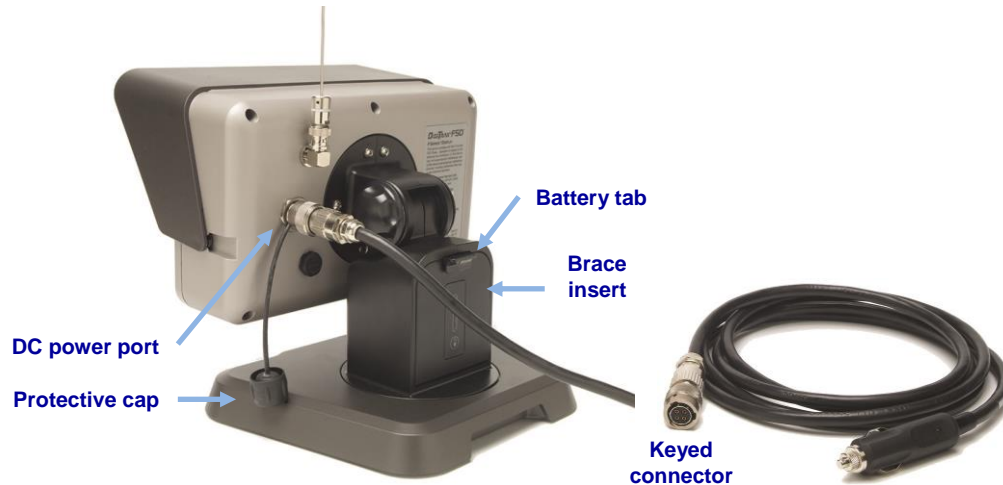
Hold the battery pack with the tab facing up and away from the FSD remote, then insert it into the battery compartment and push in until the tab latches in place.

To remove the battery pack, push down on the battery tab and pull it away from the remote.



## Connecting the DC Power Cable

The DC power port and DC power cable connector are keyed for proper alignment. To connect the power cable, remove the protective cap from the power port on the back of the remote, align the key marks in the connector with the key slots in the power port, and push in and rotate the connector clockwise until the connector locks into place. Connect the other end of the DC cable to a DC power source.




**DC Power Cable (right) and Brace Insert Installed**


When powering the FSD with DC power, install the brace insert in the battery compartment for structural integrity. Install and remove it in the same manner as the battery pack.



**Note** If both a battery pack and the DC cable are connected at the same time, the remote display will draw power from the battery until its voltage is below the DC source voltage.

## Powering On and Off

Power on the FSD by pressing the **Execute** button  for about two seconds. A tone sounds and the [Remote Mode](#) locating screen appears (see page 5).

Power off by pressing the down arrow button, selecting **Power Off**  from the Main menu, and then holding the **Execute** button.

## Keypad

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Use the keypad to the right of the display window to operate the FSD remote.

**Execute Button**

Use to turn on the FSD unit, select a highlighted menu option, adjust contrast, and execute menu options. It functions like the trigger switch on the F5 receiver.



**Arrow Buttons**

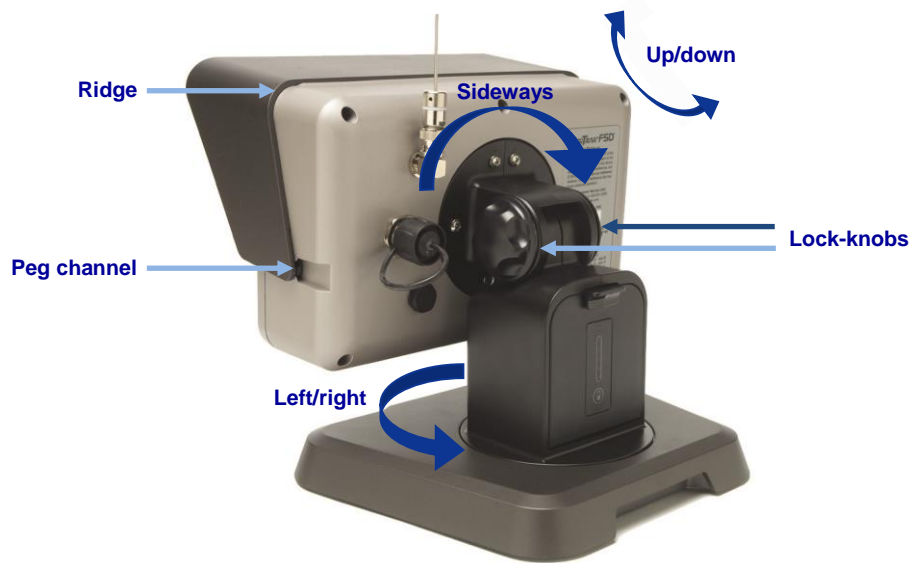
Use to navigate through menu options. Use the down arrow to access the Main menu from the Remote Mode locating screen.



## Viewing Angle and Visor

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The FSD viewing angle adjusts on three axes.



### Viewing Angle Adjustments

To adjust the vertical angle, loosen and then squeeze the two lock-knobs on the back of the remote display, adjust the screen, and retighten. If the lock-knobs are loose, the display may not hold its vertical position during drilling.

To adjust the horizontal angle, simply rotate the display in the base.

The display will also rotate sideways in the event you need to mount it to a vertical surface. If so, loosen the two lock-knobs and angle the screen out slightly before rotating so it clears the base.

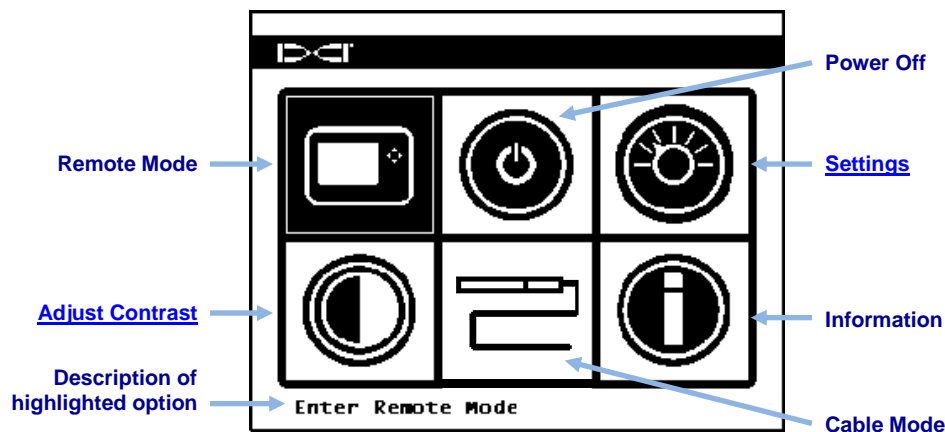


**Note** Adjusting the up/down orientation of the display without loosening the lock-knobs can damage the unit.

The removable visor on the FSD helps with both sun and rain. The visor is held in place by a ridge on the top and channels on the sides of the display. To install the visor, slide the pegs on the visor along the peg channels on the sides of the display until the visor locks over the ridge. To remove the visor, push the visor back over the ridge and along the channels, or simply rotate it back and out of the way.

## Main Menu

Access the Main menu by pressing the down arrow button. The Remote Mode option is automatically highlighted.



FSD Main Menu

Use the arrow buttons to highlight an option, then press the execute button to select it. The options available on the Main menu are described below and in the following sections.

**Cable Mode** Enables use of an FC cable or SST transmitter.

**Information** Displays FSD system information such as the software version, serial number, telemetry configuration, and current settings.

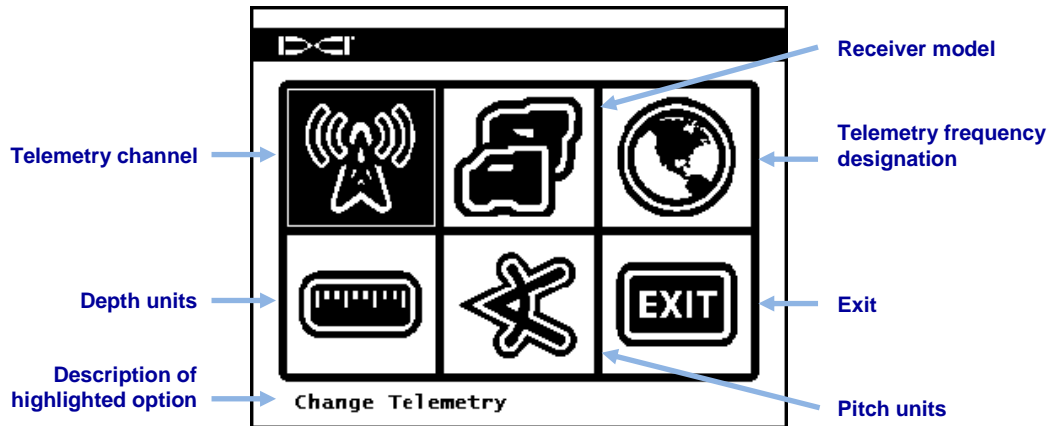
## Remote Mode

Remote Mode opens the Remote Mode locating screen, which is the default screen displayed on startup. To return to the Main menu, press the down arrow.

For detailed information about the Remote Mode locating screen and the depth display screens, see [Display Screens](#) on page 8.

## Settings

The Settings menu lets you change the settings shown below:



**FSD Settings Menu**

DCI recommends that you set the FSD to use the same settings, such as degrees or percent of slope, as those on your receiver.

**Telemetry Channel** Select between telemetry channel options 1, 2, 3, and 4. The remote display and the receiver (locator) must be set to the same channel and must have the same telemetry frequency designation.

**Receiver Model** Set the FSD to work with your DigiTrak receiver. System operator's manuals are available at [www.DigiTrak.com](http://www.DigiTrak.com).


**Telemetry Frequency Designation** Before changing the telemetry region, contact DCI to determine which setting is required in your area and to verify that it matches the receiver's telemetry frequency designation, which appears on the receiver's startup splash screen next to the phone number (example: US).





**Depth Units** Set depth units as either English (Fahrenheit, psi, and lbs.) or metric (Celsius, kPa, and kN).

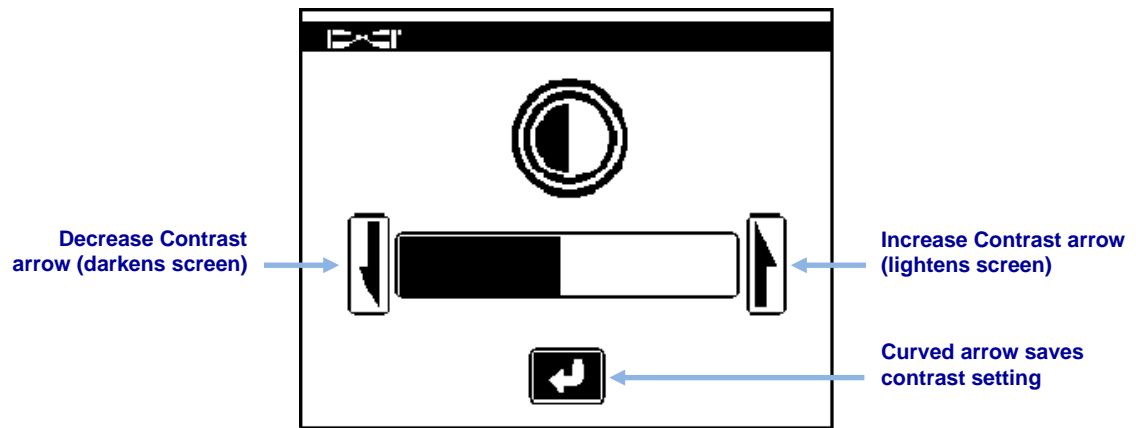
**Pitch Units** Set pitch angle units as either percent (%) or degree (°).

**Exit** Exits to the Main menu. If a setting was changed, the exit option is automatically highlighted.

## Adjust Contrast

To adjust contrast, hold the execute button  while pushing the right or left arrows to lighten or darken the display, respectively.

Alternatively, select Adjust Contrast  on the Main menu, use the left or right arrow on the FSD to select either Decrease Contrast  or Increase Contrast , then press Execute  repeatedly to change the contrast incrementally. To save the settings, use the left/right arrows on the FSD to highlight the curved arrow on the screen, then press Execute to save and return to the Main menu.

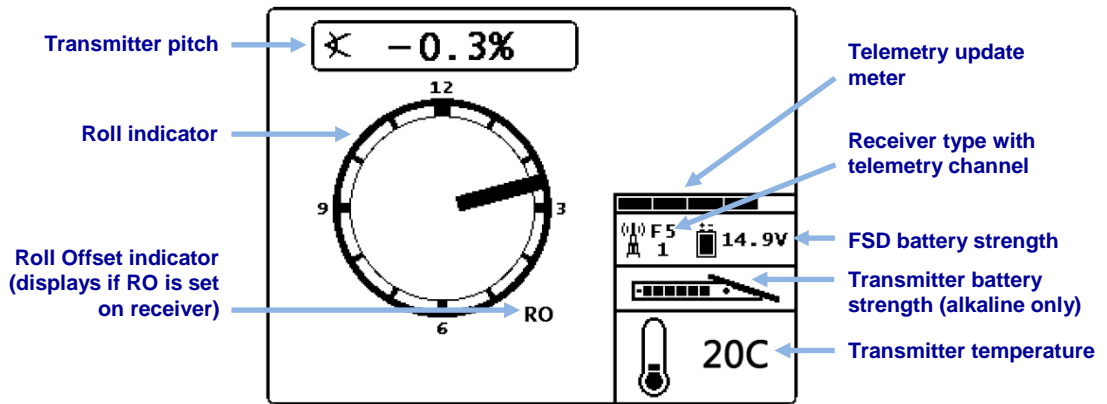


Adjust Screen Contrast

# Display Screens

## Remote Mode Locating Screen

The Remote Mode locating screen is the default screen displayed on startup. It shows the transmitter pitch, roll, battery status, depth, predicted depth, and temperature. It also shows the FSD battery status, receiver type, telemetry channel, telemetry update meter, and Target Steering data (if active). To return to the Main menu, press the down arrow.



**FSD Remote Mode Locating Screen**

The telemetry update meter displays the consistency of data being received. If data is being received less often or at irregular intervals, then fewer bars are shown on the meter. When the meter is empty, no telemetry data is being received and all transmitter information will disappear.



**Warning** If the meter is decreasing or low, ensure you have stable data before making steering decisions.

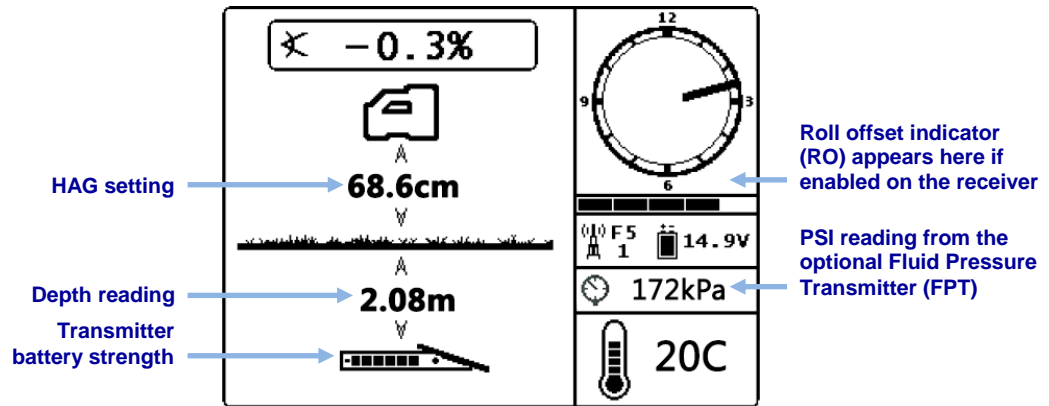
If the roll offset function (an electronic compensation to match the transmitter's 12 o'clock position to that of the tool) is set on the receiver, RO displays at the bottom right of the roll indicator.

If a fluid pressure transmitter is used, the instantaneous fluid pressure will show in place of the transmitter battery status on the screen above. The transmitter battery status will still show on the depth display screen (see next section). When using a fluid pressure transmitter, if the pressure exceeds the overload condition of 1725 kPa, the pressure will display as 1760 kPa.

## Depth Screen

The depth or predicted depth of the transmitter can be viewed on the remote display when the receiver is positioned at the locate line (LL) or at the front locate point (FLP) with its trigger held in.

The Depth screen appears when the receiver is positioned at the LL with the trigger held in. When the height-above-ground (HAG) function is turned on, the receiver icon is shown elevated above the ground with the HAG setting displayed. The following figure shows the HAG setting at 68.6 cm.



**FSD Depth Display at Locate Line with HAG On**

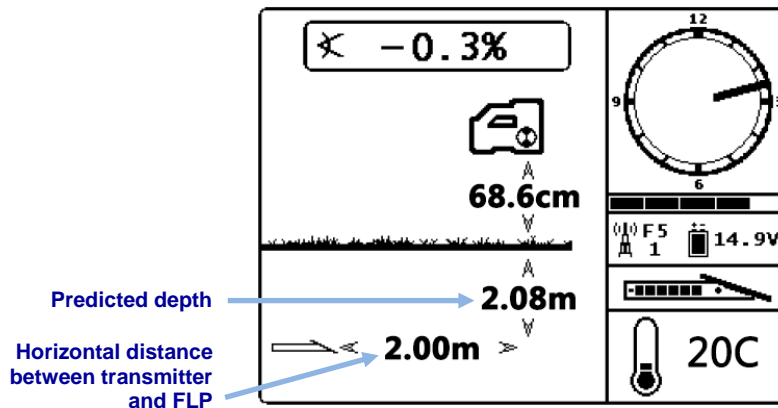
The depth will display for 10 seconds after the trigger on the receiver is released, then the display returns to the Remote Mode locating screen.

## Predicted Depth Screen



**Warning** Because both front and rear locate points appear identical to the receiver, an invalid depth prediction can be generated when the receiver is over the rear locate point (RLP). Only a reading at the front locate point (FLP) produces a valid predicted depth.

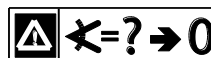
The Predicted Depth screen appears when the receiver is positioned at the front locate point (FLP) with the trigger held in. Predicted depth is what the estimated depth of the transmitter will be when it passes below the receiver if the drill head remains at its current pitch.



**FSD Predicted Depth Display with HAG On**

As on the normal Remote Mode locating screen, when roll offset is enabled at the receiver, the letters RO will display at the bottom right of the roll indicator. The example shown above shows no roll offset has been set.

When the transmitter pitch information cannot be obtained at the receiver due to range restrictions or interference, the FSD will assume the transmitter has a pitch of zero for depth and predicted depth readings. In this case, the remote will show the transmitter pitch as:

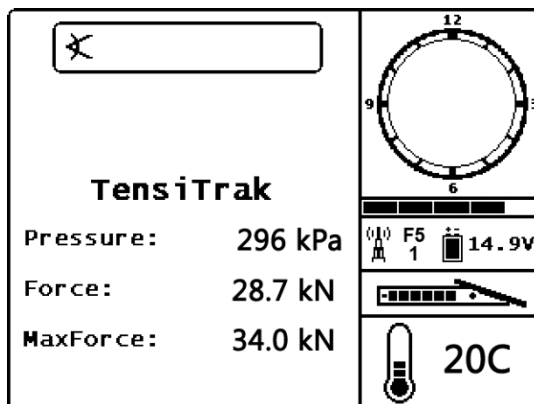


**"Warning, Pitch is Unknown, Assume Zero"**



## TensiTrak Mode

When using the F5 or Eclipse TensiTrak® Pullback and Pressure Monitoring System with the remote programmed to F5 or Eclipse mode, you will see the TensiTrak data screen shown below.



**TensiTrak Screen**

As the product's maximum recorded force (**MaxForce**) and instantaneous annular mud pressure (**Pressure**) increase, the remote will emit the following tones.

Temperature Event	Warning Tones
MaxForce increases by 8.9 kN	Single beep
Pressure increases by 34 kPa up to 276 kPa	Single beep
Pressure increases by 34 kPa from 276–345 kPa	Double beep
Pressure increases by 34 kPa from 345–414 kPa	Triple Beep

**TensiTrak Force and Pressure Warning Tones**

For additional information about the TensiTrak Pullback and Pressure Monitoring System, please download the operator's manual at [www.DigiTrak.com](http://www.DigiTrak.com).

# Target Steering

Instructions for setting up the receiver for using the Target Steering® feature can be found in the operator's manual for your system. Most of the setup for Target Steering is done by the receiver (locator) operator. This section discusses how to use Target Steering data on the F Series Display.

In general, Target Steering should be used to *maintain* a bore path, not to bring a significantly off-course bore back on track. If the drill head is already significantly off course, use front and rear locate methods as described in your DigiTrak system operator's manual to get back on course.

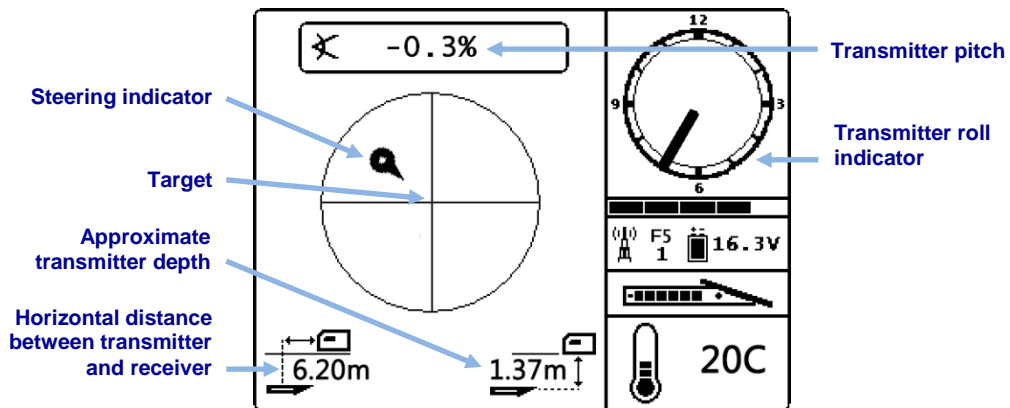


**Notice** After learning the concepts of Target Steering, practice its use *before* using on a jobsite where time and money are at a premium. A *Look-Ahead Locating* animation is also available at [www.youtube.com/dcikent](http://www.youtube.com/dcikent). If you need further assistance, please contact DCI Customer Service.

Target Steering requires a stable signal from both the transmitter and receiver.

## Steering to the Target

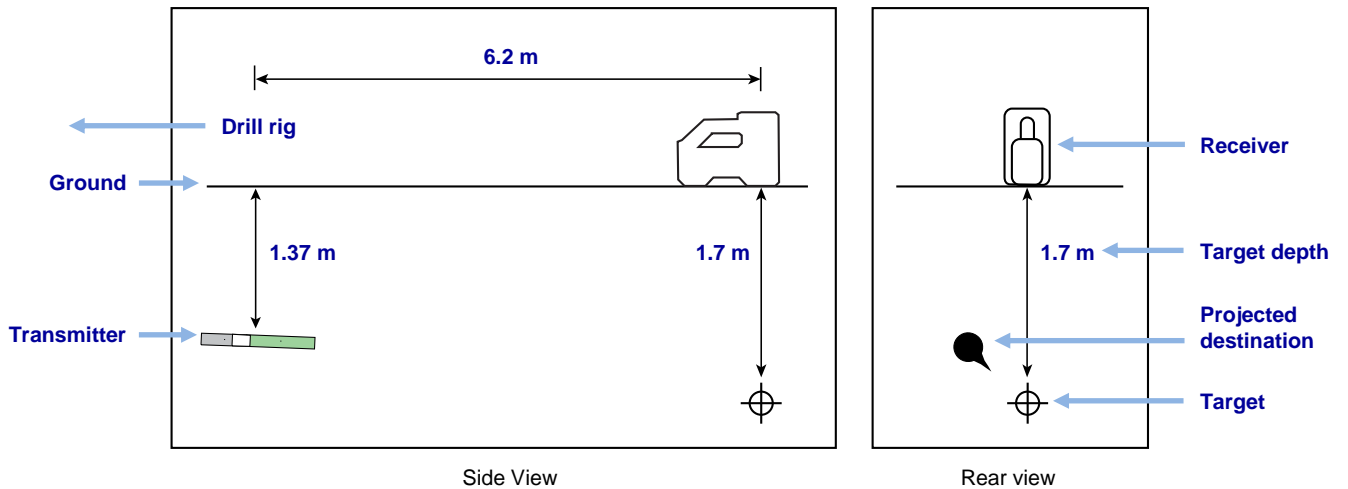
Once target steering has been enabled on the receiver, the FSD automatically enters Target Steering mode.



Target Steering Screen on the FSD

The target in the center of the image above represents the target depth entered in the receiver for a point directly below it. The steering indicator represents the projected destination or current “aim point” of the drill head in relation to the target. The pointer on the steering indicator shows the current roll position of the drill head. This screen shows that the drill head is *currently* estimated at 1.37 m below the horizontal plane of the receiver and the target is 6.2 m ahead.

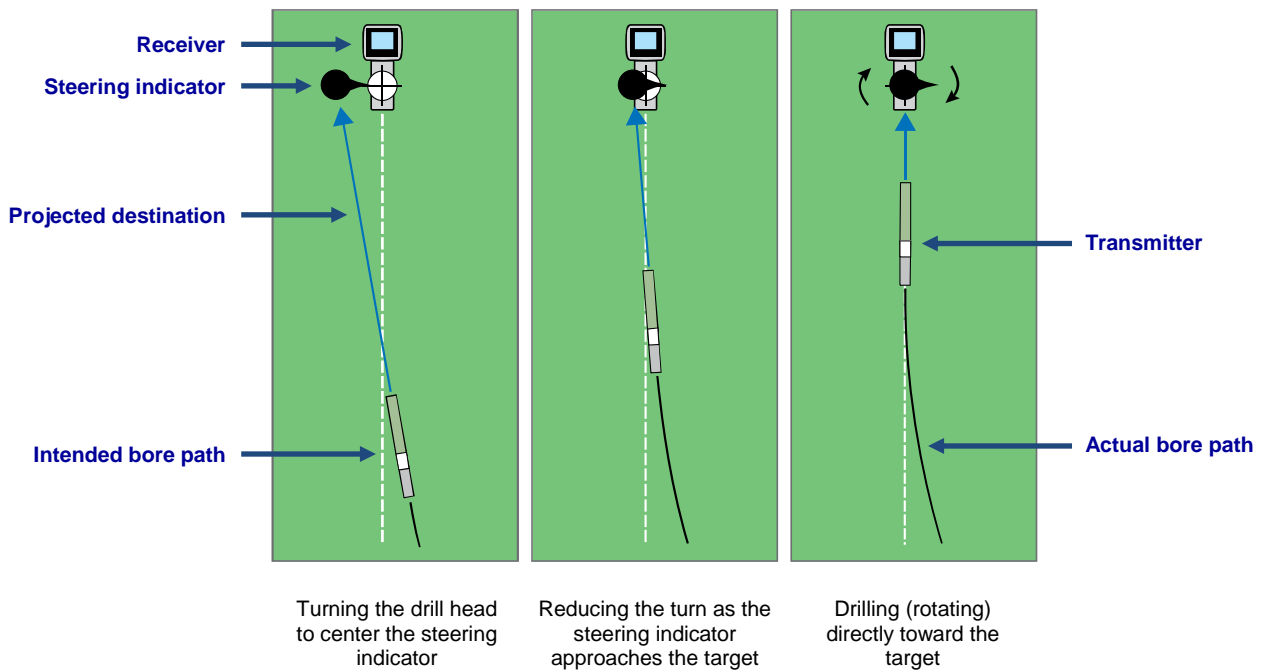
The Target Steering screen shows the following scenario:



### Transmitter, Target, and Receiver

The steering indicator shows that the drill head is heading above and to the left of the target. To bring the steering indicator back on target, rotate the drill head so the steering indicator points toward the target. The drill head is then steering correctly to reach the intended bore path (see following figure) to reach the target.

As shown in the example below, the steering indicator will help you line up the drill head with the receiver before it reaches the target.



### Target Steering and the Steering Indicator, Overhead View

The left panel of the target steering scenario above suggests that on the current heading, with no further steering corrections, the drill head will arrive to the left of the target below the receiver (depth is not reflected on this 2-dimensional drawing). However, as the drill head moves in relation to the target (center panel), the steering indicator will also move. The right panel shows the transmitter (drill head) having reached the intended bore path and drilling directly toward the target.

While drilling, monitor the steering indicator closely, make small steering adjustments, and watch and wait for the results. The closer the drill head is to the receiver, the more sensitive the steering indicator becomes. As it approaches the target, reduce the amount of the turn. When the indicator is centered on the target, the drill head is correctly positioned on the intended bore path to drill toward the target.

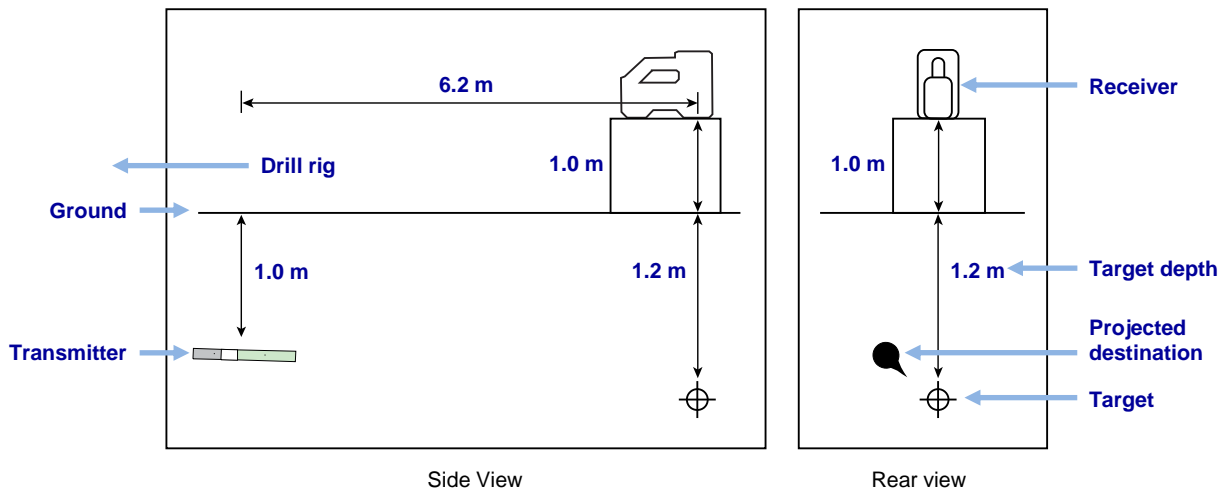
The steering indicator can only show steering corrections within the limits of the target steering screen. Once the indicator has moved outside the target circle, or "pegged", drilling farther off course will not be reflected on the remote display. Make the necessary steering corrections and when the steering indicator begins moving closer to the target, begin reducing the amount of the turn.

## Target Steering in Interference Areas



**Warning** Interference can cause inaccuracies in the measurement of depth and loss of the transmitter's pitch, roll, or heading.

In areas of passive and/or active interference, it may help to physically elevate the receiver above the ground. In the example below, the receiver is placed 1.0 m above the ground. To compensate, the target depth value must include the elevated height; 1.0 m plus 1.2 m equals 2.2 m.

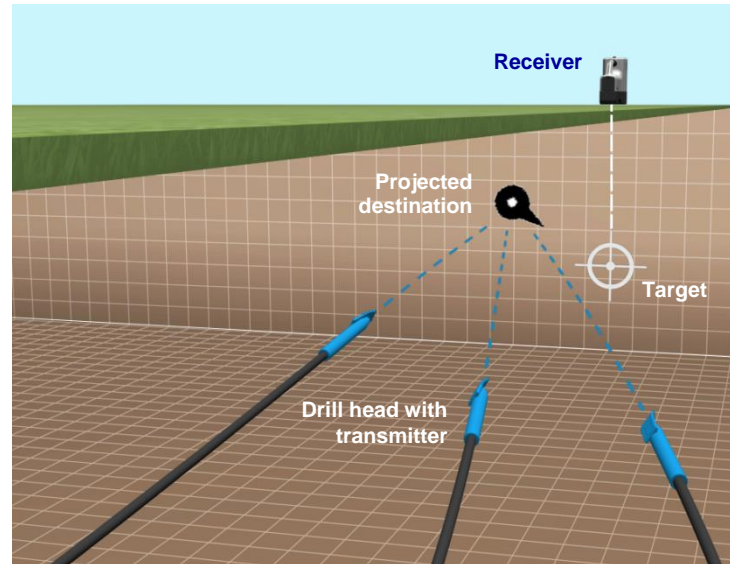


**Transmitter, Target, and Raised Receiver**

## Understanding the Steering Indicator

As shown previously, the steering indicator (projected destination) being to the left of the target does not necessarily mean the drill head itself is also currently to the left of the target. While each example below requires a different amount and duration of steering corrections, all need to move the same direction: right and down.

It is important to take into consideration the pitch over the last few rods before making steering adjustments; you may already be drilling in the direction Target Steering is instructing.



Sample Target Steering Drill Head Locations

## Turning Target Steering Off

When the receiver exits Target Steering mode, the FSD automatically returns to the normal Remote Mode locating screen.

## Appendix A: System Specifications

### Power Requirements

Device (Model Number)	Operational Voltage	Operational Current
DigiTrak F Series Display (FSD)	10–28 V $\overline{=}$	3.2 W max
DigiTrak F Series Lithium-Ion Battery Pack (FBP)	14.4 V $\overline{=}$	4.5 Ah, 65 Wh max

### Environmental Requirements

Device	Relative Humidity	Operating Temperature
DigiTrak F Series Display	<90%	-20 to 60° C
DigiTrak F Series Lithium-Ion Battery Pack (FBP)	<99% for <10° C <95% for 10–35° C <75% for 35–60° C	

System working altitude: up to 2000 m.

### Storage and Shipping Requirements

#### Temperature

Storage and transportation temperature must remain within -40 to 65° C.

#### Packaging

Ship in original carrying case or packaging of sufficient durability to prevent mechanical shock to equipment during transportation.

Approved for transportation by vehicle, boat, and aircraft.

### Equipment and Battery Disposal



This symbol on equipment indicates that the equipment must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of such equipment at a designated collection point for the recycling of batteries or electrical and electronic equipment. If the equipment contains a banned substance, the label will show the pollutant (Cd = Cadmium; Hg = Mercury; Pb = Lead) near this symbol. Before recycling, ensure batteries are discharged or the terminals are covered with adhesive tape to prevent shorting. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the equipment.

## LIMITED WARRANTY

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Digital Control Incorporated ("DCI") warrants that, when shipped from DCI, each DCI product (other than software products) 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") specified below, from material defects in materials and workmanship. In addition, DCI warrants that each DCI software product will perform in substantial accordance with the specifications set forth in the documentation for such software for the Warranty Period specified below. The following limited warranty ("Limited Warranty") is made solely to and for the benefit of 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 not assignable or transferable.

The foregoing Limited Warranty 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 software programs and applications. A Warranty Period of ninety (90) days shall apply to all other new DCI products, including transmitters and accessories. A Warranty Period of ninety (90) days shall also apply to 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. If a DCI product (excluding software products) does not perform as warranted during the Warranty Period, DCI will inspect the product and if DCI determines such product to be defective, DCI will, at its sole option and discretion, either repair or replace the product. If a software product does not perform as warranted during the Warranty Period, DCI will, at its sole option and discretion, either bring the defective software into material compliance with the specifications for such software or refund the purchase price paid for the defective software. **THE FOREGOING ARE USER'S SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF THIS LIMITED WARRANTY.** 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, and be submitted before the end of the Warranty Period.
3. The Limited Warranty shall only be effective if: (i) within fourteen (14) days of receipt of the DCI product, User registers the DCI product with DCI through its product registration website at [access.DigiTrak.com](https://access.DigiTrak.com); (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.
4. The service period for this equipment is five years from the date of manufacture. During this period, DCI will support the repair or replacement of the products featured in this manual. A fee for repairs and replacements may be charged if the product is outside the warranty period.

### 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; use of a DCI product outside the specifications for which the DCI product is designed (including without limitation temperature); 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. User 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 from the 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 does not warrant or guarantee the accuracy or completeness of data generated by HDD locating systems. The accuracy or completeness of such data may be impacted by a variety of factors, including (without limitation) active or passive interference (including from salt water) and other environmental conditions, failure to calibrate or use the device properly and other factors. DCI also does not warrant or guarantee, and disclaims liability for, the accuracy and completeness of any data generated by any external source or derived from data generated by any external source that may be displayed on a DCI device, including (without limitation) data received from any HDD drill rig.

DCI reserves the right to make changes in design and improvements upon DCI product 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, IMPLIED WARRANTY OF NON-INFRINGEMENT, 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 1-800 288-3610 (or, for international markets, the corresponding telephone number for that market) between 6:00 a.m. and 6:00 p.m. Pacific Time and ask to speak with a customer service representative. 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.

## Product demonstrations

DCI personnel may be present at a jobsite to demonstrate basic usage, features, and benefits of DCI products. User acknowledges that DCI personnel are present only to demonstrate a DCI product. DCI does NOT provide locating services or other consulting or contracting services. DCI does not assume any duty to train User or any other person, and does not assume responsibility or liability for the locating or other work performed at a jobsite at which DCI personnel or equipment are or have been present.