DIGITRAK FALCON F2 TOP TOGGLE

DCI DigiGuide User Manual

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Important Safety Info

GENERAL SAFETY WARNING

- Only operate your DCI guidance system in accordance with the operating instructions for your system.
- Serious injury and death, as well as property damage, can result if underground drilling equipment strikes a natural gas line, high-voltage electrical cable, or other utility.
- Work slowdowns and cost overruns can occur if you do not use your system correctly.
- You must properly calibrate your DCI guidance system in connection with each drilling project. If you fail to do so, depth readings will likely be inaccurate.
- Interference can lead to inaccurate depth readings and/or interruption of data. See "Special Notes About Interference" for more details.
- DCI guidance systems are used to locate and guide the transmitter (housing) underground. They cannot be used to locate underground utilities.
- Failure to find the front and rear locate points can lead to inaccuracies which may result in drilling off-path and striking an underground utility.
- The locate line on a DCI locator does not indicate the position of the drill head. DCI locators track the transmitter in its housing, which sits behind the drill bit. Also, when drilling steep and/or deep, the locate line may indicate a position behind or ahead of the transmitter. Please see "Steep and Deep" under Advanced Topics for important information about accurately locating the drill head when drilling steep and/or deep.

- Ensure that all underground utilities have been located, exposed, and/or accurately marked prior to drilling. Follow all proper safety precautions, such as potholing.
- DCI equipment is not explosion-proof and should never be used near flammable or explosive substances.
- Wear jobsite protective/safety clothing such as dielectric boots, gloves, hard hat, high-visibility vest, and safety glasses.
- Maintain a minimum distance of 8 inches (20 cm) from the front of the locator to the user's torso to ensure compliance with RF exposure requirements.
- Comply with federal, state, and local governmental regulations (such as OSHA) and all other customary or required safety precautions.

If you have any questions about the operation of your guidance system, please contact DCI Customer Service for assistance.

SPECIAL NOTES ABOUT INTERFERENCE

While DCI guidance systems provide you with technology to combat active interference (and passive interference, with the Sub-k Rebar transmitter), no guidance system is immune to all interference.

Interference can lead to inaccurate depth readings and/or interruption or loss of data. Never rely on data that does not display quickly and/or remain stable.

The Falcon frequency optimizer selects frequencies based on measured interference at a specific time and location.

Interference levels change with time and with even minor changes in location. The frequency optimizer is not a substitute for prudent operator judgment. If performance drops while drilling, consider switching to the other selected band (not available on the Falcon F1) or use Max Mode.

An **A** on the screen can indicate signal Attenuation due to the presence of excessive interference, which can make depth readings inaccurate. Attenuation is normal in shallow depths less than 8 ft (2.4 m). If the signal strength is also flashing; this indicates extreme interference. Depth and locate points may be compromised and the locator will not calibrate.

Interference is classified as either active (generating electro-magnetic signals) or passive (material that can conduct or block electro-magnetic signals). Sources of interference may include:

Active

- Traffic signal loops
- Buried dog fences
- Cathodic protection
- Radio communications
- Security systems
- Microwave towers
- Power, phone, fiber-trace and cable TV lines

Passive

- Metal pipes
- Rebar
- Trench plates
- Chain-link fences
- Vehicles
- Saltwater/salt domes
- Conductive earth, such as iron ore

If you have any questions about the operation of your guidance system, please contact DCI Customer Service for assistance.

ENVIRONMENTAL REQUIREMENTS

System working altitude: up to 6562 ft (2000m).

Storage and transportation temperature: -40° to 149°F (-40° to 65°C).

Operation may be compromised if the equipment is subjected to conditions outside these specified limits.

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

If you have any questions about the operation of your guidance system, please contact DCI Customer Service for assistance.

STORAGE AND SHIPPING OF BATTERIES

Remove the batteries from all system components during shipping and prolonged storage. Failure to do so may result in battery leakage, which may lead to risk of explosion, health risks, and/or damage.

Store and transport batteries using a suitable protective case that will keep batteries safely isolated from one another. Failure to do so may result in short circuits, which may lead to hazardous conditions including fire.

Lithium-ion batteries must be packaged and shipped by trained and certified personnel only. Never ship damaged batteries.

If you have any questions about the operation of your guidance system, please contact DCI Customer Service for assistance.

Bootcamp

HDD LOCATING HISTORY

Locating in the horizontal directional drilling (HDD) industry was initially based on locating a buried cable by sweeping the locator back and forth to find the highest signal strength (peak signal), indicating that the locator was over the cable. Unfortunately, this method did not always guarantee an accurate location of the cable, nor did it provide any depth information.

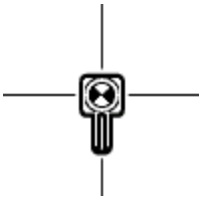
This “peak signal” method was adapted to HDD with the introduction of a transmitter that provides information on the position and depth of the drill head. However, this method is unreliable and inaccurate because the peak signal strength is not always directly above the transmitter housing.

In addition, peak signal locating doesn’t show where the drill tool is headed. Think of drilling like driving a car: it is more effective to look ahead through the windshield to see where you are going than to look down at the road through the floorboard to keep the car (drill tool) on the road (drill path).

BALL-IN-THE-BOX GUIDANCE

DCI’s design uses a “locate point” in the transmitter signal. The Front Locate Point (FLP), which is out ahead of the transmitter, shows where the **transmitter housing** is heading.

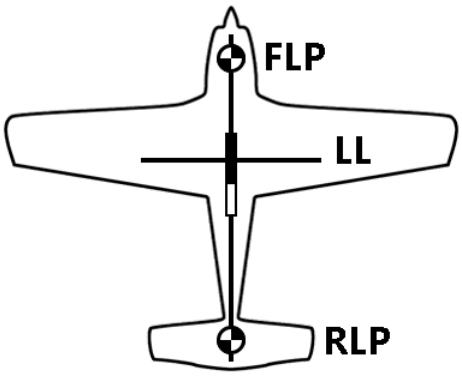
DCI invented the *Ball-in-the-Box* user interface to make it quick and intuitive to find a locate point, speeding up drilling jobs: just move the locator so the ball moves into the box on the screen.



Finding a locate point also helps you find the drill head itself.

There is a second locate point behind the transmitter called the Rear Locate Point (RLP). The two locate points, combined with a Locate Line (LL), pinpoint the precise location of the **transmitter housing** below ground.

They are arranged like an airplane, where the Front Locate Point is the plane's cockpit, the Rear Locate Point is the tail, and the Locate Line is the wings.



If your drill path requires a certain amount of depth or to maintain a constant pitch, use the predicted depth feature at the Front Locate Point. This eliminates the need for depth readings over the transmitter, speeding up the drilling process.

INTERFERENCE AND SIGNAL STABILITY

Interference can cause incorrect locate data that reduces locating accuracy. There are two different types of interference that can distort the transmitter signal: active and passive.

Active interference, or "noise", consists of anything that emits a signal that interferes with the transmitter signal. Example sources include power lines, radio towers, cathodic protection, fiber tracer lines, invisible dog fences, security systems, and traffic signal loops. Falcon's frequency optimizer finds the best frequencies to avoid noise.

Passive interference consists of anything that blocks or distorts the transmitter signal resulting in incorrect depths or missing data. Example sources include rebar, guard rails, bridge abutments, chain link fencing, salt/saltwater, and soil high in metal ore. The Falcon sub-kHz transmitter (available for Falcon F5 and F5+ only) helps cut through passive interference without distorting the signal.

An **A** on the screen can indicate signal Attenuation due to the presence of excessive interference, which can make depth readings inaccurate. Attenuation is normal in shallow depths less than 8 feet (2.4 m). If the signal strength is also flashing, this indicates extreme interference. Depth and locate points may be compromised and the locator will not calibrate.

OPTIMIZE EVERY JOB

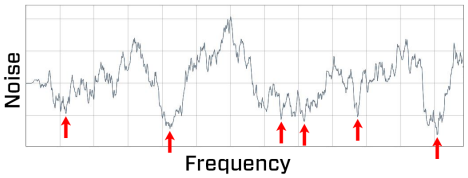
Noise varies by amount and frequency depending on where you are and even the time of day. That's why it's important to find the best frequencies for *every bore*.

This is called *frequency optimization*, and only Falcon has it. Using frequencies with the highest probability of success against noise increases locating accuracy and reduces the risk of tripping out.

Falcon's frequency optimizer scans through *hundreds* of frequencies, then bundles those with the lowest noise into finely-tuned bands that work best for the current job.

Select two bands and switch between them mid-bore if needed (not available on the Falcon F1 with singleband).

The Falcon locators with *Quick Scan Pair* offer features to make the selection of bands faster and easier. Two clicks select the two preset bands selected for your region.



MENU NAVIGATION

The Falcon F5/F2/F5+/F2+ has a toggle switch on top and a trigger switch under the handle to navigate the menu system and select options.

Use the 4-way toggle switch to access a menu, move between menu options, and open shortcuts.

Shortcuts require you to hold the toggle for a second or longer; we call this a “hold toggle”. For example, from the Locate Mode screen, open a transmitter band selection shortcut by holding the toggle right.

Use the trigger switch to power on the locator, select a menu option, and to take a depth reading.

Pull and release (click) the trigger to select. In some cases, you’ll need to hold the trigger for a second or more to use a function, such as turning the locator on or taking a depth reading.

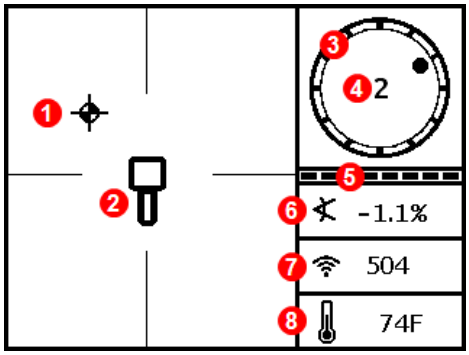
SCREEN ELEMENTS OVERVIEW

The Locate Mode, Depth, and Predicted Depth screens are the primary screens you will use for locating.

When the locator is detecting a signal from a transmitter, the Locate Mode screen provides real-time data about the transmitter’s location, temperature, pitch, roll, and signal strength.

Depth data appears when the trigger is held at the Locate Line (LL) and predicted depth appears when held at the Front Locate Point.

LOCATE MODE SCREEN



1. Locating ball (FLP or RLP)
2. Locator
3. Roll indicator
4. Roll value
5. Roll/pitch update meter
6. Transmitter pitch
7. Power Mode (not available in legacy F1/F2) and Transmitter signal strength
8. Transmitter temperature

DEPTH SCREEN

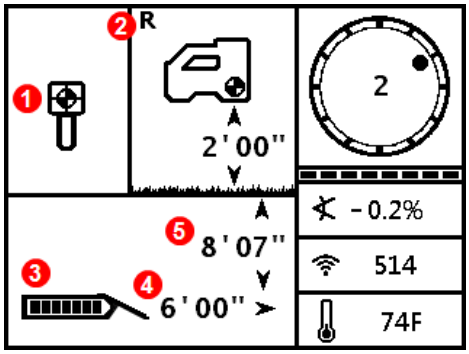
The Depth screen displays when the trigger is held with the locator at the Locate Line (LL).

1. Locate point (front or rear)
2. Bird's-eye view
3. Locate Line (LL)
4. Height-Above-Ground (HAG) setting on
5. Ground level
6. Transmitter depth
7. Transmitter battery strength

> When the HAG setting is disabled, the locator displays at ground level and must be placed on the ground during depth readings.

PREDICTED DEPTH SCREEN

The Predicted Depth screen displays when the trigger is held with the locator at the Front Locate Point (FLP).



1. *Ball-in-the-Box* at FLP
2. Reference Lock indicator*
3. Transmitter battery strength
4. Horizontal distance between transmitter and FLP

The predicted depth is the depth the transmitter is calculated to be at when it reaches the FLP if it continues on its current path.

In this example, if the drill head travels an additional 6'0" (1.82 m) at -0.2% pitch, it will be directly below the locator at 8'7" (2.62 m).

Do not take a predicted depth reading when the locator is over the Rear Locate Point (RLP).

GLOSSARY DEFINITIONS

*REFERENCE LOCK INDICATOR

Indicates a reference signal has been obtained for displaying the locate line. Displays at the top of the Locate Mode screen.

*PREDICTED DEPTH

The Predicted Depth screen displays when the trigger is held with the locator at the Front Locate Point (FLP). The predicted depth is how deep the transmitter is calculated to be when it reaches the front locate point if it continues on its current path.

Initial Setup

REGISTERING YOUR EQUIPMENT

STEP 1 OF 2

Stuff You Should Know

Registering your equipment activates the product warranty.

Registering also allows us to contact you if it is recovered after being lost or stolen.

If you want to enable the Lock Out Capability (LOC) feature, contact DCI support.

See the DCI website for warranty terms and conditions.

STEP 2 OF 2

Contact your authorized DCI dealer or DCI to register your equipment.

You will need the equipment serial number and your company contact information.

Here's where to find your serial number:

- Locator: in the battery compartment
- Transmitter: engraved on the steel body
- Remote display: decal on the back

POWER ON

STEP 1 OF 5

Check the charge level of your battery; each of the five lights on a li-ion battery represents about 20% capacity.

NiMH batteries do not have a power meter. You can view battery life in the top banner of the Main menu.

STEP 2 OF 5

Insert battery in the locator.

STEP 3 OF 5

Pull the trigger to turn on the locator.

STEP 4 OF 5

Click to confirm you've read the manual.

STEP 5 OF 5

Click again to continue.

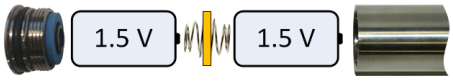
TRANSMITTER SETUP

STEP 1 OF 3

Your transmitter comes with two battery contact springs and one battery cap tool.

STEP 2 OF 3

Insert batteries positive terminal first. If you are using C-cell batteries, install one spring between batteries to help prevent chatter.



Alkaline batteries are not sufficient for High Power Mode. The locator will display a warning.

Do not use a spring with a SuperCell or the Falcon Tx Adapter (FTA).

STEP 3 OF 3

SET HEIGHT-ABOVE-GROUND

STEP 1 OF 7

Stuff You Should Know

Use Height-Above-Ground (HAG) to set a height measurement on the locator so you don't have to put it on the ground for a depth reading.

Raising the locator above the ground also provides separation from underground interference that might otherwise reduce the transmitter's range or cause variable readings.

STEP 2 OF 7

Hold the locator at your side as if you were holding a suitcase.

STEP 3 OF 7

Measure the distance between the ground and the bottom of the locator using a tape measure.

STEP 4 OF 7

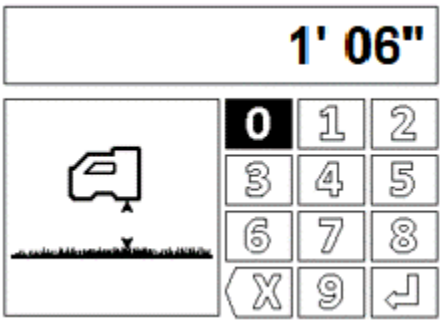
From the **Main** menu, select **HAG**.

STEP 5 OF 7

Select **Set HAG.**

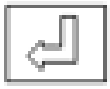
STEP 6 OF 7

Use the keypad to enter the value you measured.



STEP 7 OF 7

Select **Enter**. HAG is now on.



Everytime you use the locator with HAG enabled, hold the locator at this height for all depth readings.

HAG must be turned on manually each time after the receiver is powered on or calibrated.

Target Steering assumes that the locator is on the ground or on a TrakStand with HAG enabled. The locator ignores the handheld Height-Above-Ground (HAG) setting.

Jobsite Setup

POWER ON

STEP 1 OF 5

Check the charge level of your battery; each of the five lights on a li-ion battery represents about 20% capacity.

> NiMH batteries do not have a power meter. You can view battery life in the top banner of the Main menu.

STEP 2 OF 5

Insert battery in the locator.

STEP 3 OF 5

Pull the trigger to turn on the locator.

STEP 4 OF 5

Click to confirm you've read the manual.

STEP 5 OF 5

Click again to continue.

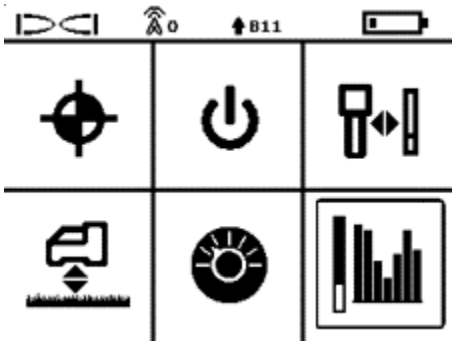
SCAN

STEP 1 OF 5

Ensure all transmitters are powered off or more than 100 ft (30.5 m) away from the locator.

STEP 2 OF 5

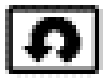
From the **Main** menu, select **Transmitter/FO** menu.

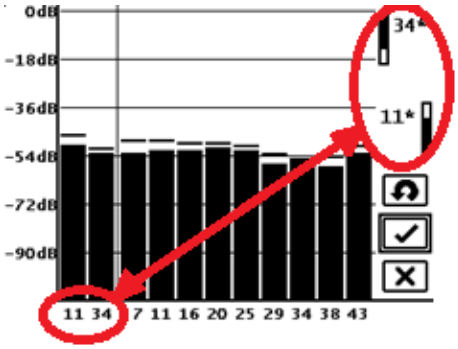


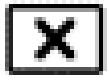
STEP 3 OF 5

Select **Frequency optimization**. 

STEP 4 OF 5

Click the arrow to start the scan. 

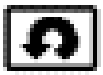


The two bands on the far left have been calibrated to the Up and Down bands. If after rescanning for noise they are still your best bands with the least noise, you can click **Cancel**. 

If there are bands with less noise, go to the next step.

STEP 5 OF 5

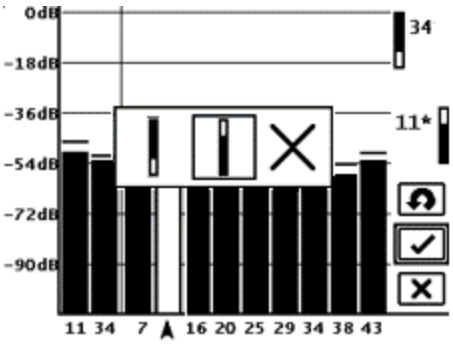
Return to the point of most noise and click to rescan. This gives you the best frequencies for this location.



PICK

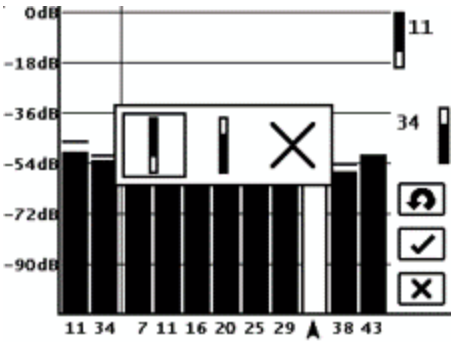
STEP 1 OF 2

Toggle the selector to the band with the least noise, or band 7 for passive issues and then click to select the Up band.



STEP 2 OF 2

Toggle to the next-lowest band, click to select, and then click again to assign as the Down band.



PAIR

STEP 1 OF 4

Pairing sends the frequencies you selected to the transmitter. Pair a transmitter immediately after scanning and picking bands.

To pair at any other time, from the **Main** menu, select **Transmitter/FO** menu,

Frequency optimization, and continue.

STEP 2 OF 4

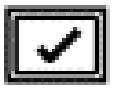
Insert battery(ies) positive terminal first and install the battery cap to power on the transmitter.
The FO noise bars will spike when the transmitter is powered on.

STEP 3 OF 4

Align the transmitter so its IR port is within 2 in (5 cm) of and facing the round IR port on the front of the locator.

If you are using a V2 transmitter with MultiPower Mode, see the "V2 Transmitter Quick Start Guide" for instructions how to set the power mode.

STEP 4 OF 4

Select **Pair**, 

then **Transmitter pairing request**. 

The locator beeps and displays a check mark after a successful pairing. ✓

CALIBRATE INTRO

Calibration is required anytime you change your transmitter, locator, drill head, or perform a new frequency scan and then pair.

Calibrate both bands with the transmitter in the housing flat on the ground in a low-noise, metal-free environment immediately after pairing.
To calibrate any other time, from the Main menu select **Calibration**, then **1PT CAL** before continuing with the following steps.

CALIBRATE, UP

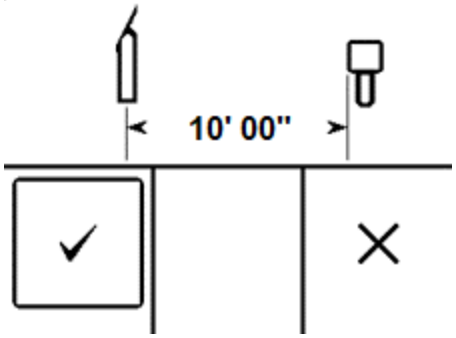
STEP 1 OF 6

From the **Main** menu, select **Calibration**. 

Select **1 pt calibration**. 

STEP 2 OF 6

Put the transmitter back in the drill head, put the cover back on, and ensure the *near edge* of the locator is still parallel to and exactly 10 ft (3 m) from the *center* of the drill head.



STEP 3 OF 6

Select **Continue** to calibrate the Up band.

STEP 4 OF 6

The locator beeps and displays a check mark after a successful calibration.

STEP 5 OF 6

Use the **Above Ground Range (AGR)** that displays next to check the accuracy of your calibration. Move the locator to at least two different distances (including maximum bore depth) and verify distance readings match the measurement.

STEP 6 OF 6

Select **Exit** to return to the Locate Mode screen, where you will see clock, pitch, and signal strength.

CALIBRATE, CHANGE BANDS

STEP 1 OF 4

To change the *transmitter* to the Down band, remove the batteries from the transmitter and observe data disappear from the locator.

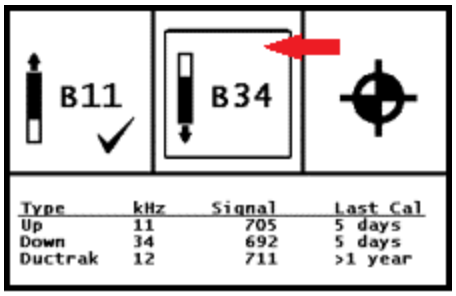
There are other methods to change transmitter bands. See Advanced Topics.

STEP 2 OF 4

While holding the transmitter vertical with the index cap end pointing down, insert the batteries and reinstall the battery cap to power on the transmitter in the Down band.

STEP 3 OF 4

To change the *locator* to the Down band, from the Locate screen, hold toggle right to open the shortcut Transmitter Selection menu and select the Down band. You will return to the Locate Mode screen.



STEP 4 OF 4

Verify you see clock, pitch, and signal strength. The error icon in the roll indicator shows calibration is needed.

CALIBRATE, DOWN

STEP 1 OF 7

Install the powered-on transmitter in the drill head.

STEP 2 OF 7

From the **Main** menu, select **Calibration**.

STEP 3 OF 7

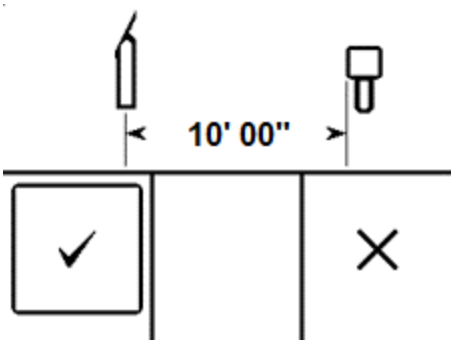
Use **1 PT Cal** to calibrate. 

STEP 4 OF 7

Using a tape measure, place the *near edge* of the locator parallel to and exactly 10 ft (3 m) from the *center* of the drill head.

STEP 5 OF 7

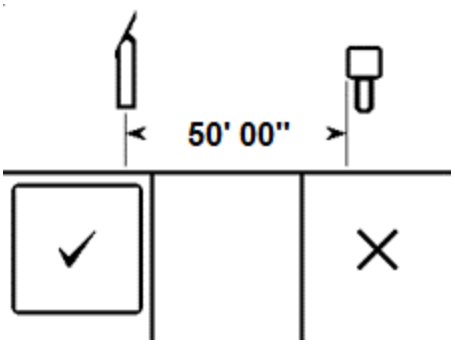
Click to calibrate the Down band.



The locator beeps and displays a check mark after a successful calibration. 

STEP 6 OF 7

Use the **Above Ground Range (AGR)** that displays next to check the accuracy of your calibration. Move the locator to at least two different distances (including maximum bore depth) and verify distance readings match the measurement.



STEP 7 OF 7

The locator assumes the transmitter pitch equals zero during the above ground range check. For accurate readings ensure the transmitter is approximately level.

Select **Exit** to return to the Locate Mode screen, where you will see clock, pitch, and signal strength.

Fasten the drill head cover properly before drilling.

During Drilling

TURN ON HEIGHT-ABOVE-GROUND

STEP 1 OF 2

From the Main menu, select **HAG**.

STEP 2 OF 2

If the height shown at the bottom of the screen is acceptable, select **Enable HAG**. Otherwise, select **Set HAG** to enter a new height.

1. Disable HAG
2. Enable HAG
3. Set HAG

The locator must now be held at this height for accurate depth readings.

HAG must be turned on manually each time after the locator is powered on or calibrated.

LOCATING THE TRANSMITTER

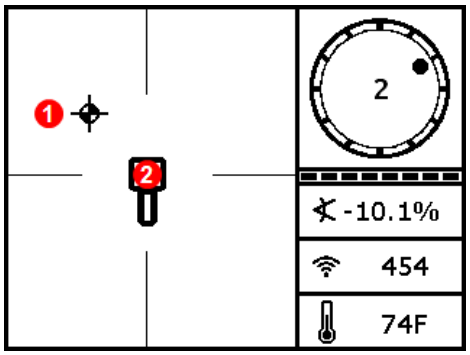
STEP 1 OF 12

Find the Rear Locate Point (RLP)

After the first rod has been drilled in, start at the entry point and face the direction of the bore.

STEP 2 OF 12

Using the **Locate** screen, move the locator to put the ball in the box.



1. Ball
2. Box

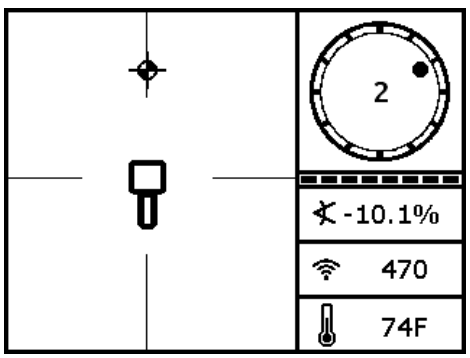
STEP 3 OF 12

Mark this position on the ground as the Rear Locate Point (RLP).

STEP 4 OF 12

Find the Front Locate Point (FLP)

Walk forward. As you pass the transmitter, the ball jumps to the top of the screen. You are now tracking the Front Locate Point (FLP).

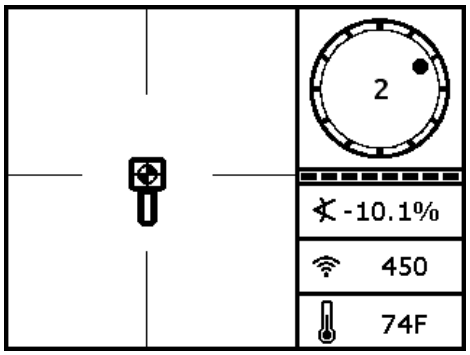


The signal strength increases as you move toward the transmitter and decreases as you move away from it.

An A near the roll indicator indicates signal Attenuation is in effect.

STEP 5 OF 12

Move the locator to put the ball in the box.



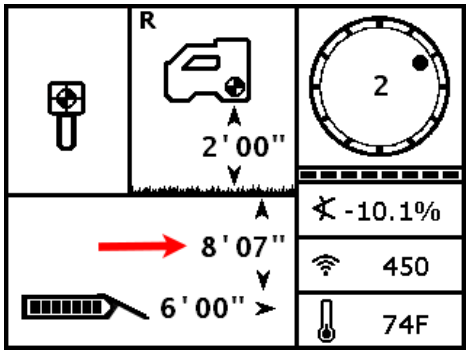
When the ball is centered in the box, hold the trigger for at least one second to lock onto the reference signal. The R icon will appear at the top of the Depth screen. The locate line (LL) will not display later without this reference.

STEP 6 OF 12

Mark this position on the ground as the Front Locate Point (FLP).

STEP 7 OF 12

Hold the trigger to show the predicted depth* of the transmitter at this location.



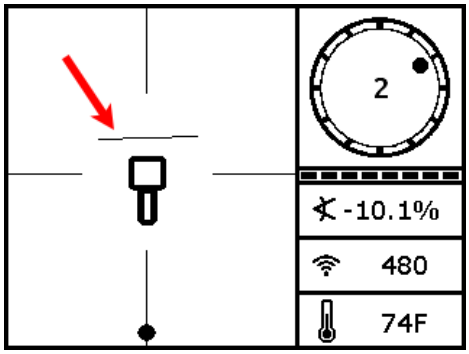
STEP 8 OF 12

Look back toward the RLP. The drill head is positioned to travel toward you along the line connecting the RLP and FLP.

STEP 9 OF 12

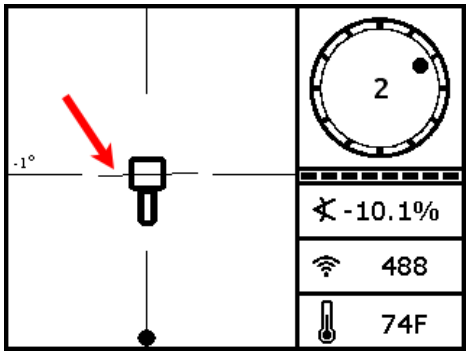
Find the Locate Line (LL)

Walk back toward the RLP until the Locate Line (LL) appears.



STEP 10 OF 12

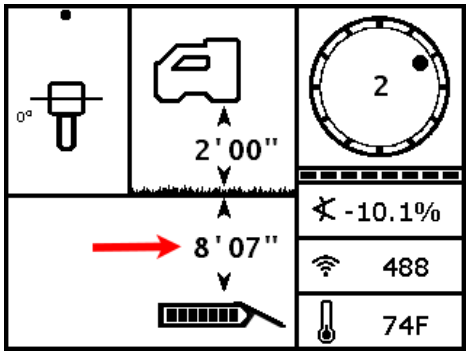
Ensure the locator is on the line connecting the two marked locate points. Position the locator so the LL passes through the center of the box. The drill head should be beneath this point as long as the transmitter is relatively level (see **Steep and Deep** under **Advanced Topics**).



The locator can face toward or away from the drill as long as it is parallel to the direction of drilling.

STEP 11 OF 12

Hold the trigger to take a depth reading.



If you hold the trigger for longer than five seconds, the locator will enter Max Mode, which can help with unstable data caused by interference or extreme depths.

STEP 12 OF 12

Continue Locating as the Drill Head Moves

After the drill head moves forward another rod, find the new RLP, FLP, and then the LL.

If the new FLP is in line with the prior locate points (a straight bore line), it is unnecessary to find a new RLP. For a curved drill path, always identify both the FLP and RLP.

If you have a straight drill path but the FLP is to the left or right of the line projected from the previous locate points, this may indicate a drill head deflection or interference affecting the transmitter's signal.

GLOSSARY DEFINITIONS

> *PREDICTED DEPTH
>
> The Predicted Depth screen displays when the trigger is held with the locator at the Front Locate Point (FLP). The predicted depth is how deep the transmitter is calculated to be when it reaches the front locate point if it continues on its current path.

CHANGE LOCATOR BANDS

STEP 1 OF 5

Stuff you should know

Switching bands on the transmitter may provide better data, better depth, and/or better locate results as interference conditions change.

Calibrate BOTH bands before drilling so you get accurate depth readings on both bands.

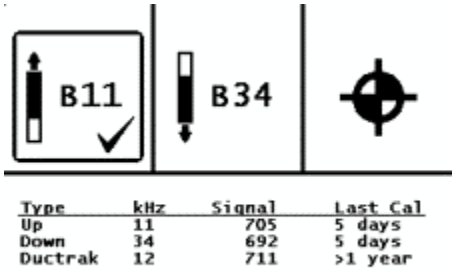
STEP 2 OF 5

Observe signal strength drop after drill operator completes a roll sequence to change bands.

When using a wideband transmitter and the 10-2-7 roll sequence, transmitter data will disappear after a successful band change.

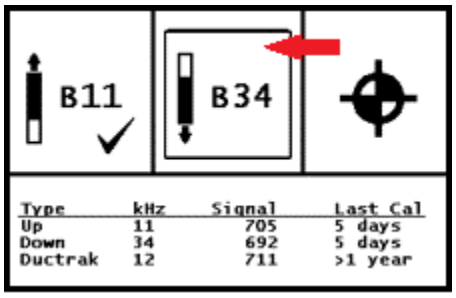
STEP 3 OF 5

From the Locate Mode screen, hold toggle right to open the **Band Selection** shortcut menu.



STEP 4 OF 5

Toggle to and select the transmitter band without the X in the box (in this case, **B34**).



If the new band shows INV under Last Cal, the depth was never calibrated and the second band will not have a correct depth reading. Contact DCI Support for suggestions.

STEP 5 OF 5

Select **Locate Mode**. 

If you did not calibrate the depth, you may also see the warning in the Roll Clock.

Post Drilling

LOCATOR AND BATTERY CARE

STEP 1 OF 4

Select power icon in the **Main** menu to power off the locator.

STEP 2 OF 4

Remove the battery and inspect its contacts and those inside the battery compartment for corrosion and debris. Clean and charge as needed.

STEP 3 OF 4

Wipe the locator clean. Use only an abrasive-free cleaner and soft cloth to clean the screen.

⚠ Do not pressure wash.

STEP 4 OF 4

Store the battery and locator in the original system carry case safe from impact, moisture, and excessive temperatures.

⚠ Do not store the battery in the battery charger or locator.

⚠ Storage and transportation temperature must remain within -40° – 149°F (-40° – 65°C).

TRANSMITTER AND BATTERY CARE

STEP 1 OF 6

Remove the transmitter from the drill head.

STEP 2 OF 6

Wipe the transmitter clean so dirt doesn't enter the battery compartment or accumulate on the battery cap threads.

STEP 3 OF 6

Remove the transmitter batteries to power it off.

The transmitter records run-time for warranty purposes.

STEP 4 OF 6

Inspect the battery compartment, springs, cap, O-ring, battery adapter, and threads for debris. Clear any debris and replace the battery cap.

Use conductive lubricant on the threads if the battery cap is difficult to turn.

STEP 5 OF 6

Store batteries so they do not contact metallic objects or terminals of other batteries.

STEP 6 OF 6

Store the transmitter in the original system carry case where it will be safe from impact and excessive temperatures.

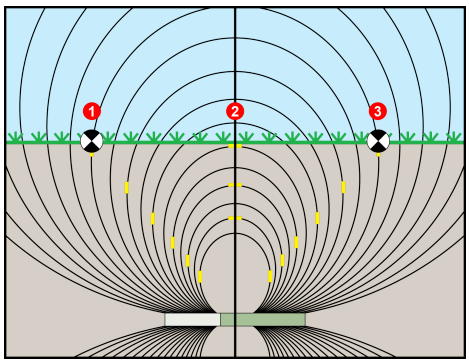
Storage and transportation temperature must remain within 40° to 149° F (-40 to 65 °C).

Advanced Topics

STEEP AND DEEP

When a transmitter is level (zero pitch) underground:

- the locate points (FLP and RLP) are at equal distances from the transmitter
- depth displayed on the locator is the actual depth, and
- the Locate Line (LL) indicates a position above the transmitter.



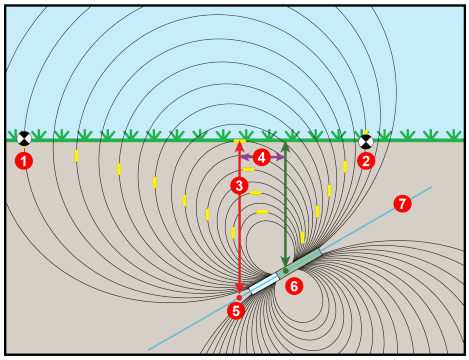
1. RLP
2. LL
3. FLP

When the transmitter is pitched up or down, the transmitter signal field also tilts.

When the transmitter is pitched down (negative pitch), the locate line on the screen reflects a future position of the transmitter, assuming the transmitter stays on the same trajectory (projected depth).

When the transmitter is pitched up (positive pitch, shown below), the locate line on the screen reflects a position behind the transmitter.

The depth reading on the locator is based on the projected depth point, which is not the same as the actual depth of the transmitter.



1. RLP
2. FLP
3. LL
4. Fore/aft offset
5. Projected depth
6. Transmitter at positive pitch
7. 30% (17°)

The differences in position and depth between the projected depth point and the actual location of the transmitter can be relatively small at low pitch and/or shallow depth.

When drilling at a steep pitch and/or significant depth, the differences are greater.

For example, if the transmitter is at a -30% pitch and a 33'1" (10.1 m) depth, the locator depth reading will be 35' (10.7 m) (just under 6% difference from actual depth) and the locate line will be 6'6" (2 m) ahead of the transmitter.

You can use the pitch and the projected depth reading on your locator to determine the actual depth and the position (fore/aft) of the locate line:

Actual Depth

Pitch → / Displayed Depth ↓	±10% (5.7°)	±20% (11°)	±30% (17°)
15′	14′ 11″	14′ 7″	14′ 2″
25′	24′ 10″	24′ 4″	23′ 7″
35′	34′ 9″	34′ 1″	33′ 1″
45′	44′ 8″	43′ 10″	42′ 6″

Fore/Aft Offset

Pitch → / Displayed Depth ↓	±10% (5.7°)	±20% (11°)	±30% (17°)
15′	1′ 0″	1′ 11″	2′ 9″
25′	1′ 8″	3′ 3″	4′ 8″
35′	2′ 4″	4′ 6″	6′ 6″
45′	3′ 0″	5′ 10″	8′ 4″

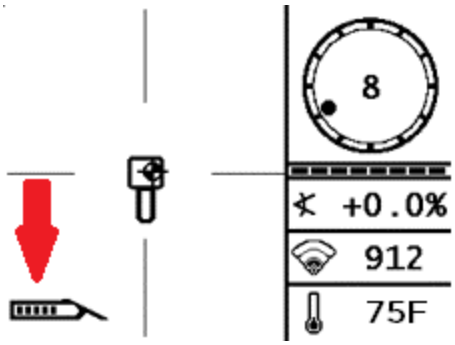
For a given pitch, you can calculate actual or projected depth:

Pitch →	±10% (5.7°)	±20% (11°)	±30% (17°)
From Actual to Projected Depth	1.007	1.026	1.059
From Projected to Actual Depth	0.993	0.974	0.944

GET TRANSMITTER INFO

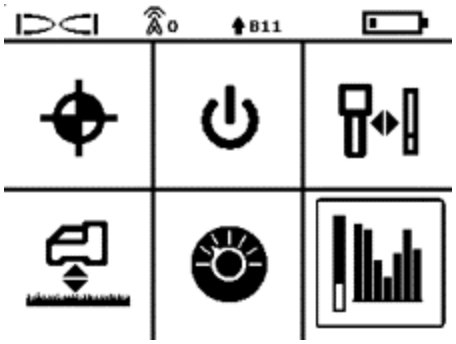
STEP 1 OF 6

On the Locate Mode screen, verify that the transmitter has power by clicking the trigger and observing either the battery level or that there is data being displayed.



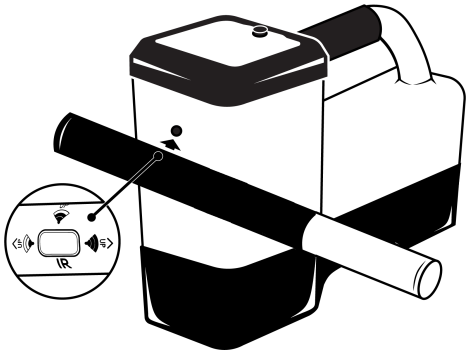
STEP 2 OF 6

From the **Main** menu, select the **Frequency Optimizer** option.



STEP 3 OF 6

Power up the transmitter and align its IR port is near and facing the round IR port on the front of the locator.



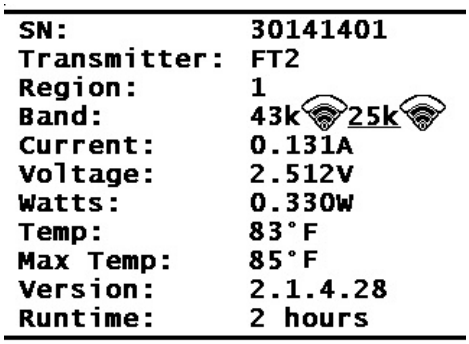
The transmitter does not need to be paired for the locator to read the transmitter info.

STEP 4 OF 6

Select **Transmitter Information**. 

STEP 5 OF 6

Check important information such as runtime hours for warranty coverage, current band, operating current, battery voltage, watts, and max recorded temperature. For V2 Tx, the power mode is displayed.



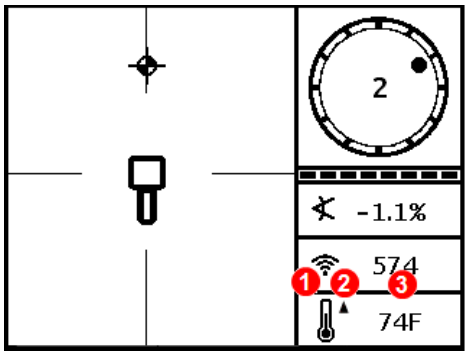
STEP 6 OF 6

Click to return to the **Main** Menu.

TRANSMITTER TEMPERATURE WARNINGS

STEP 1 OF 6

DigiTrak transmitters (Tx), with the exception of DucTrak, have an internal digital thermometer. The normal below ground temp range is 63° – 104°F (17° – 40°C). The Tx temperature displays on the bottom right of the locator screen and remote display screens.



1. Temperature status icon
2. Temp trend up/down arrows

3. Temperature

Suspend drilling when temperatures increase rapidly. Temperatures above 111°F (36°C) are not typical.

STEP 2 OF 6

As the transmitter (Tx) temperature increases above 61°F (16°C), the locator and remote emit warning beeps and the temperature icon changes on the locator or remote display.

Tx temp: 61° – 97°F (16° – 36°C) 

Warning tones: Warning tones: Double beep (Beep-beep) for every 7°F (4°C) increase.

Watch for an upward trend in temperatures.

STEP 3 OF 6

Tx temp: 104° –111°F (40° – 44°C) 

Warning tones: Two double beeps (Beep-beep; Beep-beep) for every 7°F (4°C) increase.

Cool the transmitter.

STEP 4 OF 6

Tx temp: 118° – 133°F (48° – 56°C) 

Warning tones: Three double beeps (Beep-beep, Beep-beep, Beep-beep) for every 7°F (4°C) increase.

Cooling is critical to avoid irreversible damage.

STEP 5 OF 6

Tx temp: 140° F (60°C) and above (icon flashing) 

Warning tones: Three double beeps (Beep-beep, Beep-beep, Beep-beep) for every 20 seconds on the locator and 5 seconds on the remote display.

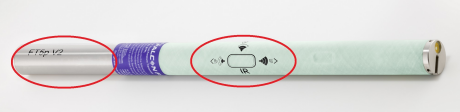
The transmitter has been exposed to dangerous drilling conditions. Temperatures above 185°F (85°C) may cause irreversible damage to the transmitter.

STEP 6 OF 6

The transmitter records the maximum temperature that it has been exposed to. Use the Transmitter Info screen to view this information. See the "Get Transmitter Info" article for steps.

V2 TRANSMITTERS MULTIPOWER MODE INTRODUCTION

V2 transmitters have three power modes to balance signal strength and battery life. V2 transmitters are etched with a "V2" on the stainless battery compartment (not on the label) and have a multipower mode sticker around the IR port.

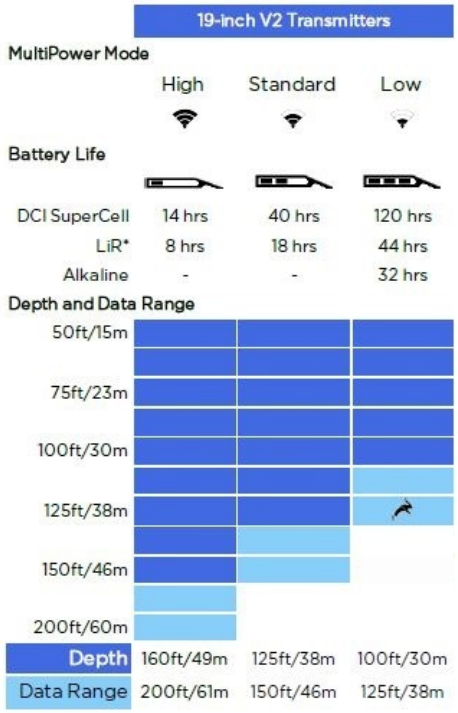


If used with a Falcon locator without the programmable power mode, the mode selected while pairing the Tx determines the signal range and the battery life.

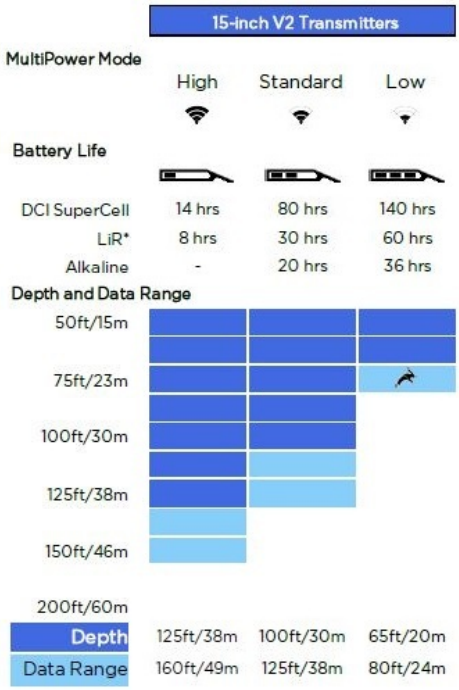
Falcon locators with programmable power mode override any other selection method when used with a V2 transmitter.

FTR Sub-k are not V2 capable.

19-in V2 Transmitters



15-in V2 Transmitters



For Falcon locators with multipower function, Low power also gives you a faster pitch update rate. Look for the rabbit icon.

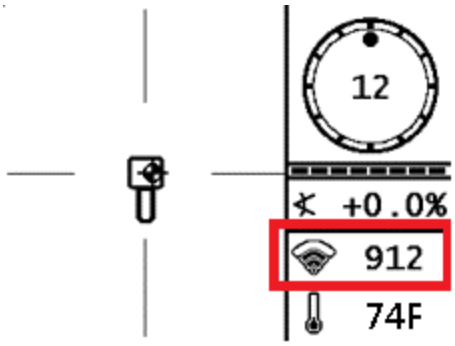
The battery types listed are the only types recommended for that model and size. DCI does not recommend using other battery types. *Lithium Rechargeable (LiR) battery life is based on 21700 battery with 5000 mAh rating. with a max 4.2 volts. Battery life while asleep is 400 hours for SuperCell and 200 hours for alkaline. Sleep mode starts 15 minutes after last roll change.

Range is based on SAE Standard J2520 in AGR mode and Max Mode. Actual range and battery life will vary based on interference, transmitter housings, and frequencies.

FTR (Sub-k Rebar) Tx's do not have MultiPower mode and have Standard power battery life. Depth/data range for Up Band is similar to Standard power; Down band is similar to Low power mode.
You can see the power mode selected for each band on the Transmitter Info screen. See "Get Transmitter Info" for steps.

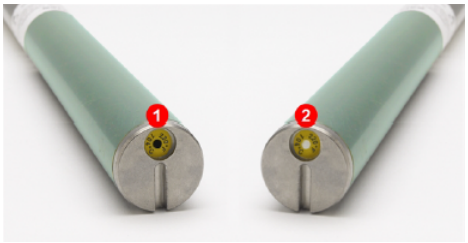
SN:	30141401
Transmitter:	FT2
Region:	1
Band:	43k 25k
Current:	0.131A
Voltage:	2.512V
Watts:	0.330W
Temp:	83°F
Max Temp:	85°F
Version:	2.1.4.28
Runtime:	2 hours

You can also see the Power mode of the current band on the Locate Mode screen and the TX Info pairing screen.



TRANSMITTER OVERHEAT INDICATOR (TEMP DOT)

DigiTrak transmitters (Tx), with the exception of DucTrak, have temperature overheat indicators (temp dot) on the front end cap.



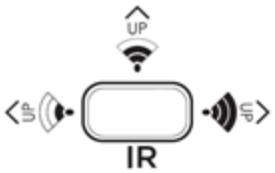
1. Black temp dot (voids warranty)
2. Normal white temp dot

The DCI Warranty does not cover any transmitter that has been overheated or had the temp dot removed.

CHANGE V2 TRANSMITTER POWER MODE

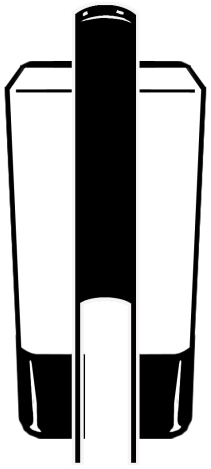
STEP 1 OF 4

If you are using a V2 transmitter with multipower mode, the direction you hold the transmitter while pairing a new band determines the power mode. See the *V2 Transmitter Multipower Mode Introduction* article for more information about power modes.



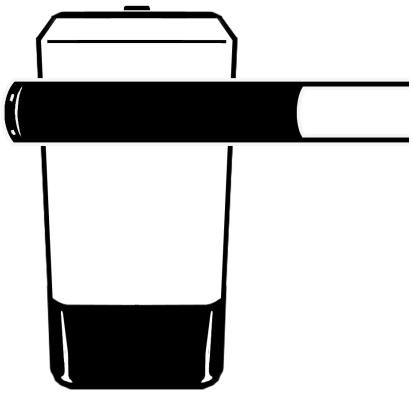
STEP 2 OF 4

To pair in High Power mode, hold the Tx with the index cap pointing up.



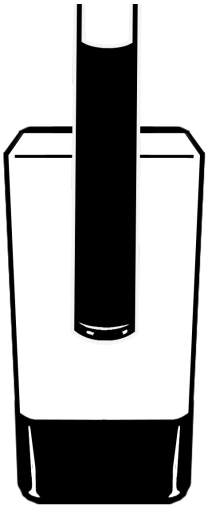
STEP 3 OF 4

To pair in Standard Power mode, hold the Tx horizontally.



STEP 4 OF 4

To pair in Low Power mode, hold the Tx with the index cap pointing down



MAX MODE

STEP 1 OF 4

Before You Get Started

Max Mode can stabilize roll/pitch data and depth readings when drilling at the transmitter's range limit due to extreme depth or interference, which will vary by jobsite. Use when the roll/pitch update meter shows low signal level or data is unstable.

The drill head must be stationary when taking readings using Max Mode. If the drill head is moving, data readings will not be accurate.

You will typically use Max Mode in areas where interference is high. In areas of high interference, it will be harder to obtain stable readings. Never rely on unstable depth or data. Max Mode is not a substitute for prudent operator judgment.

STEP 2 OF 4

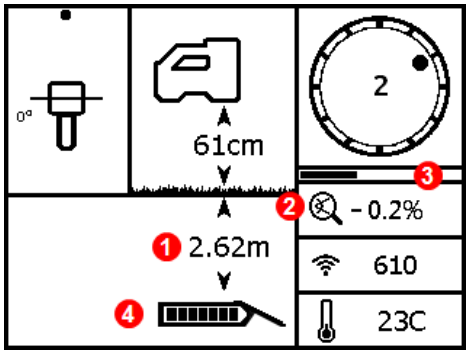
At the **Locate Mode** screen, hold the trigger for longer than five seconds to enter Max Mode.

STEP 3 OF 4

Continue holding the trigger until depth and data stabilize.

If the Max Mode timer fills up before depth and data stabilize, move to a different location near the drill head and hold to restart.

The timer bar will fill as data is confirmed.



1. Depth
2. Max Mode icon
3. Max Mode timer
4. Transmitter battery strength

STEP 4 OF 4

Take **two more** Max Mode readings. All three readings must be consistent.

> ⚠ If the readings are not consistent, change the band and try again. If the readings continue to be inconsistent, turn the locator off and then on again. If the issue continues, contact DCI Customer Support.

TARGET STEERING

STEP 1 OF 5

Before You Get Started

The Target Steering guidance method allows the Falcon locator to be placed ahead of the drill head and used as a steering target.

Use it to distance the locator from rebar that is causing signal interference and to drill where walkover locating is not possible.

Target Steering is typically only used on a straight drill path under level ground, not a curved path, with terrain changes, or to correct a significantly off-course bore.

The maximum distance the locator can be placed ahead of the drill head for Target Steering is 35 ft (10.7 m).

Within this range, starting with the drill head approximately level, the maximum depth and pitch changes are approximately 4 ft (1.2 m) and 14%, respectively.

Beyond this distance, depth information becomes less accurate.

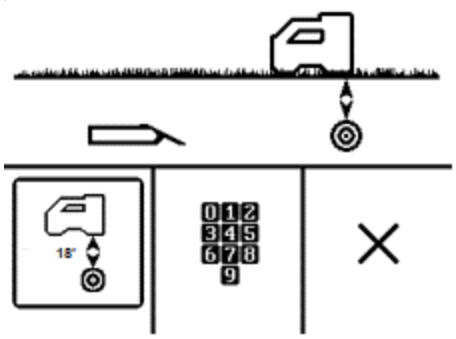
Data and left / right steering is usable for the entire range of the transmitter.

Any Height-Above-Ground (HAG) setting is ignored by the locator when Target Steering is used.

Target Steering is not supported by the Falcon Compact Display.

STEP 2 OF 5

Toggle up from the Locate Mode screen to switch to Target Steering menu.



shows the last target depth set. If it matches your desired target depth*, select **Target Steering**.

The remote screen will not display Target Steering until the locator is in Target Steering mode.

STEP 3 OF 5

To change the target depth shown, use the keypad and then select enter to turn Target Steering on.

HAG is not factored into the target depth setting. Elevate the locator and add that height to the target depth if drilling shallower than 1.5 ft (46 cm) or if elevating the locator to distance it from rebar.

STEP 4 OF 5

Place the locator on the drill path with its battery compartment facing the drill head. Target Steering guides the transmitter to be inline with the locator's handle when it reaches the target beneath the locator. For accurate depth information, use the horizontal distance reading on the Target Steering display to ensure the locator is no more than 35 ft (10.7 m) in front of the transmitter.

1. Horizontal distance from transmitter to locator
2. Current transmitter depth below the plane of the locator

At this point, the drill rig operator uses the remote display to drill to the target.

STEP 5 OF 5

When the horizontal distance is almost the same as the current depth, move the locator farther out to continue Target Steering.

Depth and distance are accurate until the Locate Line (LL) passes the locator. Once the FLP reaches the locator, or the distance is almost the same as the depth, the left/right steering indicators could be wrong.

Toggle down to turn off Target Steering and return to the Locate Mode screen.

GLOSSARY DEFINITIONS

> *TARGET DEPTH
>
> A value programmed into the locator, so it can be positioned ahead of the transmitter housing and used as a steering target. The value programmed should be the desired depth of the transmitter when it reaches the point below the locator. If a locator is placed above ground level, such as to provide separation from interference, that height must be added to the target depth.
>
> **Note**: If using a Falcon Compact Display, only left/right steering information is available. The locator used with the Falcon Compact Display must still have a target depth set. This target depth can be any value.

USE DIFFERENT SCANS FOR UP AND DOWN BANDS

STEP 1 OF 10

The Jobsite Setup topic **Find Best Frequencies** describes how to run the frequency optimizer, walk the bore to scan for interference*, then optimize both bands at the point of highest noise. You need to be familiar with that topic before reading this one.

For jobsites with extra-challenging interference, consider a scan-pick-pair of the first band at the noisiest point (such as next to the power transformer), then scan-pick-pair the second band at the second-noisiest point (such as over railroad tracks). This gives you a specifically tailored band for each of the two most difficult locations along your drill path.

⚠ To use different scans for the Up and Down bands, you must pair the first band before scanning for a second band.

STEP 2 OF 10

Ensure all transmitters are powered off or more than 100 ft (30.5 m) away from the locator.

STEP 3 OF 10

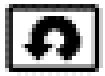
From the **Main** menu select **Transmitter options**.

STEP 4 OF 10

Frequency optimization, and continue.

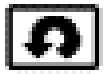
STEP 5 OF 10

Click the arrow to start the scan.



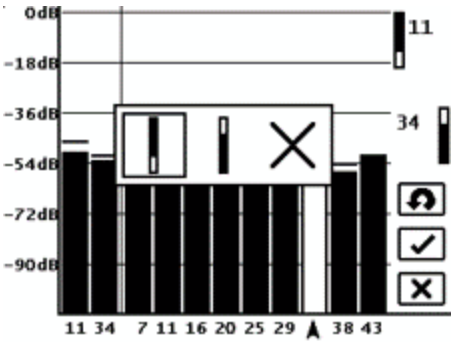
STEP 6 OF 10

When the noise bars appear, walk the intended drill path to find the two locations with the highest levels of noise, then return to one of those locations and scan again.



STEP 7 OF 10

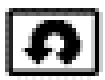
Toggle to the band with the least noise*, click to select, then click again to assign it as the Up band.



Before assigning the Down band, pair the Up band to the transmitter. Otherwise, rescanning will erase the current frequencies.

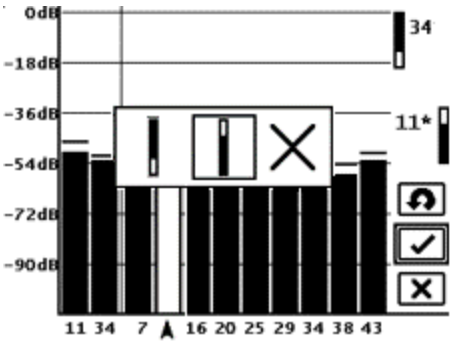
STEP 8 OF 10

Move to the other location with high noise, return to **Frequency Optimization**, and scan again.



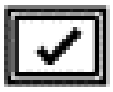
STEP 9 OF 10

Toggle to the lowest band, click to select, then click again to assign it as the Down band.



STEP 10 OF 10

Select **Pair** to pair and select power level for the Down band before proceeding to calibration as you normally would when pairing both bands at one location.



GLOSSARY DEFINITIONS

*INTERFERENCE

Your locator can only detect active interference, not passive interference, such as rebar. Lower frequency bands tend to perform better around passive interference. Middle bands can perform better in deeper bores and may have longer Target Steering capability. High bands have slightly less signal strength, but tend to offer better performance around active interference such as power lines.

*BAND WITH THE LEAST NOISE

Interference varies with time and location, and no band works perfectly in all conditions. Different bands are better for different kinds of interference. Lower frequency bands tend to perform better in passive interference. Middle bands can perform better in deeper bores and may have longer Target Steering capability.

> Higher frequency bands have slightly less signal strength but tend to offer better performance around active interference such as power lines.

10 FT (3 M) ROD DEPTH CHANGE BASED ON PITCH

Depth Increase in Inches (cm)

% Slope	Depth Increase	% Slope	Depth Increase
1	1 (2)	28	32 (81)
2	2 (5)	29	33 (84)
3	4 (10)	30	34 (86)
4	5 (13)	31	36 (91)
5	6 (15)	32	37 (94)
6	7 (18)	33	38 (97)
7	8 (20)	34	39 (99)
8	10 (25)	35	40 (102)
9	11 (28)	36	41 (104)
10	12 (30)	37	42 (107)
11	13 (33)	38	43 (109)
12	14 (36)	39	44 (112)
13	15 (38)	40	45 (114)
14	17 (43)	41	46 (117)
15	18 (46)	42	46 (117)
16	19 (48)	43	47 (119)
17	20 (51)	44	48 (122)
18	21 (53)	45	49 (124)
19	22 (56)	46	50 (127)
20	24 (61)	47	51 (130)
21	25 (64)	50	54 (137)
22	26 (66)	55	58 (147)
23	27 (69)	60	62 (157)
24	28 (71)	70	69 (175)
25	29 (74)	80	75 (191)
26	30 (76)	90	80 (203)
27	31 (79)	100	85 (216)

Slopes between 50% and 100% are provided for reference only and do not represent typical drilling conditions. All numbers are based on math only and do not take into account extremely soft or extremely hard soil conditions, which may cause depth values to vary.

DEPTH INCREASE IN INCHES (CM) PER 15 FT (4.6 M) ROD

Depth Increase in Inches (cm)

% Slope	Depth Increase	% Slope	Depth Increase
1	2 (5)	28	49 (124)
2	4 (10)	29	50 (127)
3	5 (13)	30	52 (132)
4	7 (18)	31	53 (135)
5	9 (23)	32	55 (140)
6	11 (28)	33	56 (142)
7	13 (33)	34	58 (147)
8	14 (36)	35	59 (150)
9	16 (41)	36	61 (155)
10	18 (46)	37	62 (157)
11	20 (51)	38	64 (163)
12	21 (53)	39	65 (165)
13	23 (58)	40	67 (170)
14	25 (64)	41	68 (173)
15	27 (69)	42	70 (178)
16	28 (71)	43	71 (180)
17	30 (76)	44	72 (183)
18	32 (81)	45	74 (188)
19	34 (86)	46	75 (191)
20	35 (89)	47	77 (196)
21	37 (94)	50	80 (203)
22	39 (99)	55	87 (221)
23	40 (102)	60	93 (236)
24	42 (107)	70	103 (262)
25	44 (112)	80	112 (284)
26	45 (114)	90	120 (305)
27	47 (119)	100	127 (323)

Slopes between 50% and 100% are provided for reference only and do not represent typical drilling conditions. All numbers are based on math only and do not take into account extremely soft or extremely hard soil conditions, which may cause depth values to vary.

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