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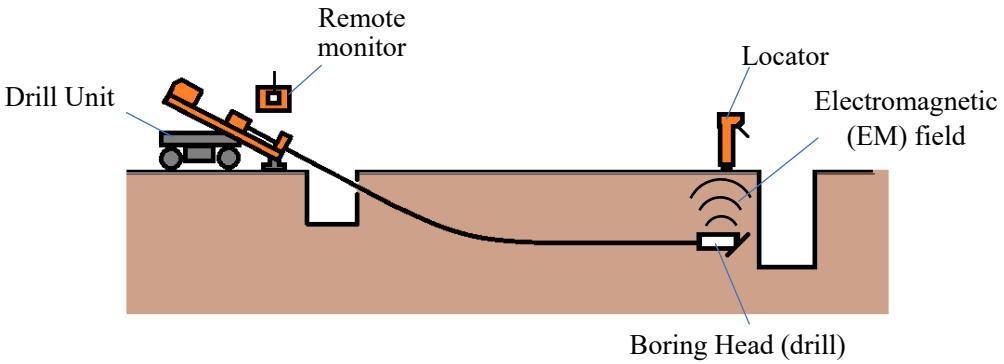
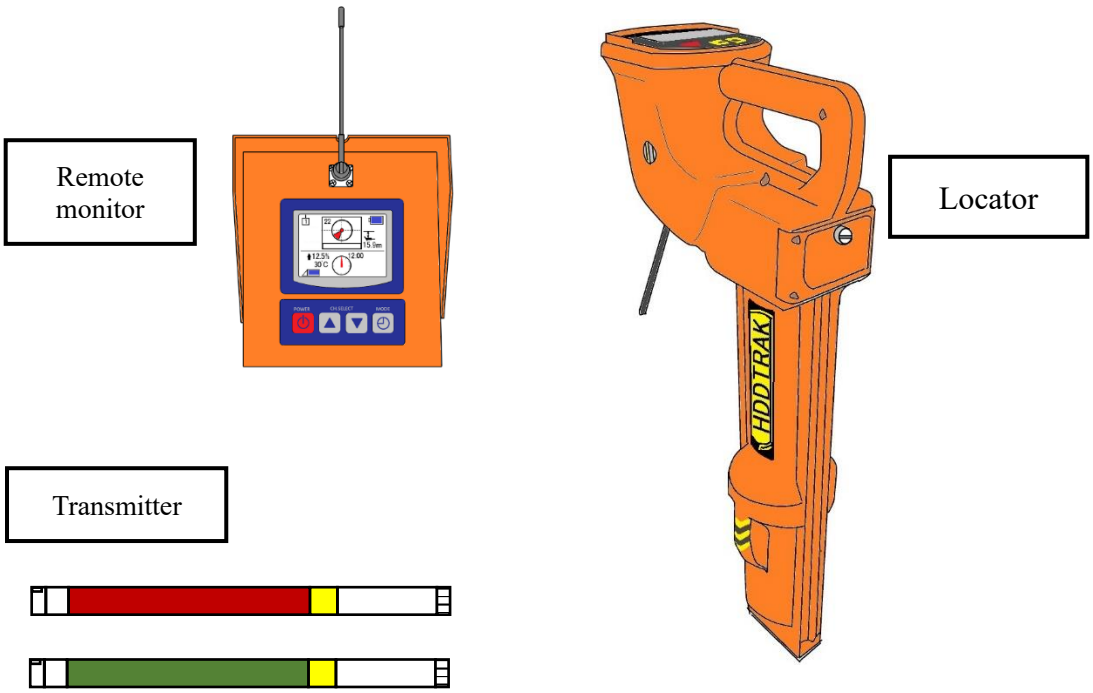
1. Product Summary

This product measures the position, angle, and depth of the drill head for Horizontal Directional Drilling. The product is composed of a locator, a monitor, and a transmitter.



Component	Explanation
Locator	This component measures the position, depth, and angle of the boring head.
Remote monitor	This component receives and displays the transmitted data from the locator. It is used inside the cab of the drill rig.
Transmitter	Placed inside the boring head, the Transmitter transmits an electromagnetic signal that informs the locator of the depth and location of the boring head, as well as information about the angle of the drill. There are several transmitters available to suit the various environmental conditions.

Product Exterior



2. Product Specifications

1) Locator

Item		Standard	
Receiving frequency		38 kHz, 14.4 kHz, 9.5 kHz	
Power source		6 Alkaline “C” batteries	
Battery life		12 hours (at 25°C, using alkaline batteries)	
Power saving function		Power turns off after no signal for 10 minutes or more	
Operating temp. range		-20 ~ 60°C	
Signal reception range		0 ~ 39.9m	
Display screen		Color LCD (with backlight)	
Wireless transmission	Channel	1ch ~ 4ch	
	Frequency	CH. 1 469.500 MHz CH. 2 469.550 MHz CH. 3 464.500 MHz CH. 4 464.550 MHz ※ Error within 3 ppm (1.4 kHz)	
	Output	70 mW (standard value), BNC connector 50 Ω	
	Wireless range	500 m or more (with no interference between locator and monitor)	
Transmitter information	Pitch angle	Displayed in degrees Displayed as %	：↑50.0°~ ↓50.0° ：↑119.0% ~↓119.0%
	Roll angle	360° (divided into 24ths)	
	Temperature	-20°C ~ 90°C	
	Remaining Battery life	0% ~ 100%（displayed in 20% increments）	
Digital level		4 levels（approx. 4 degrees per level）	
Dimensions		(H)660 mm × (W)150 mm × (D)270 mm	
Weight		2.3 kg (including batteries)	
Material		ABS (Waterproof, impact resistant)	
Dust - proof・Waterproof		Conforms to IP65 standards	

2) Remote monitor

Item		Standard
Power source		4 Alkaline “C” batteries
Battery life		12 hours (at 20ºC using alkaline batteries)
Power saving function		Power turns off after no signal for 5 minutes or more
Operating temp. range		-20 ~ 60°C
Display screen		Color LCD (with backlight)
Display data		Transmitter information, lateral position (right and left), linear position (front and back), yaw angle, depth
RF specs	Antenna	Collapsible, BNC connector (50 Ω)
	Channel	1ch ~ 4ch
	Wireless freq.	CH. 1 469.500 MHz CH. 2 469.550 MHz CH. 3 464.500 MHz CH. 4 464.550 MHz
	Range	500 m or more (with no interference between locator and monitor)
Dimensions		(H)176 mm × (W)163 mm × (D)125 mm
Weight		2.4 kg (including batteries)
Material		Stainless steel, Waterproofing
Dust - proof･Waterproof		Conforms to IP65 standards

APPROVED ANTENNAS:

The use of any antennas other than those approved of and directly supplied by the manufacture is not permitted and may violate FCC guidelines. Please do not replace antennas on locator or remote monitor without express permission of the manufacturer or an authorized representative.

The antennas used for this transmitter must be used while providing a separation distance greater than 10 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter.

Les antennes utilisées pour cet émetteur doivent être utilisées tout en offrant une distance de séparation supérieure à 10 cm de toutes les personnes et ne doivent pas être co-localisées ou utilisées en conjonction avec une autre antenne ou émetteur.

3) Transmitter

General Specifications

Item		Standard
Power source		2 Alkaline “C” batteries
Battery life		10 hours or more (at 25°C, using alkaline batteries)
Power saving function		Automatically turns off after 10 minutes without rotating
Operating temp. range		-20 ~ 60°C
Meas. functions	Pitch angle	Displayed in degrees ↑50.0°~ ↓50.0° Displayed as % ↑119.0% ~↓119.0% Resolution: Below 22.5°: 0.1° Above 22.5°: 0.5°
	Roll angle	360° divided into 24ths (Angle of rotation relative to direction of travel)
	Temperature	Temperature range -20°C ~ 90°C Resolution: 30°C ~ 70°C: 5°C Otherwise: 10°C
	Remaining battery life	0% ~ 100%（displayed in 20% increments）
Transmitting output		1 W or less
Range		25 m (with no interference of noise）
Dimensions		Diameter: 31.5 mm × length: 380 mm
Weight		Approx. 1 kg (including batteries)
Material		Body: Glass fiber, battery portion: BSBM（Ni coated）
Waterproofing		W.R. 3 bar (3 atmosphere), water will not seep into the transmitter

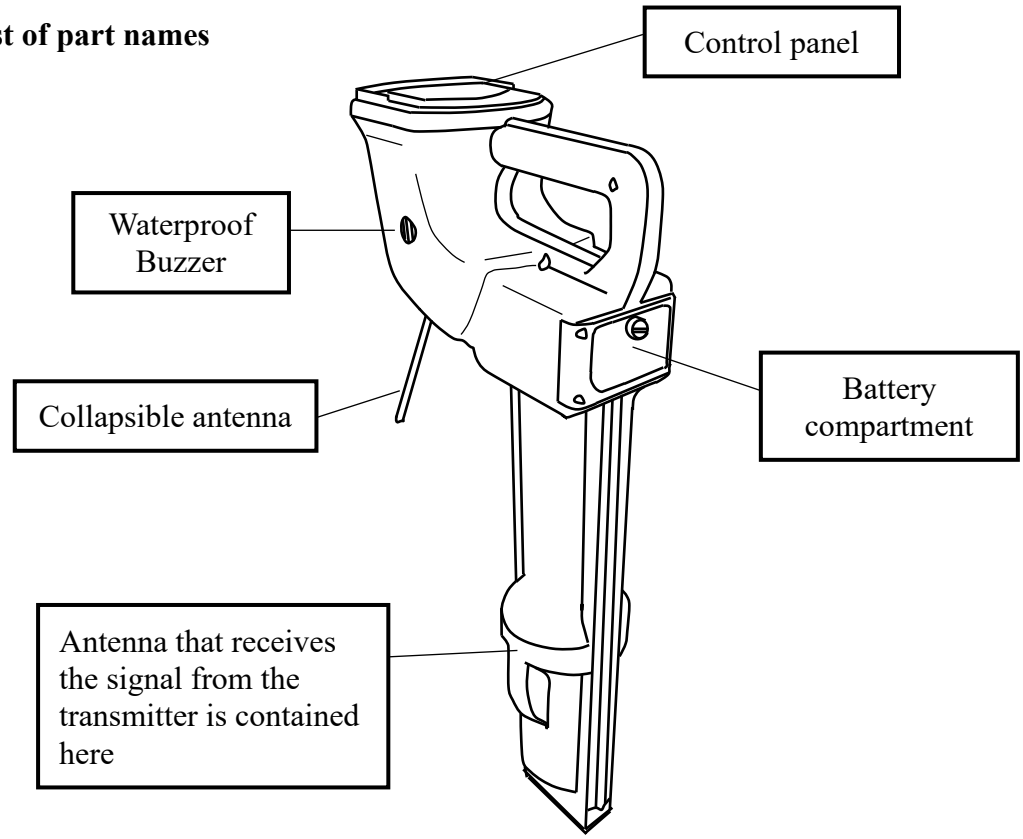
Individual Specifications (for each transmitter)

Item	Standard
HDDTRAK T14 (14.4kHz)	Body color Green Frequency 14.375 kHz
HDDTRAK T38/T9 (38kHz & 9.5kHz)	Body color: Red Dual frequency 38.075 kHz / 9.575 kHz ※Change between frequencies by rotating the Transmitter

3. List of Part Names

3-1. Locator

1) List of part names



2) Replacing the batteries

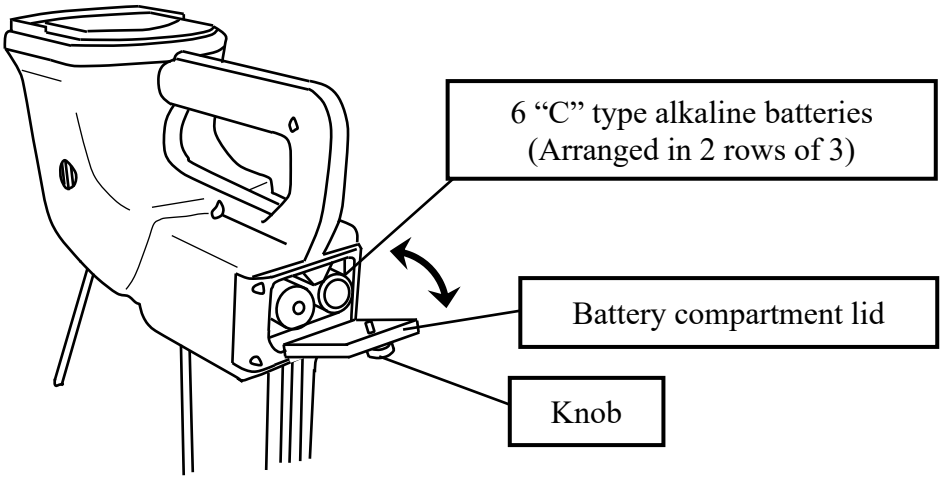
I) Turn the knob on the lid of the battery compartment on the back of the receiver. counterclockwise to open it.

Holding down on the lid while turning the knob allows the knob to turn more easily.

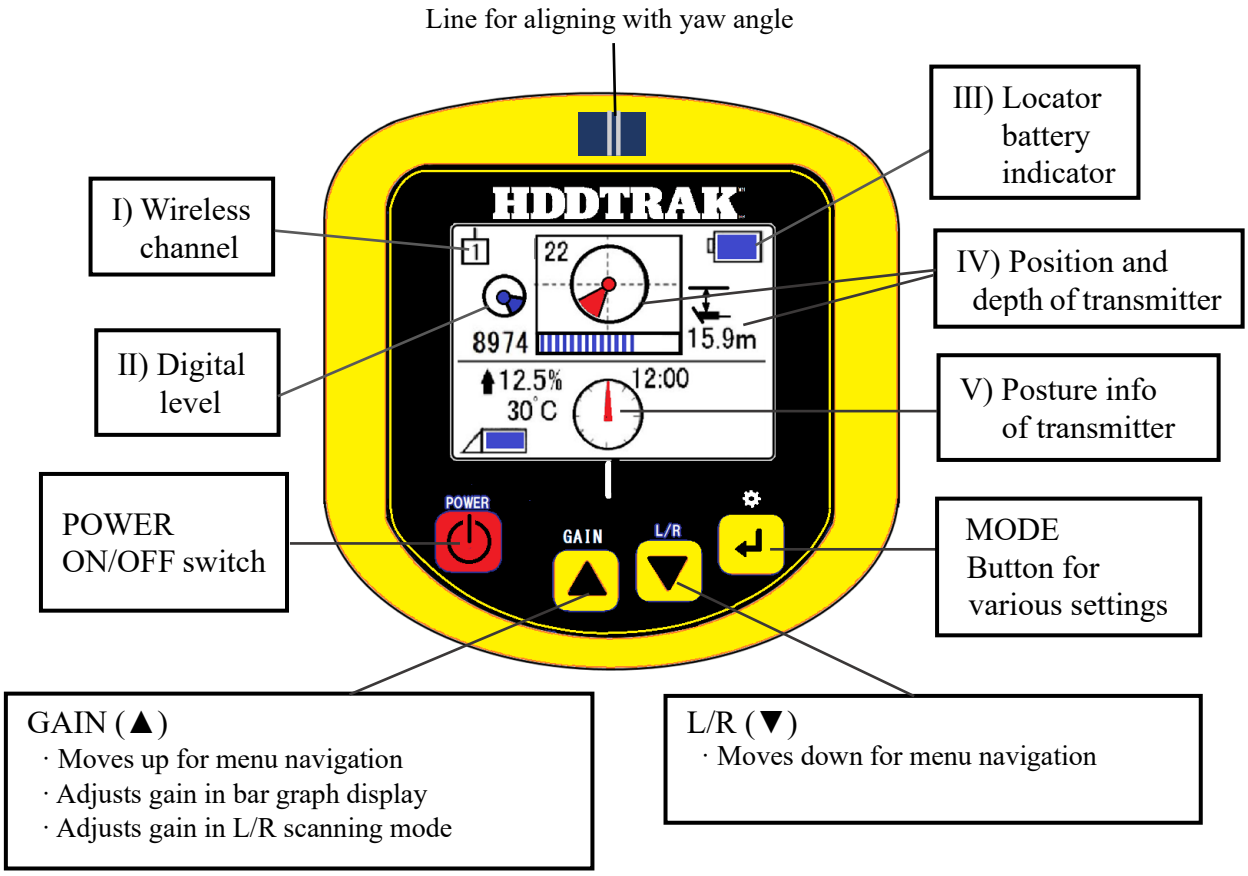
II) Put in 6 new “C” type, alkaline batteries

Insert the batteries in the direction displayed on the label in the battery case.

III) Close the battery lid and turn the knob clockwise until it is tight.

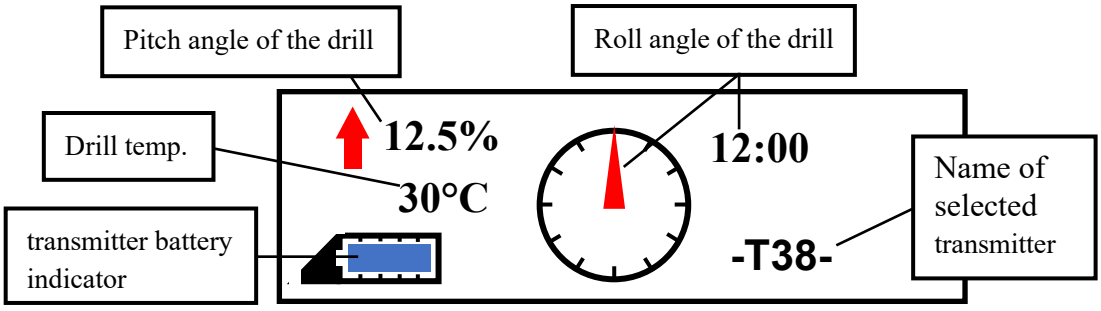


3) Explanation of Control Panel



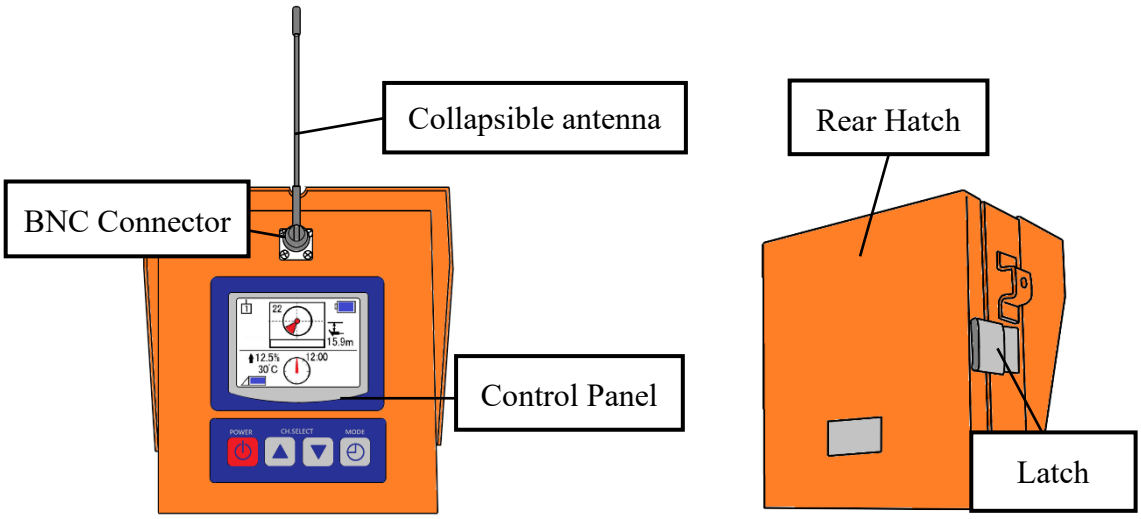
Outline of Display Panel

I) Wireless channel	Displays the wireless channel used between monitor and locator
II) Digital level	Displays the level of tilt of the locator
III) Locator battery indicator	Displays the remaining battery life of the locator itself
IV) Position and depth of transmitter	Displays EM field intensity of transmitter, Yaw angle, Linear position (front/back), lateral position (left/right), and depth
V) Posture info of transmitter	Drill angle (as measured by transmitter), temperature, remaining battery of the transmitter



3-2. Monitor

1) List of part names



2) Replacing the batteries

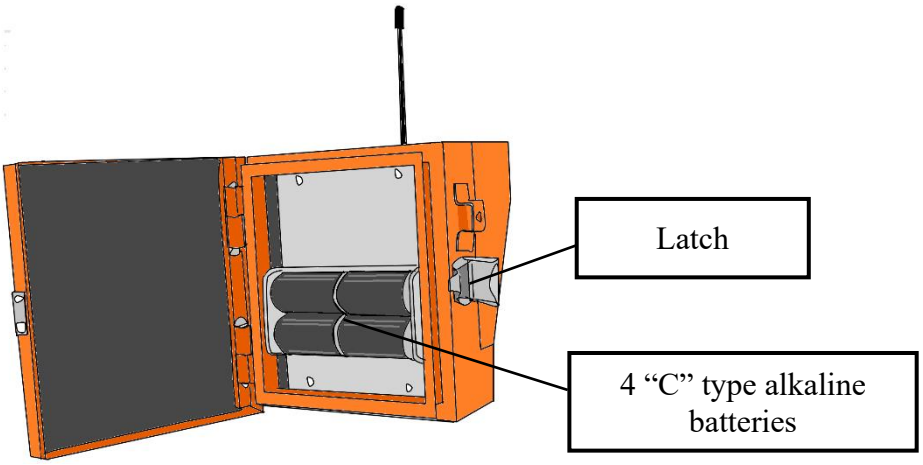
I) Release the latch on the side of the monitor to open the rear hatch.

II) Put in 4 “C” type alkaline batteries.

Insert the batteries in the direction displayed on the label in the battery case.

Take care not to pinch fingers or other extremities while replacing batteries.

III) Close the back hatch and the fasten the latch.



3) Attaching and removing the antenna

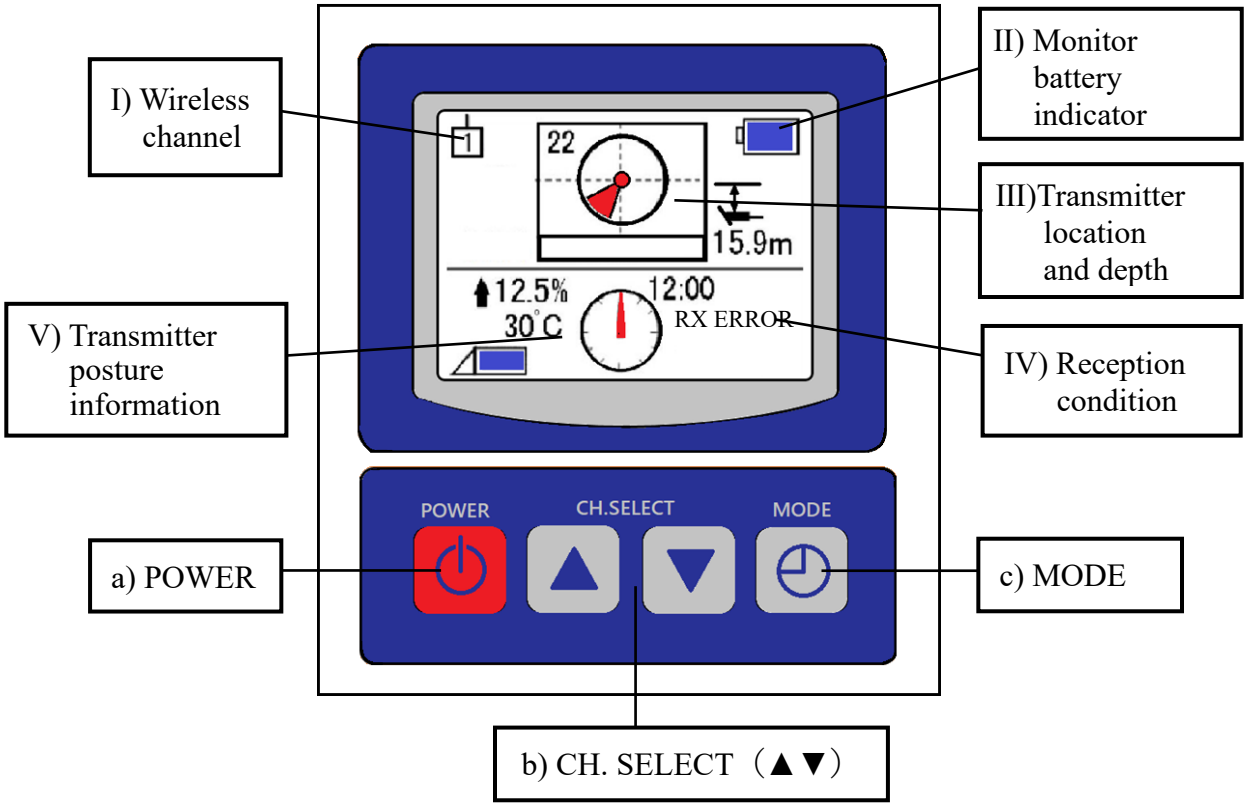
Connect the antenna to the BNC connector on the top of the monitor.

Hold the antenna by the base and align it with the hole, then turn clockwise to attach.

When removing the antenna, carry out this process in reverse order.

The antenna is collapsible and can be folded down in any direction.

4) Explanation of control panel



Outline of LCD display

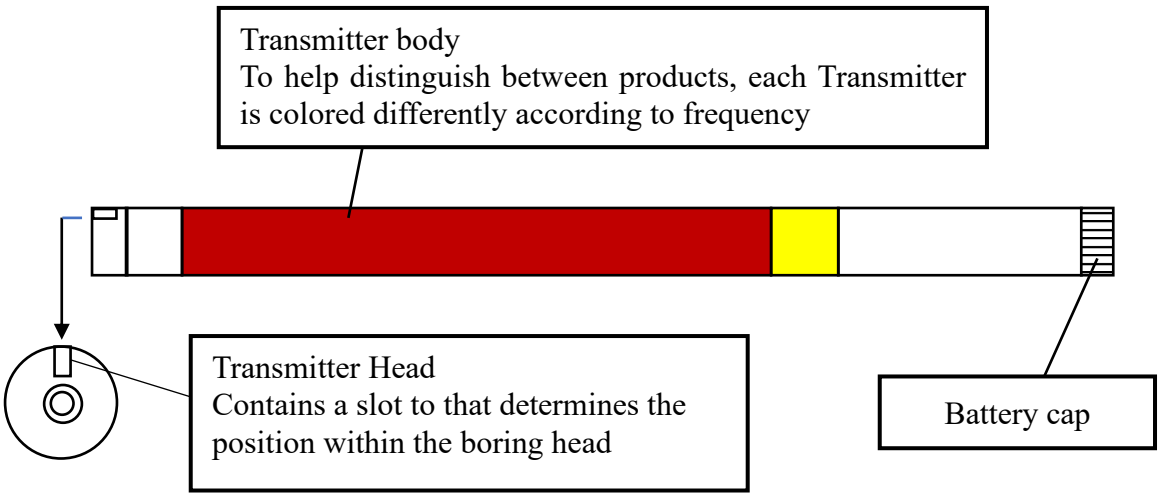
I) Wireless channel	Displays wireless channel used between locator and monitor
II) Monitor battery indicator	Displays the remaining battery power of the monitor itself
III) transmitter location and depth	Displays yaw angle, linear position (front and back), lateral position (right and left) and depth
IV) Reception condition	Displays reception condition between locator and monitor
V) transmitter posture information	Displays drill angle (measured by transmitter), temperature, and remaining battery life of transmitter ※For more details, see explanation of locator display

Outline of buttons

a) POWER	Power ON/OFF button
b) CH. SELECT（▲▼）	Selects wireless channel（ch. 1～ch. 4） ▲: Select higher channel　　▼: Select lower channel
c) MODE	Setting button（Select angle units）

3-3. Transmitter

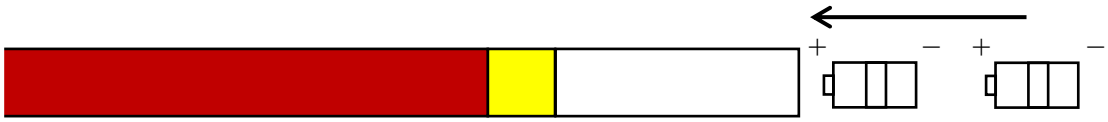
1) List of part names



2) Replacing the batteries

I) Remove the battery cap from the rear of the transmitter.

II) Insert two “C” type alkaline batteries, making sure the batteries are in the proper direction.

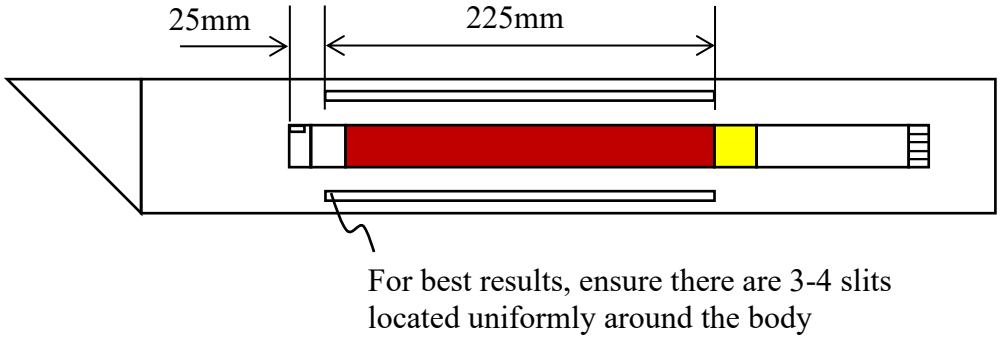


III) Refasten the battery cap.

3) Slit manufacturing dimensions

The portion of the boring head (drill) containing the transmitter has slits to allow the transmitter to transmit a magnetic field. For best results, ensure that slits are as indicated in the diagram below.

Suggested dimensions. Please contact maker for details.



4. Operating the Locator

1) Settings

Before use, it is necessary to adjust settings and perform depth calibration.

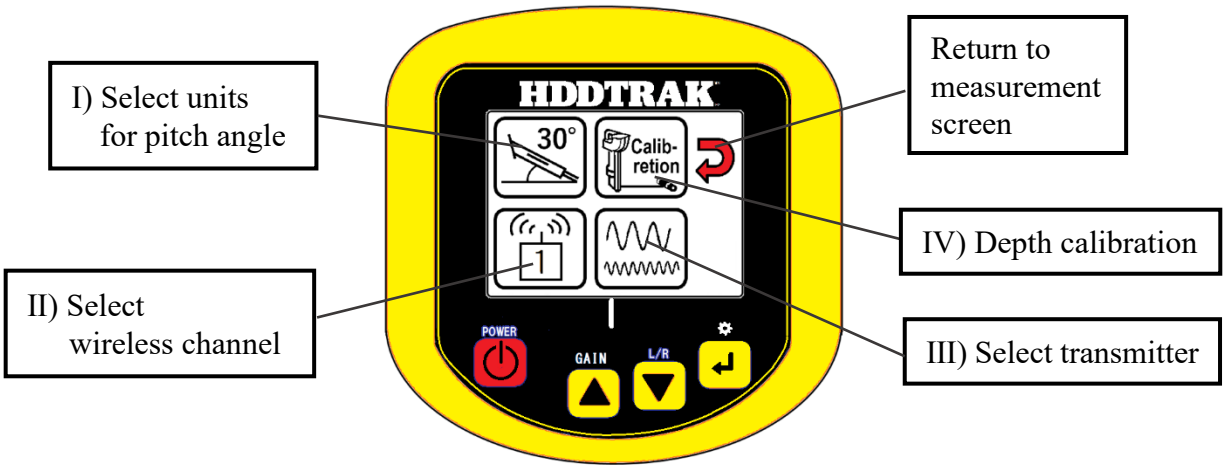
Pressing the **MODE** button from the measurement screen will bring up the **settings screen.**

(indicated in the **diagram below**)

Navigate the menu by pressing the **GAIN** (▲) and **L/R** (▼) button.

(The current selected setting will appear in red)

To make your selection, Press the **MODE** button.



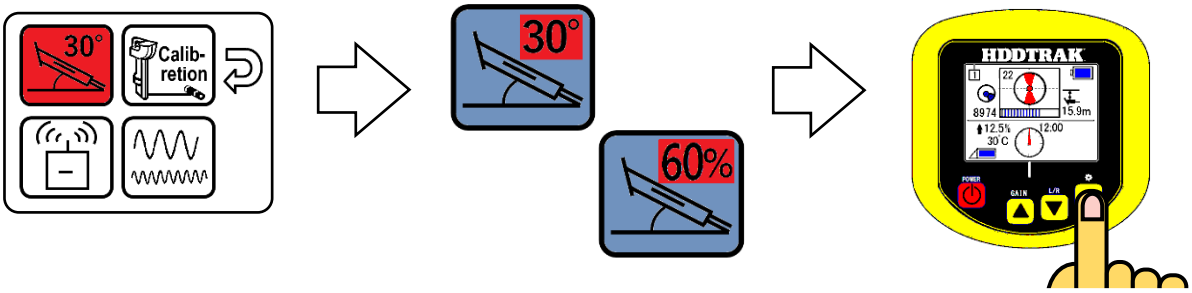
I) Pitch angle unit selection

Pitch angle can be displayed either in degrees or as a gradient (percentage).

a) Navigate to the icon in the top left corner of the screen and press the **MODE** button.

b) Use the **GAIN** (▲) and **L/R** (▼) button to select degrees or percentage.

c) Press the **MODE** button and return to measurement screen.



II) Selecting a wireless channel

Set the locator and the monitor to the same wireless channel.

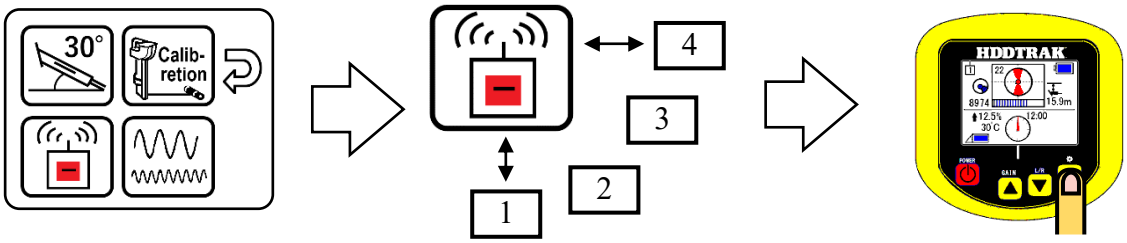
※The minus mark [-] as indicated in the figure below means that the transmission is off.

In the case of poor reception quality or interference, please change to a different channel.

a) Navigate to the wireless icon in the menu and press **MODE** button to select.

b) Toggle between channels using the **GAIN** (▲) and **L/R** (▼) button.

c) Press **MODE** again and return to the measurement screen.



III) Selecting the transmitter

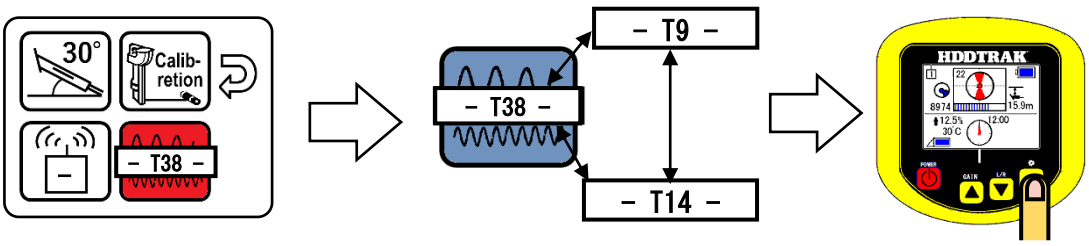
The transmitter has three available frequencies. Select the most suitable frequency for your jobsite.

For details, please refer to section **3) - "Measuring noise"**.

a) Navigate to transmitter icon in the bottom right corner and press **MODE** to select.

b) Toggle between frequencies using **GAIN** (▲) and **L/R** (▼) button.

c) Press **MODE** again and return to the measurement screen.



IV) Depth Correction (Calibration)

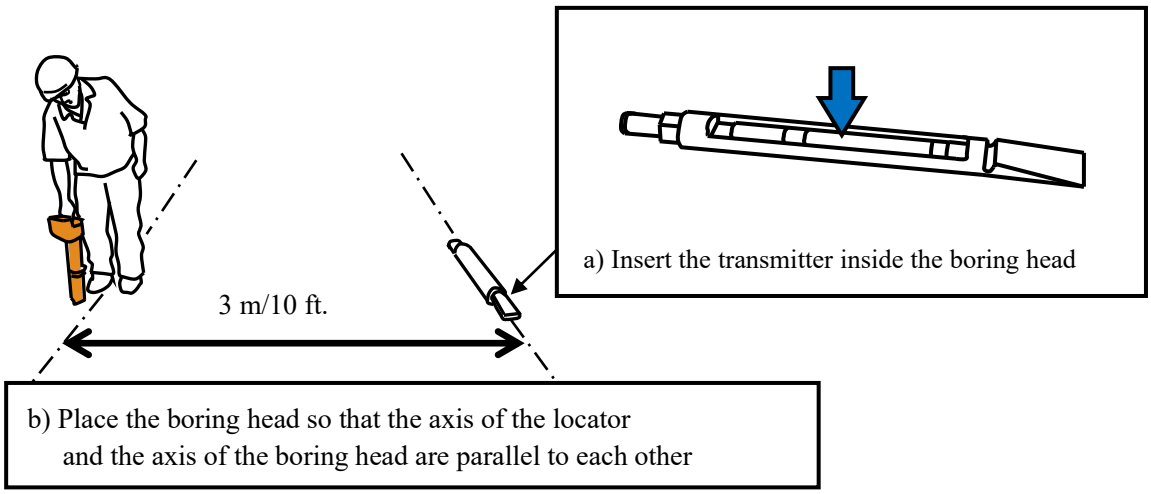
Navigate to the calibration icon in the top right corner of the screen and press **MODE** to select.

For details, refer to section **2) - "Depth correction (Calibration)".**

2) Depth correction (Calibration)

I) Set-up

From a position of 3m/10ft. from the boring head, place the locator as indicated in the diagram below.

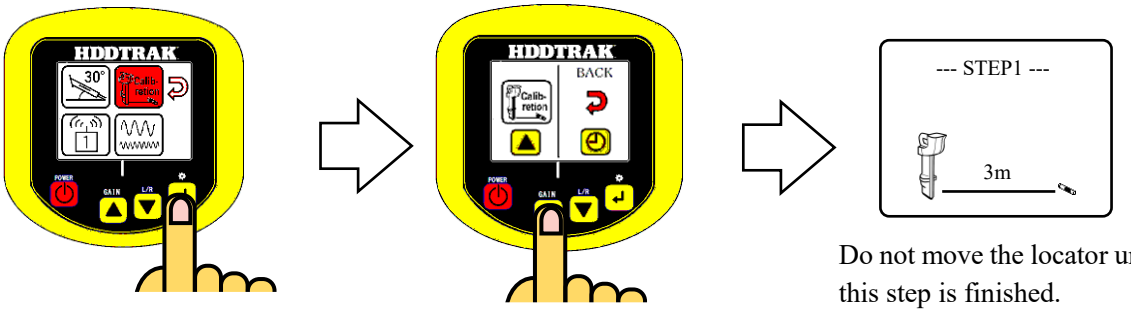


II) Starting calibration: Turn the locator ON and begin depth calibration.

a) Select "Calibration" from the menu and press and hold **MODE** for 1 second.

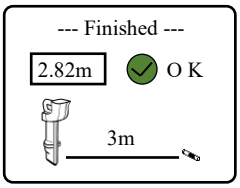
b) Press the **GAIN** (▲) button.

c) Depth calibration will begin.



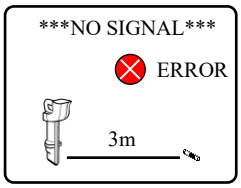
Do not move the locator until this step is finished.

III) When the calibration ~~is~~ finishes with no errors



- After receiving a display screen like the diagram to the left, return to standard measurement mode.
- The measurement value should be displayed as 2.82m/ 9ft.5in. : the initial 3m / 10ft. minus the distance from the ground to the coil (18cm / 7in.).
- When measuring a real drill under the ground, 3m / 10ft. will be displayed as 3.00m / 10ft.0 in.

IV) In the case of an error



An error message will be displayed when the signal cannot be received normally. Please perform the following checks:

- Is the batteries in the transmitter
- That the batteries are aligned properly in the transmitter
- The transmitter selected on the locator matches the transmitter being used

3) Measuring noise

As the levels of outside noise varies between job sites, the range of transmission will change.

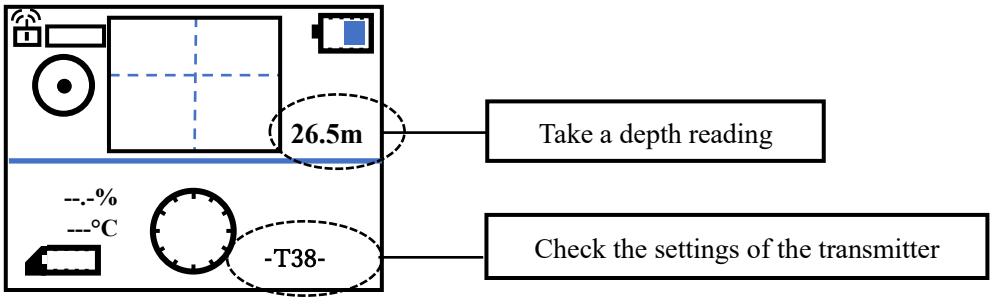
For this reason, it is useful to take a reading of the noise level of the jobsite before beginning.

I) Perform calibration as described in section 2) - Depth Correction (calibration)

II) Remove the batteries from the transmitter so that there is no signal coming from it.

III) Take a depth measurement.

Confirm the measured depth on the locator of the jobsite at which you will be using the unit.



IV) Calculate the transmission range of your site based on the measured depth.

Formula: Transmission range = Measured depth × 0.8

（e.g. for a measured depth of 30.0 m, the transmission range would be 24.0 m）

The frequency and magnitude of noise varies depending on the jobsite.

For example, strong noise may be emitted from nearby power transformers or the lights from a large retail store.

For users with multiple transmitters, please measure the noise of your jobsite and select the transmitter that is best suited for that environment.

Features of each transmitter type

· HDDTRAK T38: Frequency – 38 kHz

When the noise level is good, this transmitter has the longest range.

· HDDTRAK T9: Frequency – 9.5 kHz

This transmitter has the lowest frequency, making it less susceptible to interference from metal plating or other obstructions.

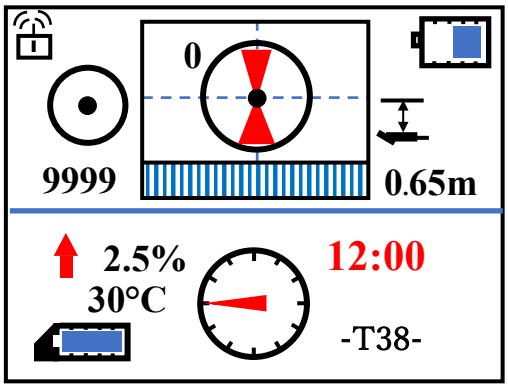
· HDDTRAK T14: Frequency – 14.4 kHz

This is a more balanced, midrange transmitter.

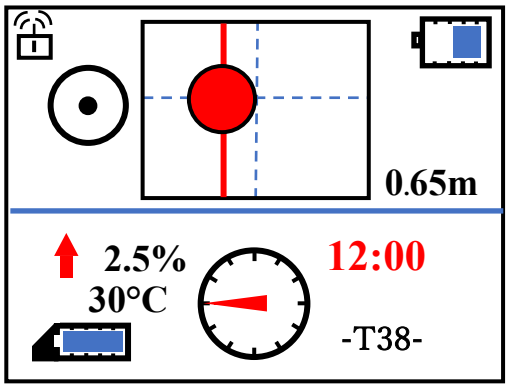
4) Measuring position

There are two methods for measuring location, as indicated in the diagram below.

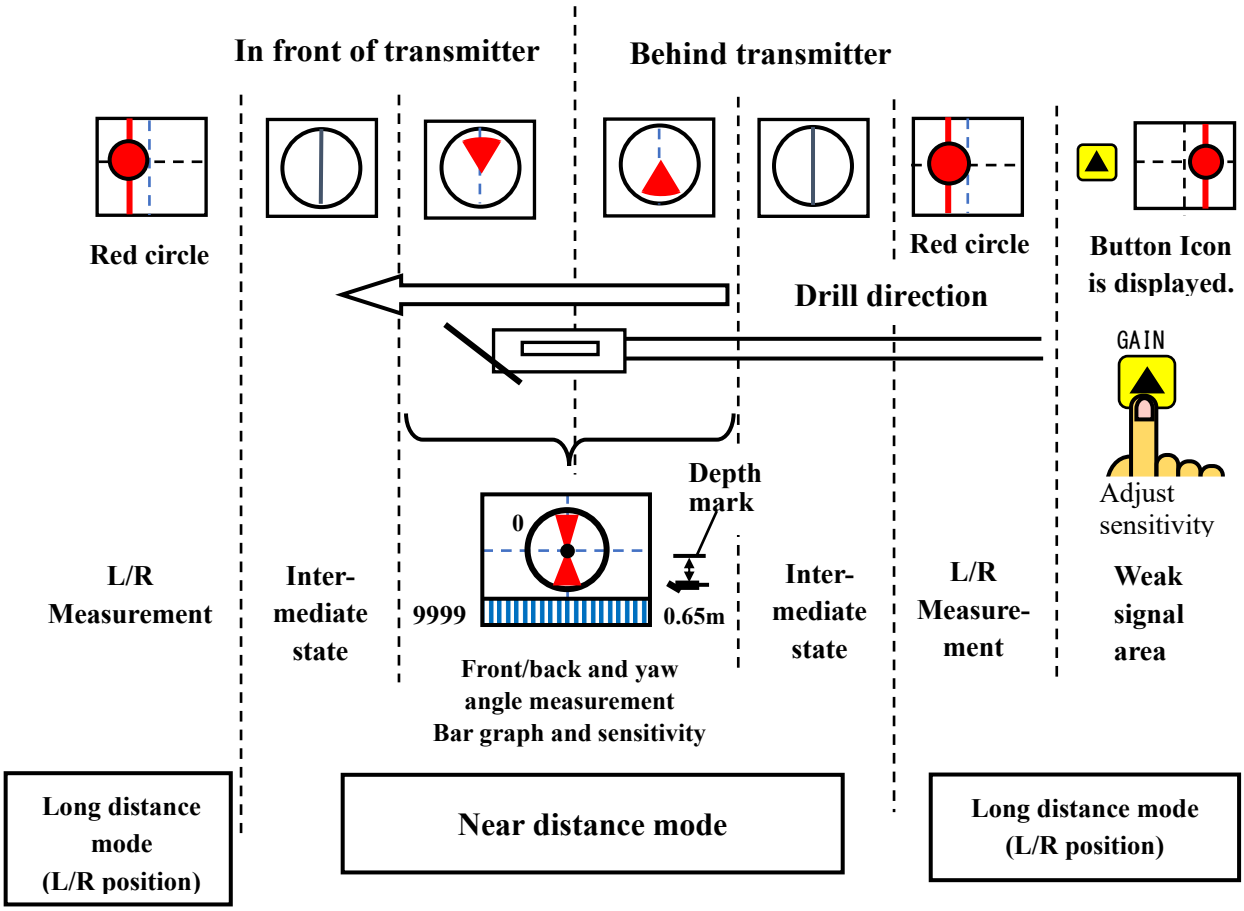
a) Near distance mode



b) Long distance mode (L/R position)



Scan method changes **automatically** based on the position of the Drill/Transmitter, as indicated in the diagram below.

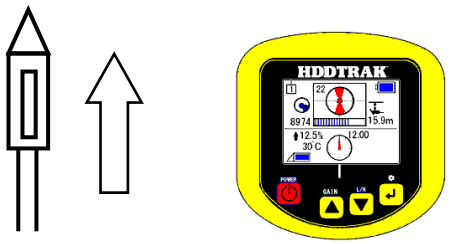


5) Near distance mode (Detailed explanation)

I) Direction of locator

In **near distance mode** ensure that

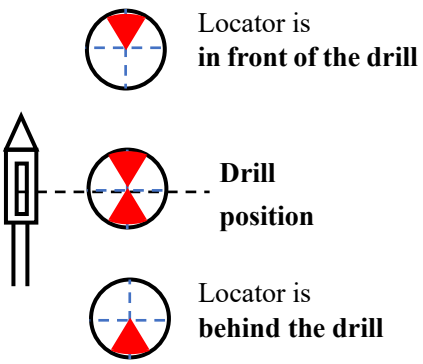
the locator is facing in the same direction as the drill is moving in.



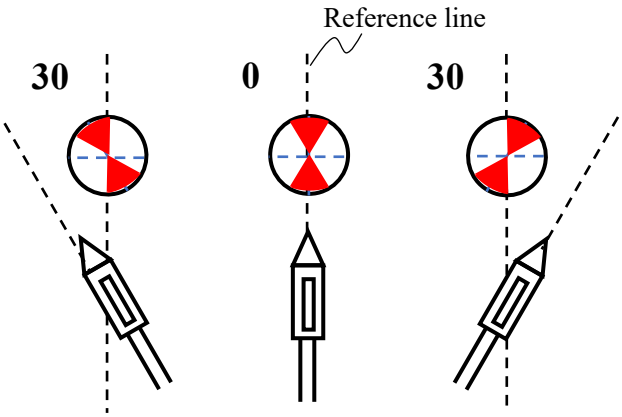
Drilling direction **Direction of locator**

> ***NOTE:***
> *If locator is facing the opposite direction, position errors related to pitch angle cannot be corrected properly.*

II) Measuring linear position (front/back)



III) Measuring tilt (yaw angle)

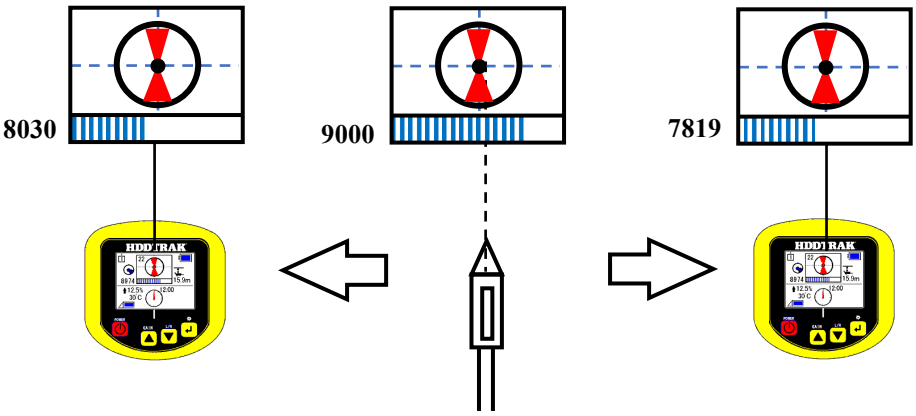


* First, conduct a linear (front/back) scan.
Then align locator with reference line.

IV) Measuring Lateral position (Left/Right)

Measure the point at which reception sensitivity (bar graph display) is at its peak.

Peak sensitivity point = Position directly above drill

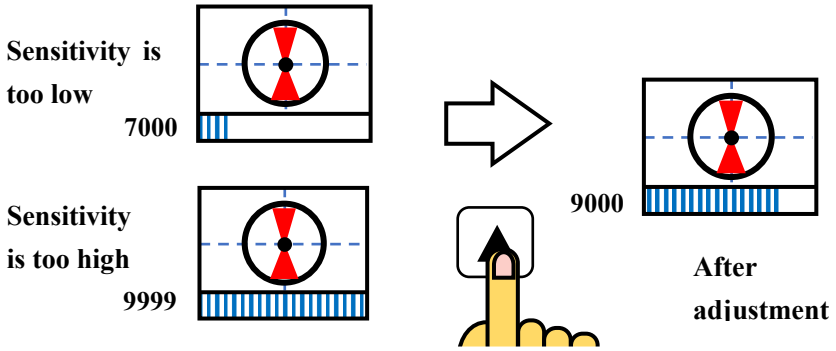


V) Adjusting sensitivity

When sensitivity is too low, or display shows 9999, press the GAIN (▲) button.

Sensitivity will be adjusted automatically.

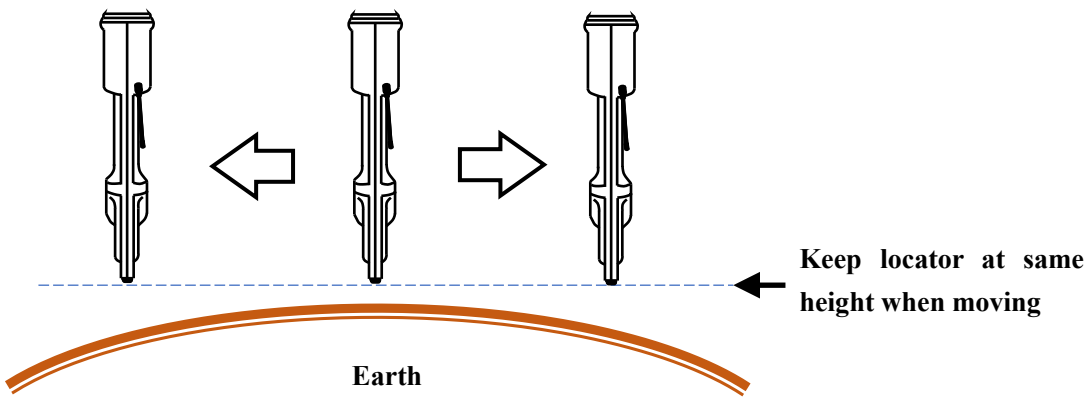
※When adjusting sensitivity, displayed value is relative value of 9000.



VI) Position measurement precautions

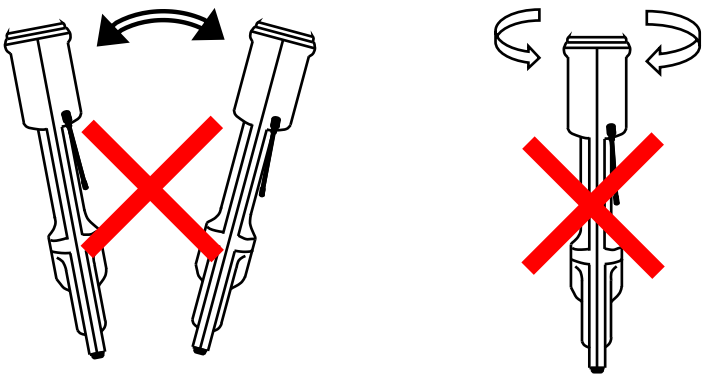
a) When moving the locator, ensure the height from the ground remains the same.

Failure to do so can result in measurement errors.



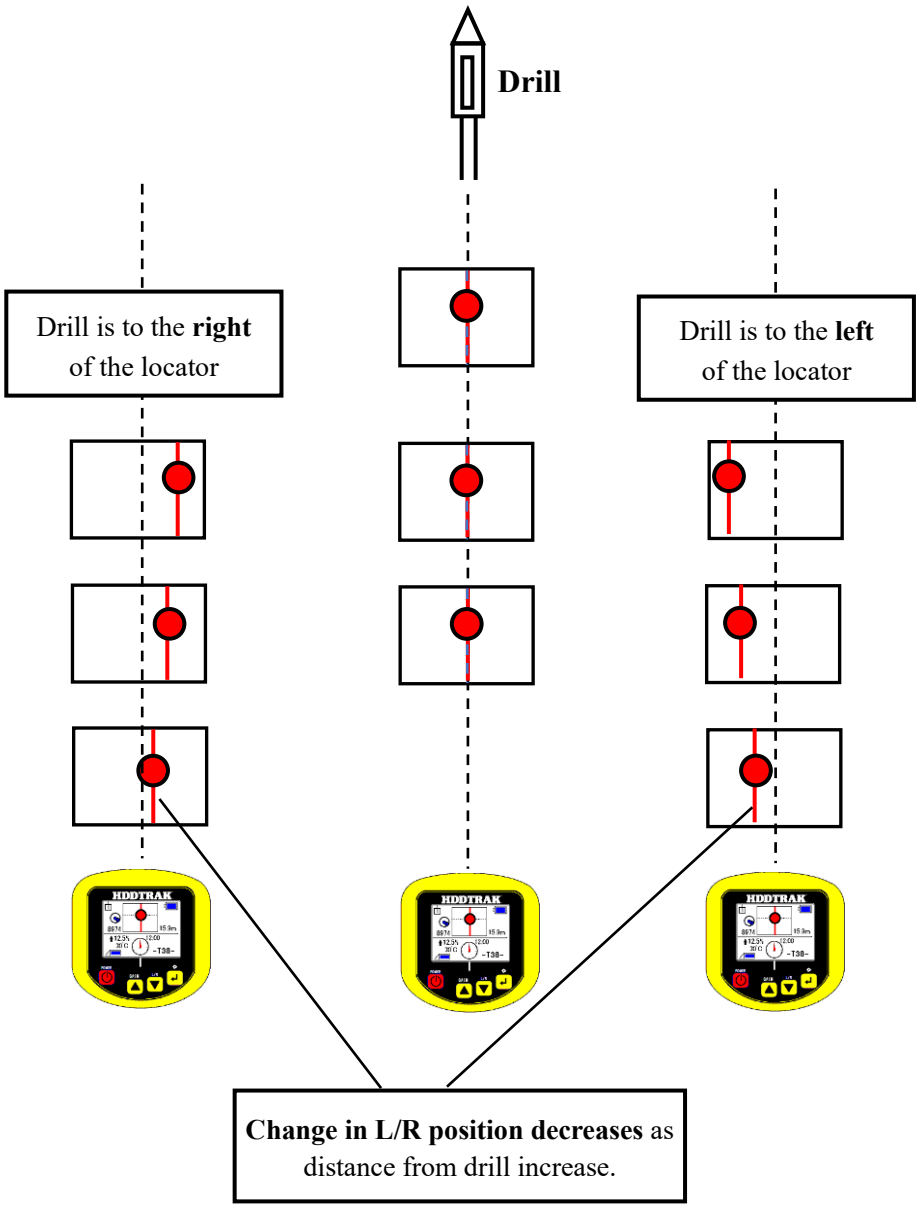
b) Keep locator at consistent posture when moving it.

Avoid tilting or twisting of the locator as this can cause measurement errors.

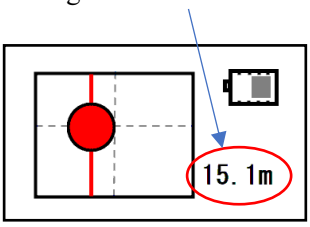


6) long distance mode (Detailed explanation)

Long distance L/R scanning mode. Conduct scan as indicated in the diagram below (Top view).



*Depth will change to **distance** from drill to locator.



FCC and ISED Compliance Declaration:

Pursuant to FCC 15.21 of the FCC rules, changes not expressly approved by Takachiho might cause harmful interference and void the FCC authorization to operate this product.

This device complies with Part 15 of the FCC Rules and Innovation, Science and Economic Development Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference. and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à des règlements Innovation, Sciences et Développement économique Canada exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes: (1) Ce dispositif ne doit pas causer d'interférences nuisibles, et (2) cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.