

# HEBS II

## User Guide

Hanwha Electronic Blasting System

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# 1.

## Before Use

1. Before Use

1.1 Warnings

1.2 HEBS-II Components

1.3 Each part name and role

## 1.1 Warnings

- This manual is described based on the settings before on-site provided.
- If a problem occurs by installing an app that is not provided by Hanwha, it can be difficult to respond immediately.
- If a user arbitrarily modifies the system settings or operating system software and experiences functional and compatibility problems, immediate response may be difficult. Modifying system settings may cause malfunction of the product or app working.
- Any alteration of the software provided by Hanwha or leakage of the software through unofficial channels violates Hanwha's software license rights.
- These radio equipments may be radio-interference during operation.
- This product has been applied with electronic display of product information. To check the information, run the Setup app and enter the Information part.

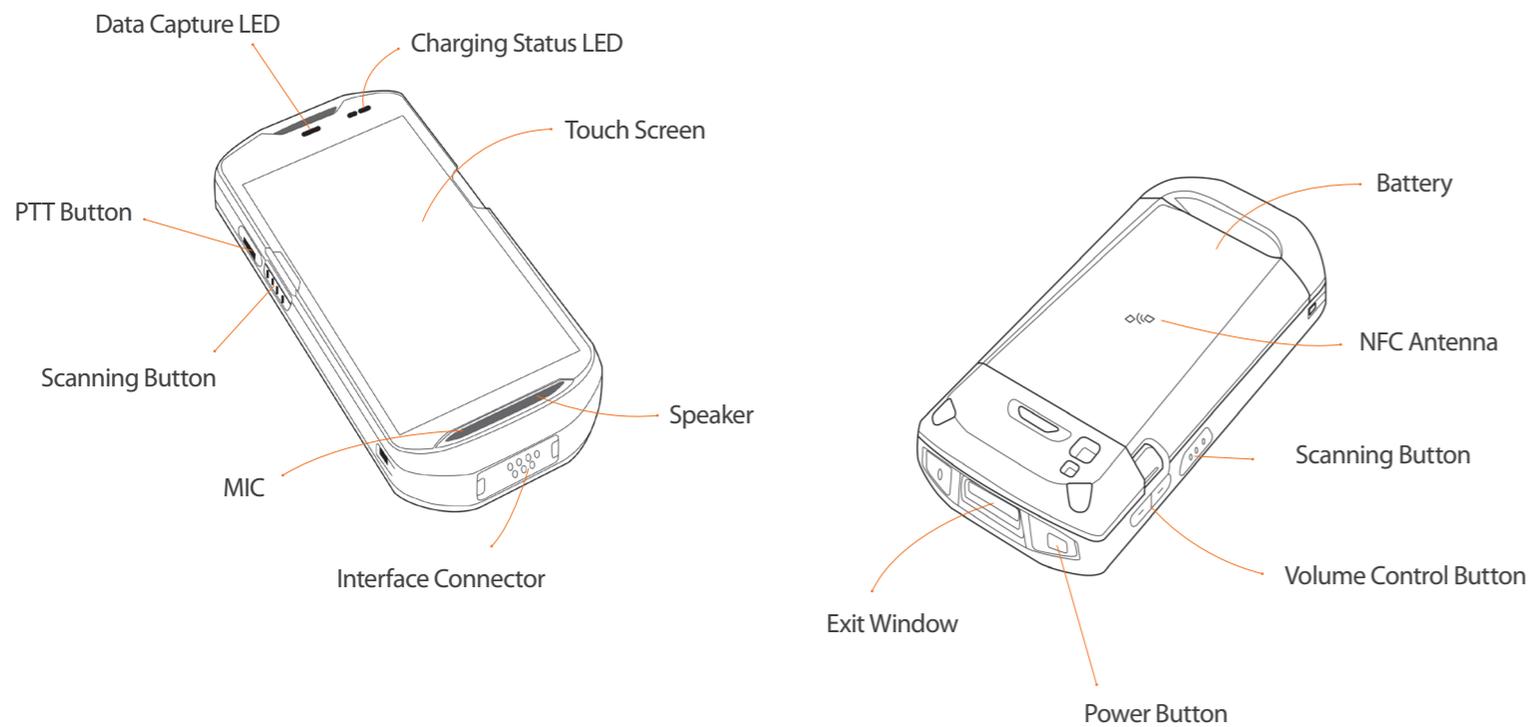
Be sure to read this manual  
and use the product safely and  
correctly before using HEBS-II.

## 1.2 HEBS-II Components

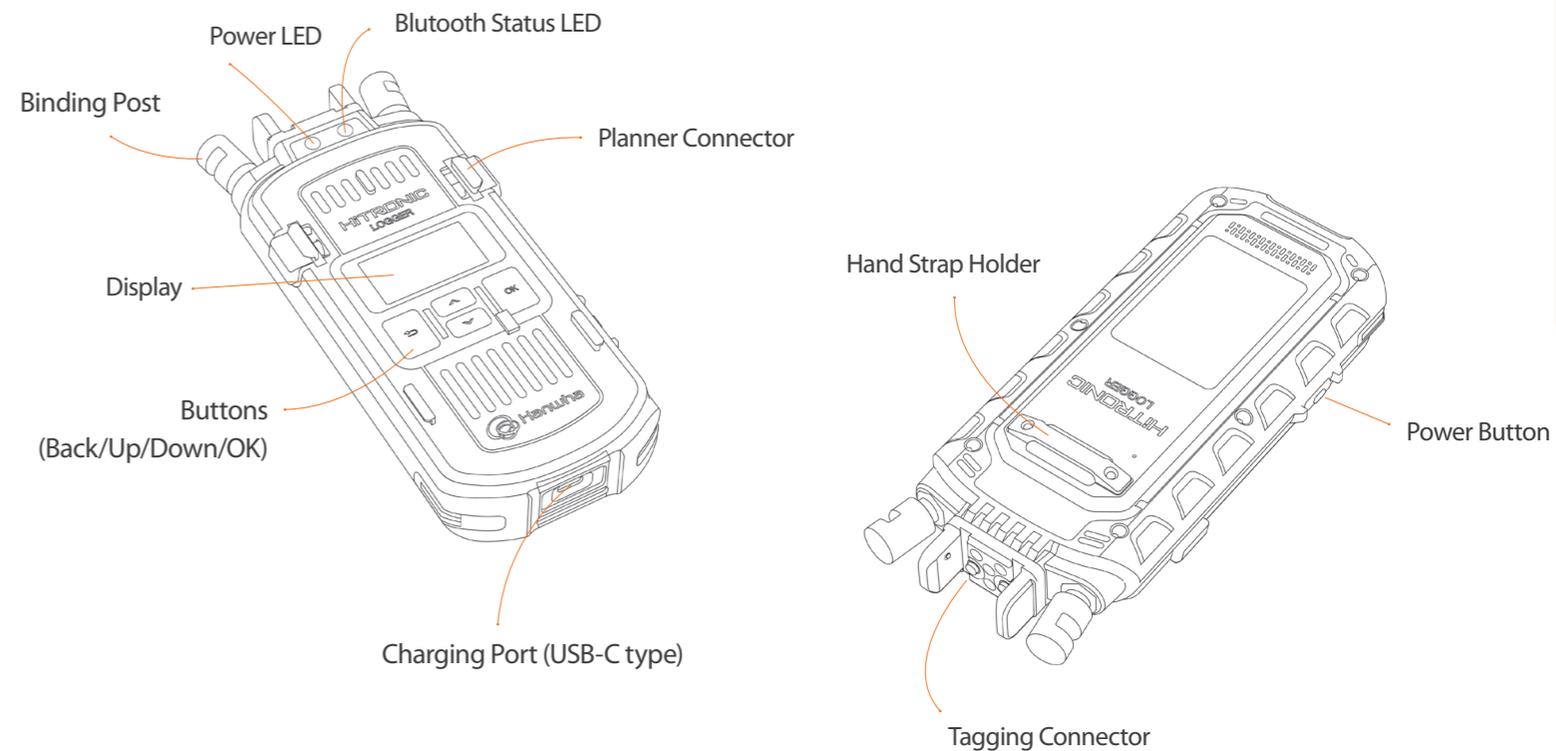


1.3  
Each part  
name  
and role

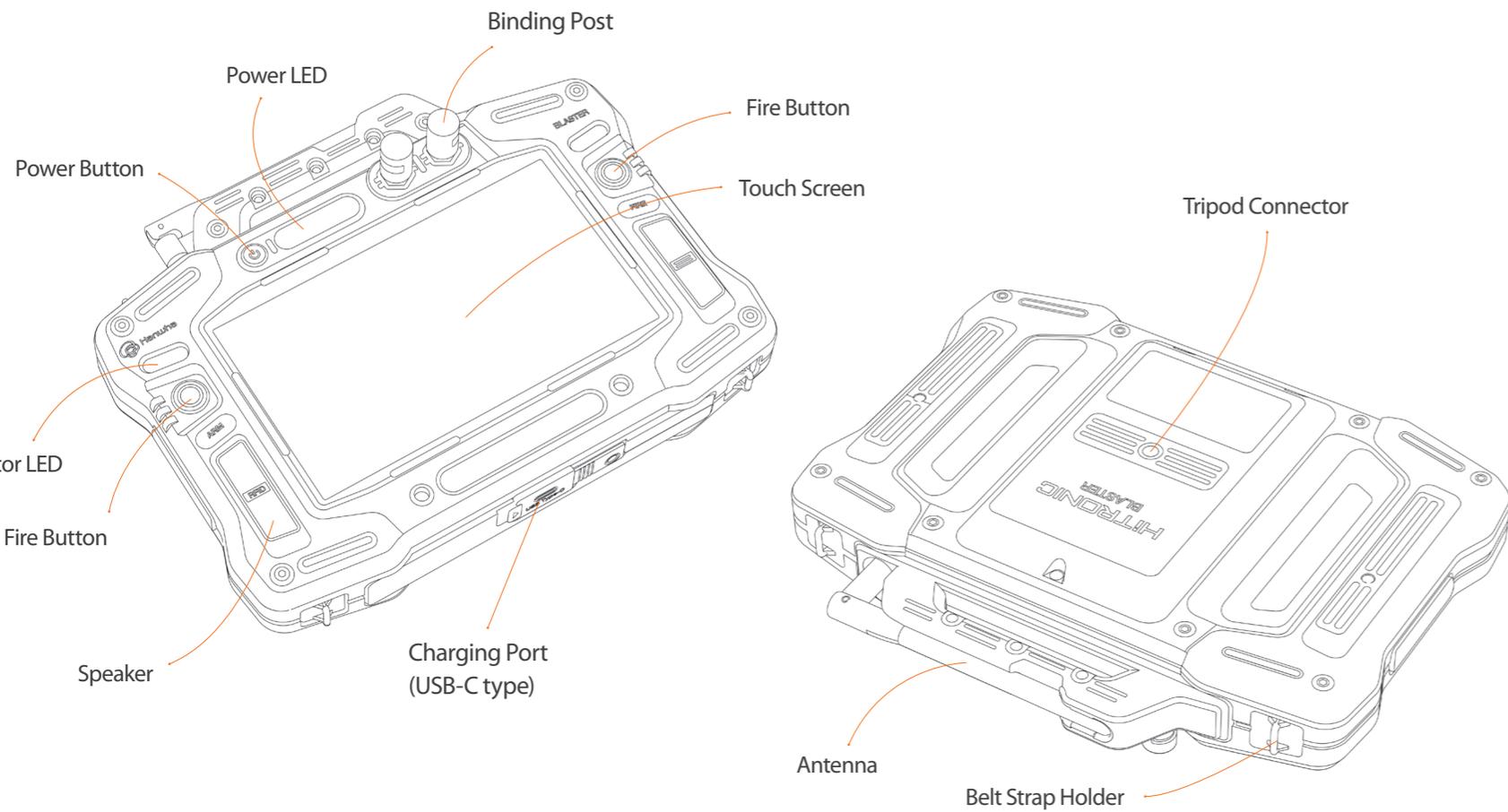
1.3.1  
Planner



1.3.2  
Logger



### 1.3.3 Blaster



## 2. How to Use Devices

- 2.1 Scanning Type
- 2.2 Logging Type
- 2.3 Tagging Type
- 2.4 Wireless Firing

# 2.

## How to Use Devices

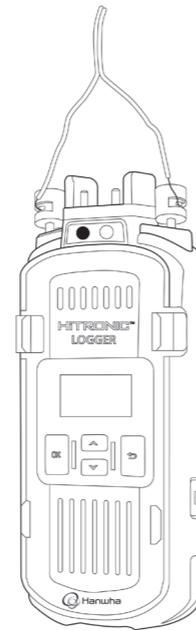
2.1 Scanning Type

2.1.1 Charging

- Insert a detonator in the end of explosives.  
\* Insert the detonator to the end of plug (black rubber) in the explosives.
- Charge explosives according to the blast design.
- After completing the charging of explosives, fill it up with sand to harden.

2.1.2 Wiring

- As shown in the figure, connect one end of harness wire to a positive terminal of Logger.
- Connect Logger on the Planner screen (Refer to 3.1.5 (1) Logger Information). Running the 'Line Test' at the planner.
- Couple a connector of detonator with the harness wire

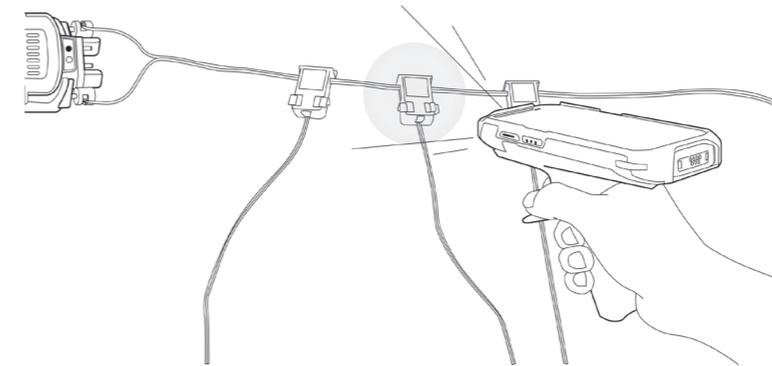


2.1.3 Scanning

- Set information about delay time after selecting mode at the Planner (Refer to 3.1.4 Start New Blasting).
- Scan QR code of detonator's connector in desired sequence as in the figure.
- Confirm the connection of detonator through 'COMMUNICATION' at the Planner after the scan completion (Refer to 3.1.5 (3) Communication).

2.1.4 Blasting

- Connect the harnesswire to a main bus wire and connect the wire to the blaster.
- Turn on the blaster power and check RFID card.
- Touch 'Start Firing' and check recharging and communication details.
- Input password and proceed with ARM.
- Firing (Refer to 3.3 Blaster).



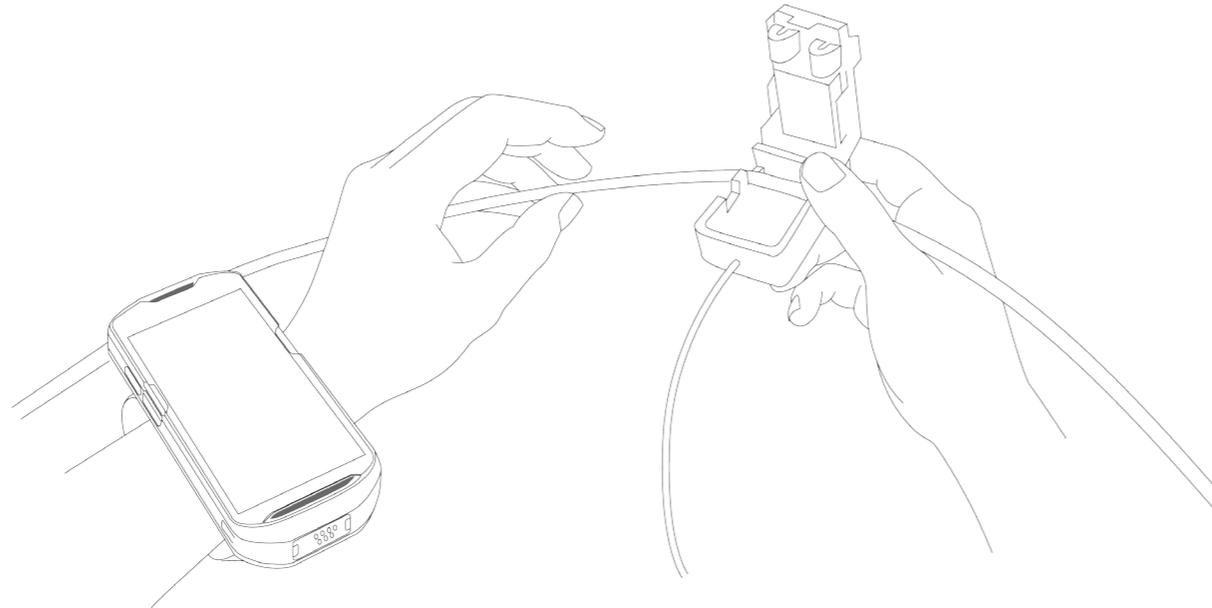
## 2.2 Logging Type

### 2.2.1 Charging

- Equivalent to 1) Charging Explosives of 2.1 Scanning Type.

### 2.2.2 Wiring

- Connect one end of harness wire to the positive terminal of Logger (communicator).
- Connect the Logger on the Planner screen (Refer to 3.1.5 (1) Logger Information).



### 2.2.3 Logging

- Select the mode at the Planner to set the information of delay time (Refer to 3.1.4 Start New Blasting).
- Couple the detonator connector with the harness wire in desired sequence.
- Check the detonator information through 'COMMUNICATION' at the Planner after the completion of logging (Refer to 3.1.5 (3) Communication).
- After connecting a detonator to the harness wire and checking the entering of the next ID, the next detonator must be connected. (In an open air, although it will not happen, there is a possibility of an error if they are connected almost at the same time.

### 2.2.4 Blasting

- Equivalent to 4) Blasting of 2.1 Scanning Type.

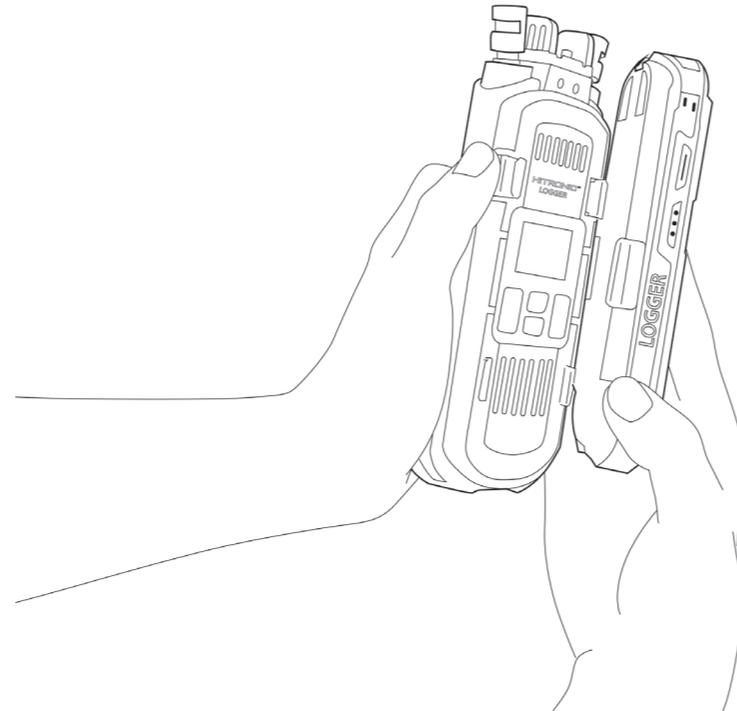
2.3  
Tagging  
Type

2.3.1  
Charging

- Equivalent to 1) Charging Explosives of 2.1 Scanning Type.

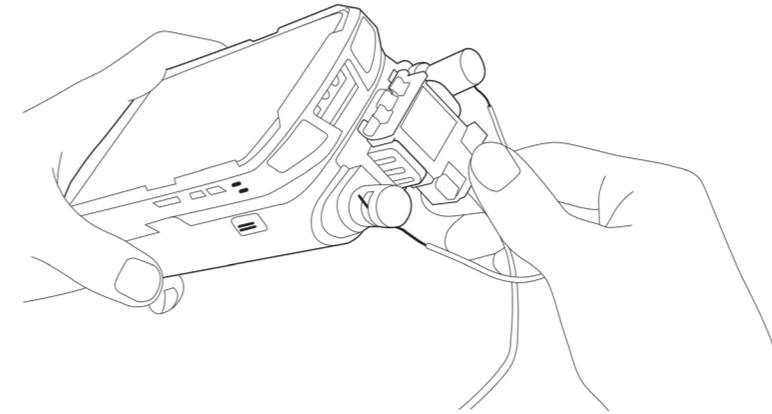
2.3.2  
Wiring

- Equivalent to 2) Wiring of 2.2 Logging Type.
- Couple the Logger with the Planner as shown in the figure.



2.3.3  
Tagging

- Select the mode at the Planner to set the information of delay time (Refer to 3.1.4 Start New Blasting).
- Tagging the detonator connector to the terminal of Logger in desired sequence as shown in the figure.
- Check the connection of detonator through 'COMMUNICATION' at the Planner after the completion of scanning (Refer to 3.1.5 (3) Communication).



2.3.4  
Blasting

- Equivalent to 4) Blasting of 2.1 Scanning Type.



## 2.4 Wireless Firing

### 2.4.1 Blast network configuration

- Connect all blasters used for wireless blasting through setting the configuration of blasting (Refer to 3.3.4 Blasting Configuration Setting).

### 2.4.2 Charging and Wiring

- Refer to 2.1 - 2.3 for charging explosives, wiring, scanning, logging and tagging.

### 2.4.3 Proceed with Wireless Blasting

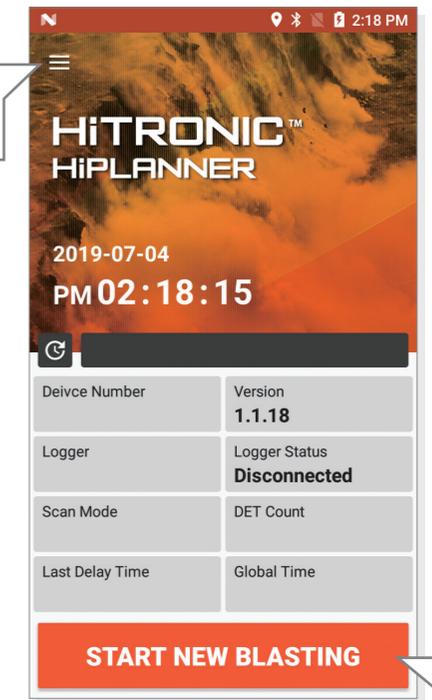
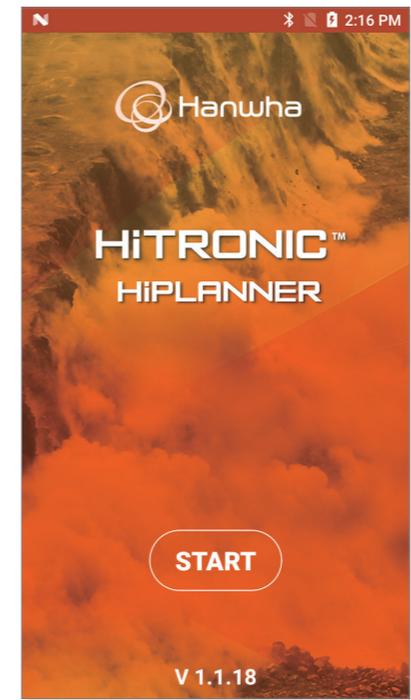
- Connect the harnesswire to a main bus wire and connect the wire to the blaster.
- Touch 'Start Blasting' on the blaster screen in blaster mode and touch 'Start Wireless Blasting'
- Transmit detonator's data from Planner to Blaster.
- Maintain the blaster in blaster mode as standby.
- Proceed with the blasting at Remote (Refer to 3.3.5 Start Blasting).



### 3.1 Planner

#### 3.1.1 Starting Screen

#### 3.1.2 Main Screen



Available to check the main menu.

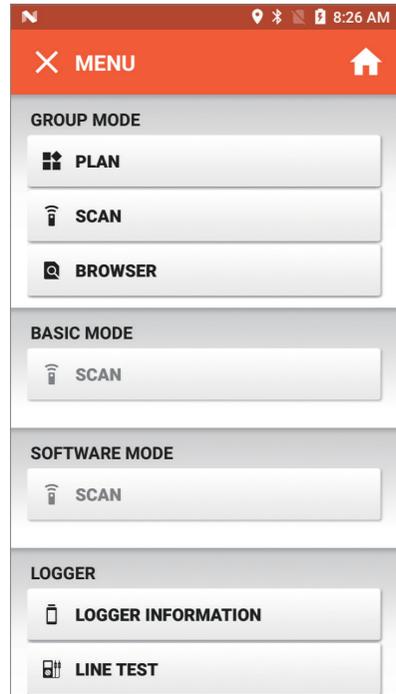
Touch to start a new blasting.

- 3. Menu Configuration
- 3.1 Planner
- 3.2 Logger
- 3.3 Blaster

# 3. Menu Configuration

- - 
  - 
  - 
  -
- 3.1 Planner

### 3.1.3 Main Menu

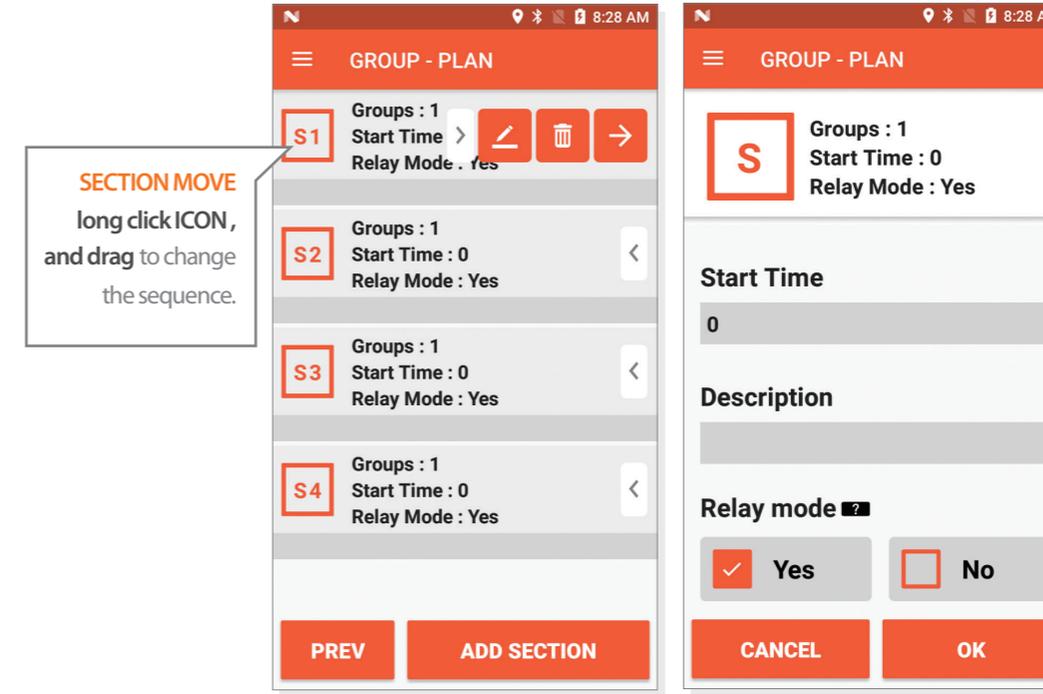


- **Group Mode** Available to use for a group blasting when blasting tunnel and outdoor.
- **Basic Mode** Available to use for a small-scale simple pattern blasting.
- **S/W Mode** Available to use in a blast design software mode.
- **Logger** Available to check Logger connection, line test, detonator communication and ID check.
- **Blaster** Available to transmit data to the blaster.
- **Others** Available to check and edit saved information, set environment, and end.

#### 3.1.3 Main Menu

### 1) Group Mode - (a) Plan

#### ① Section Design

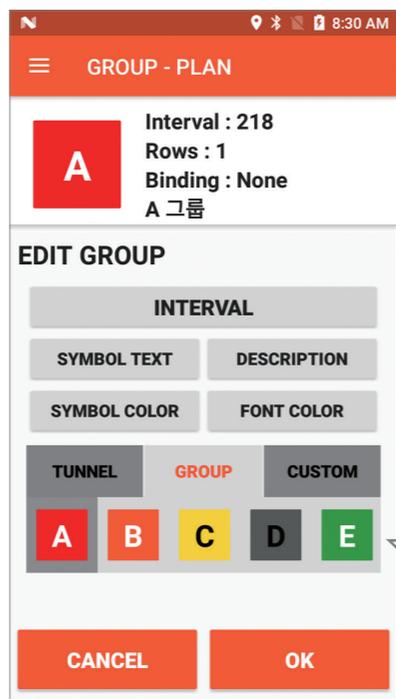
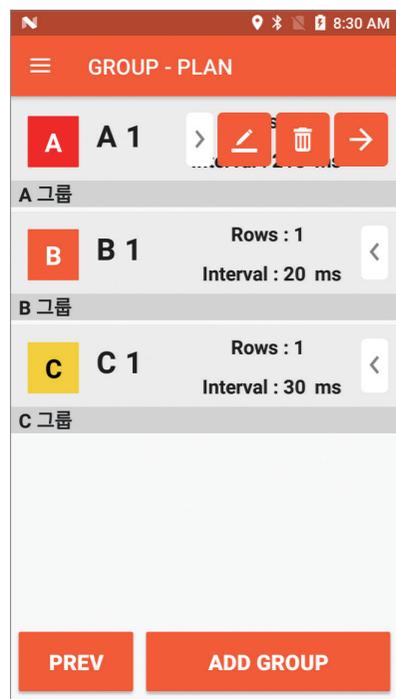


- **ADD** Touch the button at the bottom to add a new section.
- **EDIT** Click EDIT button on the section to edit. As shown in the figure, if a section information window is displayed, edit the starting time and explanation and click OK button.
- **DELETE** Click EDIT button on the section item to delete and click button. If the information window is displayed, click OK button.
- **SECTION MOVE** To change the sequence of section, long click ICON (S1 S2), and drag to change the sequence.

3.1.3 Main Menu

1) Group Mode - (a) Plan

2) Group Design



Template - Available to reflect the preset information that has been set in advance.

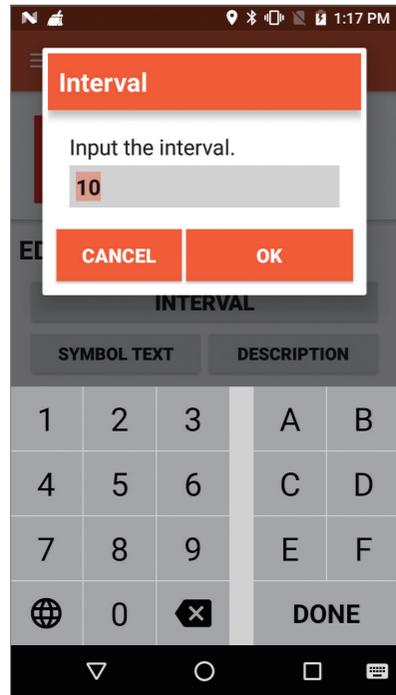
3.1.3 Main Menu

1) Group Mode - (a) Plan

- **ADD** Click **ADD GROUP** button at the bottom to add a group.
- **EDIT** Click EDIT (⌘ & ↵ Button) button of the group to edit. If a group information window is displayed, edit group time gap, symbol, and explanation and click **OK** button. Click **TEMPLATE** at the bottom to reflect the previously set information.
- **DELETE** Click ⌘ button of the group item to delete and click **OK** button. If the information is displayed, click **OK** button.
- **GROUP MOVE** To change the sequence of group, long click **C S** ICON, and drag to change the sequence.

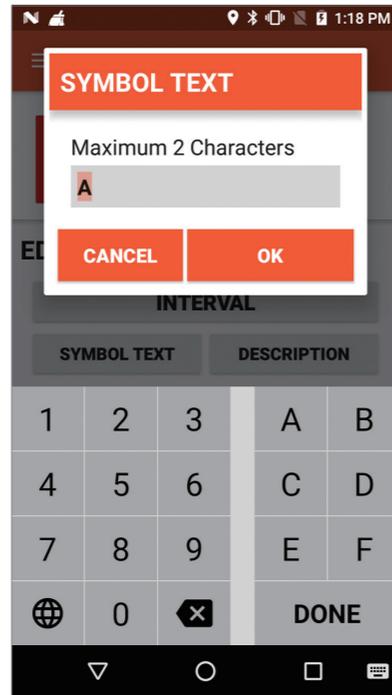
3.1.3 Main Menu

1) Group Mode - (a) Plan



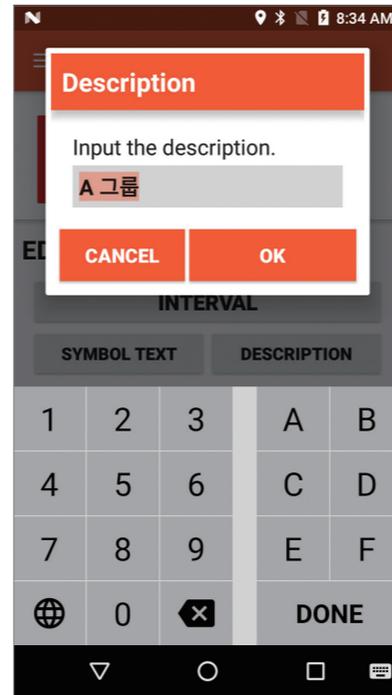
**TIME GAP**

Available to change the group time gap.



**SYMBOL TEXT**

Available to change the symbol text (Max. 2 alphabets).

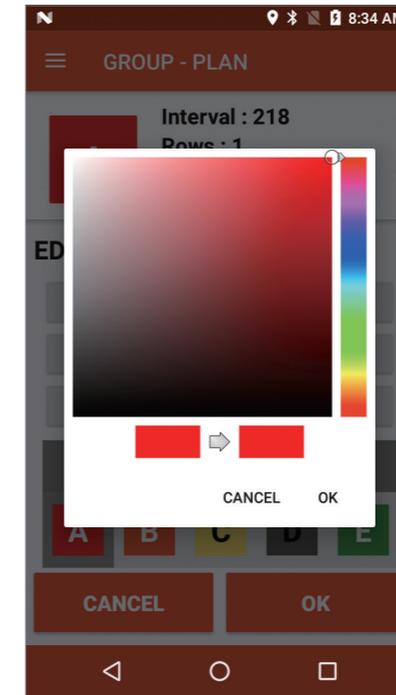


**EXPLANATION**

Available to edit the group explanation.

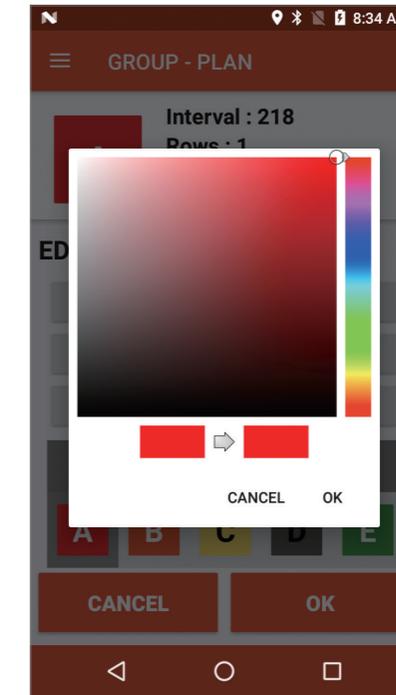
3.1.3 Main Menu

1) Group Mode - (a) Plan



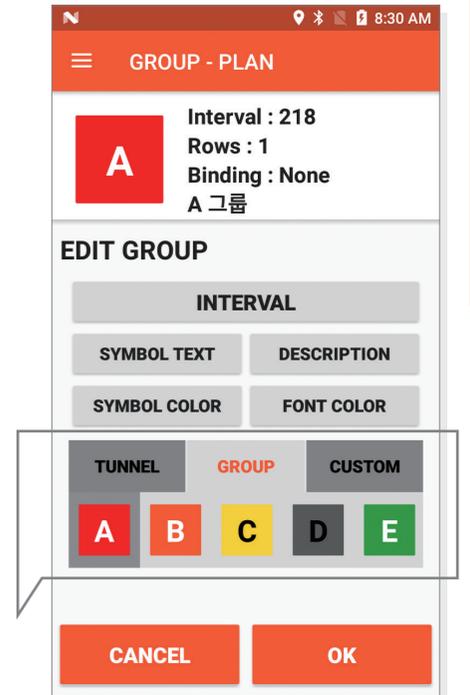
**SYMBOL COLOR**

Available to change the symbol color.



**FONT COLOR**

Available to change the font color of a symbol.



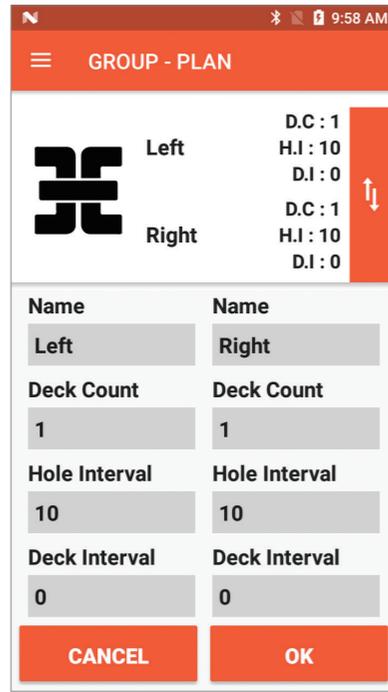
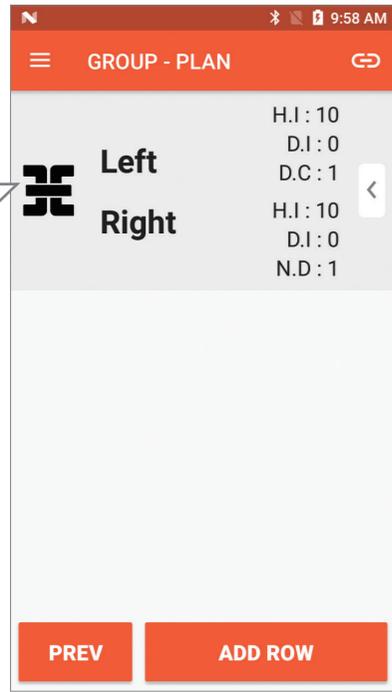
**TEMPLATE**

There are tunnel, group, user definition TAPs. Select desired TAP to change at once to a group information set previously.

3.1.3 Main Menu

1) Group Mode - (a) Plan

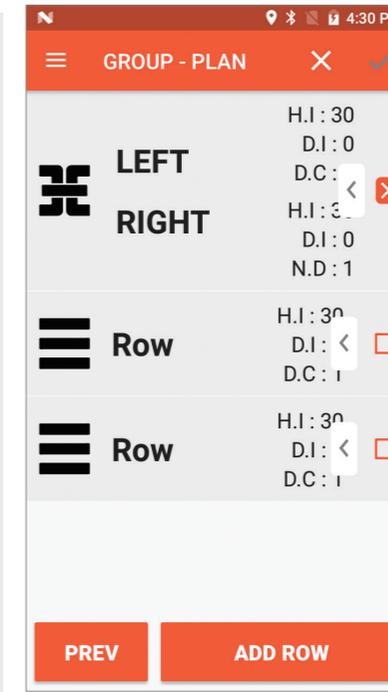
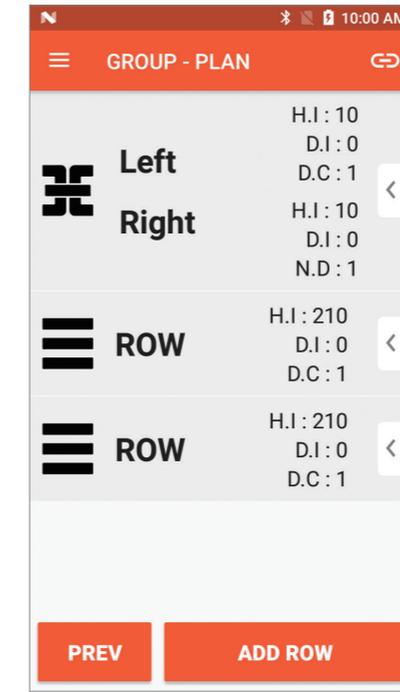
③ Row Design



- **ADD** Click **ADD ROW** button at the bottom to add a new row.
- **EDIT** Click & button of the row to edit. If a row information window is displayed, edit the name of the row, the number of decks and the time gap of holes and click **OK** button.
- **DELETE** Click button of the row item to delete and click button. If the information window is displayed as shown in the figure, click **OK** button.
- **ROW MOVE** To change the sequence of rows, long click and drag it to change the sequence.

3.1.3 Main Menu

1) Group Mode - (a) Plan



- **BINDING** There are two types of row. One is the row for general use, and the other is the binding row that binds two rows into one. For the binding row, the delay time is designed by a type to fire two rows in turn. If using the binding, it is possible to design to fire left side and right side in turn at the time of tunnel blasting.
- **BINDING SETTING** For row binding, add two rows to click icon on right top. The row with a hole for the first firing, namely, first check a row which becomes a parent and check a row which becomes a child. Check two rows and click icon to change to a binding row.
- **BINDING SEQUENCE CHANGE** To change the roles of parent and child, enter EDIT of the binding row to click SEQUENCE CHANGE icon.

3.1.3 Main Menu

1) Group Mode - (b) Scan

① SCAN

Aim to hit the red point on QR code of a detonator. Click SCAN button to hear beep sound and scan QR code.

② SECTION, GROUP, ROW MOVE

Click  icon at the bottom of screen to display a window to move. Here, click the left or right arrow key   to change SECTION, GROUP, and ROW to move each block.

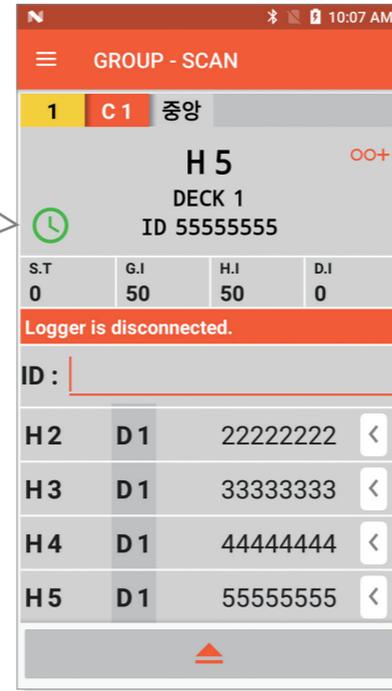
③ DELAY TIME VIEW

Click  button to check the delay time of corresponding detonator.

④ DETONATOR ID MANUAL INPUT

Click ID input window **ID:**  at the center of screen to display keyboard. At this time, available to input detonator ID directly.

**Viewing Delayed Time** - Available to check the delayed time of corresponding detonator by clicking the clock button.



3.1.3 Main Menu

1) Group Mode - (b) Scan

⑤ DETONATOR DELETE

Scan QR code of the detonator to delete again. Hearing beep sound three times to change to a red color. At this time, click the icon  at the right bottom of a red box to display an information window and press  button to delete ID.

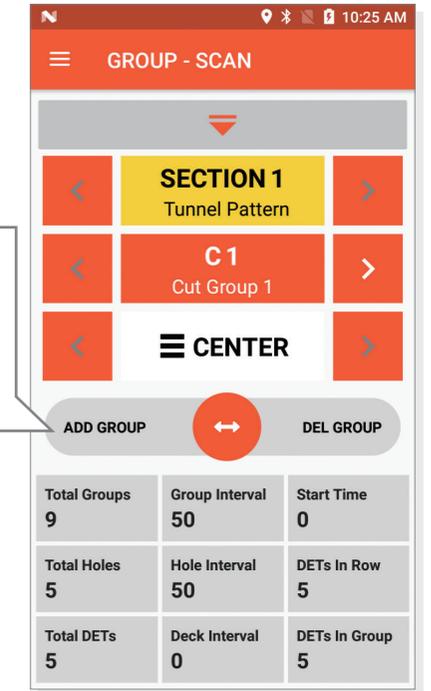
⑥ HOLE ADD

Click  a button on right top of scan screen to add a deck without ID. At this time, decks are added as many as the number of decks in a row.

⑦ Group ADD/DELETE

Click the arrow button  at the bottom of screen to display a window to move as shown in the figure. At this time, add or delete a group with   button.

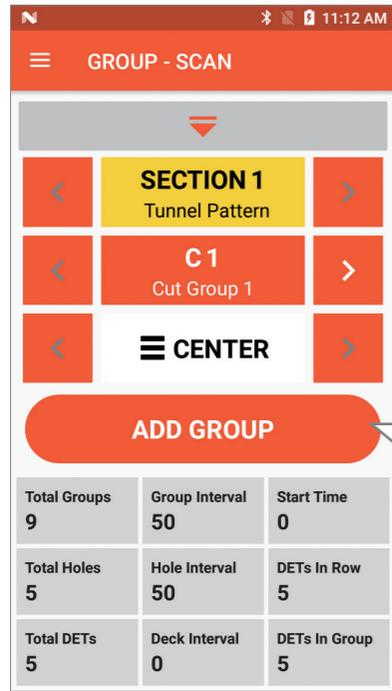
**Group Add/Delete**  
Available to add or delete a group by dragging to the left or to the right.



3.1.3 Main Menu

1) Group Mode - (b) Scan

⑧ GROUP ADD



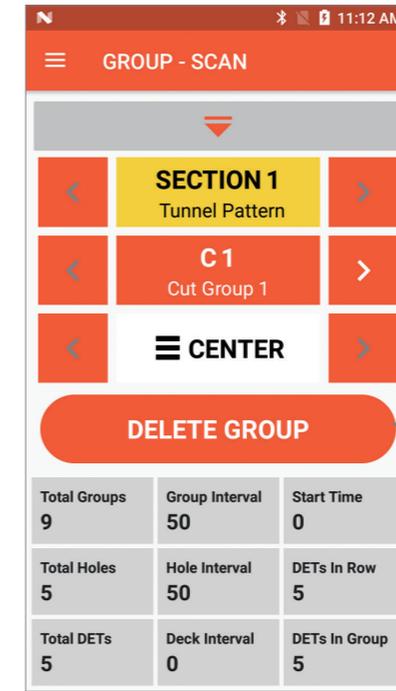
If you drag the Slide button to the left on the front page, a Group Add button appears as shown in the figure.

- Drag the slide button  on the previous page toward the GROUP ADD on the left to move.
- **ADD GROUP** button is created. Click this button will move to the added group with the same new group information as the current group's information.
- **Other Information** Information to refer during the scanning from the information window at the bottom.

3.1.3 Main Menu

1) Group Mode - (b) Scan

⑨ GROUP DELETE



If you drag the Slide button to the right on the front page, a Group Add button appears as shown in the figure.

- Drag the slide button (Blue Circle from page 19) toward the GROUP DELETE on the right to move
- Click **DELETE GROUP** to delete the group immediately if there is no ID in the group or to display DELETE window if there is at least one ID.
- At this time, to maintain the group and delete the hole only, click 'Delete All Holes of Group'. To delete the hole of present hole, click 'Delete All Holes of Row' button.
- **Other Information** Information to refer during the scanning from the information window at the bottom.

3.1.3 Main Menu

1) Group Mode - (c) Browser

① LIST

Browser is the window to edit data looking at the list of scanned detonator ID.

② BLOCK MOVE

Widget to move section, group and row on top of the screen. Select each block to display the list of decks at the bottom of corresponding block.

③ DELAY TIME UPDATE

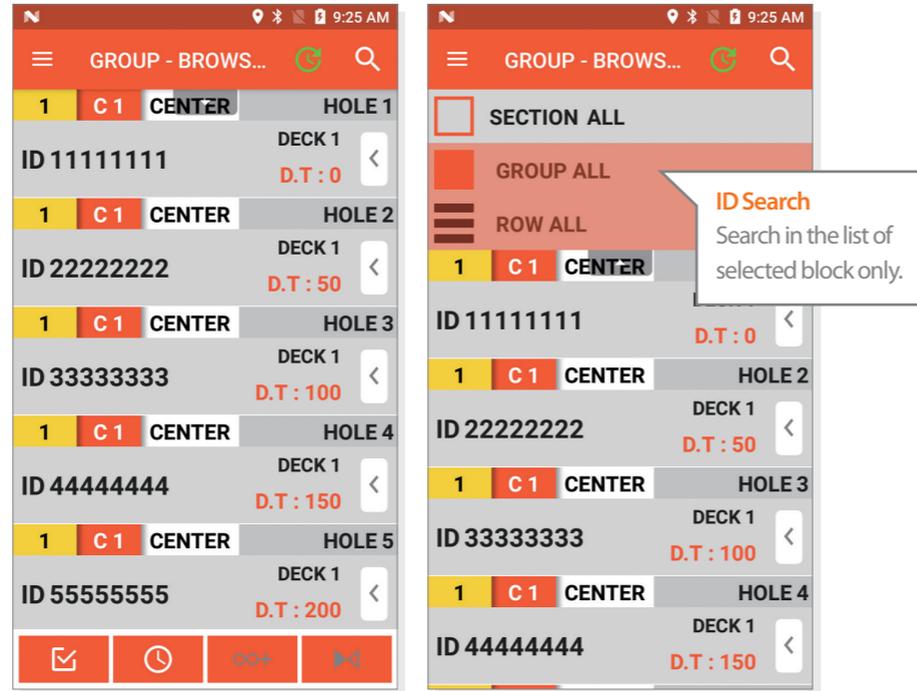
Click  button to update the delay time of all decks.

※ **Caution**  
Must edit data and press UPDATE  
Please design well to see CAUTION.

④ ID SEARCH

Click  button on the right top to display a Text Input window. Input ID to search to display ID on the list.

※ **Caution**  
Search ID only at the list of selected block. To search every ID, make sure to set entire section, entire group, and entire row to search.

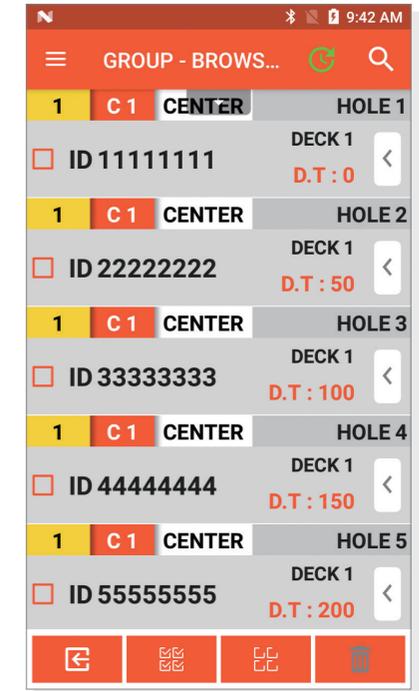


3.1.3 Main Menu

1) Group Mode - (c) Browser

⑤ SELECT Click  Select the First button on the left bottom to display CHECK box for each deck. To select several decks to delete, work at the selection mode.

- CANCEL  Cancel the selection mode on.
- ALL SELECT  Available to check all decks on the list of.
- ALL CANCEL  Available to cancel all decks on the list of.
- DELETE  Available to delete selected decks on the list of.

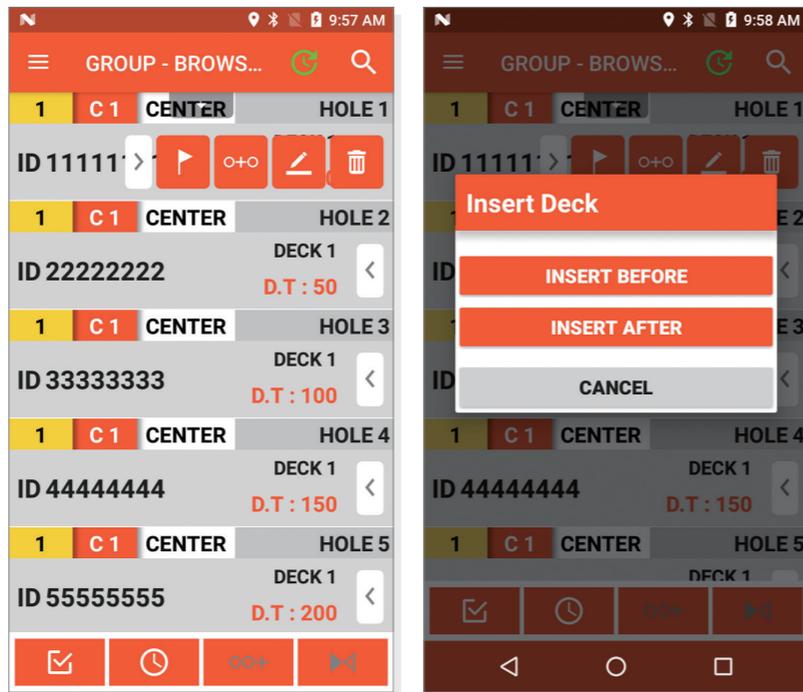


3.1.3 Main Menu

1) Group Mode - (c) Browser

⑥ HOLE ADD

Click  button of the list item at the location to add to open the menu, and click  button. Add by judging whether to insert before the selected item or after.



3.1.3 Main Menu

1) Group Mode - (c) Browser

⑦ REVERSAL

Inactivated reversal icon when selecting the entire block on the ( bottom). Must select a specific row to activate the reversal. Select REVERSAL to arrange all decks in the row reversely. Scanning the sequence of firing reversely by each situation, use the reversal function to arrange the list reversely.

⑧ INSERT

- **Insert by Touch** Refer to 6) HOLE ADD.
- **Insert by Scan** First, scan ID at the location to insert. Select the corresponding deck to scan ID to insert again. On the Deck Insert window, select whether to insert before or after to insert at the corresponding location.

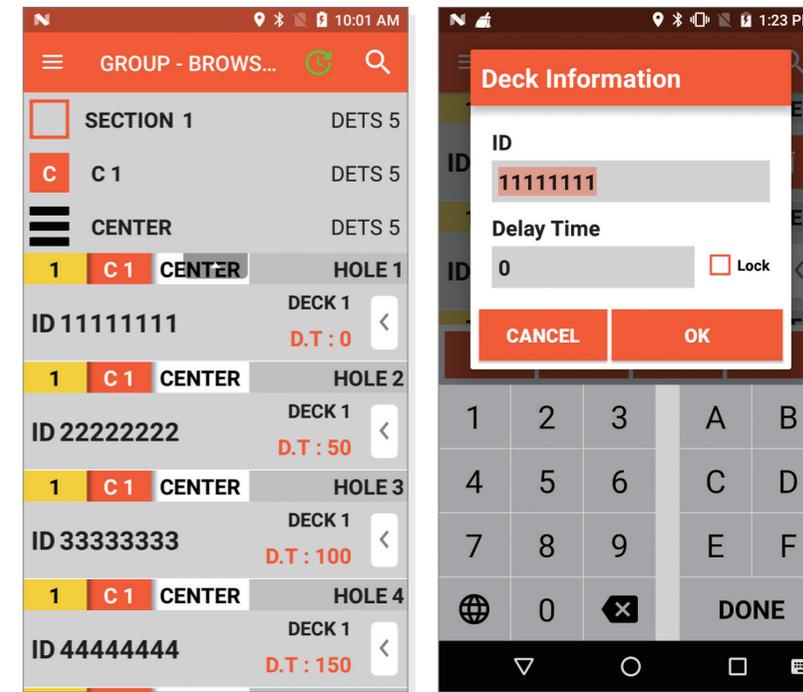
⑨ EDIT

Click the arrow  of the detonator to edit the deck ID and delay time. At this time, changing the delay time to become a lock condition.

※ Caution

If the delay time becomes a lock condition, it will not be available to update the delay time even after the update.

In order to set for the update of delay time again, you may cancel 'Lock Check Box'.



3.1.3 Main Menu

2) Basic Mode - (a) Scan

① STARTING TIME

Input the starting time for blasting before scanning. Without input, previously input value becomes the starting time. The starting time shall be changed with  mark after the first ID scanning. This means to continue time gap without setting the starting time. If the starting time is changed again in the middle to scan ID, the starting time shall be set again from that step.

② TIME GAP

Click TIME GAP button to display the Time Delay Gap window and change the time gap. Changing the time gap, a new time gap shall be applied from the scanned detonator.  
Ex) 3 shots start from 0 to 50 time gap, and 3 shots from 1000 to record 100 time gap

Sequence	1	2	3	4	5	6
Starting Time	0	-	-	1000	-	-
Time Gap	50	50	50	100	100	100
Delay Time	0	100	100	1000	1100	1200

③ DETONATOR ID MANUAL INPUT

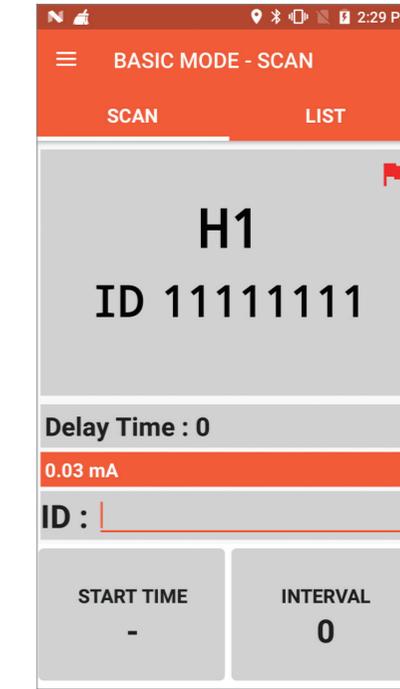
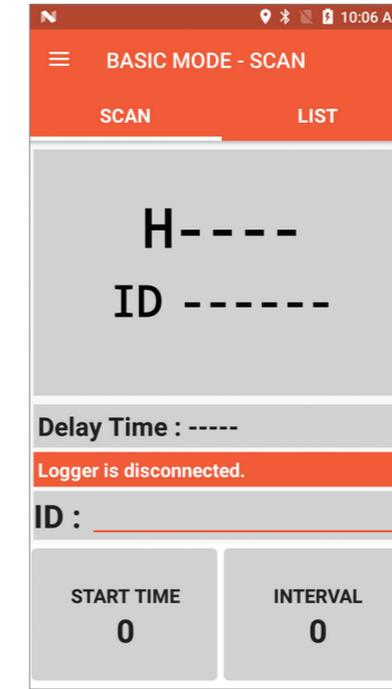
Click the ID Input window (grey bar) at the center screen to display keyboard. At this time, available to input detonator ID directly.

④ FLAG SETTING

If it is not sufficient to set the time gap but to scan first, you may mark the location to change with . If long clicking PTT button on the right side of a device after scanning ID,  be displayed on the scan screen with beep sound. After marking with the flag to finish scanning, it will be available to set the time gap.

3.1.3 Main Menu

2) Basic Mode - (a) Scan



3.1.3 Main Menu

## 2) Basic Mode - (b) List

### ① DETONATOR ADD

To add new detonator, click  button at the bottom screen to display DETONATOR ADD screen. Input ID, starting time and time gap and press  button to add detonator.

### ② DETONATOR INSERT

- **Insert by Dragging** To insert a detonator, proceed with DETONATOR ADD in number 1) and long click newly added detonator. Then, with a vibration feedback, available to drag the detonator item to move. With such method, drag the detonator to the location to insert.
- **Insert by Item Menu** Press  button of the list item at the location to add to open the MENU and click [O+O] button. Judge whether to insert before the selected item or after.

### ③ DELAY TIME EDIT

Difficult to edit one by one in order to comprehensively edit the time information again in the list. At this time, It is a function to change the time information simply. Click a  button to display Starting Time and Time Gap buttons. At this time, long click the desired button to display a window to edit. After editing desired value, click one item by another item of detonator desired to change for direct reflection. After editing, click the button  for EDIT button to disappear.

3.1.3 Main Menu

## 2) Basic Mode - (b) List

### ④ DETONATOR INFORMATION EDIT

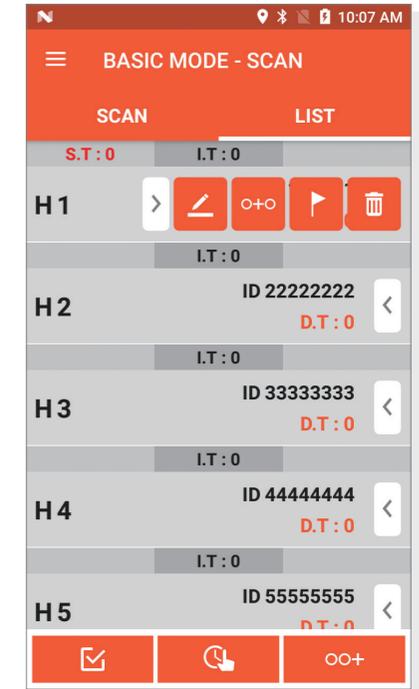
To edit one detonator information, click and select the detonator to edit and press the arrow ,  button to display the Information window. Here, edit the information of ID, starting time and time gap and press OK button to complete the edition of detonator information.

### ⑤ FLAG SETTING

Available to set and cancel the flag set on the scan screen in the list. If it is not sufficient to set the time gap but to scan first, it is available to mark with a flag at the location to change. Press the  button to set and cancel the flag.

### ⑥ DELETE

To delete a detonator in the list, select the detonator to delete and click  button. To delete several detonators, click the check  button on the right top screen and check 'Detonator Item' to delete and click  button.



3.1.3 Main Menu

### 3) Software Mode - (a) Before Starting

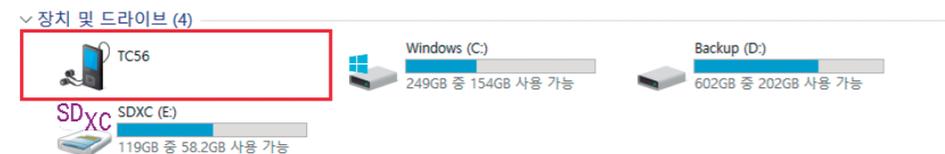
#### ① SAVE DESIGN FILE IN PLANNER

To use the software mode, first use the blast design program to design and export it by CSV file.

Next, use the USB cable exclusive for Planner, connect the Planner with PC.

Copy corresponding CSV file in the path below.

Path [inside PC\TC56\ the share save space \HiPlanner\save]



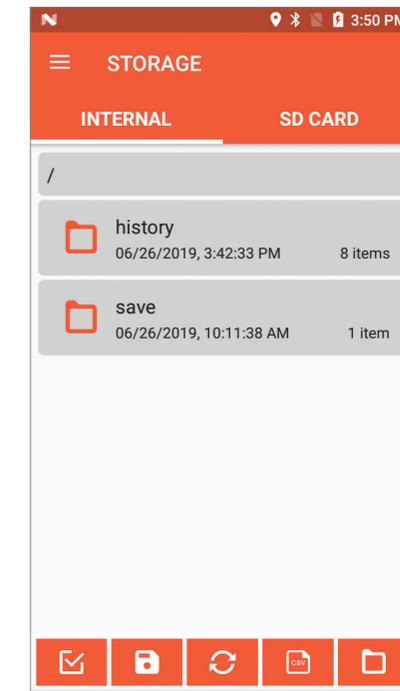
3.1.3 Main Menu

### 3) Software Mode - (a) Before Starting

#### ② IMPORT DESIGN FILE

Press 'SAVE' file inside 'STORAGE'.

Press the corresponding CSV type file to proceed with OPEN.



3.1.3 Main Menu

### 3) Software Mode - (b) Scan

To use the software mode, first import the design file prepared in the blast design software. Refer to '3.1.4 Start New Blasting' for importing.

#### ① DETONATOR ID MANUAL INPUT

Click the ID Input window at the center screen to display keyboard. At this time, available to input ID directly.

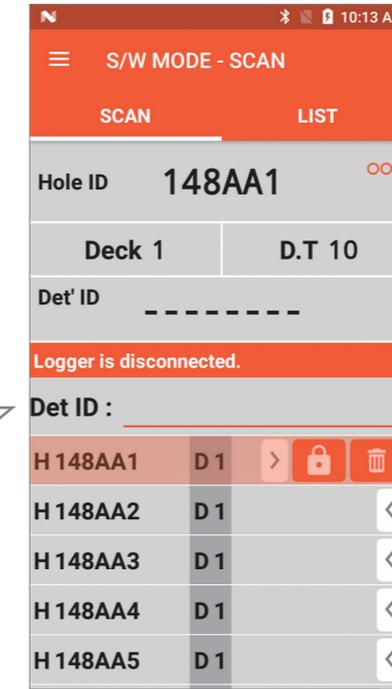
#### ② DECK LOCKING

Available to lock deck if the charging of explosives would not be done by following reasons.

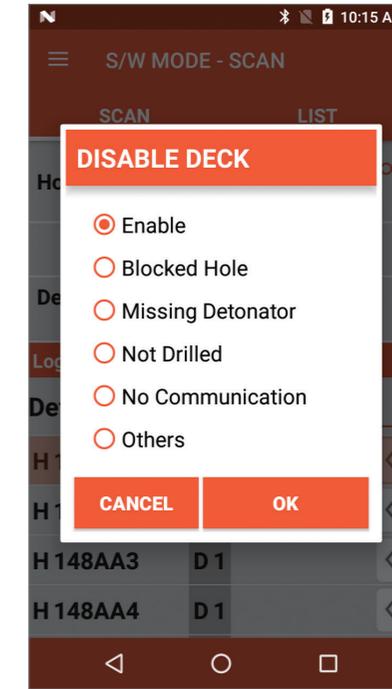
- Collapsed hole
- No detonator
- No hole
- No communication
- Others

3.1.3 Main Menu

### 3) Software Mode - (b) Scan



Available to input detonator ID directly by clicking ID Input Window.



3.1.3 Main Menu

### 3) Software Mode - (c) List

① **EDIT** 

Available to edit hole ID, tag number, detonator ID, delay time, and condition.

② **HOLE INSERT** 

Select whether to insert before or after in reference to the selected item, and input hole ID and delay time.

③ **TAG INSERT** 

Select whether to insert before or after in reference to the selected item, and input tag number and delay time.

④ **FLAG SETTING** 

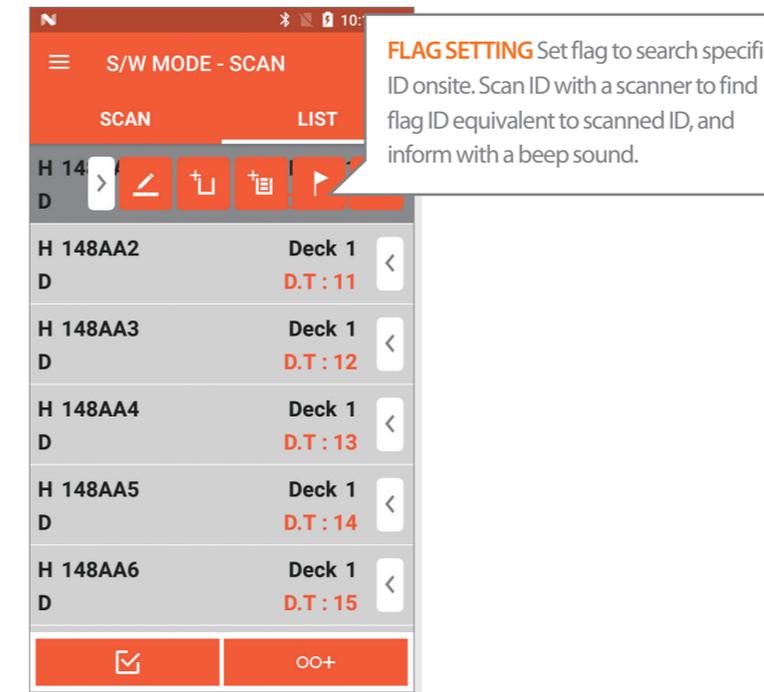
Set flag to search specific ID onsite. Scan ID with a scanner to find flag ID equivalent to scanned ID, and inform with a beep sound.

⑤ **DELETE** 

If a detonator ID exists, press  button to delete the detonator ID. Press  button again to delete item.

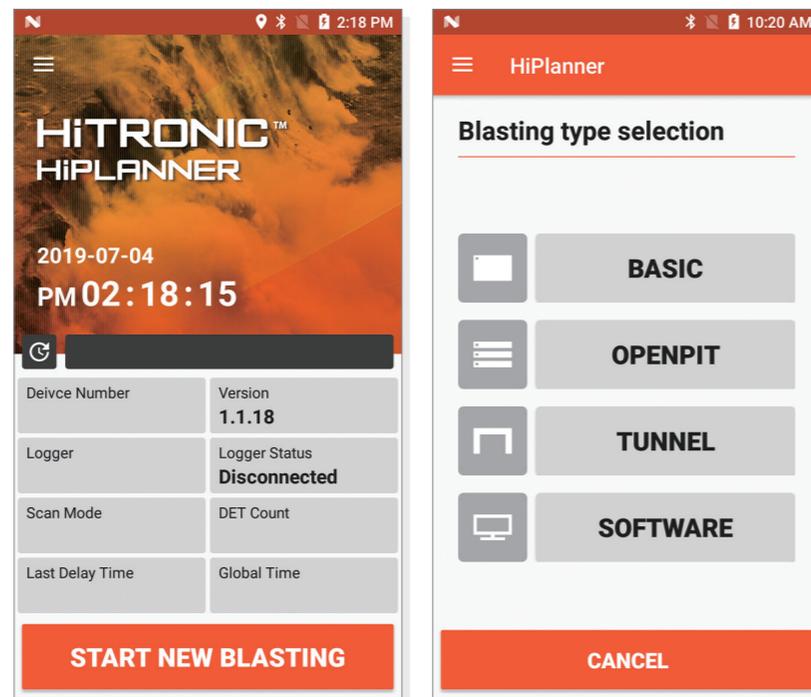
3.1.3 Main Menu

### 3) Software Mode - (c) List



### 3.1.4 Start New Blasting

Available to design the pattern for Start New Blasting fast by using a simple blast pattern at the **START NEW BLASTING** bottom of main screen. Press the button to display the mode selection for basic, outdoor, tunnel, and software as shown in the figure.



### 3.1.4 Start New Blasting 1) Basic Mode

Basic mode is equivalent to '3.1.3 Basic Mode'.

3.1.4 Start New Blasting

2) Openpit Mode

Conveniently design the blast pattern used for outdoor blasting.

① OUTDOOR INFORMATION

HiPlanner

**Openpit Information**

Group Count (1 ~ 9999)  
10

Row Count (1 ~ 99)  
1

Deck Count (1 ~ 3)  
1

Relay mode  Yes  No

PREV NEXT

- **Group Number** Set the number of groups. If its number is not always constant, it is fair to set sufficiently.
- **Row Number** Set the number of rows in the group.
- **Deck Number** Set the number of decks.

3.1.4 Start New Blasting

2) Outdoor Mode

HiPlanner

**Relay Mode**

**Relay Mode ON**  
All previous groups are detonated,  
and the next group is detonated.

**Relay Mode OFF**  
After the previous group was  
detonated,  
the next group was detonated.

OK

- **Relay Mode** Determine the sequence of blasting by the first hole of each group. When the relay mode is ON, the first hole of the next group shall be fired after the first of the previous group. In case of OFF, after delaying each group time gap on the basis of the starting time, each group shall be fired independently.

## 2) Outdoor Mode

### ② TIME INFORMATION

HiPlanner

**Time Information**

Group Interval (0 ~ 10000)  
50

Spacing Interval (0 ~ 10000)  
9

Deck Interval (0 ~ 10000)  
0

PREV NEXT

- **Group Time Gap** Set the time gap between rows.
- **Space Time Gap** Set the time gap for space.
- **Deck Time Gap** Set the time gap for deck.

## 2) Outdoor Mode

### ③ BLAST DESIGN INFORMATION

- After checking if set information is correct, set whether to add a section or to create a new section.
- **Section Add** Add one more section to the present blast pattern to create.
- **Creation** Delete data to create a new section.

### ④ Scan and List

- The process is equivalent to 3.1.3 (1) Group Mode.

HiPlanner

**Blast Design Information**

**Group Information**  
Group Count : 10  
Row Count : 1  
Deck Count : 1  
Relay Mode : NO

**Time Information**  
Group Interval : 50 ms  
Hole Interval : 9 ms  
Hole Interval : 0 ms

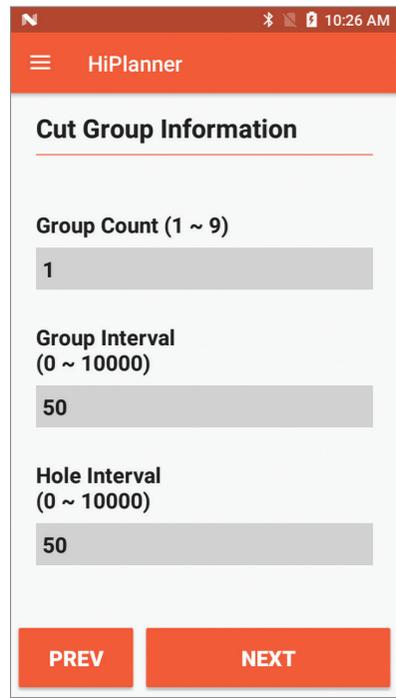
PREV ADD SECTION GENERATE

3.1.4 Start New Blasting

3) Tunnel Mode

Conveniently design the blast pattern used in the tunnel blasting.

① DEEP BLAST GROUP INFORMATION

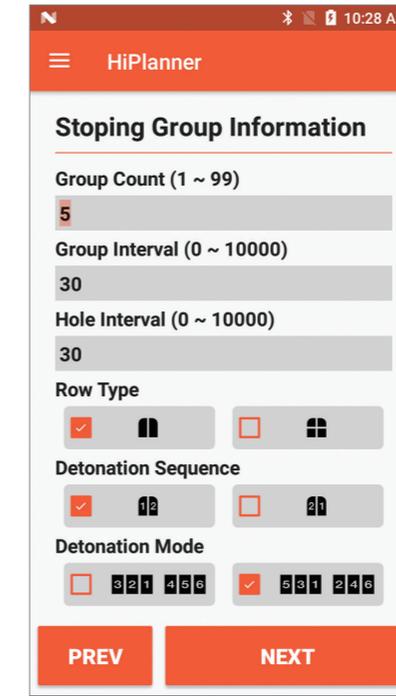


- **Number of Groups** Input the number of deep blast groups. Commonly available to set only one deep blast group but for specific case available to set up to 9 groups.
- **Group Time Gap** Input the time gap when passing from the deep blast group to the next group.
- **Hole Time Gap** Input the hole time gap in the group.

3.1.4 Start New Blasting

3) Tunnel Mode

② EXPANDED GROUP INFORMATION



- **Number of Groups** Input the number of expanded groups. Available to input maximum 99 groups.
- **Group Time Gap** Input the time gap when passing from the expanded group to the next group. One expanded group is the time gap to pass to the next external group. More than two expanded groups are the time gap to pass from the first expanded row to the second row.
- **Hole Time Gap** Input the hole time gap in the group.
- **Row Type** Set into how many rows the expanded group shall be divided. It is efficient to divide into 4 rows if the working space is large to install the harness wire on top. If the working space is the scale to work at the bottom part, set to 2 rows.
- **Firing Sequence** Determine which group between left group and right group should be fired first.
- **Firing Mode** Sequentially fire one row followed by the next row. To fire left and right in turn for the effect of blast, select the cross firing.

3.1.4 Start New Blasting

3) Tunnel Mode

③ EXTERNAL GROUP INFORMATION

Set the external group information by the same method as the expanded group information.

④ FLOOR GROUP INFORMATION

Excluding the row type, set the floor group information by the same method as the expanded group information.

⑤ BLAST DESIGN INFORMATION CREATION

Check the information of blast pattern created in the tunnel mode.

⑥ SCAN and LIST

The next process is equivalent to '3.1.3 (1) Group Mode'.

3.1.4 Start New Blasting

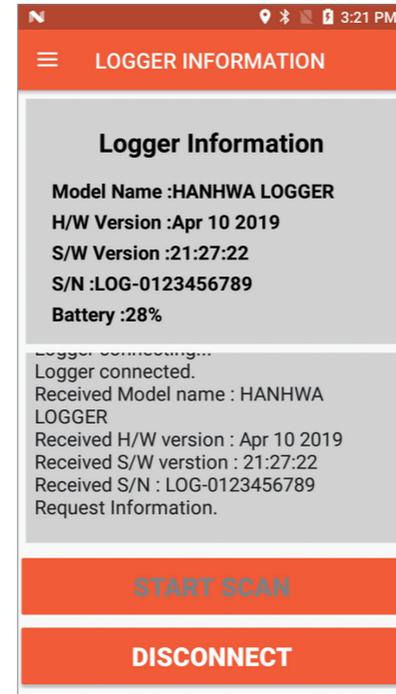
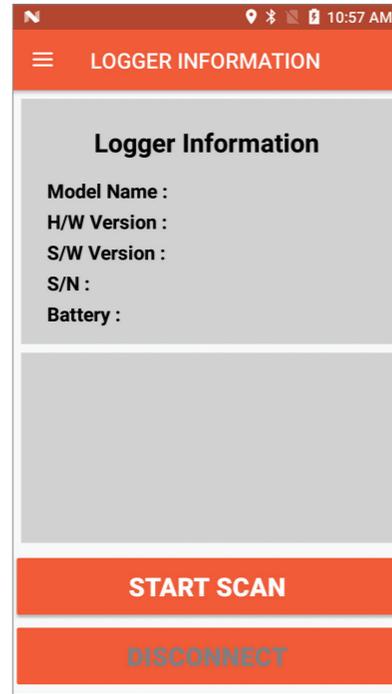
4) Software Mode

'3.1.3 (3) - (a) Save CSV file in the Planner as in the step '① Before Starting'.  
Then, select copied CSV file to proceed with OPEN.  
The next process is equivalent to '3.1.3 (3) Software Mode'.

### 3.1.5 Communication

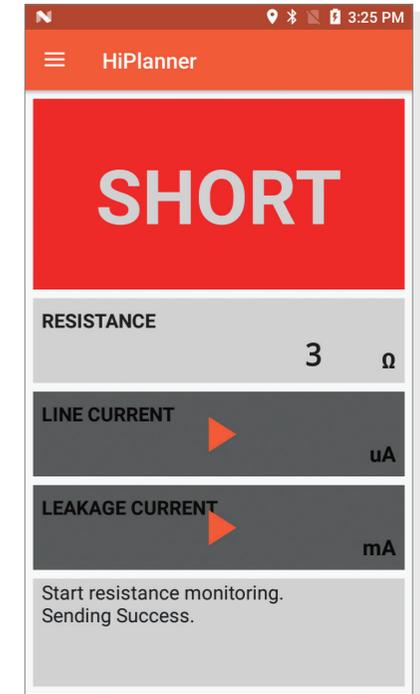
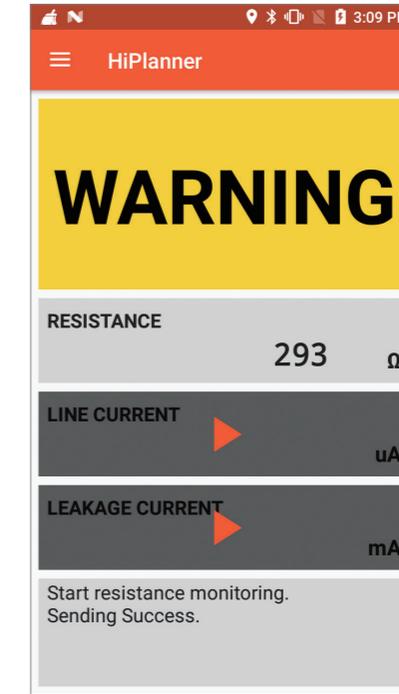
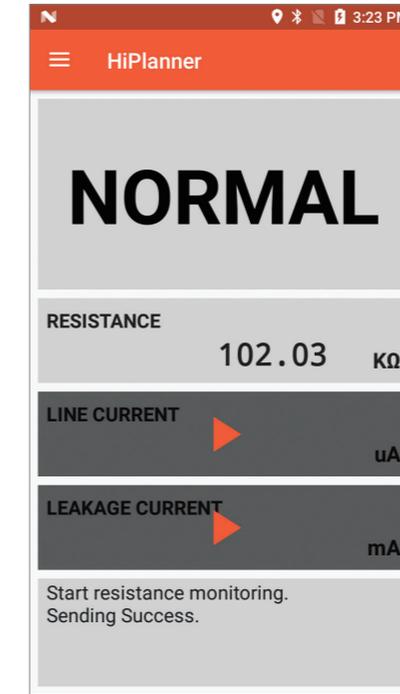
#### 3.1.5 Communication

##### 1) Logger Information



#### 3.1.5 Communication

##### 2) Line Test

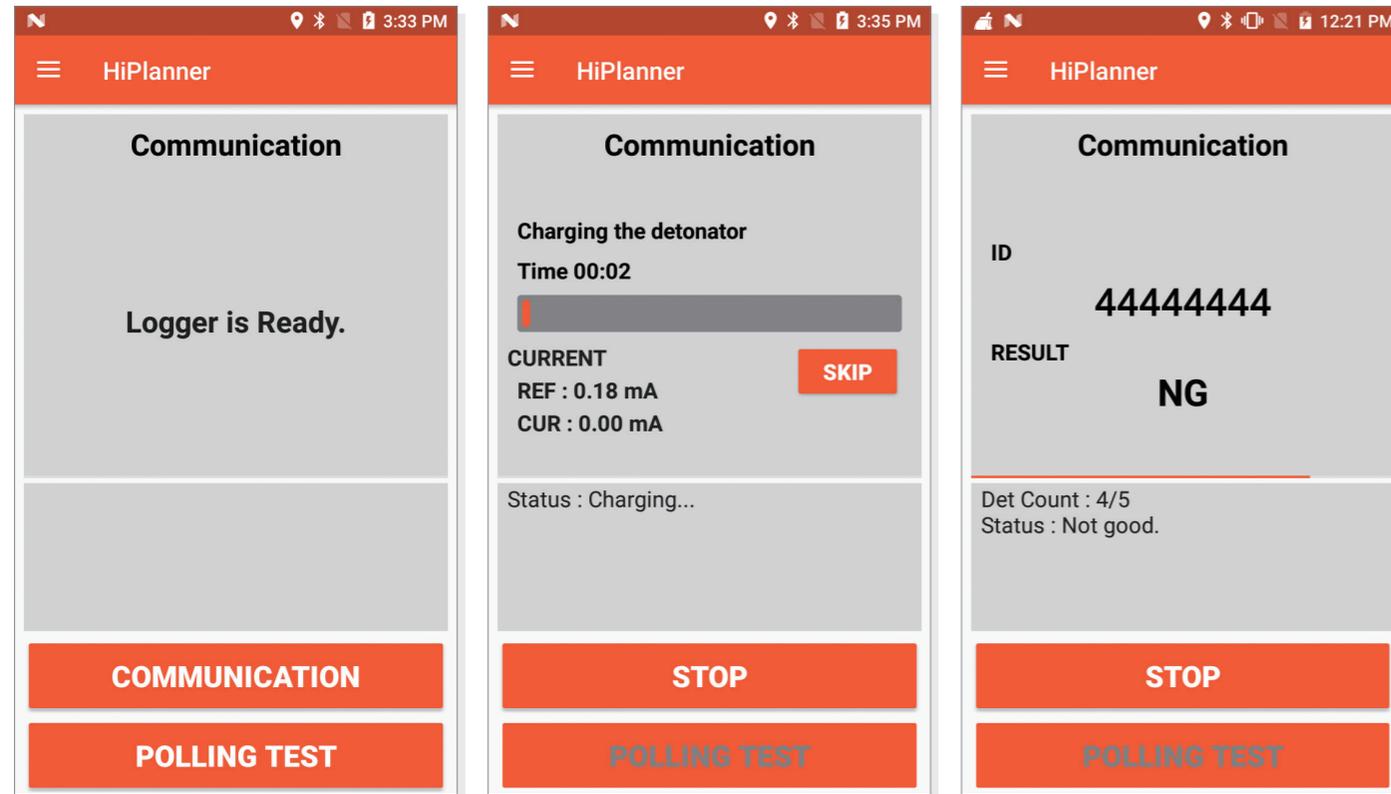


Check short circuit or abnormal condition during wiring.

Judgement Criteria	Resistance	Wiring Track Current
Warning	1 KΩ ↓	-
Short Circuit (Leakage)	200 Ω ↓	40 mA ↑

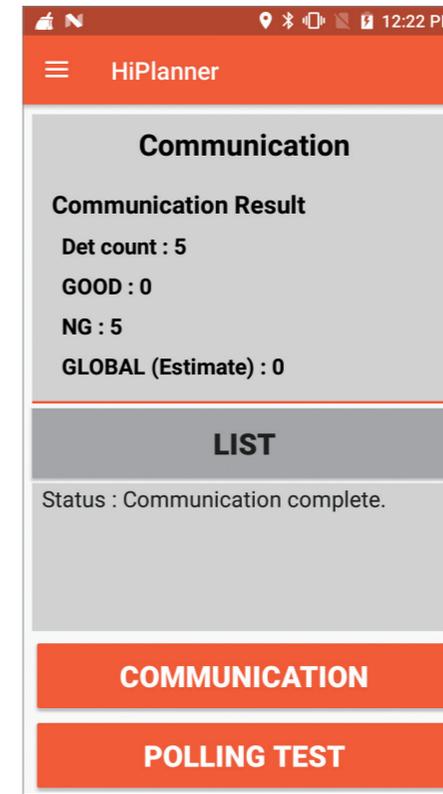
3.1.5 Communication

3) Communication



3.1.5 Communication

3) Communication



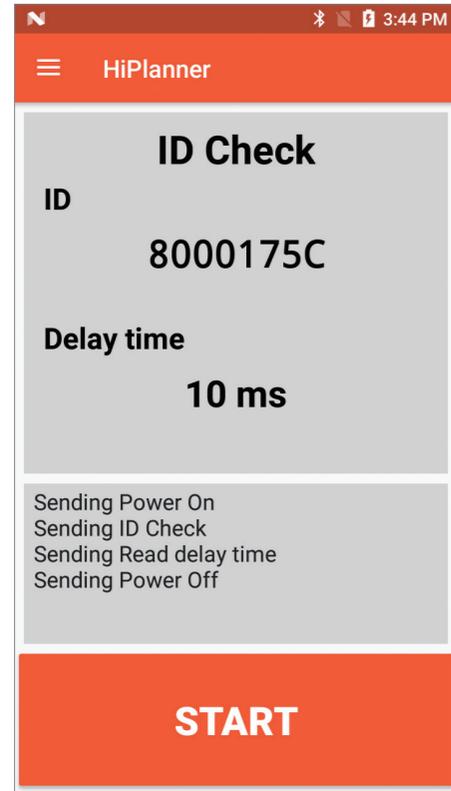
① COMMUNICATION

Check abnormal condition of every detonator once after the completion of wiring, scanning, logging and tagging.

② POLLING TEST

Continuously check abnormal condition of every detonator until the user stops.

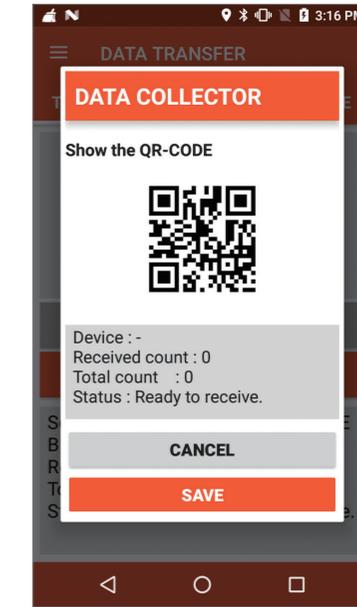
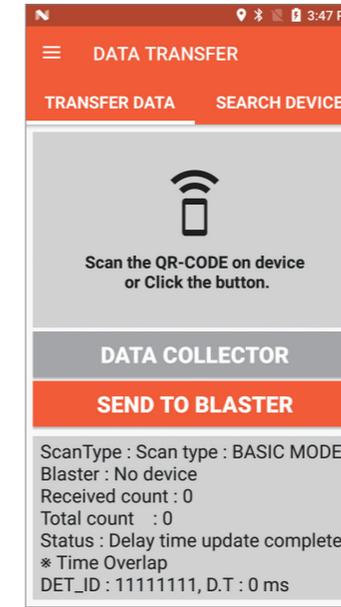
3.1.5 Communication  
4) ID Check



If the detonator connector is damaged, connect the detonator leg wire to check detonator ID.

3.1.6  
Data transmission

3.1.6 Data transmission  
1) Data Transmission



① **SECTION SELECTION** Available to select and transmit section by each situation. The basic setting is ALL. Click to select the section.

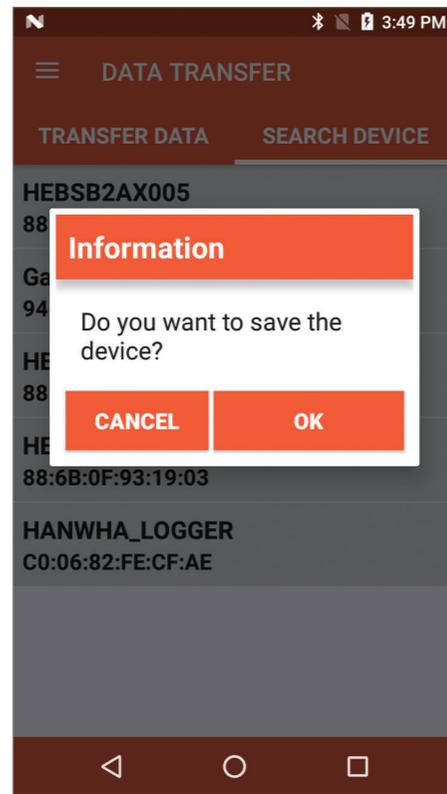
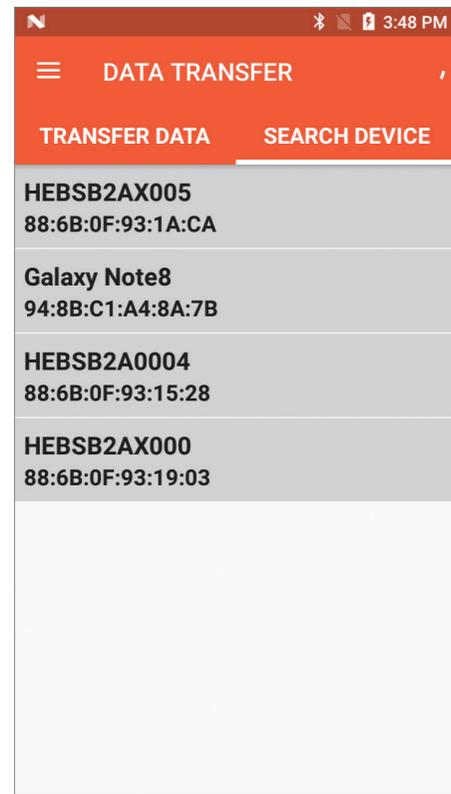
② **TRANSMISSION BY SCAN** Enter by the transmission standby in the blaster to scan QR code of the device for immediate download.

③ **TRANSMISSION BY BUTTON CLICK** Click the button of a device to transmit among blasters to transmit data. Except, must save the device to transmit through device search.

④ **DATA COLLECTION** Gather scanned data of several units with one scanner to transmit them to the blaster.

3.1.6 Data transmission

2) Device Search

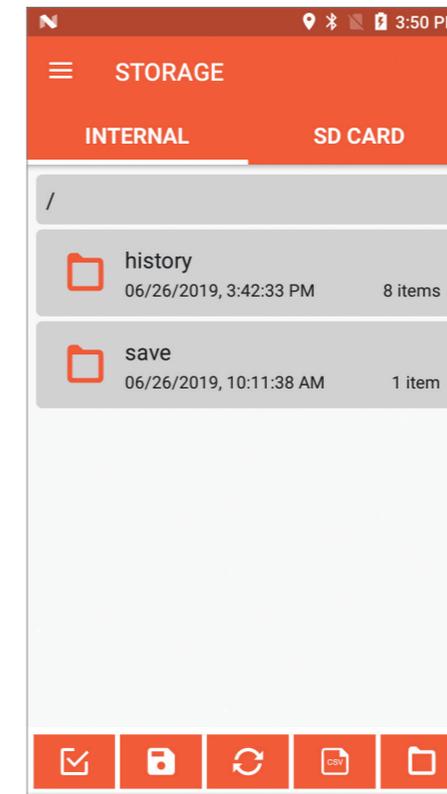


Select Device Search tap at the top on the Data Transmission screen. Select the tap to start searching device immediately and first to display the list of devices paired previously, and add devices in search below. Click the device item to display the Device Add screen. Press the device item to add for saving.

3.1.7 Others

3.1.7 Others

1) Storage - (a) Internal Storage -SD Card



In case of broken Planner during working, mount SD card to the spare Planner to import the information from HISTORY or SAVE.

- ① **DATA**  
Automatically save the information of currently working.
- ② **HISTORY**  
Automatically save all information worked previously.
- ③ **SAVE**  
Save all information saved after design and scanning.

3.1.7 Others

1) Storage - (b) Option Menu

① SELECT 

Available to select item.

② SAVE 

Save data in a folder. The following shows the structure of file name.  
[Scanner Management Number]\_[Number of Scanned Detonators]\_[Date]\_[Classifier].hsd

③ REFRESH 

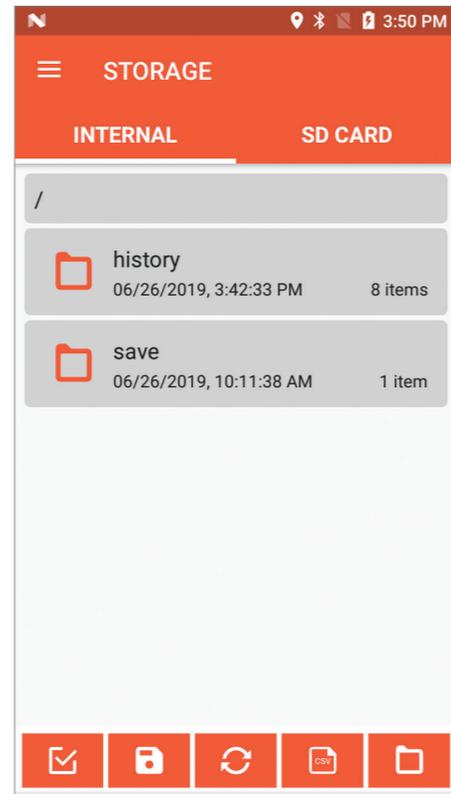
Display the list of latest folders.

④ CSV EXPORT 

To transmit scanned data to PC and import by Excel, at first must create CSV file through CSV export.

⑤ NEW FOLDER 

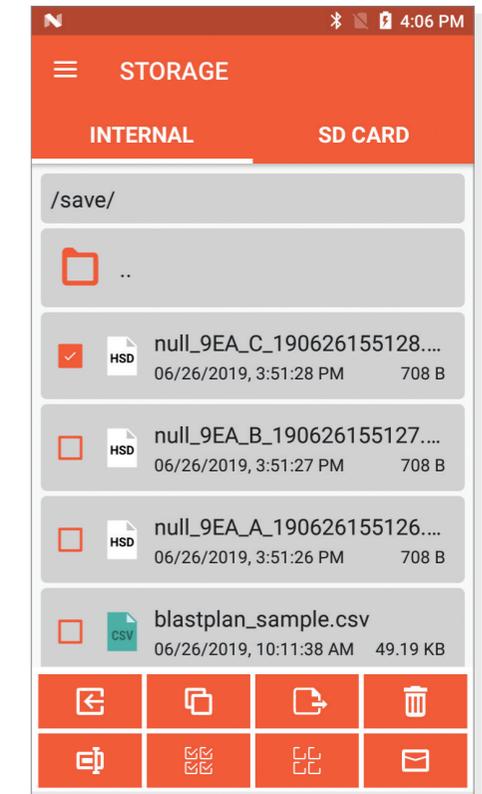
Create a new folder.



3.1.7 Others

1) Storage - (b) Option Menu

- Cancel  Cancel selection.
- Copy  Available to copy selected item.
- Move  Available to move selected item.
- Delete  Available to delete selected item.
- Name Change  Available to change the name of selected item. Except, must select only one.
- All Select  Select all items.
- All Cancel  Cancel all items.
- Email Sending  Available to send email attached with selected item.



3.1.7 Others

2) Settings - (a) Cancel

① ALL DELETE

Delete all information of designed data and scanned holes for blasting.

② HOLE DELETE

Delete hole information only leaving designed data for blasting.

3.1.7 Others

2) Settings - (b) Cancel

① SOUND FEEDBACK

Available to ON/OFF the sound feedback.

② SOUND FEEDBACK TYPE

Select whether to make a beep sound or a voice at scanning.

③ MULTIPLE FEEDBACK

Available to make different sounds by 5 multiples.

④ VIBRATION FEEDBACK

Available to generate vibration to receive the feedback even under noisy environment.

3.1.7 Others

2) Settings - (c) Feedback

① MAXIMUM DELAY TIME

Set the maximum delay time of a detonator (Refer to HiTRONIC Detonator TDS).

② MAXIMUM TIME GAP

Set the maximum time gap to design.

③ AUTOMATIC GLOBAL TIME

If the automatic global time is ON, operate the global detonator time with the time added by the automatic global time gap to the delay time to fire for the last time.

④ AUTOMATIC GLOBAL TIME GAP

Set the global time gap to be accumulated automatically.

⑤ MANUAL GLOBAL TIME

If the automatic global time is OFF, operate the manual global time for the global time

⑥ TIME OVERLAP WARNING

If the time is designed within 'Maximum Overlap Time' set previously by each detonator, warning shall be displayed.

⑦ MAXIMUM OVERLAP TIME

Set the standard time gap to display 'TIME OVERLAP WARNING'.

3.1.7 Others

2) Settings - (d) Others

① NEW ID

If a NEW ID is ON, set to HiTRONIC-II ID (8 digits). If a NEW ID is OFF, set to HiTRONIC-I ID (6 digits)

## 3.2 Logger

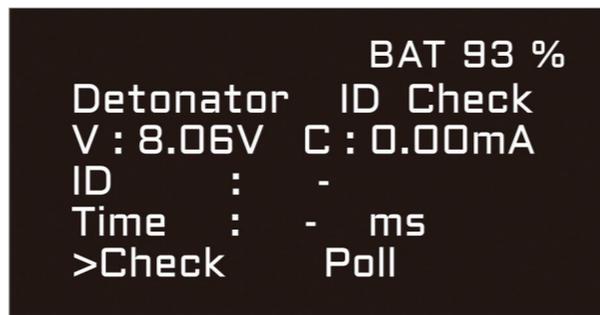
### 3.2.1 Main Menu



Available to select each menu on the screen by using a button at the bottom of Logger screen.

- **DET ID Check** Check the ID of corresponding detonator at the connection of each electronic detonator line.
- **Line Test** Check the current, leakage current and resistance of connected harness wire.
- **Information** Check model name of Logger, versions of hardware and software, serial number, name of Bluetooth device.

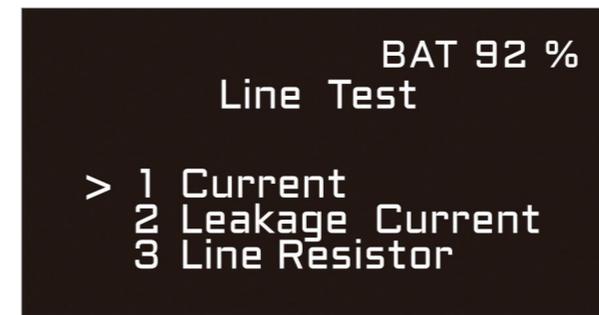
### 3.2.2 DET ID Check



Available to check the ID and delay time (if entered) of detonator directly connected to the Logger post.

- **ID** Display the ID of corresponding detonator.
- **Time** Display the delay time of corresponding detonator.

### 3.2.3 Line Test



Check the current, leakage current and resistance of connected wire. Available to select each menu by using a button at the bottom of screen.

#### 3.2.3 Line Test 1) Current



- **MES Current** Display present current value of connected Harnesswire by mA unit.

3.2.3 Line Test

2) Leakage Current



- **MES Leakage Current**  
Display present leakage current value by  $\mu\text{A}$  unit.

3.2.3 Line Test

3) Line Resistor



- **MES Line Resistor**  
Display present resistance value of connected harness wire by ohm unit.

3.2.4

Information



- **MODEL** Model Name
- **H/W** Hardware version of corresponding logger
- **S/W** Software version of corresponding logger
- **S/N** Serial number of corresponding logger
- **BT** Name of Bluetooth device

3.3 Blaster

3.3.1 Start Screen



Available to check the program version of corresponding blaster on the first screen appeared when pressing the power button.  
If touching the start button on the screen, move to the main screen.

3.3.2 Main Screen



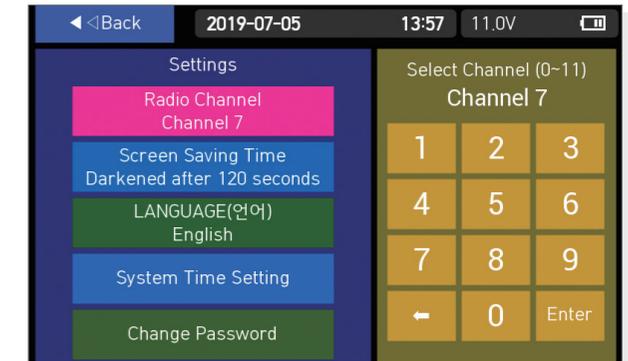
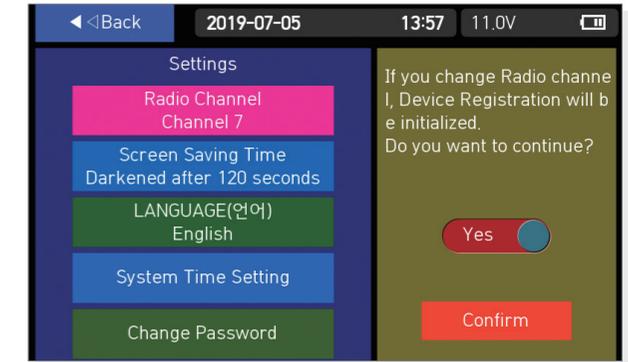
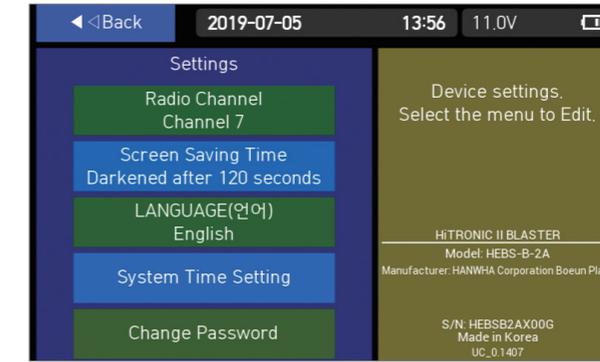
Check the ID number and motion mode of corresponding blaster on the screen center.  
Check the time and remained battery of the system on the screen top.

- **Setting** Select the time, language, and motion mode of blaster.
- **Setting of blast configuration** Select the connection between blasters.
- **Starting blast** Enter the process to start firing.

3.3.3 Setting

3.3.3 Setting

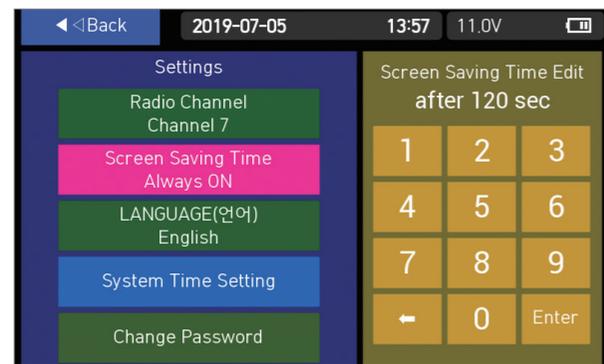
1) Communication Channel



Set the communication channel between blaster/remote/repeater. A channel setting is possible by entering a password. Available to set from channel 1 to channel 13, change to save and end.

3.3.3 Setting

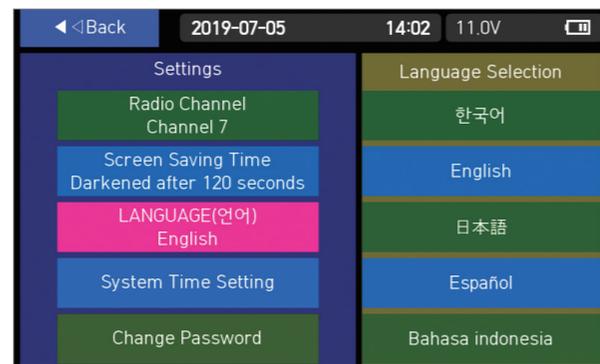
2) Screen Saving Time



Set the time to turn off the blaster screen.

3.3.3 Setting

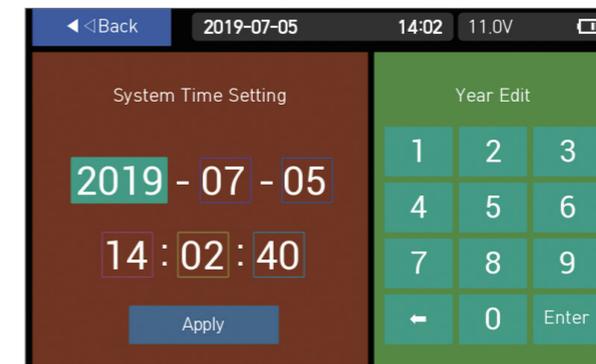
3) Language Setting



Select the language to display on the blaster screen.  
Available to select total 5 languages of Korean, English, Indonesian, Spanish and Japanese.

3.3.3 Setting

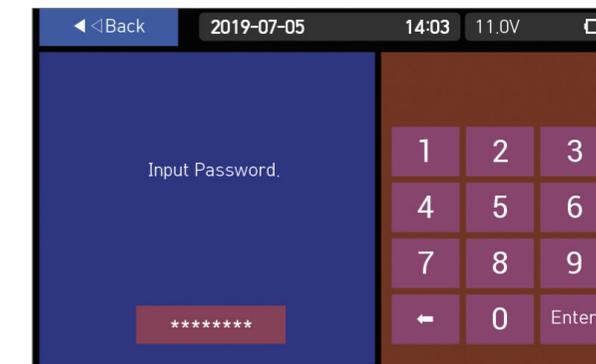
4) System Date Setting



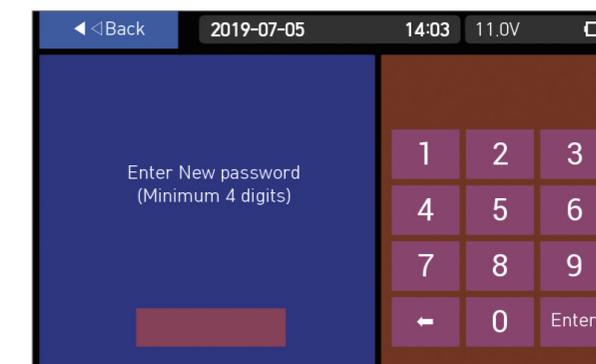
Set the system date of corresponding blaster.

3.3.3 Setting

5) Password Change



Set the configuration of blast, change the password used to start firing.  
① Input previous password.



② Input at least 4 digits and maximum 16 digits of your choice.  
③ Input password to change once more.

### 3.3.4 Blast Configuration Setting

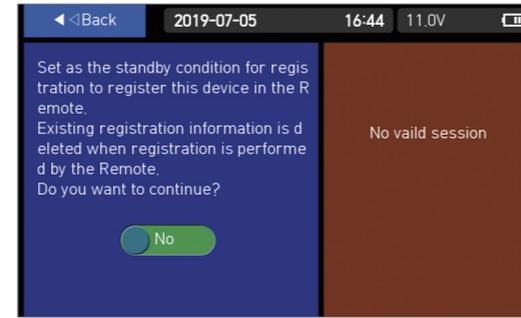
#### 3.3.4 Blast Configuration Setting

##### 1) Blaster & Repeater

Device Registration  
Standby



① Connect Blaster & Repeater to the Remote.



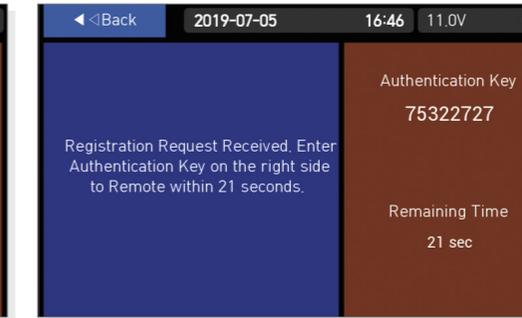
② Available to check previous registration session, previous information shall be deleted if continuing to proceed.

#### 3.3.4 Blast Configuration Setting

##### 1) Blaster & Repeater



③ Transmit the signal requested for the registration of corresponding device to the remote.



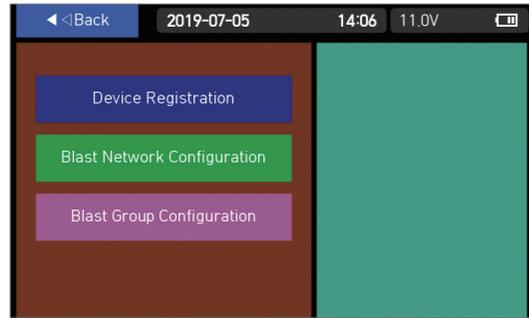
④ Check the registration signal at the remote, and input the code number on the right to the remote within 30 seconds (Refer to 3.3.4 (2) - (a) Device Registration).



⑤ If the corresponding blaster completes the registration in the remote, the device shall display the registered session number.

3.3.4 Blast Configuration Setting

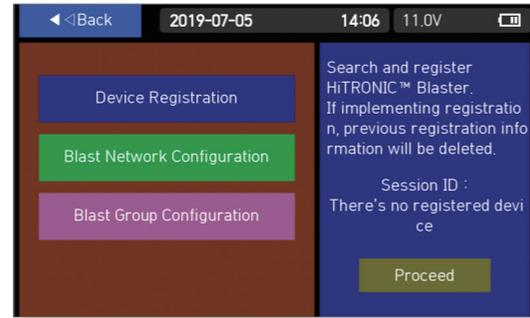
2) Remote



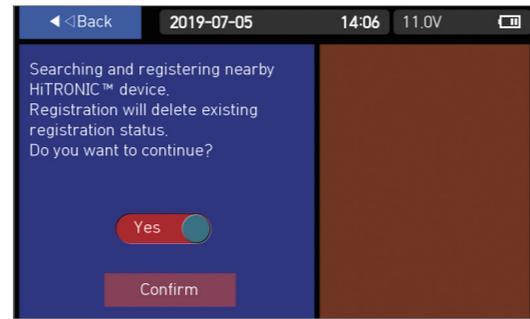
- **Device Registration** Connect repeater and blasters searched at the remote.
- **Blast Network Configuration** Set the sequence and structure of communication for repeater and blasters connected to the remote.
- **Blast Group Configuration** Set the sequence and method of blast for the blasters connected to the remote.

3.3.4 Blast Configuration Setting

2) Remote - (a) Device Registration



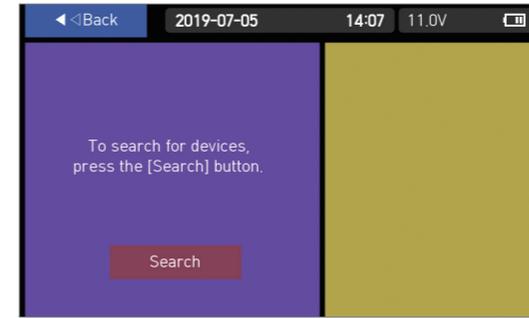
- ▶ Connect all blasters and repeater used for wireless blast at the remote.



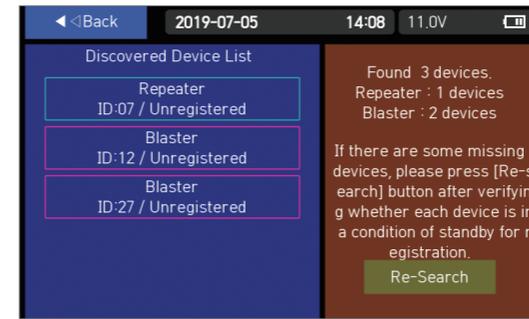
- ▶ Check all previous registration information to be deleted. Input password.

3.3.4 Blast Configuration Setting

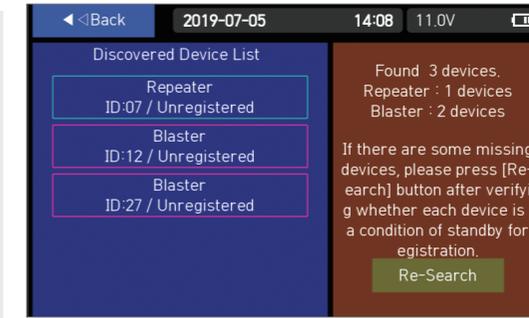
2) Remote - (a) Device Registration



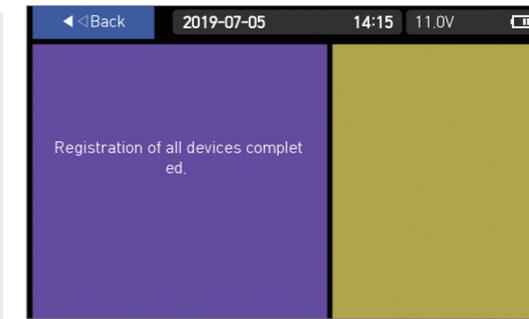
- ▶ Press the search button to search blasters in request for registration.



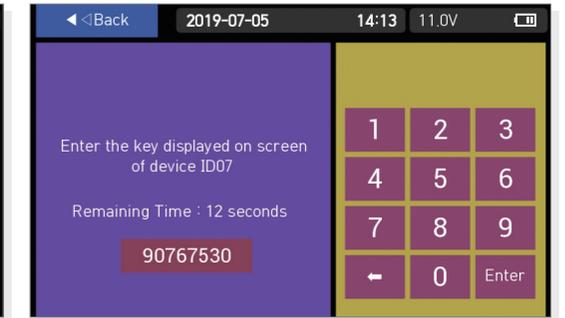
- ▶ The text 'Registered' shall be displayed on the search screen for blasters connected to the remote.



- ▶ Check the motion mode and ID of blasters in request for registration, select each one to register



- ▶ The statement 'Registration of all devices completed' is displayed on the screen when registration completed of all devices retrieved from the remote.



- ▶ Input registered code displayed on the right screen of Blaster/Repeater for registration within 30 seconds to the remote.



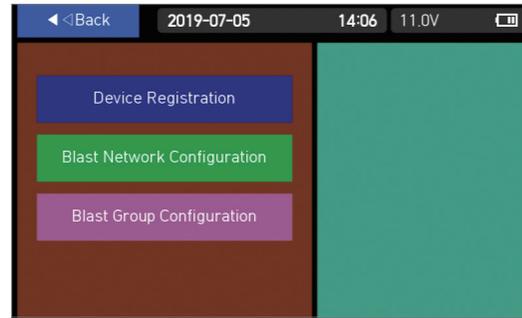
- ▶ If repeaters are included in the registered devices, Routing information is sent automatically.

3.3.4 Blast Configuration Setting

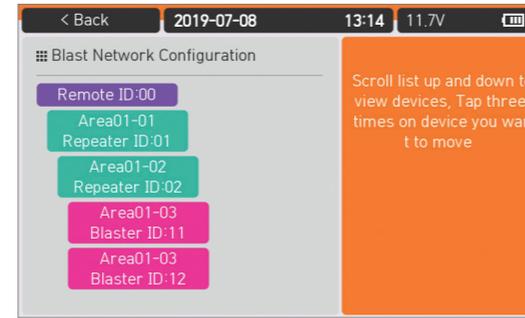
2) Remote - (b) Blast Network Configuration

Available to edit the connection configuration of Repeater and Blaster registered in the remote.

※ The repeater should be on to change the blast network where the repeater is included.



▶ Touch the configuration of blast network.

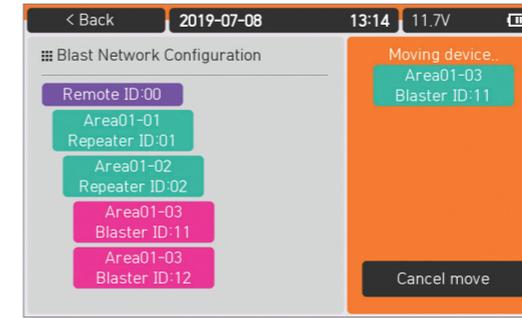


▶ Devices registered in the remote shall be arranged by the connection structure. On top, remote device shall be displayed, and each device shall be displayed by the structure connected under the remote.

Area means the path to deliver one signal. The blasters inside the Area shall have the path to deliver the same signal. The numeral after the Area number is the Depth, which means the step to deliver the signal at the remote.

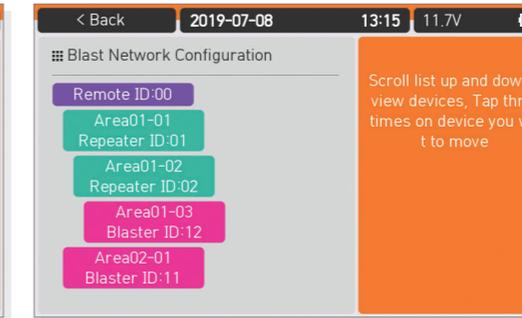
3.3.4 Blast Configuration Setting

2) Remote - (b) Blast Network Configuration



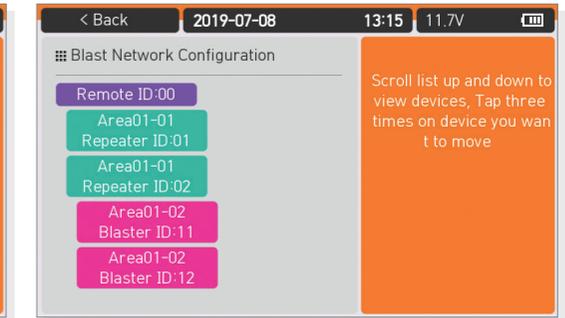
▶ It is available to configure the network by moving devices. If tapping device to move three times, Moving Device shall be popped up to display the device to move on the right screen. If tapping the target host device, it shall be arranged to the substructure of corresponding device.

In case of Blaster, only corresponding device shall move, and in case of repeater, all devices included in the substructure of the corresponding device shall move.



**Example)**

▶ It is available to check that the blaster ID No. 11 which was previously Area 01 and Depth 03 (namely, under the repeater ID 02) shall be moved under the remote to become Area 02 and Depth 01.

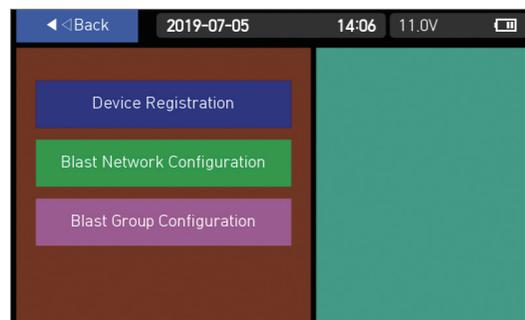


▶ If the repeater 02 is moved under the remote, the entire substructure shall be moved, and it is available to check changed Depth.

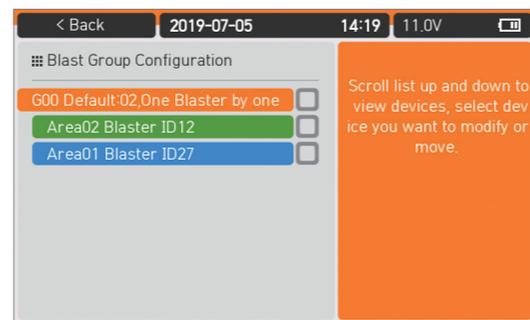
The Area shall be determined by the blaster. If no blaster exists in the path of substructure, additional Area shall not be created.

3.3.4 Blast Configuration Setting

2) Remote - (c) Blast Group Setting



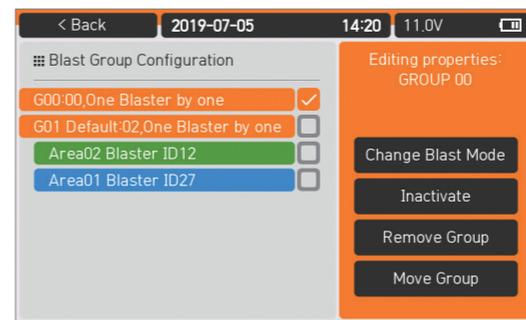
▶ Touch the blast group configuration.



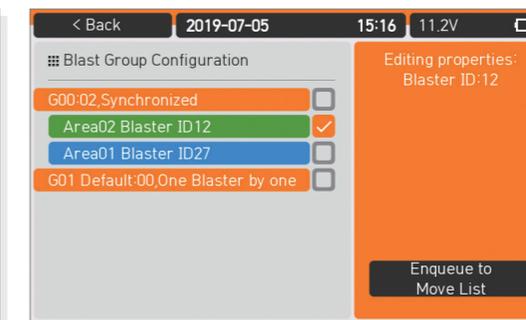
▶ If entering the first blast group setting after pairing, all blasters are in a basic group. The basic group is displayed with Default, which shows the number of blasters to the corresponding group next to the display of each blast mode.

3.3.4 Blast Configuration Setting

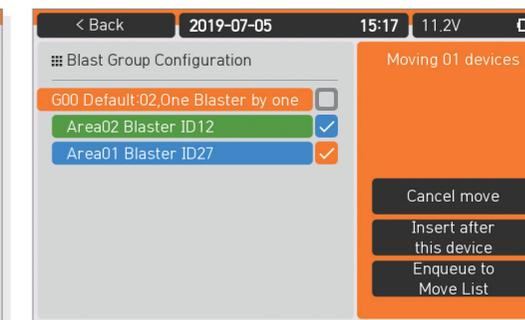
2) Remote - (c) Blast Group Setting



▶ Currently selected item shall be displayed with orange check symbol on the right screen. Title bar of basic group is selected to display the button to create a new group. If the new group is created, the blaster can be moved to the corresponding group.



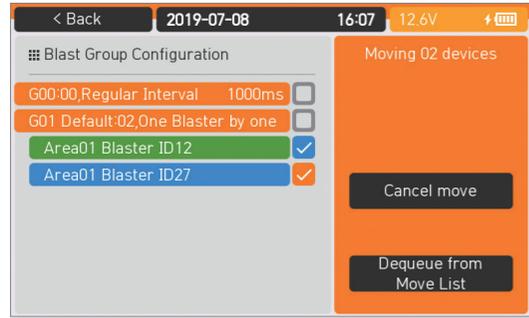
▶ If a blaster is selected, a button, 'Enqueue to Move List', shall be displayed. If this button is tapped, the corresponding blaster shall be registered in the move list.



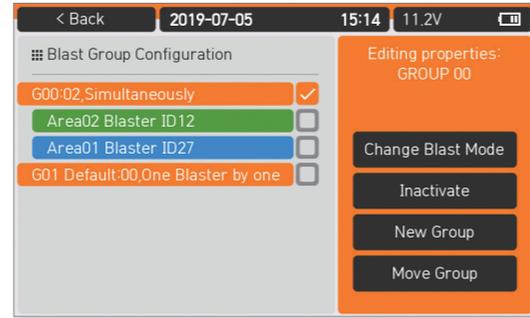
▶ The item registered in the move list shall be displayed in a box with blue check symbol. If Enqueue to Move List is tapped by selecting one by one, it is available to register several devices in the move list. 'Insert in front of this Group' button is tapped to move the blaster to the corresponding group. 'Cancel Move' is tapped to cancel the movement.

3.3.4 Blast Configuration Setting

2) Remote - (c) Blast Group Setting



▶ If a device existed in the move list is selected, it is available to remove the device by tapping Dequeue from Move List.

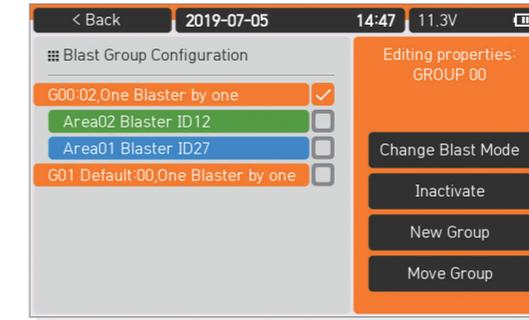


▶ The properties of blast group and blasters (individual blast) can be edited only when they are not in movement.  
'Change Blast Mode' shall change the blast mode of corresponding group.  
'Inactivate' shall inactivate the corresponding blast group.  
Blasters in the corresponding blast group shall be inactivated, which shall skip being treated as if there is no corresponding group and blaster.  
'Move Group' shall move the group location.

3.3.4 Blast Configuration Setting

2) Remote - (c) Blast Group Setting

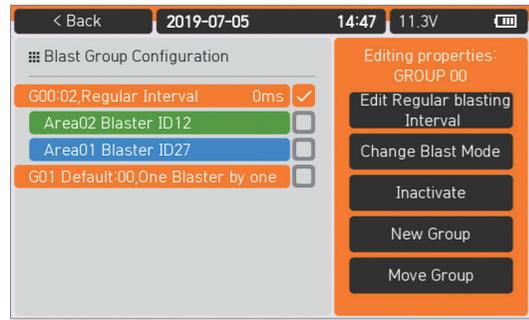
① Change Blast Mode



▶ **Each hit (individual blast)**  
The blast shall proceed to ARM simultaneously. Whenever the blast button is pressed 'once', the blast shall proceed for each blaster.

3.3.4 Blast Configuration Setting

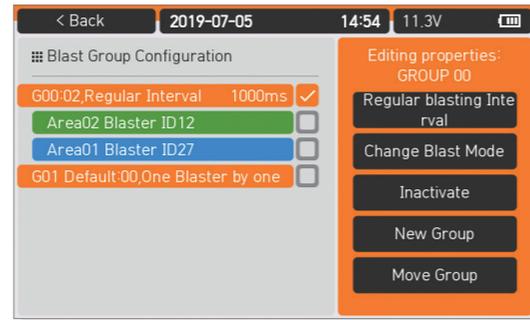
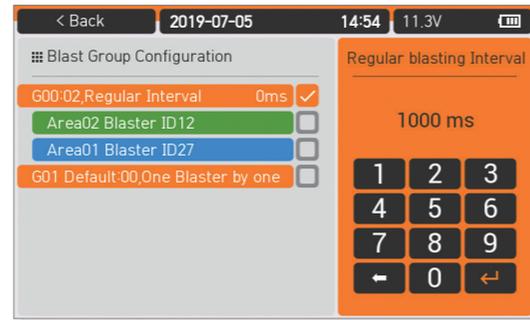
2) Remote - (c) Blast Group Setting



► Regular Interval

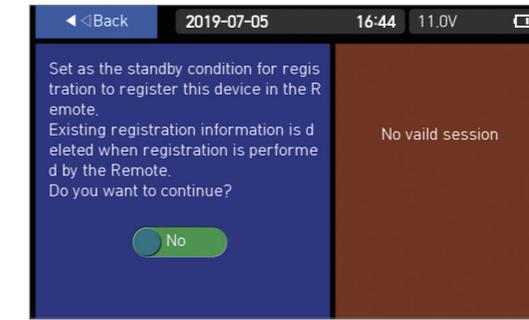
In a regular interval mode, Modify Group Interval button shall be displayed. If pressing the corresponding button, it is available to set Regular Interval.

If pressing the blast button once, blasters in the group shall proceed with the blast in a regular interval. If the interval is set as 1,000ms, each blaster shall carry out the blast in an interval of 1,000ms.



3.3.4 Blast Configuration Setting

2) Remote - (c) Blast Group Setting



► Individual Interval

If pressing the blast button once, blasters in the group shall fire automatically in each set interval. The interval set in each item is the standby time until the blast of device after the blast of corresponding device.

In a Individual Interval Mode, it is available to set the delay time in the blaster until the blast of the next blaster. If pressing Modify Interval, it is equally available to set the time.

► Simultaneously

If pressing the blast button once, all blasters in the group shall proceed with the blast simultaneously.

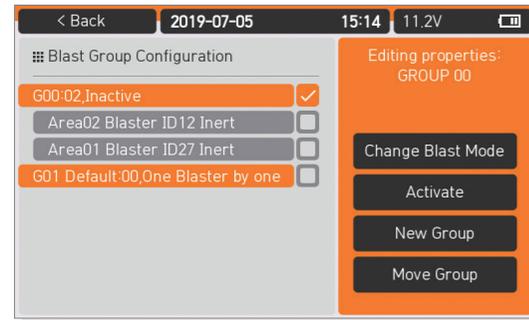
► Synchronized

If pressing the blast button, blasters in the group shall blast in series. Lagging time between the last detonator and the previous detonator of the previous blaster shall be applied. For example, if lagging time of the last detonator of the previous blaster is 1300ms and that of the previous detonator 1275ms, the next detonator shall begin 25ms post blast after the last detonator of previous blaster is fired.

3.3.4 Blast Configuration Setting

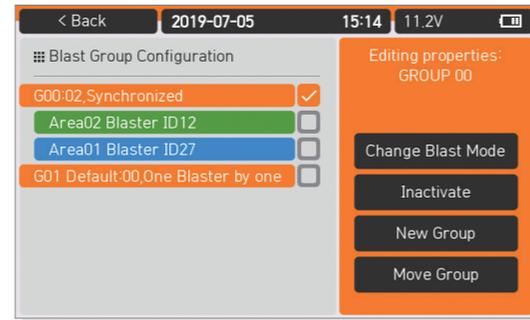
2) Remote - (c) Blast Group Setting

② Inactivate

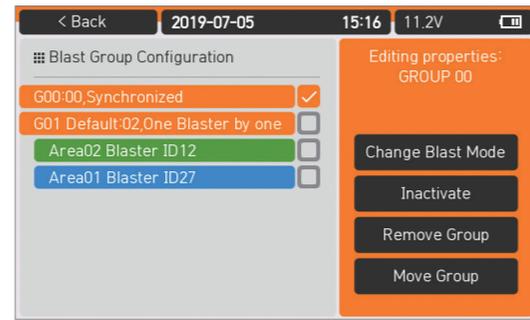


► It is the appearance of inactivated blast group. If selecting Activate, it is available to activate.

③ Move Group



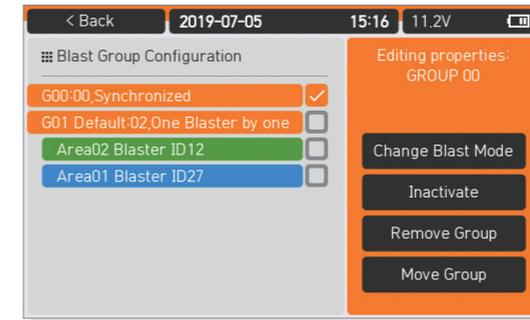
► The movement of a group shall be displayed with a blue marker if selecting the group to move and selecting Move Group. If selecting the title bar of other groups, Insert after this Group shall be selected to move the corresponding group to the next group.



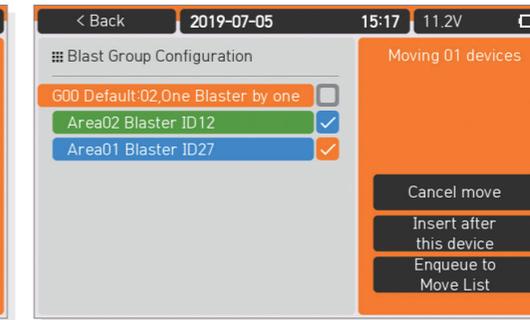
3.3.4 Blast Configuration Setting

2) Remote - (c) Blast Group Setting

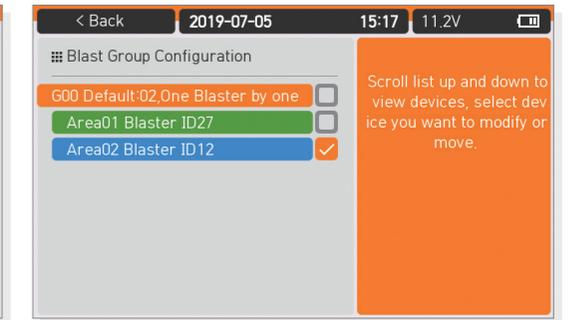
④ Remove Group



► It is only possible to delete the group in a condition without the group blaster. If the group without the blaster is selected, Remove Group button shall be displayed to delete the group.



► The sequences of group and blasters in the group shall be the sequence of blast. Therefore, the sequence of blasters in the group should be set. As in the movement between groups, blasters shall be selected through Enqueue to Move List. Then, if selecting the location to move (device or group title bar), it shall be moved right after the corresponding location.



**Example)**  
► If selecting the movement of Device No. 12 and selecting the location of No.27 to select the Insert After This Device, Device No.12 shall be arranged after Device No. 27, and devices in the group shall be rearranged

### 3.3.5 Start Blasting

#### 3.3.5 Start Blasting

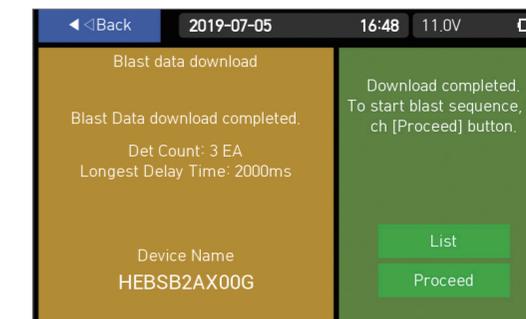
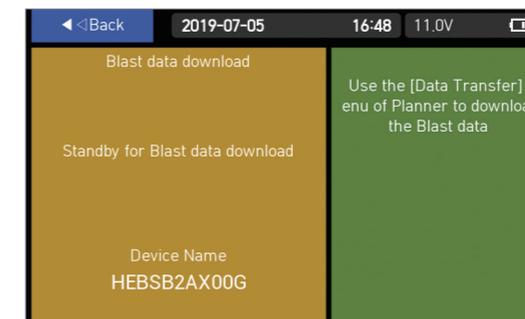
##### 1) Blaster



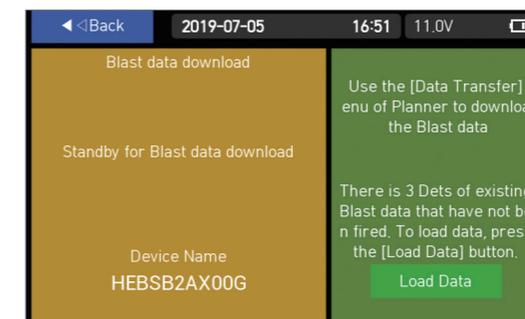
▶ To proceed with the blast, touch the Start Blasting on the screen.

#### 3.3.5 Start Blasting

##### 1) Blaster



▶ Download the electronic data for detonator from the planner (Refer to 3.1.6 Data Transmission).

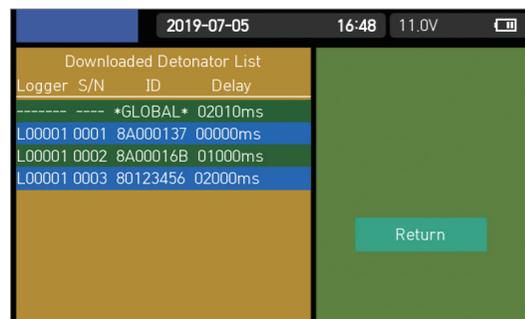


▶ Available to retrieve the previous data for detonator ended without the proceeding of blast.

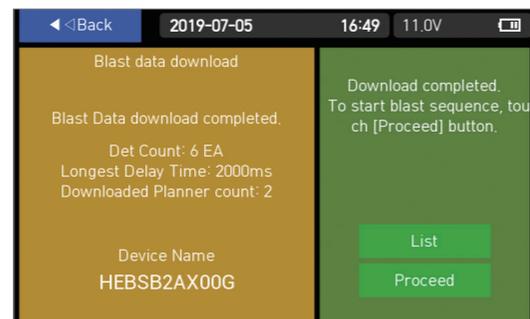


3.3.5 Start Blasting

1) Blaster



▶ Tap the 'List' Button and confirm the list downloaded.



▶ Download up to 3,000 detonators and check the number of Planner used in download.

3.3.5 Start Blasting

1) Blaster



▶ If any of the downloaded data has duplicate IDs, cancel the download.



▶ Confirm all IDs and delay times downloaded.



3.3.5 Start Blasting

1) Blaster - (a) Starting Wireless Blast



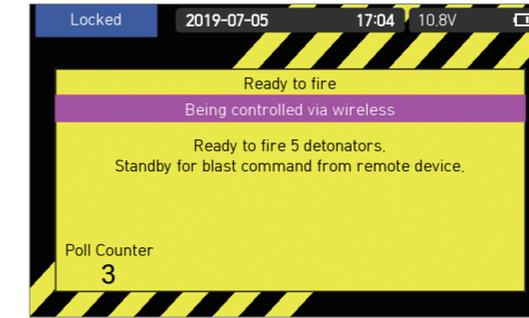
▶ Touch 'Start Wireless Blast' button. It is not possible to maneuver the corresponding blaster after the initiation of wireless control. It is available to maneuver the power at emergency.



▶ Blaster shall be maintained for a blast standby mode.

3.3.5 Start Blasting

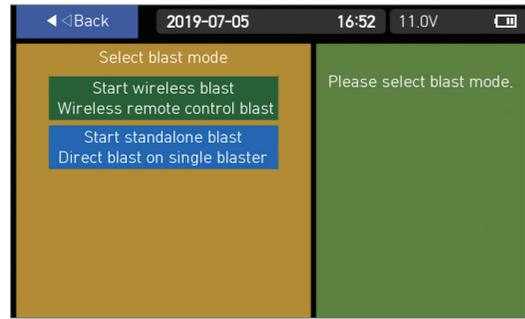
1) Blaster - (a) Starting Wireless Blast



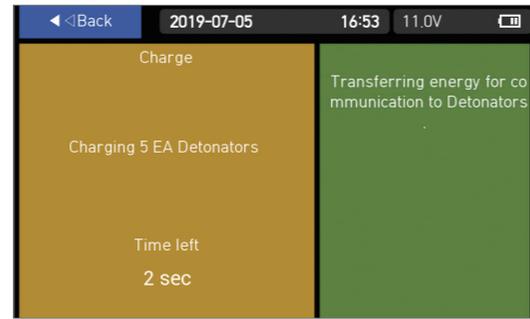
▶ The screen of a blaster shall be converted by carrying out the preparation for the blast at the remote.

3.3.5 Start Blasting

1) Blaster - (b) Starting Single Blast



▶ Touch 'Start standalone blast' on the screen.



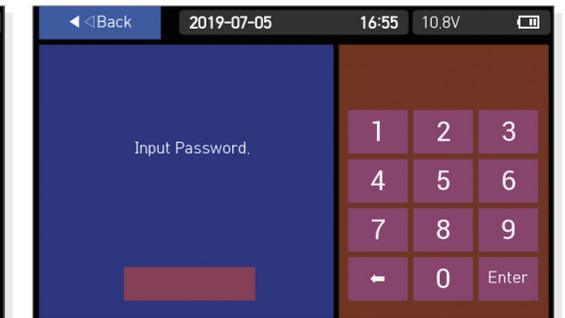
▶ Proceed with the communication with a detonator connected to a blaster.

3.3.5 Start Blasting

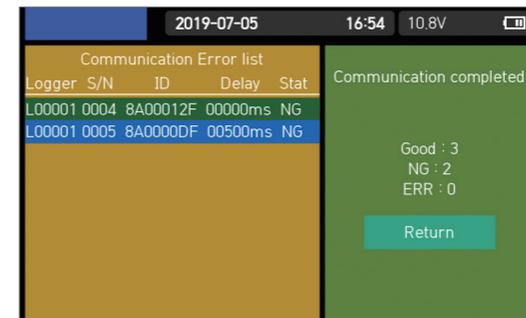
1) Blaster - (b) Starting Single Blast



▶ If an error occurs after the completion of communication, it is available to communicate again after implementing the countermeasure.



▶ Input password set for the actual fire (at least 4 digits, max. 16 digits).



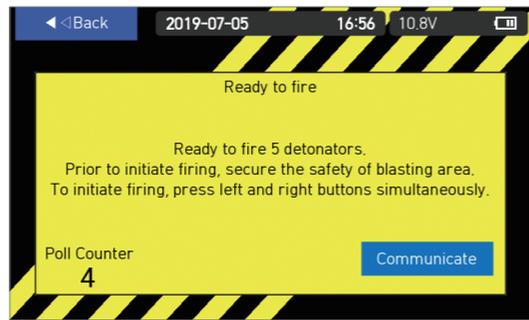
▶ If any error exists, NG shall be displayed. It is available to check the information about corresponding detonator immediately.

3.3.5 Start Blasting

1) Blaster - (b) Starting Single Blast



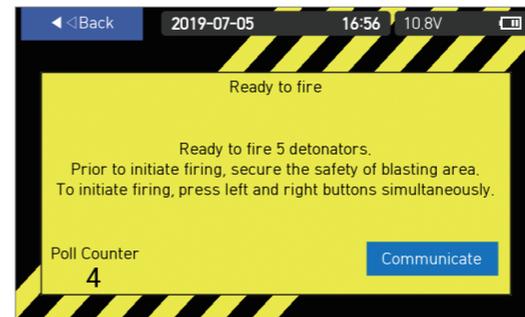
▶ Charge energy in the electronic detonator for firing.



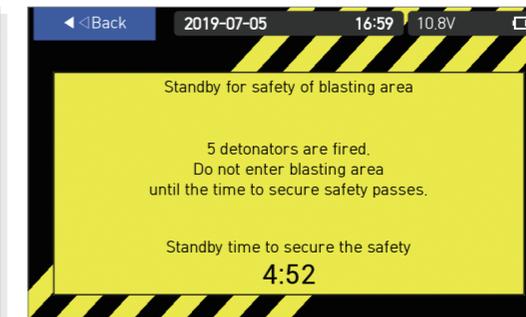
▶ Screen for standby after the complete recharging.

3.3.5 Start Blasting

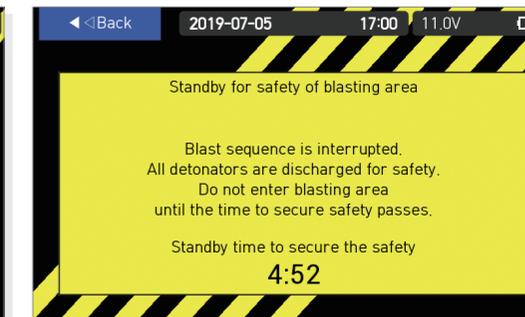
1) Blaster - (b) Starting Single Blast



▶ Continuous communication is being carried out. If an error occurs, the count of detonator with error shall be displayed as NG.



▶ If pressing ARM and FIRE buttons simultaneously, the blast shall proceed. It is the blaster screen after the complete blast.



▶ The blaster screen when the blast stops after ARM.

3.3.5 Start Blasting

2) Repeater



▶ To proceed with the blast, touch the Start Blast on the screen.



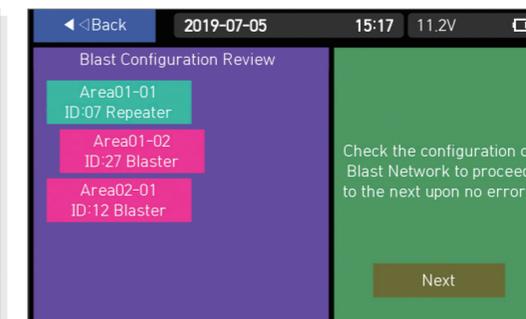
▶ After checking ID of the repeater, carry out the procedure for the blast at remote.

3.3.5 Start Blasting

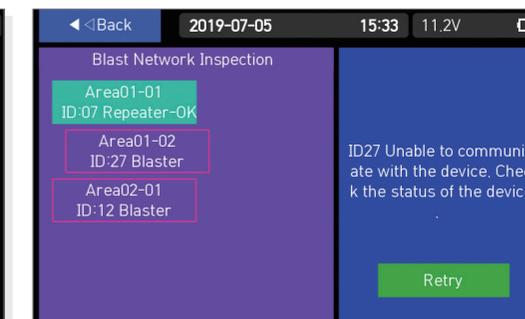
3) Remote



▶ Check the repeater connected to the remote, the blast ID of a blaster, and a motion mode and touch the 'Start Blast' on the screen.



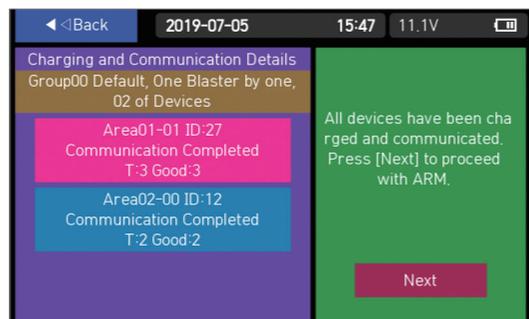
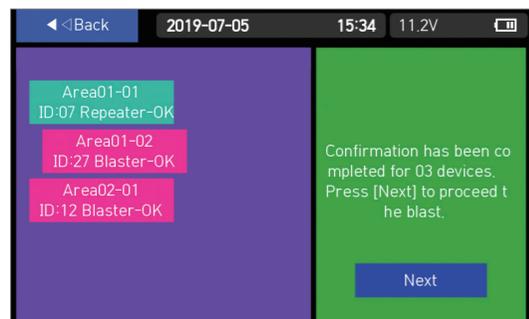
▶ A blasting network shall be checked for the corresponding remote.



▶ Check the connection. In case of the above screen, touch 'RETRY' after checking the preparation of corresponding blaster.

3.3.5 Start Blasting

3) Remote



▶ Available to check the condition after the communication with every electronic detonator and to enter the charging step for blasting.



▶ Proceed with recharging to check the connection of detonator connected to the blaster.

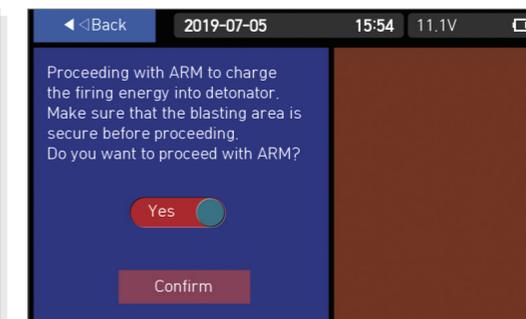
Available to check the remaining time and communication result during recharging.

3.3.5 Start Blasting

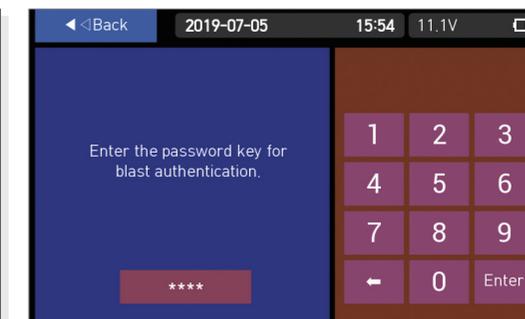
3) Remote



▶ In case of detecting a detonator with defective connection, touch the "Back" button to stop the blasting, or touch "Next" to continue. Available to stop the blast preparation or to proceed continuously.



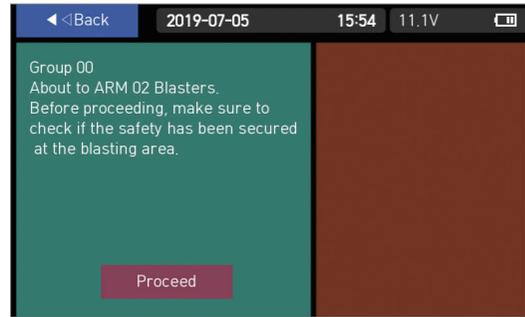
▶ Step to check the proceeding of recharging for actual firing.



▶ Input password.

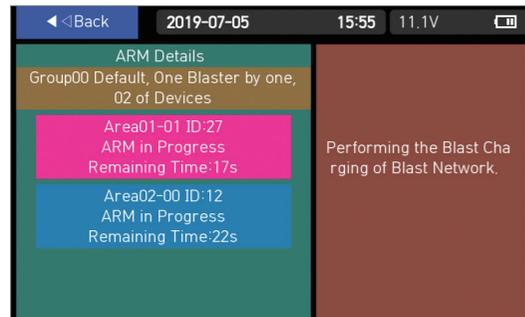
3.3.5 Start Blasting

3) Remote



► Each hit

Recheck the safety of blast field before recharging. If pressing CHECK, recharging shall be proceeded for the fire of electronic detonator.



► Recharge energy to the electronic detonator for firing.



► Standby screen for blasting after the complete recharging.

For 'one blaster by one' mode, press the left and right buttons at the same time while the ready is displayed on the screen, then the blaster is firing. Press buttons to continue the blasting of each blaster in the group until all the blasters are firing. An additional process is carried out to allow and timing of the blasting of each transmitter. The time required for this process depends on the breakaway network configuration.

3.3.5 Start Blasting

3) Remote



► If pressing ARM and FIRE buttons simultaneously, blast shall proceed at the blaster of corresponding ID.



► If pressing ARM and FIRE buttons simultaneously, the blasting shall be proceeded in the blaster.



► Remote screen after the complete blast.

3.3.5 Start Blasting

3) Remote



► All blasting mode except Each hit

All groups are Charging and communicating when there are more than one blast group. Inactivate groups and groups without blasters will be omitted. From the ARM stage, one group is ARM and after the blasting, and the next group is ARM and Blasting.



► If the blasting group has different mode with 'Each hit', the starting timing of each blasters depends on the blasting mode of the blasting group. Because it is automatically set and processed, press the left and right buttons on the blast preparation screen to apply the blast. An additional process is carried out to allow and timing of the blasting of each transmitter. The time required for this process depends on the breakaway network configuration.

3.3.5 Start Blasting

3) Remote



► After entering the ARM phase, touch the [Back] button to send a discharge command to all the blasters.

► Automatic countdown (approximately 10 to 20 seconds) is carried out after the additional process. At the end of the countdown, each of the blasters will automatically fire to match the set blasting mode.



► After entering the ARM phase, touch the [Back] button to send a discharge command to all the blasters.



► Each blaster that carries out the discharge command enters a safe standby state. Additional commands cannot be performed until safety Standby time is complete.

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- 
- 
- 4. Maintenance
- 4.1 Problem Solving at Planner Work
- 4.2 Problem Solving at Blaster Work
- 4.3 Problem Solving for Misfire after Blasting

# 4.

## Maintenance

### 4.1 Problem Solving at Planner Work

#### 1. Contaminated Lens

- **Symptom** When scan speed slows down or it is difficult to scan.
- **Resolution** Clean the lens with soft cloth and retry.

#### 2. Damaged QR-CODE

- **Symptom** QR-CODE mounted on the connector has been damaged, so that it is not available to scan and it is hard to find out ID.
- **Resolution** In Logger, must use [ID CONFIRM] function to check ID and input ID manually.

#### 3. No response from App

- **Symptom** State of either disconnection after error message or no response
- **Resolution**
  - A) Press the power button for 5 long seconds for rebooting.
  - B) If the problem is not resolved even after rebooting, contact with A/S in charge.

#### 4. Declined App Performance

- **Symptom** Either program speed apparently slows down or scan speed slows down
- **Resolution**
  - A) Press the power button for longer than 5 seconds to implement rebooting.
  - B) If the problem is not resolved even after the implementation of A), press numerals 1+9+Power Button to implement the factory default.
  - C) If the problem is not resolved even after the implementation of A) and B), contact with A/S in charge

※ It is recommended to reboot at least once a week.

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- 
- 
- 4.1 Problem Solving at Planner Work
-

#### 5. Keypad Operation Error

- **Symptom** Keypad is not operated.
- **Resolution**
  - A) Press the power button for long 5 seconds for rebooting.
  - B) If the problem is not resolved even after rebooting, contact with A/S in charge.

#### 6. Date Transmission Error

- **Symptom** Tried to download at the Planner but failed with a warning sound.
- **Resolution**
  - A) Reboot Planner and Blaster.
  - B) Retry the download at the Planner.
  - C) If several trials are implemented for A) to B) processes but failed to download, contact with A/S in charge.

#### 7. Disconnection between Logger and Planner

- **Symptom** Connection is cut off between Logger and Planner during the work.
- **Resolution**
  - A) Reboot Logger.
  - B) Try to connect Logger at the Planner.
  - C) If several trials are implemented for A) to B) processes but failed to download, contact with A/S in charge.

#### 8. Logging fails

- **Symptom** Not able to receive logging data during logging.
- **Resolution**
  - A) Check if Planner is connected to Logger.
  - B) If it is not connected to Logger, reconnect.
  - C) If the connection is normal, reboot the Logger.
  - D) Reconnect the Logger.
  - E) Check Logging.
  - F) If several trials are implemented for A) to E) processes but the logging fails, contact with A/S in charge.

#### 9. Short of detonator lead, harness wire, and bus bar sheath at charging gun powder

- **Symptom** Not able to communicate at the Planner if sheath of two wires is peeled off to result in short circuit.
- **Resolution**
  - A) Must check harness wire. Sheath may be peeled off at the part of knot for fixation, and the end of sheath may be peeled off to contact.
  - B) To find the short circuit, cut wires in sequence from 1/2 of connected harness wire to check (This method is faster in average than the consecutive checking method).

**10. Global detonator occurs after wiring**

- **Symptom** More than one shot have been detected in Global Detonator Search after the end of communication with Tester or Blaster.
- **Resolution**
  - A) One shot has been detected: Find if there is a wired detonator without scanning. Judge by considering onsite situation whether it is faster to find it or to scan again, or to fire with global delay time.
  - B) More than 2 shots have been detected:
    - If there are many detonators without scanning by worker's mistake, recommend to scan again.
    - If the communication is not smooth due to electronic wave and leakage current at onsite and the charged number of detonators with gun powder is equivalent to the number of scanning, blast may proceed by considering onsite situation. (Necessary to consult with A/S in charge).

**11. Defective Contact of Harness Wire**

- **Symptom** If harness wire or blast main bus is cut off, a message of 'DISCONNECTED' is displayed at the Planner.
- **Resolution**
  - A) Check if the wire is connected well to the binding post of Logger.
  - B) Check if the wire is cut off in the middle.

## 4.2 Problem Solving at Blaster Work

**1. Disabled Screen Control**

- ① **Safety Standby** In a safety standby after blast/discharge, it is unable to control the screen. Do not enter the onsite during the safety standby and turn off the power of blaster.
- ② **Blaster Wireless Control** During the wireless control of the blaster, it is unable to control the screen. Except, if an onsite personnel must stop blasting in emergency, he will be able to turn off the power as a POWER OFF dialog box shall be displayed after pressing the power button for 5 seconds.
- ③ **Abnormal Functions of Disabled Touch/Stopped Screen/Crashed Screen** Press the power button for more than 30 seconds to reset the device.
- ④ **Wrong Touch or Unable to Touch Specific Part**
  - A) Check if moisture or foreign substance is on the screen.
  - B) Check if there is a crack on the surface of the screen from damage -> Request A/S
  - C) Touch Calibration: While pressing the LEFT/RIGHT button, touch the screen with three fingers to maintain for about 40 seconds. Later, follow the instruction on the screen for the calibration function.

## 2. Disabled Wireless Communication

- ① Change a device to wireless channel among paired devices, change ID or device mode (Remote, Blaster, Repeater): Pairing should be done again due to the initialization of pairing information.
- ② On the inspection screen for remote blast network, it displays "xx blaster is not ready to blast": After the download of detonator information to the blaster, 'Select Blast Mode' must be selected for a wireless blast.
- ③ 'Unable to communicate with xx device' is displayed :
  - A) Check battery condition.
  - B) Check antenna connection.
  - C) Check blast standby condition.
  - D) On and Off Communication.
  - E) Check antenna condition.
  - F) Change to wireless channel at the Remote and try pairing again.
- ④ ③ and ④ in common :
  - A) Check if Line of Sight is secured.
  - B) Move to a place to secure LoS if not secured.
  - C) Review the use of Repeater if LoS cannot be secured.

## 3. Unable to communicate with detonator at the blaster

- ① Check harness wire: Implement the measurement of resistance.
- ② Check Binding Post: Check if mud or foreign substance is trapped.
- ③ Check if download data is equivalent to currently communicating detonator.

## 4. Lost Password

Request A/S

## 5. Unable to Recharge

- ① Upside down USB-C cable to reconnect.
- ② Check if USB-C port or cable is damaged.
- ③ Try with other charger.

## 6. Short on Detonator Lead, Harness Wire, Main Bus Sheath

- **Symptom** Unable to communicate at the Blaster if sheath of two wires are peeled off for short circuit.
- **Resolution**
  - A) Check the sheath of main bus.
  - B) Check harness wire. The fixed knot of sheath may be peeled off or the end of sheath may be peeled off to contact.
  - C) To find the short circuit, cut wires in sequence from 1/2 of connected harness wire to check (This method is faster in average than the consecutive checking method).

## 7. Defective Contact of Wires (Harness Wire, Blast Main Bus)

- **Symptom** In case of short circuit in harness wire or blast main bus, a message of 'DISCONNECTED' is displayed.
- **Resolution**
  - A) Check if the wire is well connected to the binding post of Blaster.
  - B) Check the connection of harness wire and blast main bus. If there is no problem, check if the wire is cut off in the middle.

4.3 Problem Solving for Misfire after Blasting

1. How to handle misfire

- ① Check the location of misfired hole and check if detonation lead is visible.
- ② Peel off the sheath at the end of detonation lead to implement ID Check by using Logger and Planner (Available for ID Check with Logger only).
- ③ To communicate or fire again, use the auxiliary bus to connect the detonation lead in the misfired hole to the main bus.
- ④ If ID has been checked with ID Check, input ID and delay time manually in the Planner to try the blast again
- ⑤ If ID is unknown, input temporary ID and delay time 0ms in the Logger to try the blast again. At this time, entered arbitrary ID is displayed as NC and one shot of global detonator shall be confirmed. The global delay time shall be entered in the detonator to fire.

2. Cause Analysis due to the result of re-communication & re-fire (Arrange the above details in one table)

Re-communication	Re-firing (0ms)	Predicted Cause
O	O	① Damage on part of Power unit or Communication unit ② Damage on part of power capacitor ③ Damage on part of fire capacitor ④ Malfunction of MCU
O	×	① Damage on parts in firing unit ② Damage on fire capacitor ③ Damage on ignition head
×	O	① Damage on parts in power unit or communication unit ② Damage on part of power capacitor
×	×	① Damage on parts in power unit or communication unit

3. Misfired Detonator: Damage on part of PCB

- ① **Symptom** Damage on power unit or communication unit.
  - A) Try communication again to display NC.
  - B) If only the communication & response unit is damaged, it is available to fire again.

Re-communication	Re-firing (0ms)
O or ×	O or ×

- ② **Symptom** Damage on firing unit
  - A) If trying to communicate again, communication is possible, but it is not available to fire.

Re-communication	Re-firing (0ms)
O	×

※ Resolution: If possible, disconnect the wire to try firing again with 0ms. If it does not fire, take action to return.

#### 4. Misfired Detonator: Damage on the capacitor

##### ① Symptom Damage on the power capacitor.

- A) Possible misfire, if the detonator is recovered to try firing again, the charging voltage is not sufficient, which prevents motion or expedites discharging.
- B) If firing is tried again in 0ms or short delay time, firing may be possible. However, firing does not occur at long delay time.

Re-communication	Re-firing (0ms)
O or ×	O or ×

##### ② Symptom Damage on fire capacitor

- A) Possible misfire, if the detonator is recovered to communicate again, it may solve the problem. If firing is tried again, it may be possible to fire in 0ms or a short delay time as the firing energy is insufficient. However, firing does not occur at long delay time.

Re-communication	Re-firing (0ms)
O	O or ×

※ **Resolution: If possible, cut off the wire to try firing again with 0ms. If it does not fire, recover the detonator and take action according to the misfired product handling criteria.**

#### 5. Misfired Detonator: Damage on ignition head

##### ① Symptom Damage on ignition head or fall off of welding part.

- A) In this case, firing will not occur after the trial of re-firing.

Re-communication	Re-firing (0ms)
O	×

※ **Resolution: Recover the detonator to take action according to the misfired product handling criteria.**

#### 6. Precaution to Enter Onsite

- ① Implement the electric discharge to enter before firing.
- A) Electric discharging shall be done by pressing [BACK] button during Arming or on the Blast Standby Screen.
- B) For natural discharge, standby for 10 minutes after turn off the Blaster power.
- ② To check the blast result after firing, make sure to enter the blast field after standby for 10 minutes of natural discharge. It is safe after 10 minutes as all firing energy is discharged naturally. A work to check any detonator of misfired holes must be done only with Logger. To prepare for the risk of firing, a communication shall be done in a safe place.

## 5.1 HEBS-II Technical Data Sheet

### Explanation

HiTRONIC is a high precision electronic detonator with an innovative safety, a high reliability on firing and a precision on delay time, which can input and realize optimized delay time difference for each blast onsite directly at onsite. A Blaster, a scanner, and a Logger exclusive for HiTRONIC are needed to operate. (both Scan type and Logging type available to operate).

### Features

- Normal firing even in short circuit of main bus after blast order.
- Available to input delay time desired by user.
- Fired in an exact time to increase blast efficiency and decrease vibration and noise.
- Easy connection of the detonator with harness wire.
- Available for Logging and scanning with QR code.
- Inspection on the connection and main bus of detonator before firing.
- **Two-way communication**  
Detonator ↔ Logger, Detonator ↔ Blaster
- **Bluetooth communication**  
Scanner(Logger) → Blaster
- **Stand-alone and Remote blasting**  
Blaster, Remote ↔ Blaster, Remote ↔ Repeater ↔ Blaster
- **Security**  
Mandatory exclusive blaster, signal for encoded blast.

# 5.

## Appendix

5. Appendix

5.1 HEBS-II Technical Data Sheet

5.2 Contacts

## HITRONIC II™

\* Contact Hanwha's technical representatives for custom made lengths.

Type	Folded	Spool
Base charge	PETN, #8 (730mg)	
Primary charge	DDNP	
Shell	Material	Copper
	Dimension	ø7.5mm × 90mm
Barcode Type	QR code	
Programmability	1 ms	
Maximum Delay Time	50,000 ms	
Accuracy	0.02 CV%	
Length of Wire	6, 9, 12, 15, 18 m	15, 20, 25, 30, 35, 40, 50, 60, 80 m
	(Custom made length possible)	
Spool Size	Small – H : 42mm, D: 90mm	
	Large – H : 42mm, D: 110mm	
Tensile strength	Normal : 23 kgf, Heavy duty : 50 kgf	
Wire Color	Yellow	
Operating Temperature	-30 to +70 °C	
Storage Temperature	-30 to +50 °C	
Transport Temperature	-40 to +70 °C	
Water resistance	7 bar, 4weeks	
Drop weight impact	EN13763-11	
Electrostatic Discharge Resistance	Wire to wire : 2,500pF at 30kV	
	Wire to shell : 2,500pF at 30kV	



## Blaster

\*Need to consult with the technician about maximum operating distance and detonator quantity.

Dimension	242 x 189 x 52 mm
Maximum Detonator Capacity	Stand-alone mode : 3,000 detonators per blast
	Multiple blast mode : 21 blasters, 63,000 detonators
Maximum Wireless Range without repeater	5 km, Line of Sight
Maximum Lead in Wire	2,000 m
Weight	1.45 kg
Operating Temperature	-20 to +60 °C
Storage/Transport Temperature	-30 to +60 °C
Charge Temperature	0 to +45 °C
Battery	7,000mAh@12.6V, Rechargeable
Splashproof	IP65



## Planner

<b>Dimension</b>	155 x 75.5 x 18.6 mm
<b>Maximum Detonator Capacity</b>	1,000 per Planner
<b>Weight</b>	249 g
<b>Operating Temperature</b>	-20 to +50 °C
<b>Storage/Transport Temperature</b>	-40 to +70 °C
<b>Charge Temperature</b>	0 to +40 °C
<b>Battery</b>	4,300mAh@3.6V DC Rechargeable Li-Ion
<b>Electrostatic Discharge Resistance</b>	+/-15kV Air, +/-8kV Contact, +/-8kV Charge body
<b>Drop</b>	Multiple 1.2m to tile over concrete over -10 to +50°C
<b>Sealing</b>	IP67 and IP65 per applicable IEC sealing specification



## Logger

<b>Dimension</b>	186 x 78.7 x 38.5 mm
<b>Maximum Detonator Capacity</b>	500 per Logger
<b>Maximum Lead in Wire</b>	2,000 m
<b>Weight</b>	330 g
<b>Operating Temperature</b>	-20 to +60 °C
<b>Storage/Transport Temperature</b>	-30 to +70 °C
<b>Charge Temperature</b>	0 to +40 °C
<b>Battery</b>	3,500mAh@8.4V, Rechargeable
<b>Electrostatic Discharge Resistance</b>	+/-15kV Air, +/-8kV Contact
<b>Sealing</b>	IP65



## Harnesswire

Length	250 m / roll
Properties	Wire - Cu $\Phi$ 0.6mm, 0.075 $\Omega$ /m Wire insulation - PE, Outer diameter - 1.2mm Tensile strength - 23kgf



## 5.2 Contacts



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