

EV Charging Tester

The EV charging tester is an equipment that determines the status of quick/normal charges, high-voltage relay, and the presence of any abnormality in quick and high-voltage charging path of the electric vehicle.



Precautions Before Use

Precautions when handling high-voltage parts



The user is responsible for all damages that are caused by not understanding the contents of this EV charging tester Manual thoroughly or by controlling it differently from the contents of the User Manual.

- Before inspecting or repairing high-voltage system, make sure to separate the safety plug to cut off the high voltage.
- Make sure to remove metal objects substances (watch, ring, and other metal products, etc.) from your body as they may cause high-voltage short circuit, which causes human and vehicle damages.
- Before starting any operation related to high voltage, please wear personal protective equipment for safety accident prevention.
- Please make sure that persons other than the operator wearing the protective equipment are prohibited from touching any part related to high-voltage parts.

Precautions when utilizing the product



Personal injuries or material damages can occur if the user does not pay attention for handling, and more serious results may occur under certain conditions. Please comply with all safety rules and instructions.

- Remove foreign materials from the component and keep its cleanliness before and after using the equipment.
- Make sure you familiarize yourself with contents of the manual before use, and follow the procedures and instructions.
- Before using the equipment, please familiarize yourself with safety instructions for vehicle management.
- Use the equipment only in a well-ventilated space, and make sure to wear protective equipment (protective glasses and gloves, etc.).
- If the equipment is damaged by external shock, immediately stop using the equipment. If the equipment needs to be repaired, make sure to request the equipment manufacturer to perform the repair work. (Abnormal repair may become the cause of equipment damage)
- Make sure to use a grounded circuit.
- Use only with the power source (AC 110~220V, 50/60Hz) intended by the manufacturer.
- The equipment must not be exposed to rain or snow.
- The equipment must not be used for purposes other than the purpose of its manufacture.
- Do not leave the equipment being installed in the vehicle.
- If you do not use the equipment within its operating temperature range (0 – 104°F /40 °C).



Warning

These connectors are used for *CP/*PD voltage check and only trained professionals should use (or access).

Measuring voltage:

CP: 12V \pm 0.3V, PD: 3V \pm 0.3V

*CP: Control Pilot

*PD: Proximity Detection



Hardware

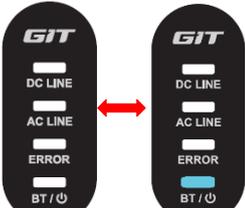
Specification

Item	Specification
LED Status	4 Color LEDs(DC LINE/ AC LINE/ ERROR/ Power, BT)
Wireless communication	Bluetooth V5.0(BLE)
High voltage range	DC 800V MAX
Current range	12A MAX
Operating power(± 10%)	AC 110~220V/50~60Hz/1A
Operating temperature	0°C ~ +40°C
Operating humidity/altitude	Up to 20~80 % R.H/ 2000m
Operating place	Indoor place
Overvoltage category	II
Size and weight	CCS1-Type(Korean/North America):70mm x 361mm x 240mm / 1.7kg

EV charging test components

Name	Component	Major function
EV charging tester		<ol style="list-style-type: none"> 1. Controls the conditions for the charging test. 2. Measures high voltage/current.
GDS Mobile & GDS SMART		<ol style="list-style-type: none"> 1. Performs the test sequence. 2. Indicates the test measured values.
VCI II & VCI III		<ol style="list-style-type: none"> 1. Performs the vehicle diagnostic communication. (Connects the OBD terminal of the vehicle.)

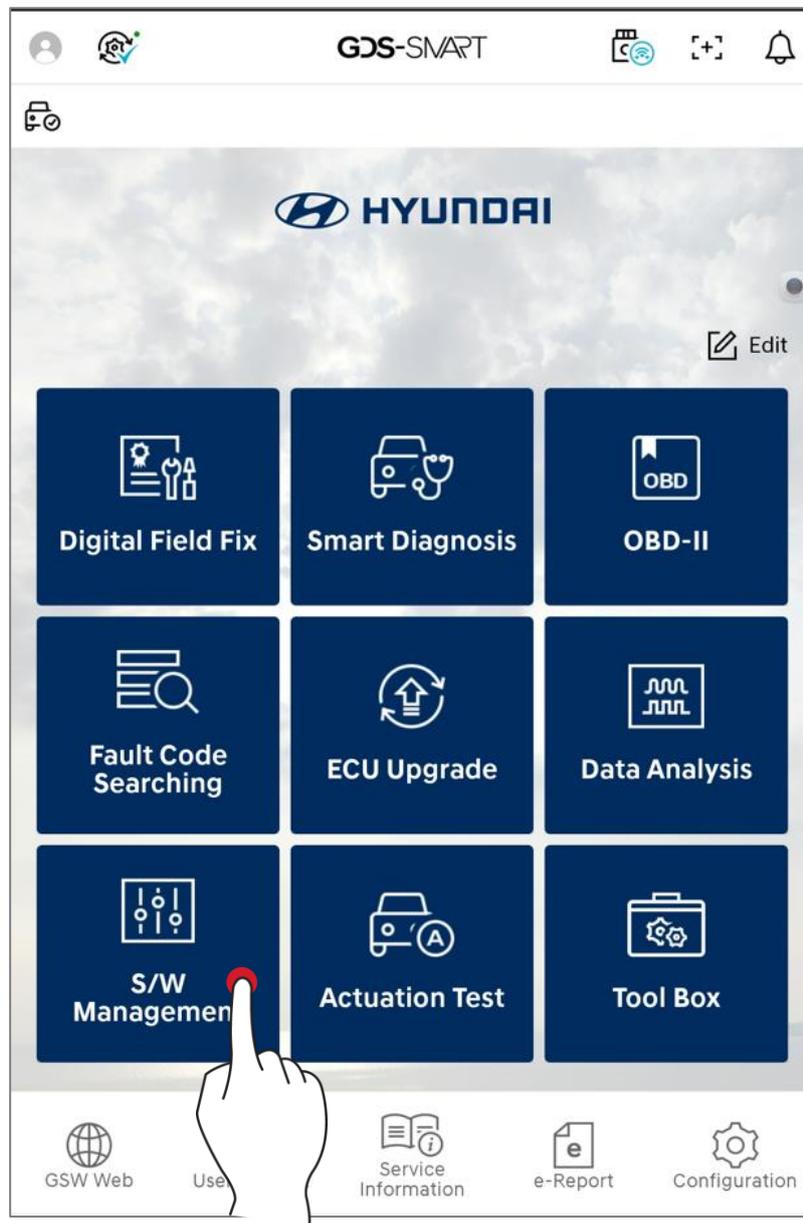
Detailed description of the EV Charging Tester LED

Name	Major function	LED status	
DC LINE	Indicates the test results on rapid charging line.	 OK	 NG
AC LINE	Indicates the test results on standard charging line.	 OK	 NG
ERROR	Indicates the occurrence of system error.	 OK	 NG
BT/Power	<ul style="list-style-type: none"> - Indicates the power. - Indicates the connection status between the diagnostic apparatus and the test equipment. 	 Connected	 Not connected (the light flickers once a second)

Advanced Preparation - Entering into the function screen

Phase1

Tab [S/W Management].

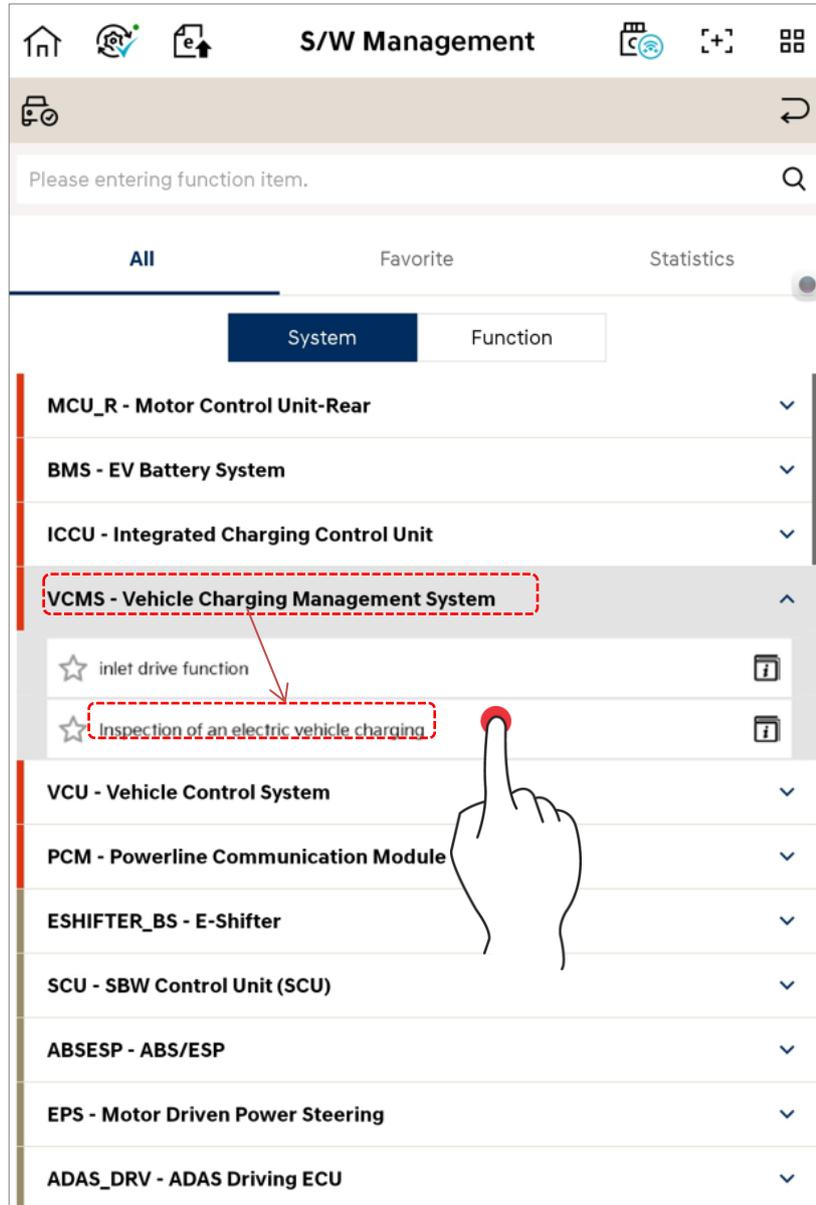


Reference

Before performing the function, VCI II or VCI III must be connected to OBD connector on the vehicle.

Phase2

Select [Vehicle Charging Management system] -> [Inspection of an electric vehicle charging] menu.



Advanced Preparation - Connection of the equipment

Phase1

After checking the purpose and condition of the EV charging test, tab

Run

button at the bottom of the screen.

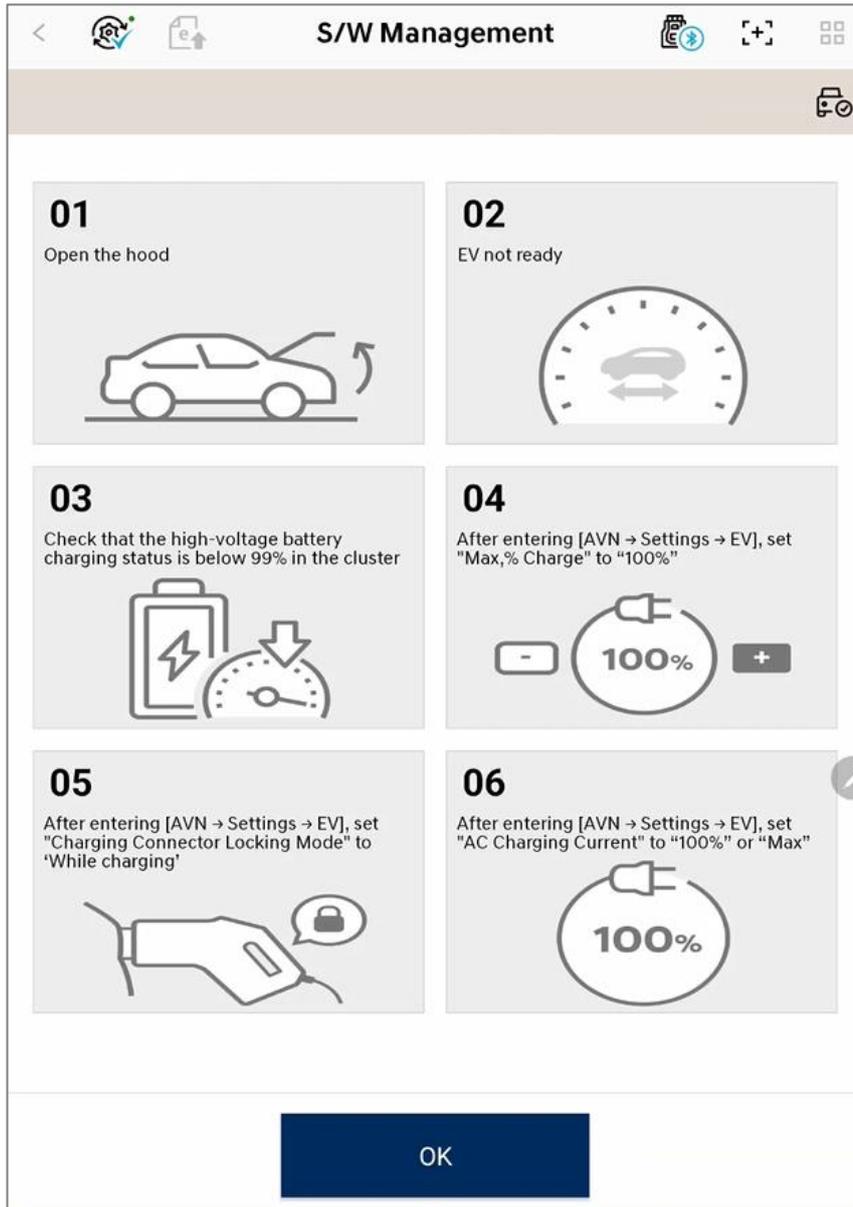
The screenshot shows a software management interface for an IONIQ 6(CE EV)/2023/160kW vehicle. The title bar reads 'S/W Management'. Below the title bar, the vehicle model 'IONIQ 6(CE EV)/2023/160kW' is displayed. The main content area is titled 'Electric vehicle charging system inspection' and contains a table with the following data:

Purpose	A function to check to see if fast/slow-charging lines are abnormal indirectly.
Enable Condition	<ol style="list-style-type: none">1. Open the hood2. EV Not ready3. Battery Charge Below 99%4. Set maximum battery charge to 100%5. Set Charging Connector Locking Mode to be "While charging"6. Set Normal Charging Current to be "100%"
Concerned Component	VCMS(Vehicle Charging Management System)
Concerned DTC	-
Fail Safe	-
Etc	-

At the bottom of the screen, there are two buttons: 'Close' and 'Run'.

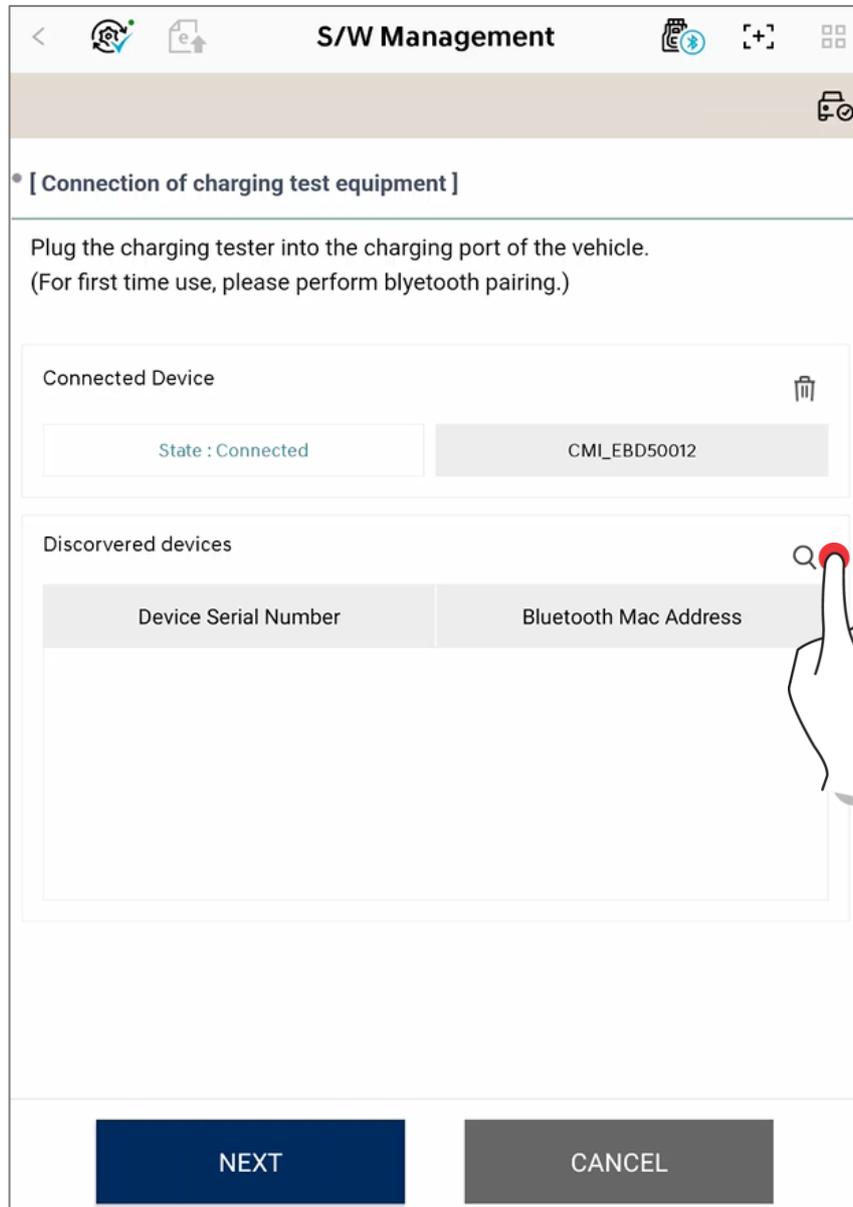
Phase2

Check the condition on the vehicle step by step. Then, tap “OK”.



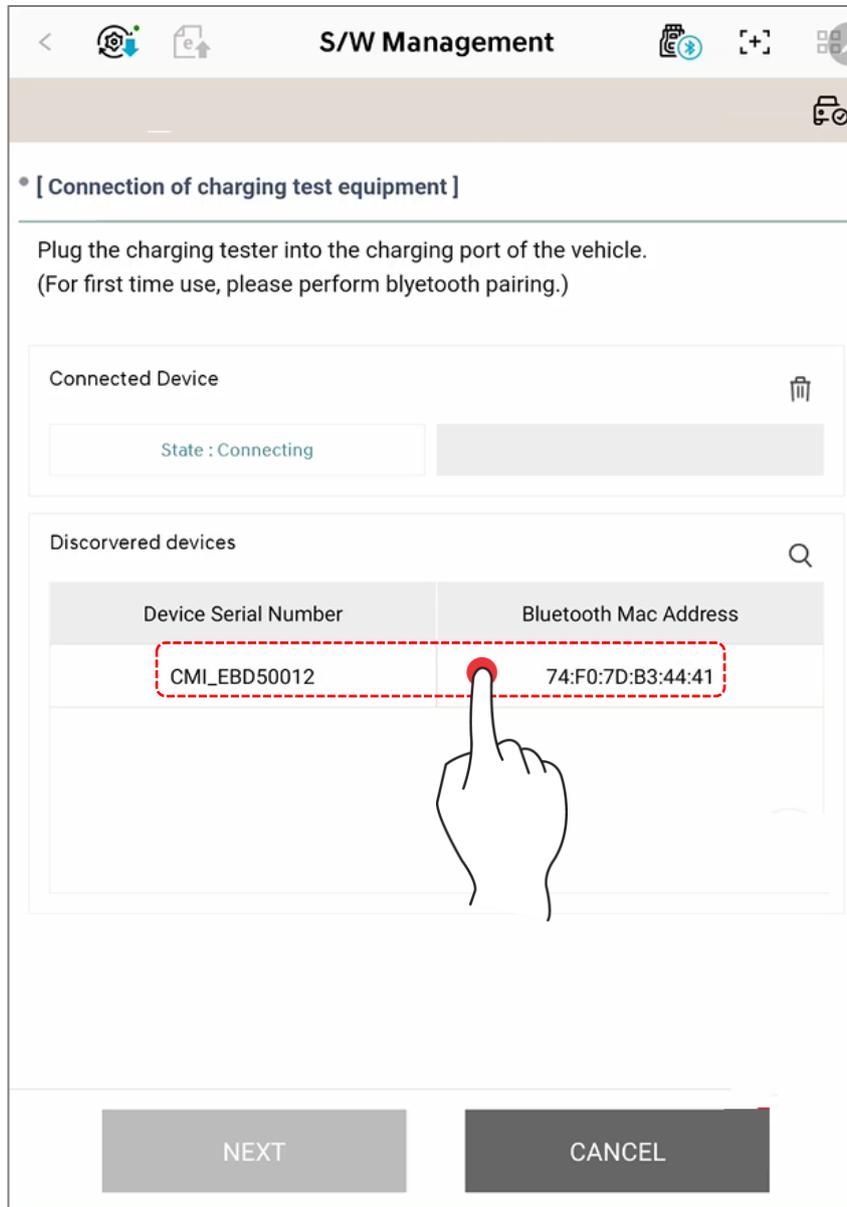
Phase3

Tab  button to connect the charging test equipment.



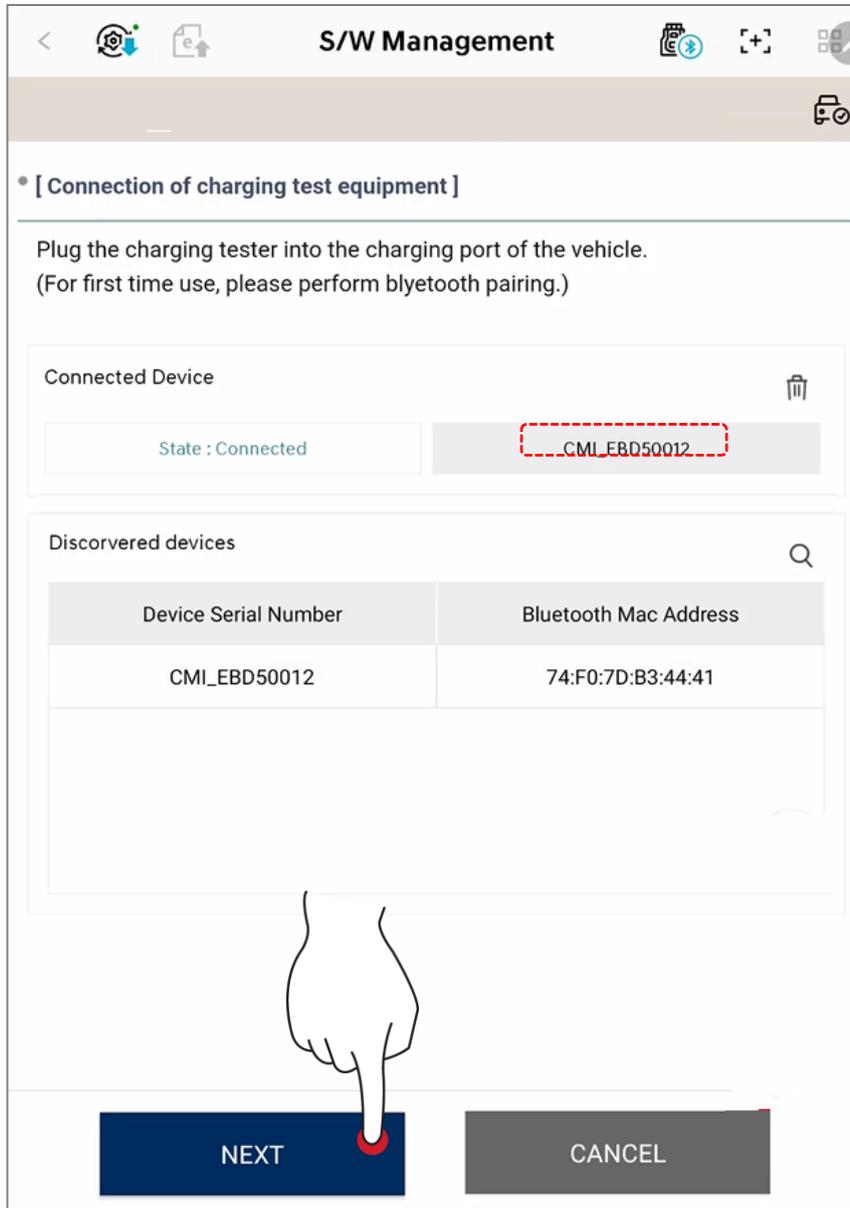
Phase4

Tab the equipment in the research result.



Phase5

After the selected, the equipment is registered in “Connected Device” list, tab **NEXT** button at the bottom of the screen.



Phase6

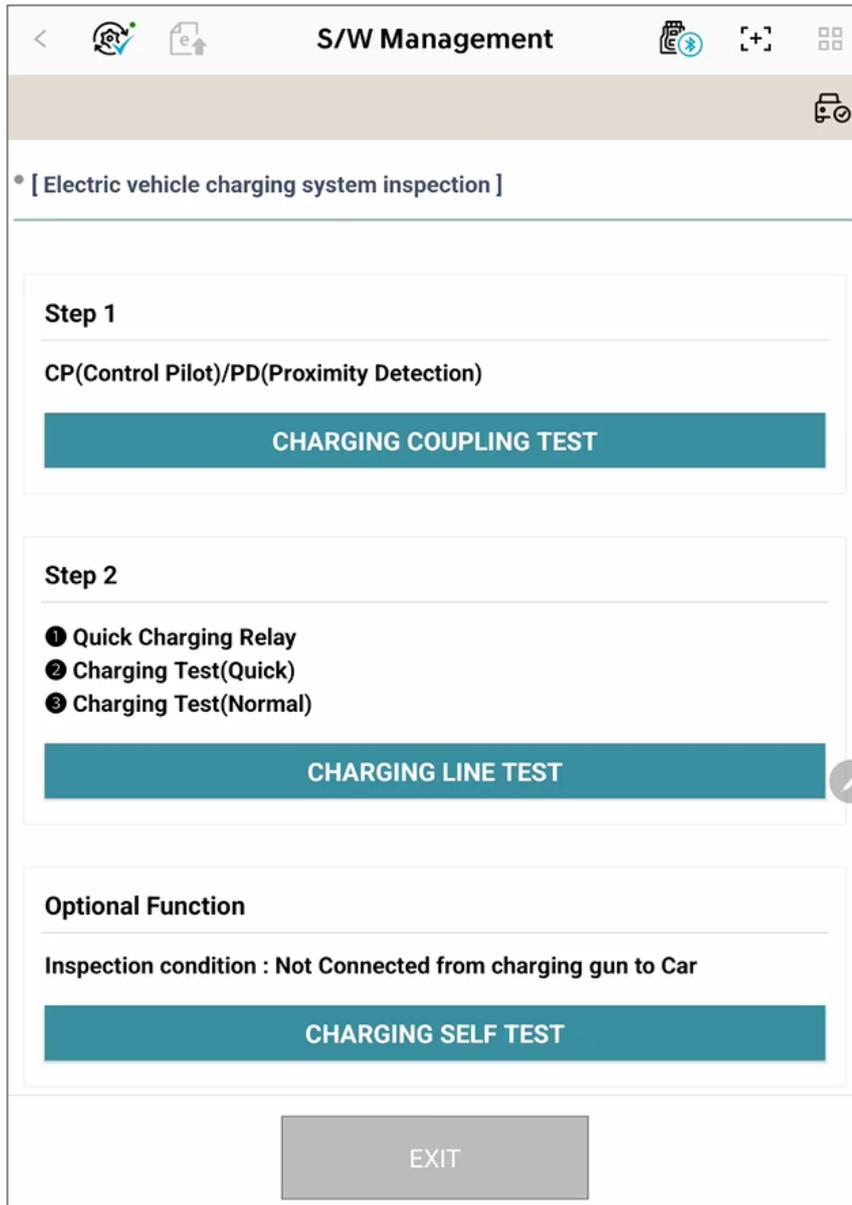
Once the BT signal of the equipment is connected normally, “BT/Power” LED of the equipment main body will be turned on with blue light.



Major Function

Main screen

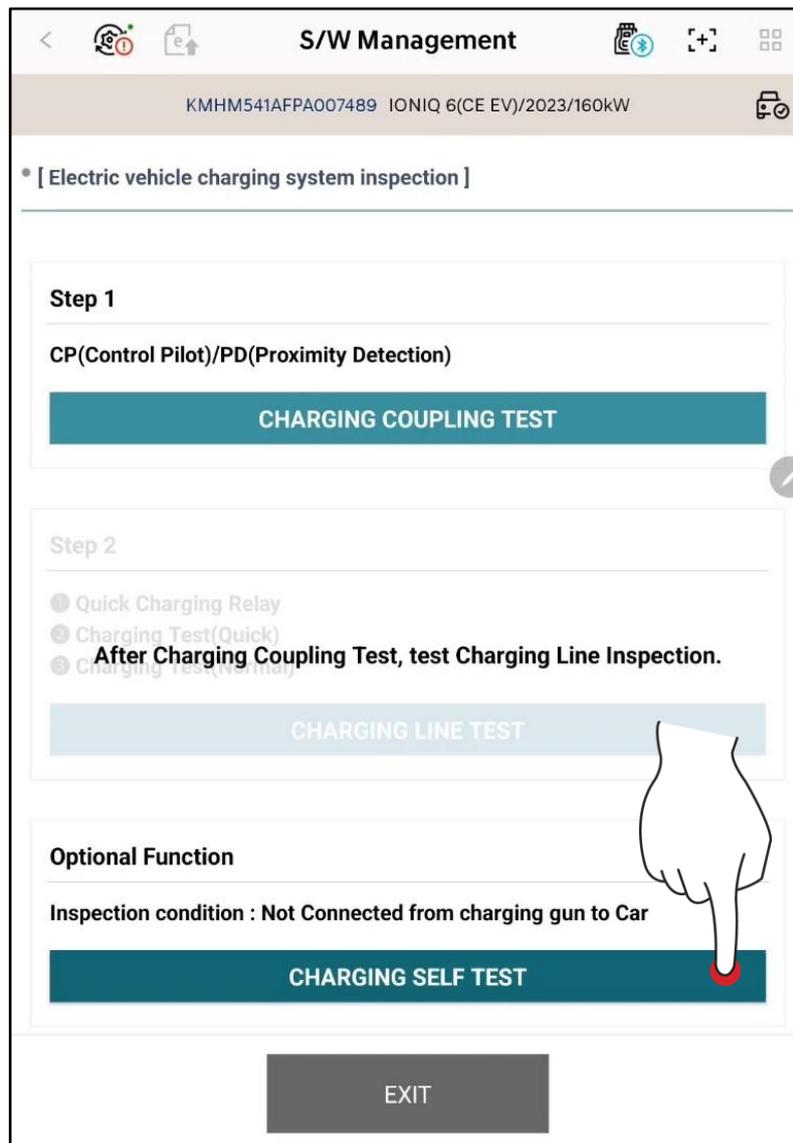
It shows major functions of the EV charging line test, and the users can run a desired function by touching it.



Self-test on the test equipment

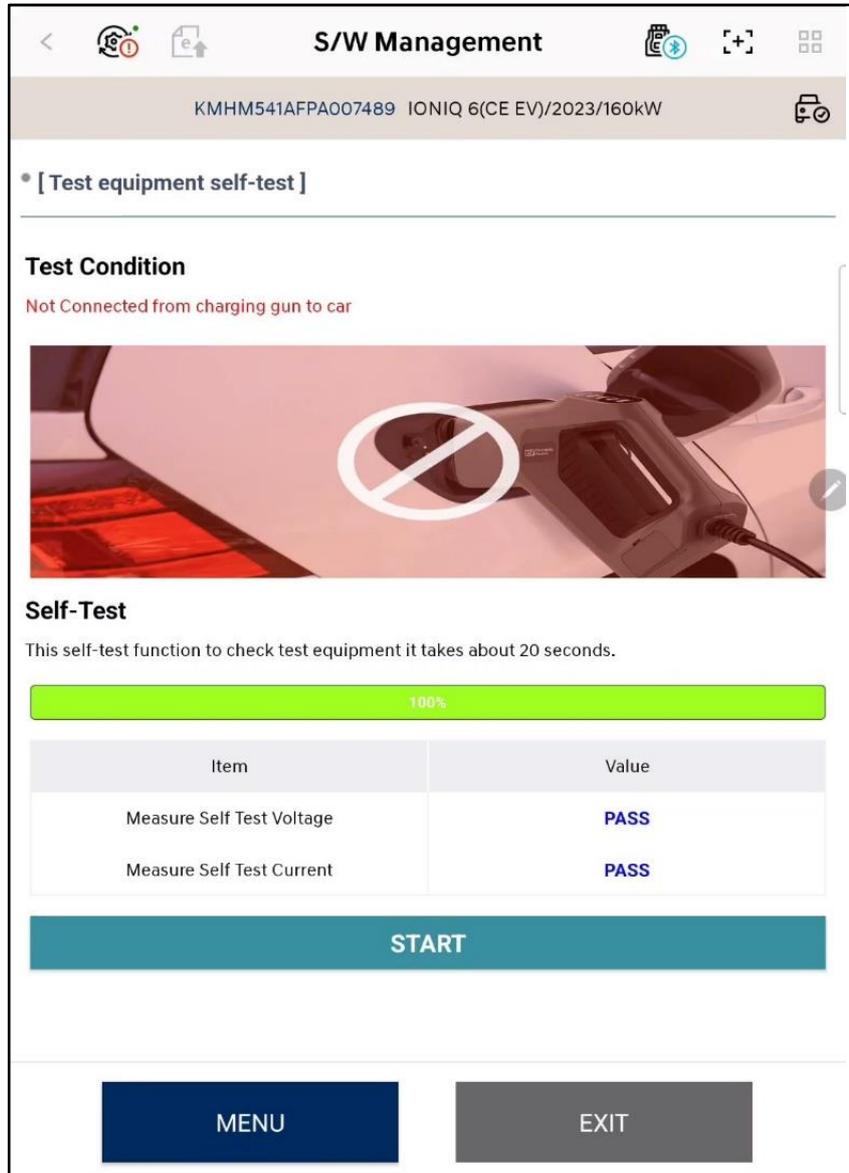
Phase 1

This is a function is for checking the status of EV Charging tester whether there is abnormality in charging when an error occurs while the main test function is being operated, or if there is no change in voltage in connection test. Tab [Charging Gun Self-test]



Phase 2

Once you enter into the function screen, the self-test will begin, and the results will be shown on the screen after approximately 20 seconds.





Notification

Please run the corresponding function **only after removing the charging test** from the inlet.



Notification

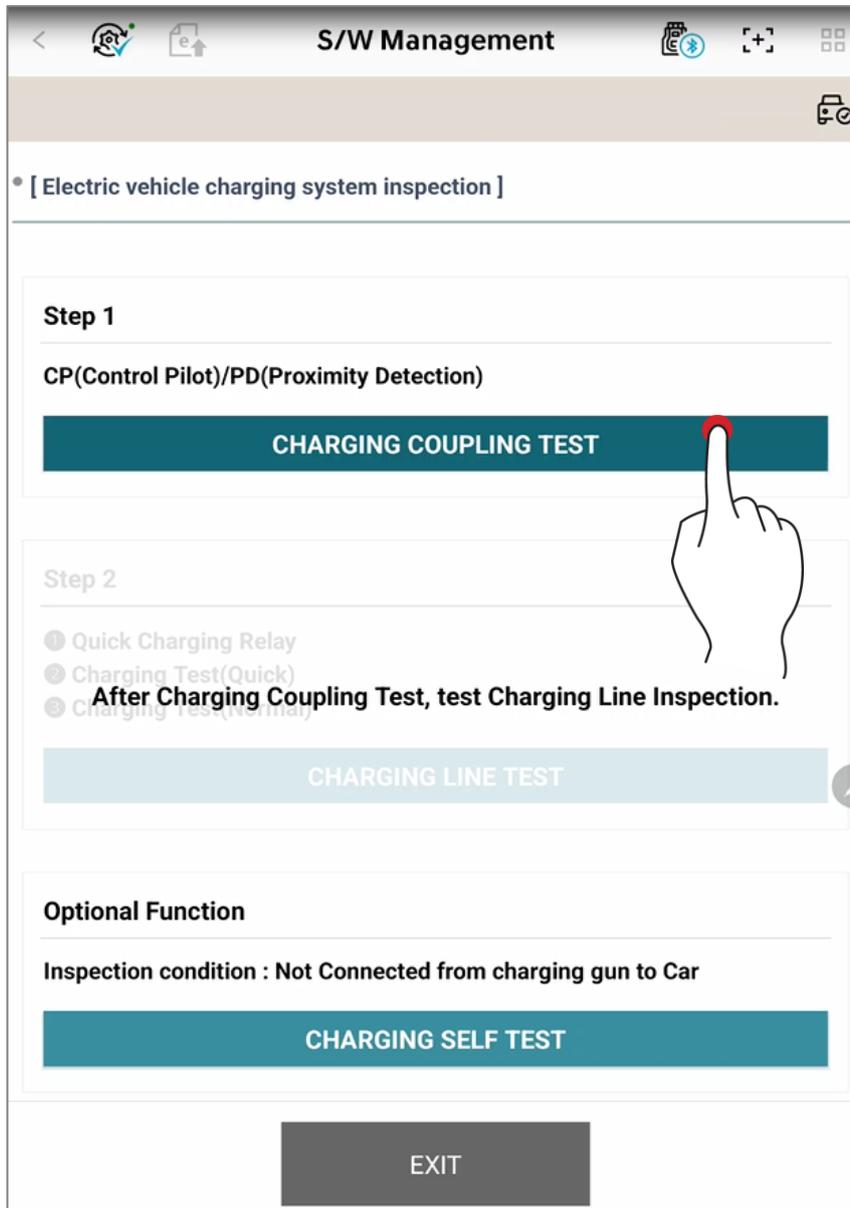
The message below will appear when failure occurs.

The screenshot shows a mobile application interface with a dark grey background. At the top, there is a navigation bar with a back arrow, a refresh icon, a document icon, the title "S/W Management", a search icon, a plus icon, and a grid icon. Below the navigation bar, there is a header area with the text "KNAC381BFNA009074" on the left, "EV6(CV)/2022/160kW (2WD) / 70+160kW (AWD)" in the center, and a car icon on the right. The main content area is titled "[Inspection of an electric vehicle charging] Inspection equipment self-test". Below the title, there is a paragraph of text: "This Inspection is self-test function to check Inspection equipment. It takes about 20 seconds." Below the text, there are two lines of text: "[OK] Button : Inital Menu" and "[Cancel] Button : End Test". At the bottom of the main content area, there is a dark grey button labeled "OK". Below the main content area, there is a white section titled "Notice" with the text "The self test failed. your device failed continuously please contact administrator." Below the notice, there is a dark grey button labeled "OK". At the bottom of the screen, there are two buttons: a dark grey button labeled "OK" and a light grey button labeled "CANCEL".

Charging Coupling test

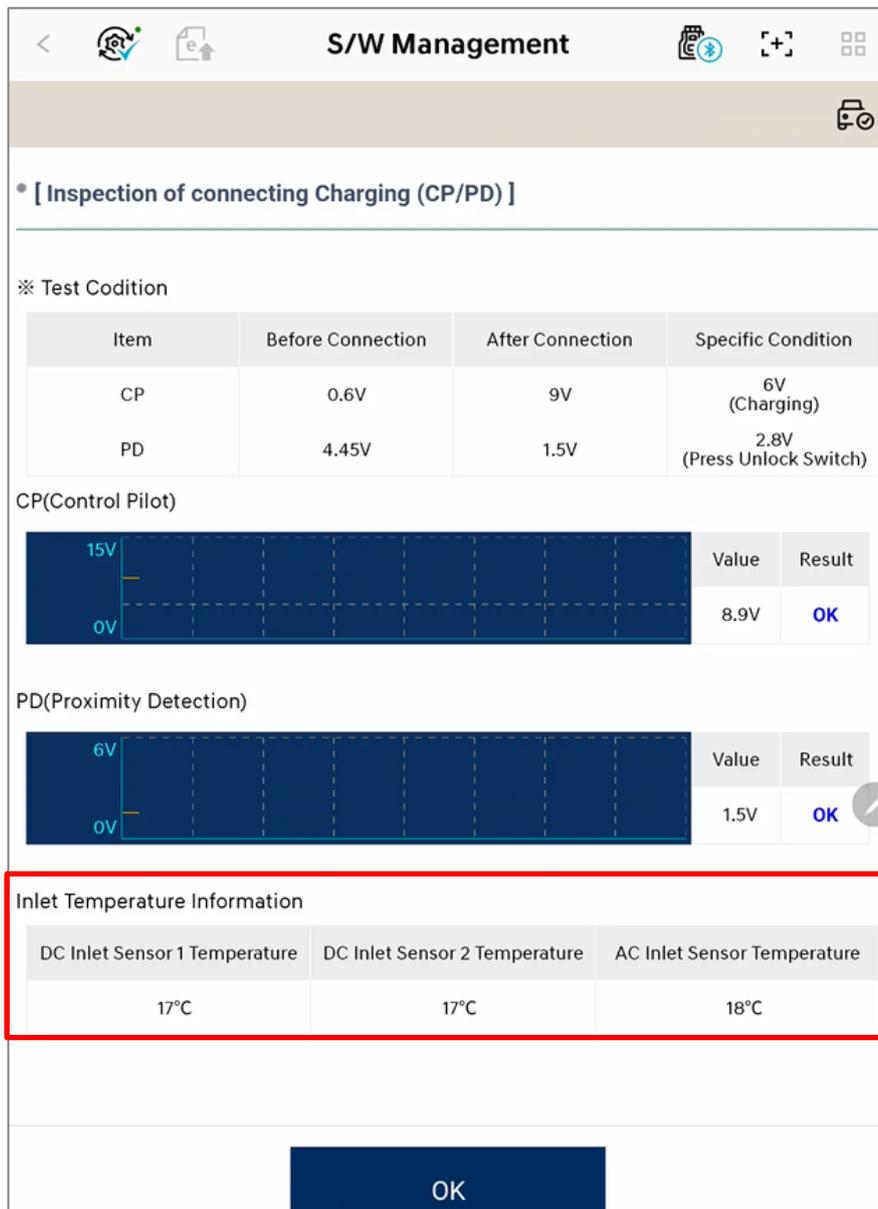
Phase 1

This is a function that measures CP/PD voltage value to check whether the charging test equipment is normally connected to the inlet.



Phase 2

The table at the top of the screen shows voltage value per operation and test results. The graph in the middle of the screen shows change in CP/PD voltage values of the controller, which are measured in real time through the diagnostic communication.



Reference

Since the DC/AC Inlet temperature exceeds 124 degrees Celsius or falls below -40 degrees Celsius, entry into the charging line inspection function is not possible. Therefore, please verify whether the charging port Inlet temperature sensor has been checked and securely fastened.



Determination condition

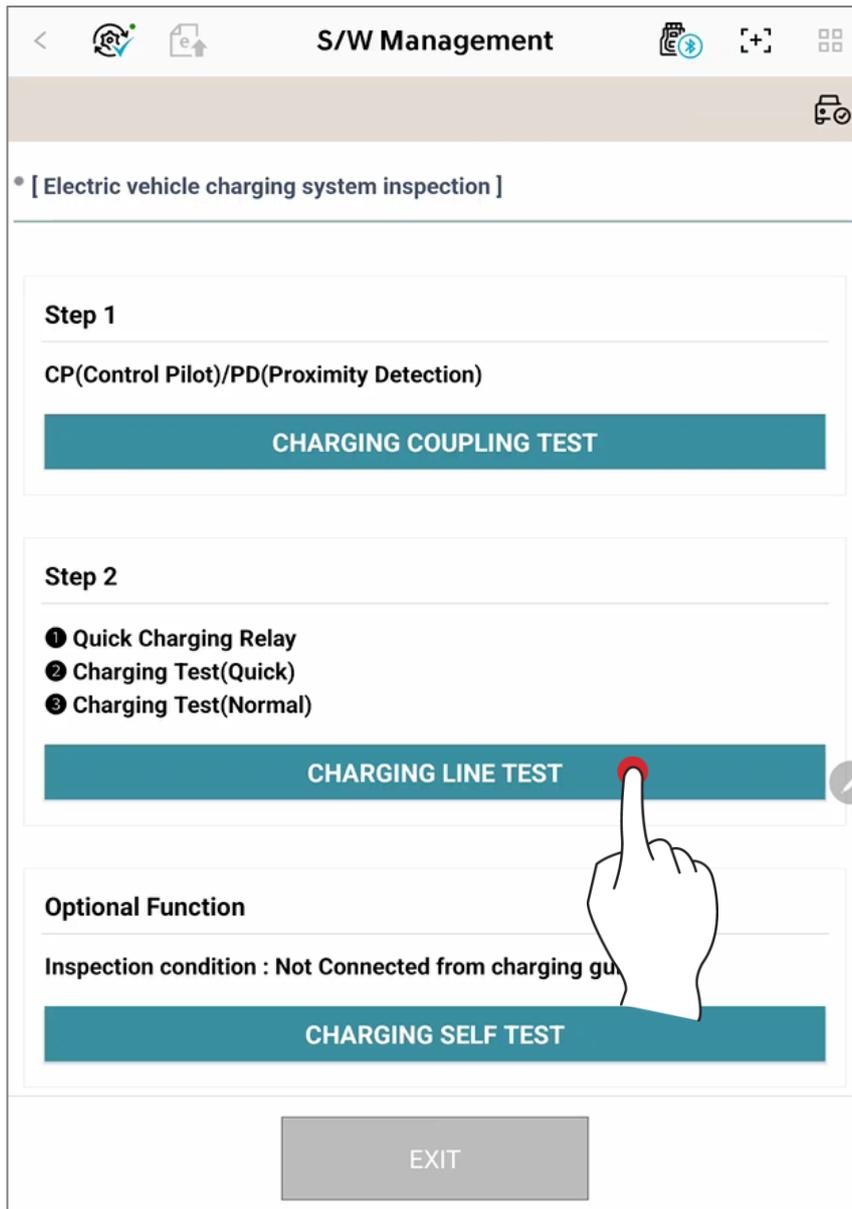
Korea /North America (CCS1)	Measured Value	Determination
CP	9V±0.3	OK
PD	1.5V±0.3	NG

Charging line test

Description

The following 3 different functions will be performed as the main test functions:

1. Quick charge relay test
2. Quick charging line test
3. Standard charging line test



Quick charge relay test

This is a test that checks if there is abnormality in the quick charge relay operation through a high-voltage quick charge port.

S/W Management

Quick Charging Relay
Charging Line(Quick)
Charging Line(Normal)

• [Inspection of an electric vehicle charging] Quick Charge Relay Test

Item	Value	Result
Fast Charging Relay Test	0V	OK

NEXT
CANCEL



Determination condition

Measured Value	Determination
0V	OK
exceeds 0V	NG

Quick charging line test

This is a test that checks whether there is abnormality in the quick charging line that goes through [high-voltage battery → inverter → charge port] through the path of the high-voltage quick charge port.

S/W Management

Quick Charging Relay **Charging Line(Quick)** Charging Line(Normal)

• [Inspection of an electric vehicle charging] Quick Charge Line Test

Item	Value	Result
Fast Charging Line Test	458V	OK

Charging Port Inlet

VCMS ICCU AC(Normal) DC(Quick)

AWD ONLY
FRT Motor
Gear Differential Unit
Inverter (FRT)

H/V Junction Block (FRT)

VCU

H/V Battery

BMU

PRA

H/V Junction Block (RR)

RR Motor
Gear Differential Unit

Multi Inverter (RR)

NEXT **CANCEL**



Determination condition

Comparison between *the charging equipment measured values and *diagnostic communication values

Deviation	Determination
Less than 20%	OK
0V or 20% or more	NG

* Charging equipment measured value: BMU controller's diagnosis communication voltage value

* Diagnostic communication value: actually measured voltage value of the high-voltage quick charge port



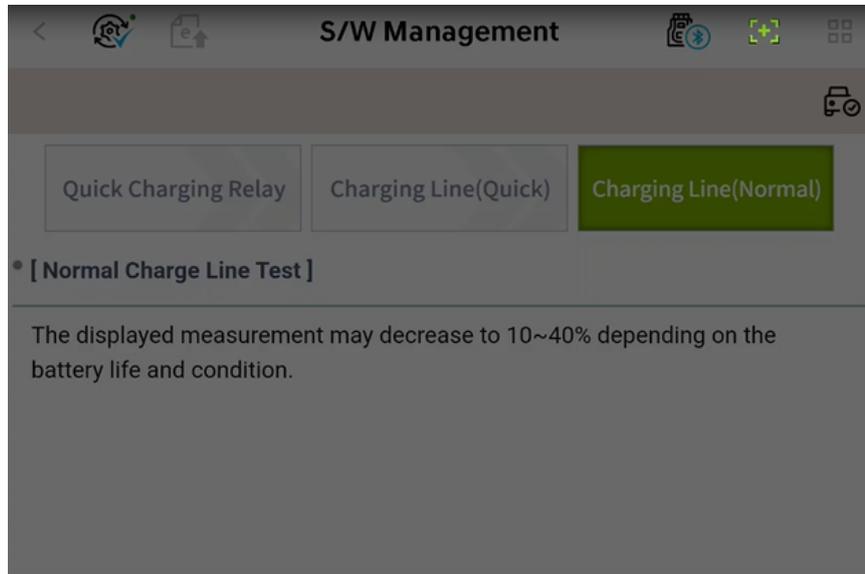
Notification

If the test result is NG, it will receive the breakdown status from the vehicle to indicate the problematic part as red light on the screen, and display the AS response method. (Only target vehicle models can operate this feature.)

Normal charging line test

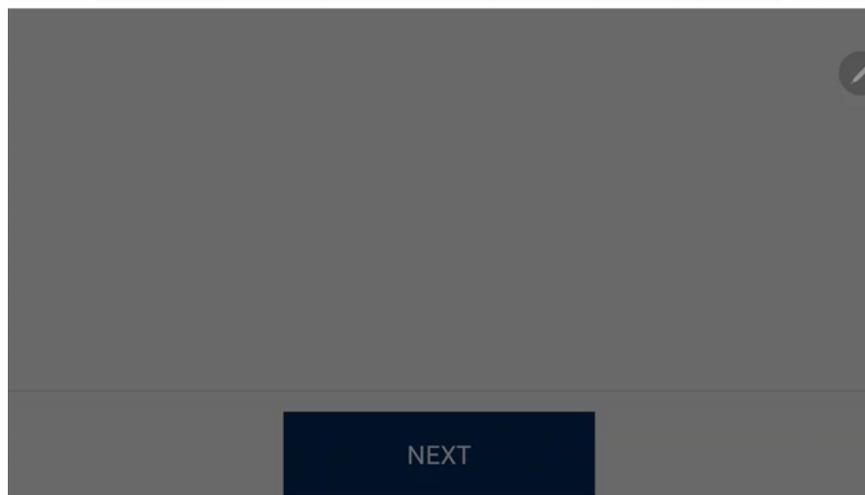
This is a test that checks whether there is abnormality in the normal charging line, which goes through [high-voltage battery -> *ICCU -> charge port] through the path of normal charge port.

* ICCU : Integrated Charging Control Unit



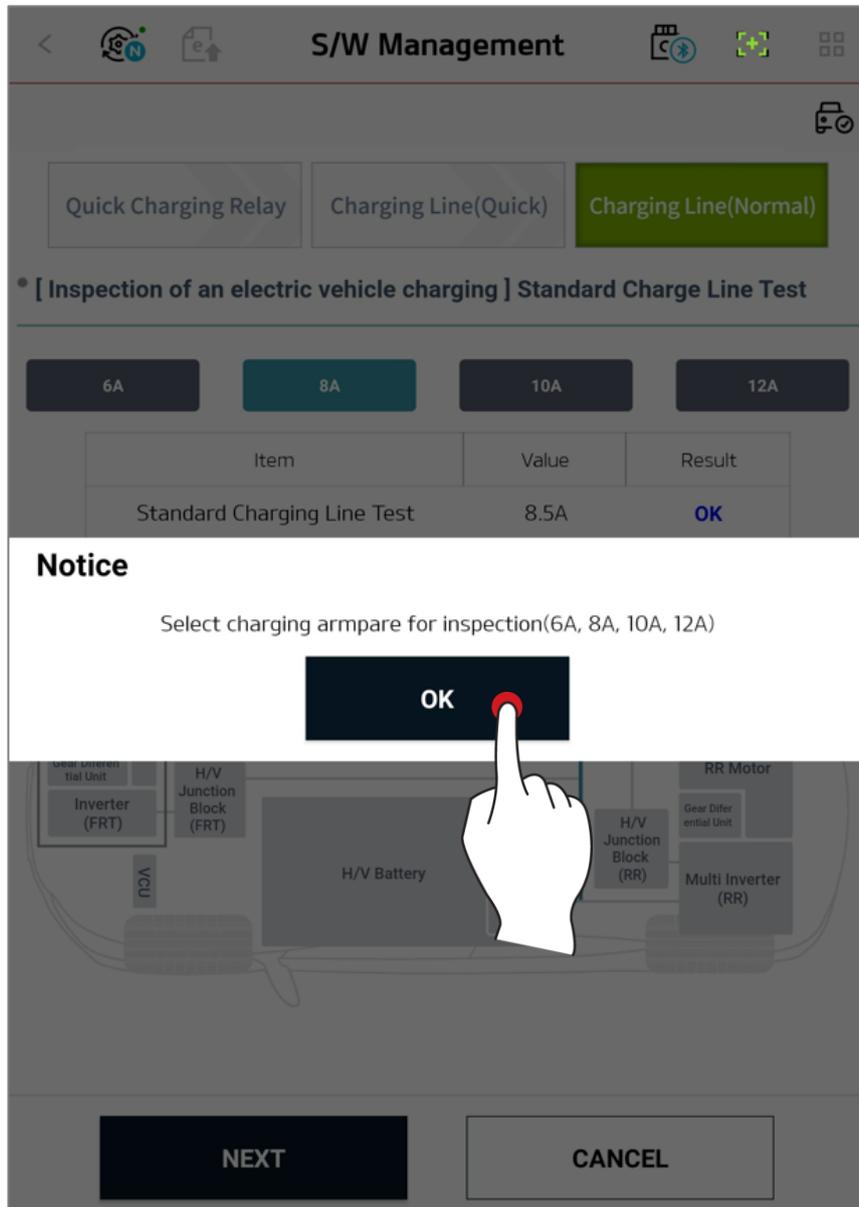
Notice

progress during 1minute Standard Charging Line Test for DTC Detection.
Please do not remove equipment from the car.



● **step 1**

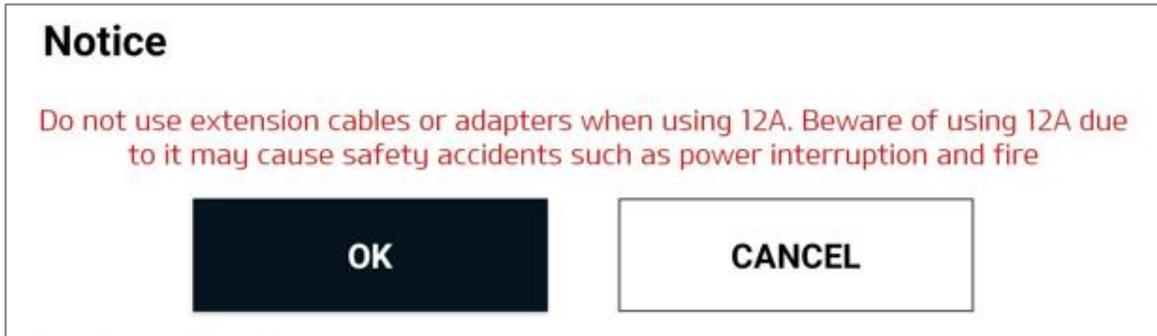
When you enter into the function screen, the test will be run with a fixed default value of 8A. Then, the user can change the current value to be measured by touching a desired current value (6, 8, 10, or 12 A) to proceed the measurement. Tab **OK** button, then select a current value (6, 8, 10, or 12 A) that you want to check.





Notification

In the case of 12 A, using a thin extension cable may lead to causing a safety accident. Thus, the following notification will be shown, and the test will be conducted only when the user approves it.



Notification

Battery charging current is adjusted to 10% ~ 40% depending on the user's charging environment and battery life. (The current values between 3 and 5 A can also be charged)

● step 2

Once the measurement is completed, tap **NEXT** button to close the test.

The screenshot displays the 'S/W Management' application interface. At the top, there are navigation icons and the title 'S/W Management'. Below the title, three buttons are visible: 'Quick Charging Relay', 'Charging Line(Quick)', and 'Charging Line(Normal)', with the latter being highlighted in green. A sub-header reads '[Inspection of an electric vehicle charging] Standard Charge Line Test'. Below this, four buttons represent current values: 6A, 8A, 10A, and 12A, with 12A selected. A table shows the test results:

Item	Value	Result
Standard Charging Line Test	12.8A	OK

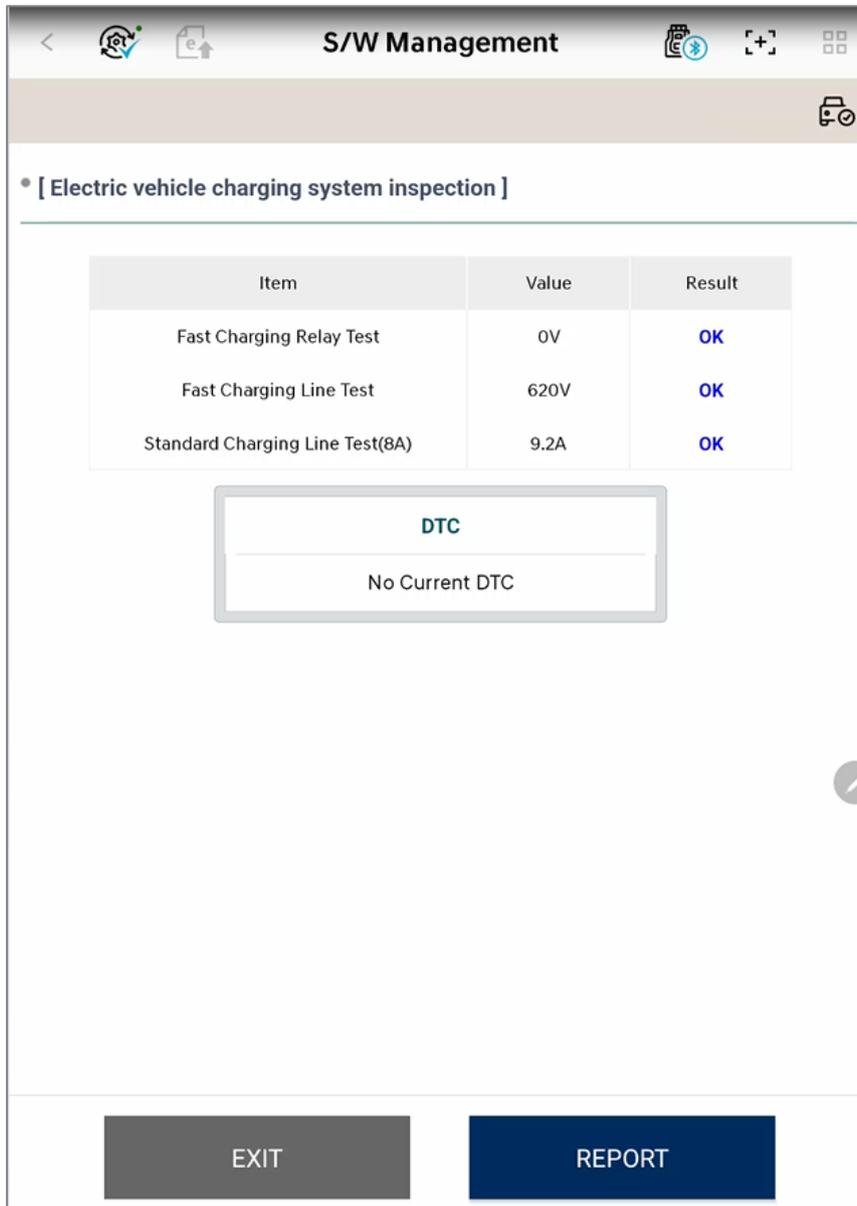
Below the table is a schematic diagram of an electric vehicle's powertrain. It includes components like the 'Charging Port Inlet' (with AC(Normal) and DC(Quick) options), 'VCMS', 'ICCU', 'VCU', 'H/V Battery', 'PRA', 'BMU', 'H/V Junction Block (FRT)', 'Inverter (FRT)', 'FRT Motor', 'Gear Diferen tial Unit', 'H/V Junction Block (RR)', 'Multi Inverter (RR)', 'RR Motor', and 'Gear Diferen tial Unit'. At the bottom, there are two large buttons: 'NEXT' (highlighted in black) and 'CANCEL'.

Test result

After the test has completed, test results are displayed.

EXIT : Tab “Exit” button to end the process.

REPORT : Tab “Report” button to print out the result for the customer.



Enter Print menu.

PREV: Tab “PREV” to go back to the previous step.

PRINT: Tab “PRINT” to print out the result.

The screenshot displays the 'S/W Management' application interface. At the top, there is a navigation bar with a back arrow, a refresh icon, a document icon, and the title 'S/W Management'. Below this is a header bar with a car icon and a checkmark. The main content area is divided into sections: 'Basic Information' with fields for VIN (KMHM541), Model (CE12), and Inspection Date (2023-11-10 15:30:34); 'Charging Test Result' with a table of test items, values, and results; a 'Comment' section with a text input field and a character count '(0 / 300)'; and a red warning message. At the bottom, there are two buttons: 'PREV' and 'PRINT'.

Basic Information

VIN	KMHM541
Model	CE12
Inspection Date	2023-11-10 15:30:34

Charging Test Result

Item	Value	Result
Fast Charging Relay Test	0V	OK
Fast Charging Line Test	620V	OK
Standard Charging Line Test(8A)	9.2A	OK

Comment (0 / 300)
Enter comment here

Please note that this inspection is a function to check for abnormalities in the vehicle's charging system, and that the inspection results cannot be used as a standard for the normality or performance of the vehicle battery.

PREV **PRINT**