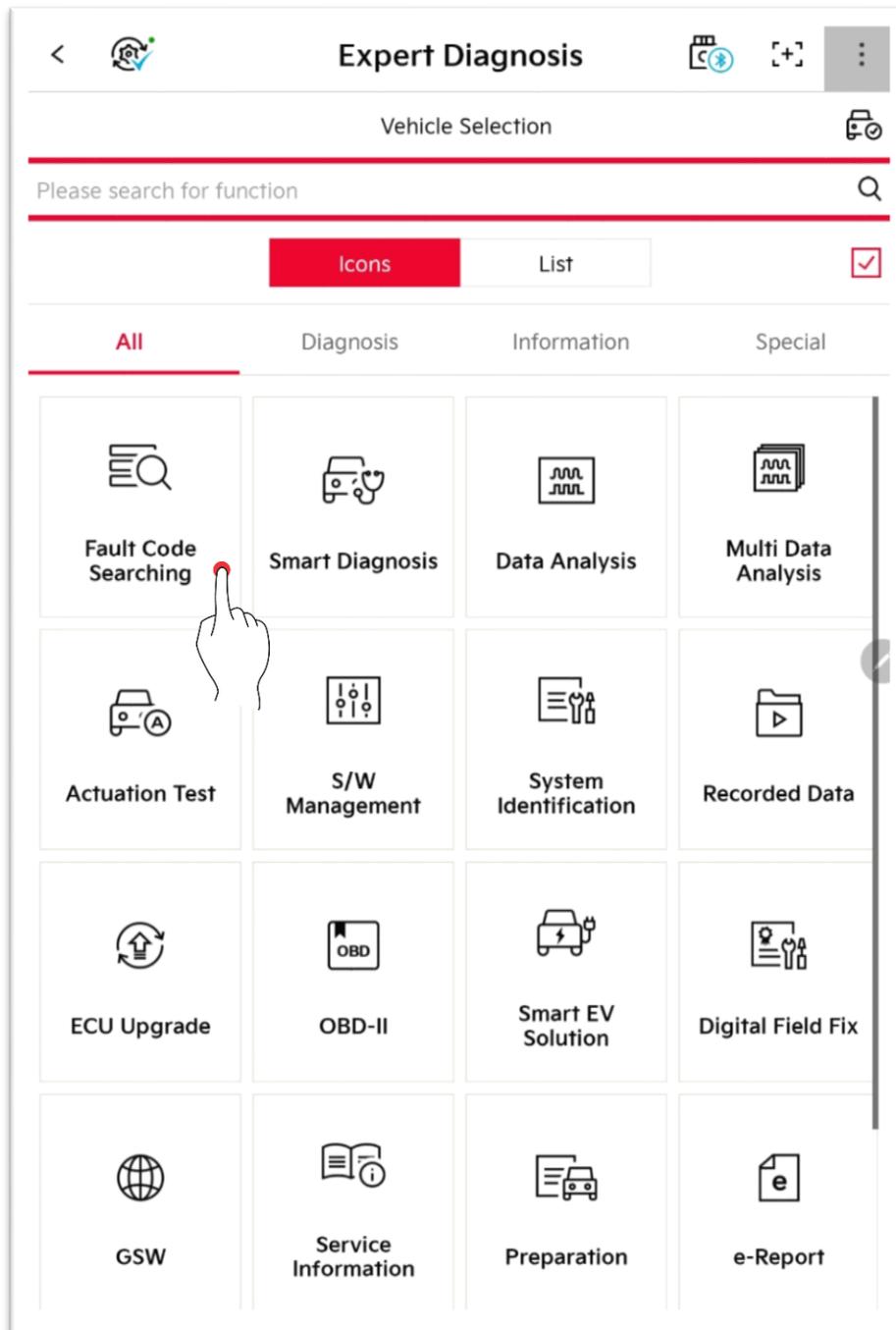


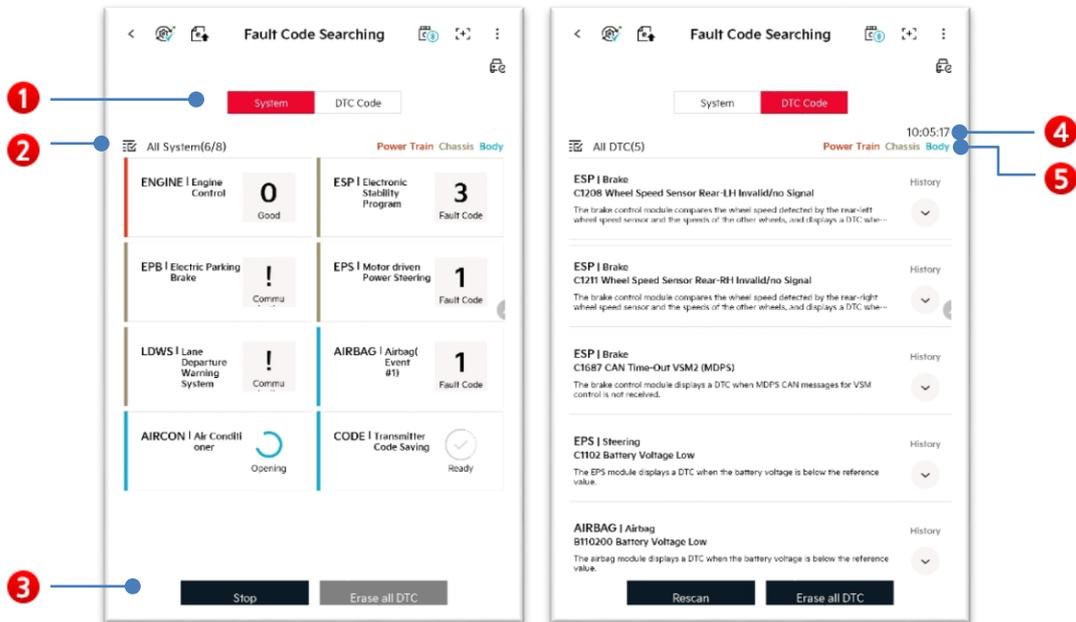
Expert Diagnosis - Fault Code Searching

It searches fault code(s) of one or multiple number of systems mounted on the vehicle. The users can check detailed information related to fault codes that are searched, as well as maintenance information.



Basic Operation

The searched fault codes can be checked in formats of group or list by system.

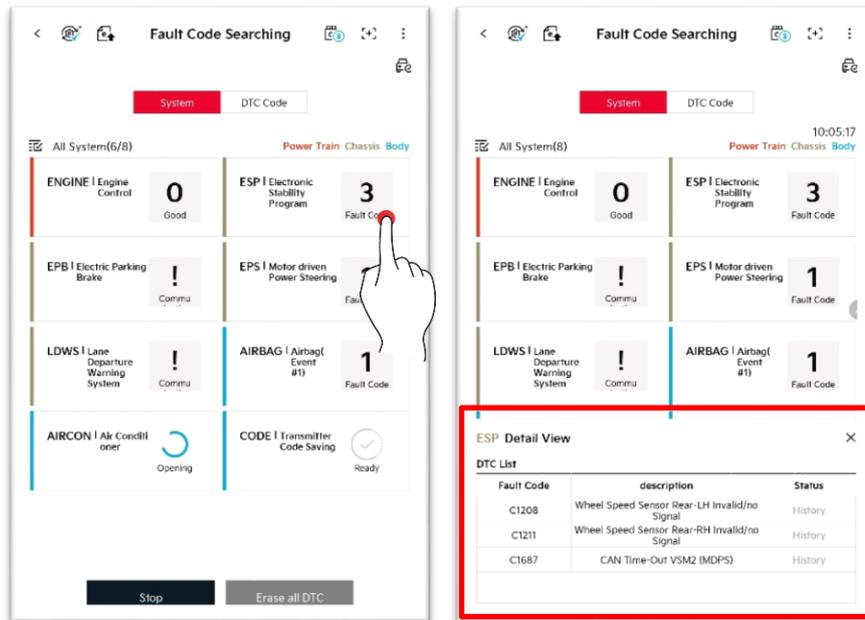


1	You can configure viewing of list by system/by fault code.
2	You can filter systems and fault codes, and view a desired item.
3	The searched fault code can be researched again or deleted.
4	It shows time consumed for searching the fault code.
5	It shows groups of systems and fault codes (powertrain, chassis, body) through color classification.

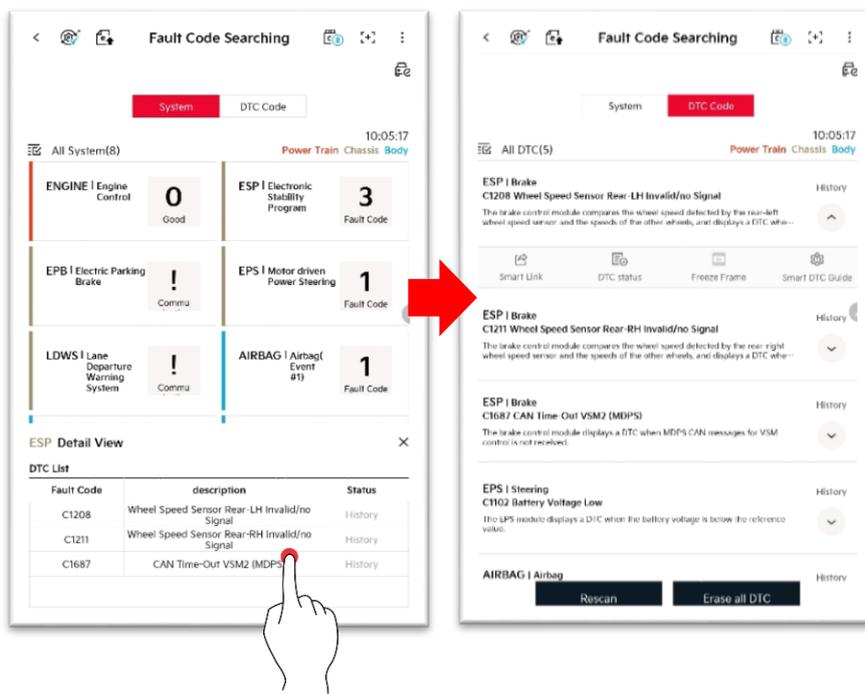
Fault Code Search - System

It shows number of searched fault codes by system.

If you select a system, a detailed screen on the searched fault code appears at the bottom.



If you select a fault code in the detailed screen, it is switched to 'Fault Code' screen, which provides additional information.



Status Information

This is status information on the searched results of the fault codes.

Status Information by Card

 Scanning	Currently performing diagnosis communication with the vehicle.
 Ready	Preparing for diagnosis communication.
0 Good	There are no search results for fault codes.
3 Fault Code	It indicates number of searched fault codes.
! Communication Failed	Diagnosis communication has failed.
- Not Supported	This system is not supported.

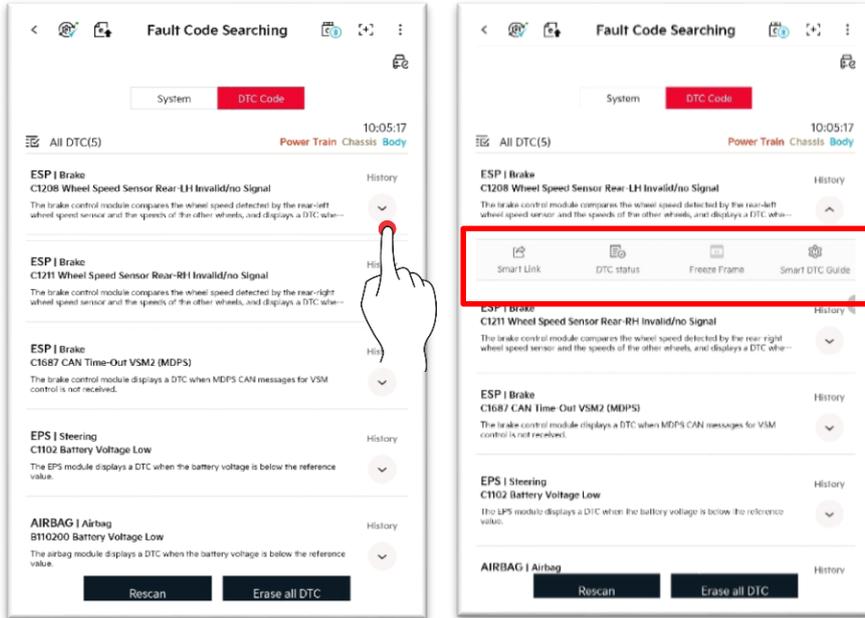
Fault Code Status Information

Current	Fault codes that are currently recognized as faults in the vehicle.
History	Fault codes that are not currently recognized as faults, although the corresponding faults had occurred in the past.

Fault Code Search - Fault Code

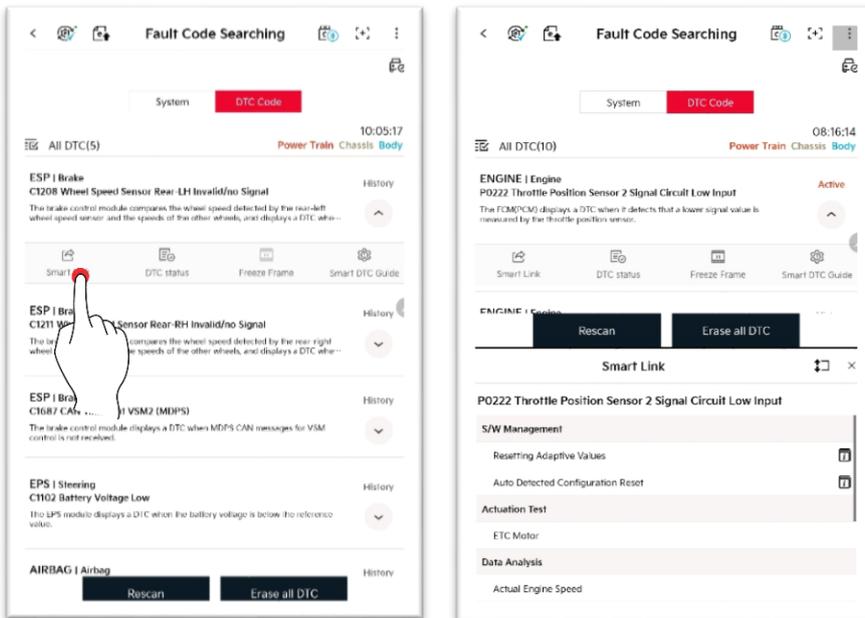
It shows searched fault codes in list format.

Use ^ v button to receive additional functions on fault codes.



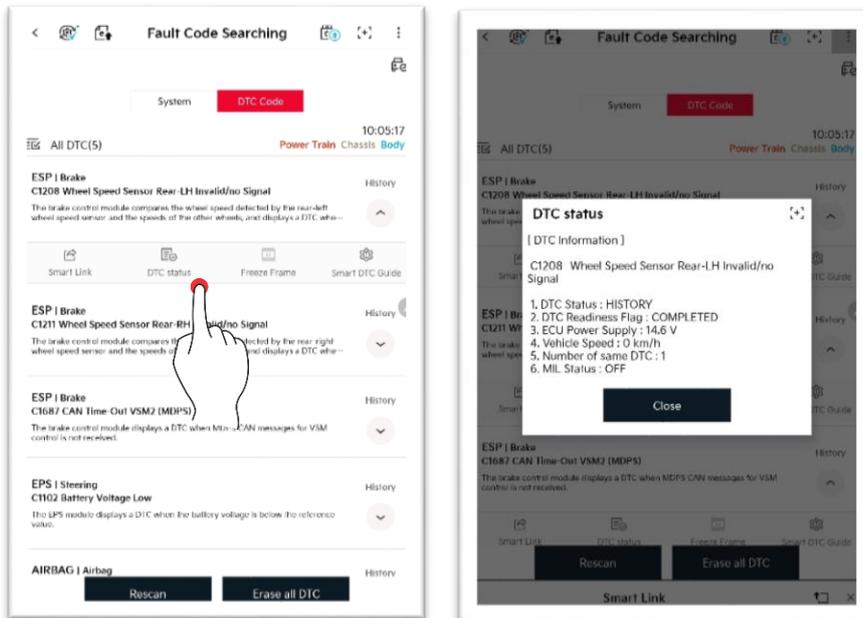
Smart Link

It provides shortcut links to S/W Management, Actuation Test, and Data Analysis that are related to selected fault codes. Select a desired item.



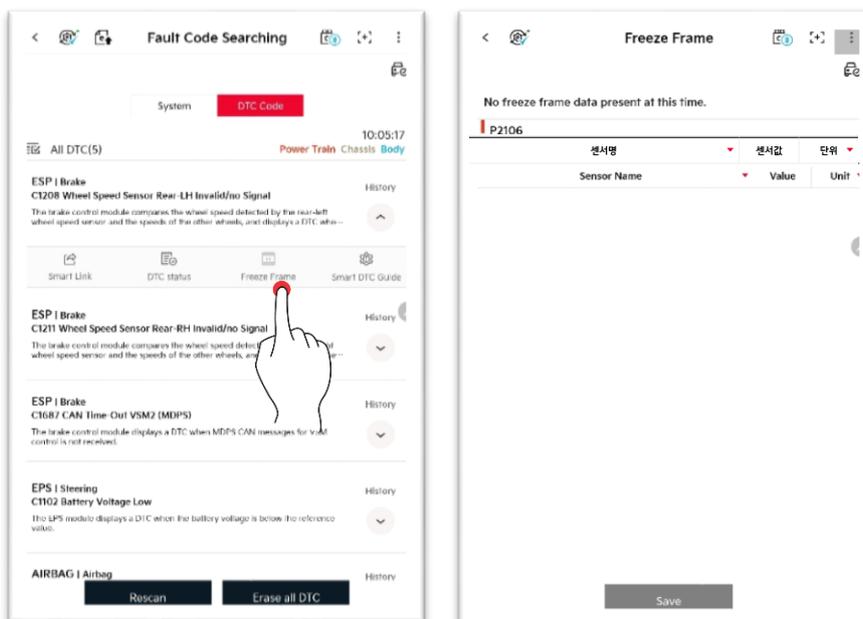
DTC Status

It provides information such as fault type, fault diagnosis completion status and warning light status, etc. related to selected fault codes.



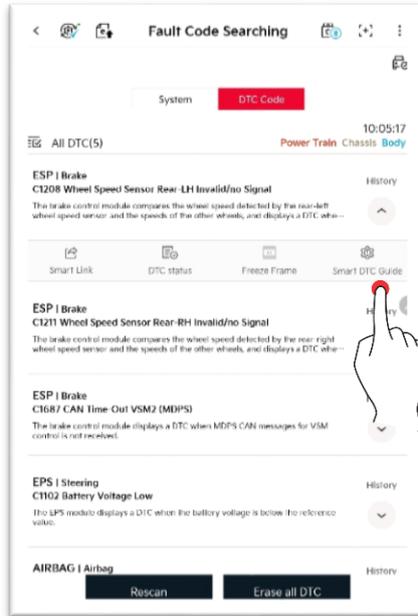
Freeze Frame

It indicates the sensor data, which is stored in the vehicle at the time when the selected fault code has occurred.



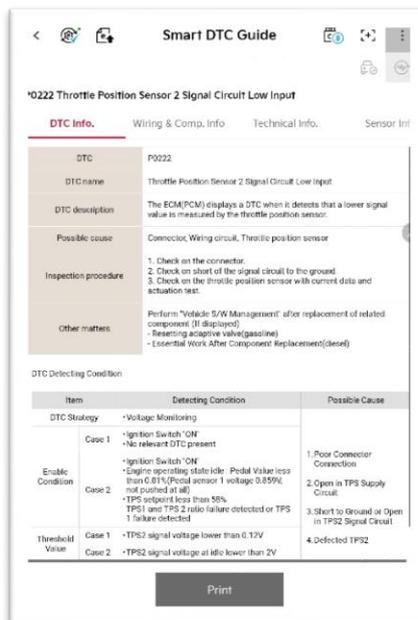
Smart DTC Guide

It provides various functions for inspecting the fault codes that occurred, such as expected causes, inspection procedure and relevant wiring/unit information, etc.



DTC Info

It summarizes and shows necessary information such as expected causes of the fault code occurrence and inspection procedure, etc.



Wiring/Unit Information

It summarizes and shows necessary information such as expected causes of the fault code occurrence and inspection procedure, etc.

Technical Information

It provides diagnosis guide for fault codes, electrical circuit diagram, and maintenance instruction.

* Please refer to GSW data.

Smart DTC Guide

P0222 Throttle Position Sensor 2 Signal Circuit Low Input

Technical Info | Sensor Info | Actuation Test | S/W Menu

Diagnosis Guide | **ETM** | Shop Manual

Component Location

ETC Motor & TPS

General Description

The Electronic Throttle Control (ETC) system is made of the components throttle body, Throttle Position Sensor (TPS)1&2 and Accelerator Position Sensor (APS) 1&2. TPS1&2 are sharing the same source voltage and ground. The throttle valve opening is control by throttle motor which is controlled by Engine Control Module (ECM). The throttle position indicator shows inverted signal characteristic. TPS1 output voltage increases smoothly in proportion with the throttle valve opening angle after starting. TPS2 output voltage increases in inverse proportion with the throttle valve opening angle after starting. TPS provides feedback to the PCM to control the throttle motor in order to control the throttle valve opening angle properly in response to the driving condition.

TC Description

ECM sets DTC P0222 if the PCM detects signal voltage lower than the possible range of a properly operating TPS2.

TC Detection Condition

Print

Smart DTC Guide

P0222 Throttle Position Sensor 2 Signal Circuit Low Input

Technical Info | Sensor Info | Actuation Test | S/W Menu

Diagnosis Guide | **ETM** | Shop Manual

Inspection

Throttle Position Sensor (TPS)

Connect the OBD on the Data Link Connector (DLC).

Start the engine and measure the output voltage of TPS1 and 2 at C.T. and W.O.T.

Throttle Angle	Output Voltage (V)	
	TPS1	TPS2
C.T.	0.5	4.5
W.O.T.	4.41	0.59

TC Motor

- Turn the ignition switch OFF.
- Disconnect the ETC module connector.
- Measure resistance between the ETC module terminals 1 and 2.
- Check that the resistance is within the specification.
- Specification: Refer to "Specification".

Removal

- Turn the ignition switch OFF and disconnect the battery negative (-) cable.
- Remove the resonator and the air intake hose (Refer to "Intake And Exhaust System" in I/M group).
- Disconnect the ETC module connector (A).

Print

Sensor Data - Text Mode

It indicates the sensor data related to fault codes in text format.

A reference value is provided to enable the user to check normal range of the sensor data.

The screenshot shows the 'Smart DTC Guide' interface for DTC P0222. The 'Sensor Info' tab is selected, and the 'Text' mode is active. The data is presented in a table with columns for Sensor Name, Value, Unit, and Ref. IG ON. The current values are: Throttle Position Sensor Angle 1 (94.0 TPS), Throttle Position Sensor Angle 2 (94.3 TPS), Throttle Position Sensor Angle1-Voltage (5.0 V), Throttle Position Sensor Angle2-Voltage (0.0 V), Actual Engine Speed (0 RPM), Water Temperature (-39.8 °C), Throttle Position Closed (Idle) (OFF), and Throttle Position Full Open (OFF).

Sensor Name	Value	Unit	Ref. IG ON
Throttle Position Sensor Angle 1	94.0	TPS	Max. 7.4 Avg. 7.4 Min. 7.1
Throttle Position Sensor Angle 2	94.3	TPS	Max. 7.3 Avg. 7.3 Min. 7.2
Throttle Position Sensor Angle1-Voltage	5.0	V	Max. 0.8 Avg. 0.8 Min. 0.8
Throttle Position Sensor Angle2-Voltage	0.0	V	Max. 4.7 Avg. 4.2 Min. 4.2
Actual Engine Speed	0	RPM	
Water Temperature	-39.8	°C	
Throttle Position Closed (Idle)	OFF		
Throttle Position Full Open	OFF		

Sensor Data - Graph Mode

It indicates the sensor data related to fault codes in graph format.

A reference value is provided to enable the user to check normal range of the sensor data.

The screenshot shows the 'Smart DTC Guide' interface for DTC P0222. The 'Sensor Info' tab is selected, and the 'Graph' mode is active. The data is presented in a table with columns for Sensor Name, Value, Unit, and Ref. IG ON. The current values are: Throttle Position Sensor Angle 1 (94.0 TPS), Throttle Position Sensor Angle 2 (94.3 TPS), Throttle Position Sensor Angle1-Voltage (5.0 V), Throttle Position Sensor Angle2-Voltage (0.0 V), Actual Engine Speed (0 RPM), Water Temperature (-39.8 °C), and Throttle Position Closed (Idle) (OFF).

Sensor Name	Value	Unit	Ref. IG ON
Throttle Position Sensor Angle 1	94.0	TPS	Max. 7.4 Avg. 7.4 Min. 7.1
Throttle Position Sensor Angle 2	94.3	TPS	Max. 7.3 Avg. 7.3 Min. 7.2
Throttle Position Sensor Angle1-Voltage	5.0	V	Max. 0.8 Avg. 0.8 Min. 0.8
Throttle Position Sensor Angle2-Voltage	0.0	V	Max. 4.7 Avg. 4.2 Min. 4.2
Actual Engine Speed	0	RPM	
Water Temperature	-39.8	°C	
Throttle Position Closed (Idle)	OFF		

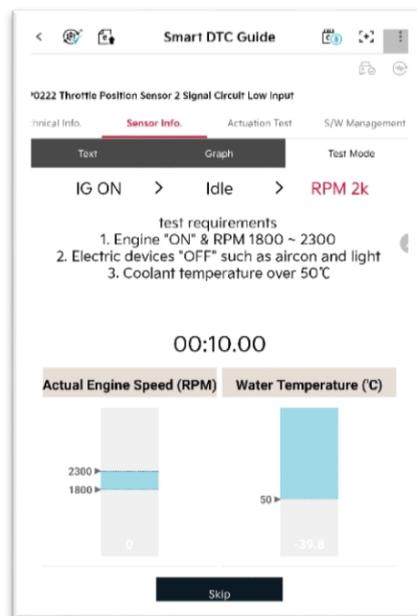
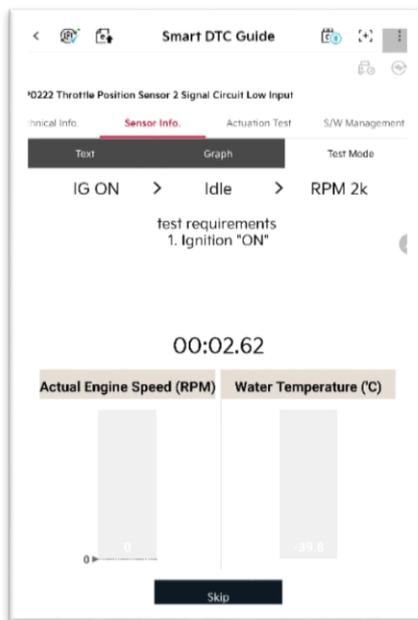


It may not be supported depending on the selected vehicle type, and the reference value is not an absolute number. Please utilize this value for reference purpose

Sensor Data - Test Mode

Test Mode saves the sensor data values under certain conditions including IG ON, Idle, 2000RPM, etc., and inspection can be performed through data comparison.

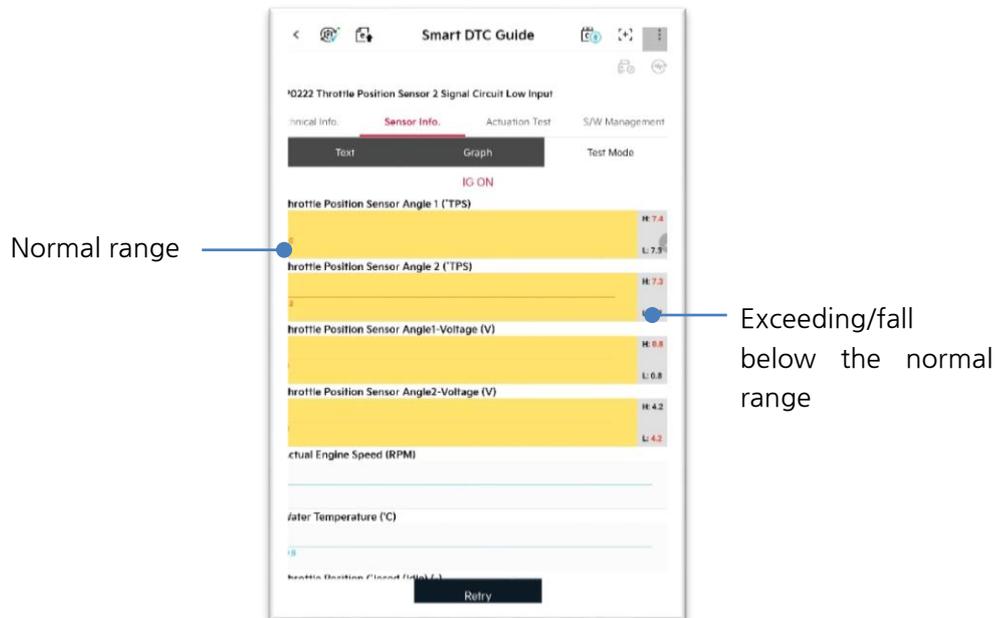
Once the test conditions indicated on screen are satisfied, data are collected for a designated time.



Sensor Data - Test Mode Results

It indicates the data collected for each sensor item.

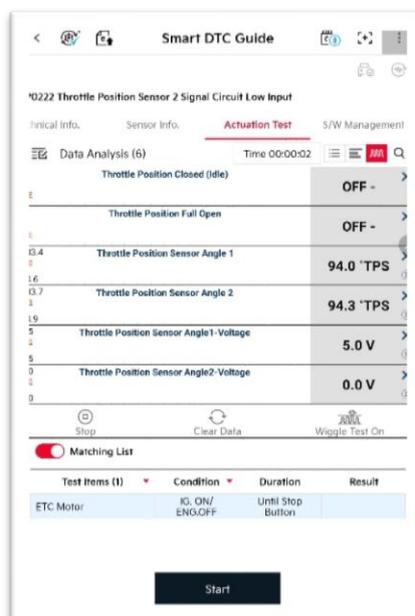
Sensor items that exceed/fall below the normal range reference value are indicated by change in color.



Actuation Test

It indicates the forced self-driving related to selected fault codes.

For detailed information on the forced self-driving, please refer to the relevant manual.



S/W Management

It indicates additional functions related to selected fault codes.

For detailed information on the additional functions, please refer to the relevant manual.

