USER MANUAL

ACB/MCCB OCR TESTER

2019-07-04

Updated Contents

Date Of Update	Updated Contents	Updated By	Reviewed by	Version
2019-01-11	Initial	Yoon Jae-Shik		V0.9.0
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2019-07-04	Release	Yoon Jae-Shik		V1.0.0

List

Figure list

0. Waring

In order to use OCR TESTER's functions sufficiently and safely, please read the instruction manual carefully before use.

- Symbols used on product and in user manual represents following warnings:
  - Warning: Appears when instruction are violated, and there is possibility of serious injury or death.
  - Caution: Appears when instruction are violated, and there is possibility of minor injury or product damage.

● Warning

- Do not operate, check or install alone.

- Do not carry out a test when ACB or MCCB is powered or while operating.

  - it may cause electric shock or malfunction of ACB or MCCB

- Do not carry out a test if the bus is in live-wire state.

  - it may cause electric shock and the charging voltage of current transformer may be damaged or cause fire

- Do not carry out a test when ACB or MCC control is powered.

  - it may cause electric shock or malfunction of ACB or MCCB.

- Do not disassemble the product even when unpowered.

  - internal charging current of the product may cause electric shock.

- Do not install or operate with wet hands. It may cause electric shock.

- Do not use if the sheath of cable is damaged.

  - it may cause electric shock.

- Please wear necessary protection for usage.

- Please attach safety caution before operating (it may cause electric shock).

● Caution

- ■ Precaution for installation and terminal wiring.

  - ✓ Please apply correct power which suits rating of power terminal.

    - violation of this caution may cause product damage or fire.

  - ✓ Do not allow screws or other metal materials, water, oil or other substances enter inside the product.

    - violation of this caution may cause product damage or fire

  - ✓ Please check the direction before connecting the connector to terminal input/output.

    - violation of this caution may cause product damage or fire.

  - ✓ Please use the offered adapter.

    - violation of this caution may cause product damage or fire.

- ■ Checklist before inserting power.

  - ✓ Check voltage and polarity of control power.

  - ✓ Check cable direction of tester and device.

  - ✓ Please change the battery if product fails to operate without additional power supply.

- ■ Precautions for storage and handling.

  - ✓ Please store in area where there is no moisture or dust.

  - ✓ Do not throw or add strong force when moving.

- ■ Precautions for disposal.

  - ✓ When disposing, treat it as industrial waste disposal.

1. Product Feature

1.1 Product Feature

1.1.1 Feature

OCR TESTER is a stand-alone type that can test new ACB, SMART MCCB and existing ACB. It is equipped with self-calibration function, device information setting, relay setting and device. It is a device that has the function to check the status. In addition, it supports 256 x 128 graphic LCD to support not only English but also Chinese and Russian languages, and has the function to output test and test results in the same way using upper Manager S/W.

1.1.2 Function

- ✓ **Calibration**: OCR TESTER's calibration function corrects the generated error using the output value set in TESTER and current data of device, and updates the correction coefficient.

- ✓ **Device H/W Setting:** It consists of setting the H / W value and time of the device and setting the language and time of the OCR TESTER itself.

- ✓ **Relay Setting**: It consists of checking the current relay of the device and setting the relay.

- ✓ **Relay Test**: It is composed of MANUAL/ AUTO / USER TEST to perform various relay test.

- ✓ **Control**: It provides the function of clearing or resetting the data of the device and controlling the DO and CB.

- ✓ **System Information**: It consists of a part that displays the system information of the device, the relay status, and the system information of the OCR TESTER.

- ✓ **Test History**: It consists of a part to check the test history stored in the OCR TESTER and a part to delete the stored history information.

1.2   Product Overall Configuration

1.2.1   Overall Configuration
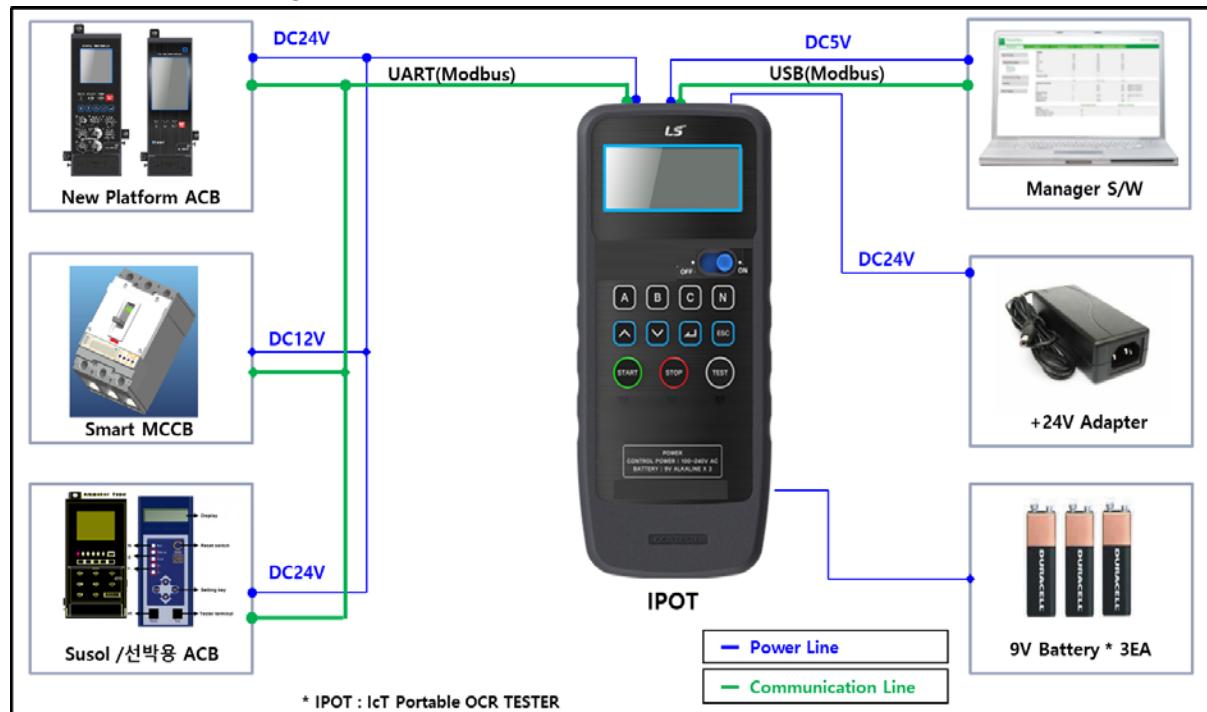
Figure 1-1: Overall Configuration

  Figure 1-1 shows the overall connection diagram of the OCR TESTER. OCR TESTER is designed to be easily tested with NEW ACB and SMART MCCB as well as 10Pin signal connection port to provide easy testing of existing ACB to maintain compatibility. It is configured to operate using DC24V or 9V battery as the input power source. By using the input power, the signal connection port supplies DC24V for use in ACB, and power is supplied for DC12V used in SMART MCCB And UART and Modbus communication can be used to perform device relay test, device monitoring, setup and operation in a stand-alone manner. In addition, the manager S / W is configured to perform the overall relay test using the USB mode Modbus communication with the manager S / W. In addition, OCR TESTER is configured to operate with 256 x 128 Graphic LCD and Key.

1.2.2 Product Component

Figure 1-2: Product Component

Num	Component	Feature
①	OCR TESTER	IPOT(ICT Potable OCR TESTER) Product
②	Adapter	AC100-240V, DC24V, 2.5A Adapter
③	Power Cable	Power Cable for Adapter
④	Socket	Power Compatible Socket(Only Overseas)
⑤	Signal Cable #1	Signal Cable for New ACB & MCCB (Black molded cable)
⑥	Signal Cable #2	Signal Cable for existing ACB (Gray flat cable)
⑦	USB Cable	USB Cable(Mini-B)
⑧	Manual(Korean)	Korean Manual for User
⑨	Manual(English)	English Manual for User
⑩	Bag	Bag for Product and Components
⑪	Box	Product Box

* ICT: Information and Communication Technology

1.2.3   Product Appearance

Figure 1-3: Product Appearance

Num.	Contents	Feature
①	Power Switch	Power ON/OFF Switch
②	LCD	256 x 128 Graphic LCD
③	KEY PAD	Buttons for Menu Navigation, Setup and Operation
④	Adapter Terminal	DC24V Adapter Terminal
⑤	USB Terminal	USB communication connector with PC (USB 2.0)
⑥	Signal Port	Device Testing Port
⑦	Battery	9V Alkaline Battery(x 3ea)

1.2.4 Product Control Part

Figure 1-4: Product Control Part

Num.	Contents	Feature
1	A B C N	Phase A~N selected Button
2	∧	"INCREASE or UP" Button
3	∨	"DECREASE or DOWN" Button
4	↵	"ENTER" Button
5	ESC	"ESC" Button
6	START	"START" Button for generating waveform
7	STOP	"STOP" Button for stopping waveform
8	TEST	HOME/TEST Switch Button

2. LCD Display

2.1 Main Menu

(1) NEW ACB
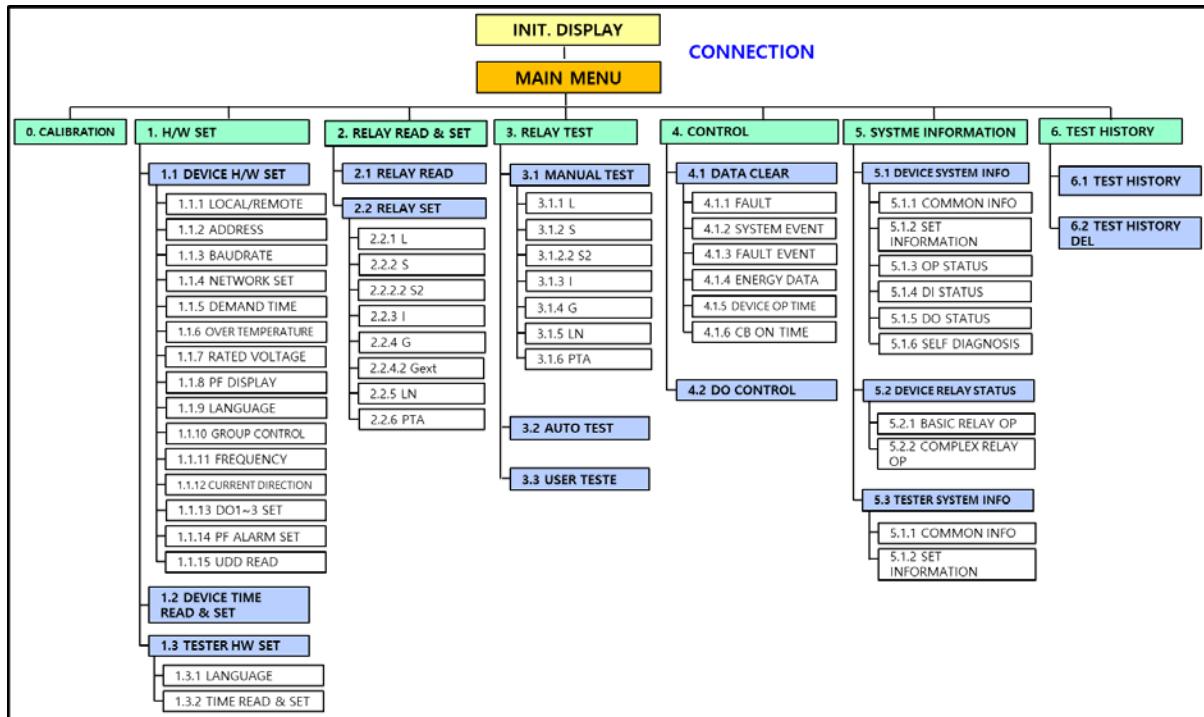
(a)NEW ACB

(2) SMART MCCB
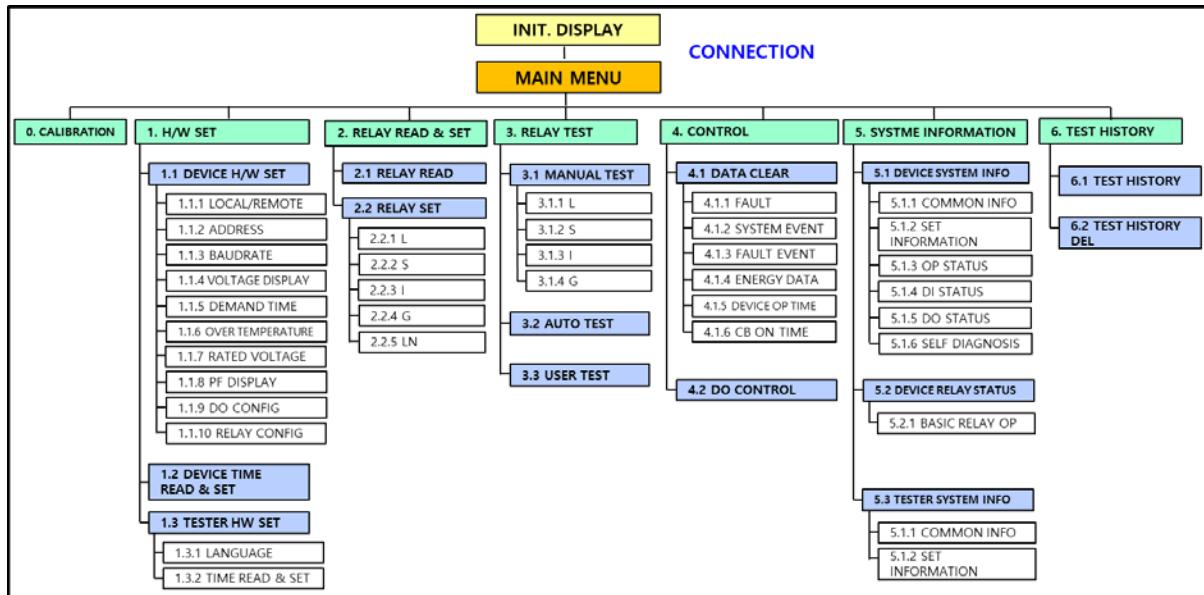
(b)SMART MCCB

(3) Existing ACB
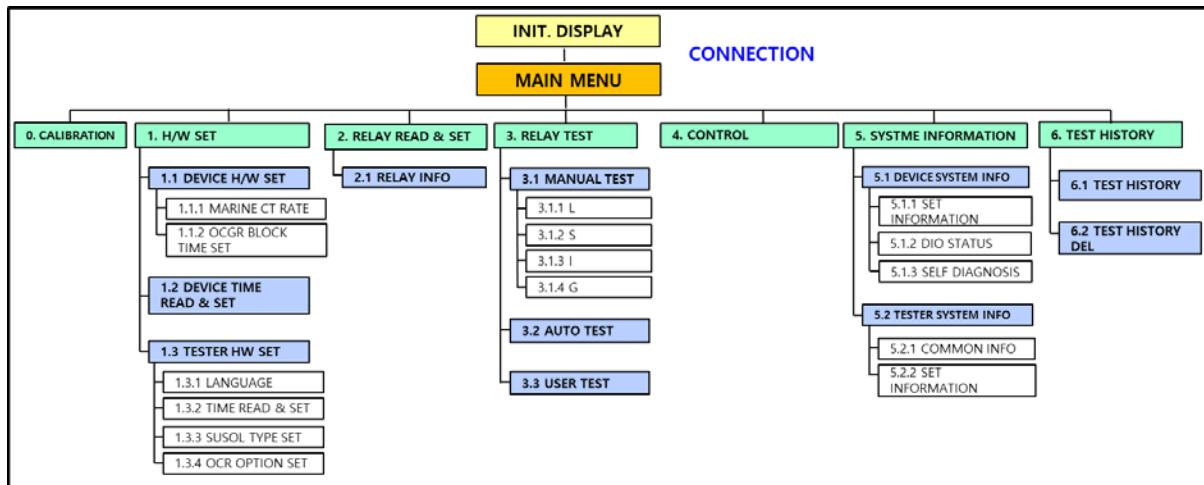
(c)Existing ACB

Figure 2-1: Overall MENU TREE

The configuration of the LCD consists of seven large items from calibration (0.CALIBRATION) to the test history (6.TEST HISTORY).

Menu	List	Explanation
0.CALIBRATION	0.TESTER CALIBATION	Calibration of TESTER
1.H/W SET	1.1 DEVICE H/W SET	Set hardware information of the device.
	1.2 DEVICE TIME READ & SET	Read and reset the time set on the device.
	1.3 TESTER H/W SET	Read and set the display language and time of TESTER.
2.RELAY READ & SET	2.1 RELAY READ	Check the entire current relay information of the device.
	2.2 RELAY SET	Set the current relay information of the device.
3.RELAY TEST	3.1 MANUAL TEST	The relay other than the selected relay element is tested in NOT USE state.
	3.2 AUTO TEST	Test only relay elements set to "**USE**" among current relay information
	3.3 USER TEST	Test the current relay element with the relay set.
4.CONTROL	4.1 DATA CLEAR	FAULT and EVENT clear function of device
	4.2 DO COTNROL	DO and CB control function
5.SYSTEM INFORMATION	5.1 DEVICE SYSTEM INFO	Check device common, setting, DI / DO information and self-diagnosis status information.
	5.2 DEVICE RELAY STATUS	Check the basic and complex relay status.
	5.3 TESTER SYSTEM INFO	Check the TESTER common and self-diagnosis status.
6.TEST HISTORY	6.1 TEST HISTORY	You can check the HISTORY of the relay test result and generate the test result report using the Manager S / W.
	6.2 TEST HISTORY DEL	Performs HISTORY delete function as a result of relay test.

2.2 Detailed Menu Configuration
2.2.1 <0. CALIBRATION>

When the calibration is performed by the calibration function of the OCR TESTER, the correction coefficient is updated by correcting the generated error by using the output value set in the tester and the measuring current of the device. The calibration takes about 20 seconds and appears as "**COMPLETE**" on success and "**FAIL**" on failure. The calibration correction value is switched to the DEFAULT value held by the first tester when the power is turned off and then turned on again.

<**CALIBRATION PROCEDURE** >

1) You can proceed with the calibration of the instrument in OCR TESTER. Calibration work can be done through LCD screen and Manager software.

2) And then perform calibration at **100% In point (200% In for MCCB)** in OCR TESTER.

3) The execution sequence is as follows.

　① If the test mode switching command is sent from the OCR TESTER to the instrument, the instrument switches to the test mode for calibration.

　② In the OCR TEST, turn off the set current relay element to prevent the relay operation from being performed when the calibration is in progress.

　③ Step # 1 After the test output is generated at 100% In (MCCB: 200% In) and the current measurement data is read from the device, the error between the current generated from OCR TESTER and the current value read from the device is + -20% , The test output is generated at the 100% In point (MCCB: 200% In) as in Step # 2, and the current measurement data is read from the device and the calibration is automatically performed to correct the error.

　④ After the calibration is completed, the current relay element which is turned off is returned.

　⑤ From the OCR TESTER, the instrument switches to the operation mode via the test mode release command.

However, the device automatically returns to the operation mode when the test mode release command is not present for a predetermined time (60s)

2.2.2 <1. H/W SET>

<1. H/W SET> section consists of hardware and time setting part of the device and hardware setting part of the tester.

- 1.1 DEVICE H/W SET: Set hardware information of the device.

1.1 DEVICE H/W SET		
기 기	항 목	설 명
NEW ACB	1.1.1 LOCAL/REMOTE	Set the device's Local or Remote.
	1.1.2 ADDRESS	Set the device address (or station number).
	1.1.3 BAUDRATE	Set the communication speed (9600 ~ 57600bps) used by the device.
	1.1.4 NETWORK SET	Set network connection status (Y or Delta connection).
	1.1.5 DEMAND TIME	Set the demand time (5, 10, 15, 20, 30, 60 minutes).
	1.1.6 OVER TEMPERATURE	Set trip operation (Trip or No Trip) when temperature is generated.
	1.1.7 RATED VOLTAGE	The rated voltage can be set in the range of 100 to 1000V.
	1.1.8 PF DISPLAY	Set the power factor display (LS / IEC / IEEE) method.
	1.1.9 LANGUAGE	Select the language (English / Chinese / Russian) you want to use the device. However, the language can be set only for NEW ACB-P, S type, and other types are fixed in English.
	1.1.10 GROUP CONTROL	Select the relay control group (A or B Group). However, only the NEW ACB-S type can be set, and the other type is fixed as A Group.
	1.1.11 FREQENCY	Set the frequency of use (50 or 60Hz) of the device.
	1.1.12 CURRENT DIRECTION	Current direction setting (forward / reverse direction).
	1.1.13 DO1~3 SET	DO1 ~ 3 Set the use function (RELAY or CB).
	1.1.14 PF ALARM SET	Under PF and Over PF sets the alarm range.
	1.1.15 UDD READ	User Defined Display(S type only)
SMART MCCB	1.1.1 LOCAL/REMOTE	Set the device's Local or Remote.
	1.1.2 ADDRESS	Set the device address (or station number).
	1.1.3 BAUDRATE	Set the communication speed (9600 ~ 38400bps) used by the device.
	1.1.4 VOLTAGE DISPLAY	Set the voltage display state (phase voltage or line voltage).
	1.1.5 DEMAND TIME	Set the demand time (5, 10, 15, 20, 30, 60 minutes).
	1.1.6 OVER TEMPERATURE	Set trip operation (Trip or No Trip) when temperature is generated.
	1.1.7 RATED VOLTAGE	The rated voltage can be set in the range of 100 to 1000V.

1.1 DEVICE H/W SET		
기 기	항 목	설 명
	1.1.8 PF DISPLAY	Set the power factor display (LS / IEC / IEEE) method.
	1.1.9 DO CONFIG	DO operation (relay operation or CB control).
	1.1.10 RELAY CONFIG	Set the relay function for DO1 and DO2.
Existing ACB	1.1.1 MARINE CT RATE	Set ACB CT RATE for ship.
	1.1.2 OCGR BLOCK TIME SET	Set the OCGR blocking time (1 to 60 seconds)

- 1.2 DEVICE TIME READ & SET: It is a common support function to read and set the time of the device.

1.2 DEVICE TIME READ & SET	
기 기	설 명
COMMON	You can check the time of the device and reset the set time (Year / Month / Day / Hour / Minute / Sec).

- 1.3 TESTER H/W SET: Select the tester's display language (English, Chinese, Russian) and set the time

1.3 TESTER H/W SET		
기 기	항 목	설 명
COMMON	1.3.1 LANGUAGE	You can set the language (English / Chinese / Russian) to be displayed in OCR TESTER.
	1.3.2 TIME READ & SET	Set the time of OCR TESTER.
Only Existing ACB	1.3.3 SUSOL TYPE SET	You can set the existing SUSOL OCR type (Normal, Hynix).
	1.3.4 OCR OPTION SET	You can set options for existing SUSOL OCR (UL or IEC).

2.2.3 <2. RELAY READ & SET>

<2. REALY READ & SET> section consists of reading and setting relay information of the device (However, only current relay element can be set in TESTER). The 2.2 REALY WRITE function, which is a relay element setting function, supports only NEW ACB and SMART MCCB, and does not support existing ACB.

- 2.1 RELAY READ: It provides a function to check the whole current relay information on one screen.

2.1 RELAY READ	
Device	**Explanation**
NEW ACB **or** **Existing ACB**	✓ Pick-Up Current(Ir) and the operation time (tr) of Long Time Relay ✓ Pick-Up Current(Is) and the operation time (ts) of Short Time Relay, I2T ✓ Pick-Up Current(Ii) of Instantaneous Time Relay ✓ Phase N Pick-Up Current(Inr) of Long Time Relay ✓ Pick-Up Current(Ig) and the operation time (tg) of Ground Relay, I2T ✓ Pick-Up Current(Ige) and the operation time (tge) of external Ground Relay ✓ Pick-Up Current(Ip) and the operation time (tp) of PTA
SMART MCCB	✓ Pick-Up Current(Ir) and the operation time (tr) of Long Time Relay ✓ Pick-Up Current(Is) and the operation time (ts) of Short Time Relay, I2T ✓ Pick-Up Current(Ii) of Instantaneous Time Relay ✓ Phase A Pick-Up Current(Inr) of Long Time Relay ✓ Pick-Up Current(Ig) and the operation time (tg) of Ground Relay, I2T

- 2.2 RELAY SET: It provides the function to set the whole current relay information.

2.2 RELAY SET		
Device	**Item**	**Explanation**
NEW ACB	2.2.1 L	Set the relay element of Long Time
	2.2.2 S1	Set the relay element of Short Time(STAGE1)
	2.2.2.2 S2	Set the relay element of Short Time(STAGE1) (S Type only)
	2.2.3 I	Set the relay element of Instantaneous Time
	2.2.4 G	Set the relay element of Ground Time
	2.2.4.2 Gext	Set the relay element of external Ground Time
	2.2.5 LN	Set the Phase N relay element of Long Time
	2.2.6 PTA	Set the relay element of PTA
SMART MCCB	2.2.1 L	Set the relay element of Long Time
	2.2.2 S	Set the relay element of Short Time
	2.2.3 I	Set the relay element of Instantaneous Time
	2.2.4 G	Set the relay element of Ground Time
	2.2.5 LN	Set the Phase N relay element of Long Time
Existing ACB	-	Relay setting function is not provided.

2.2.4 <3. RELAY TEST>

<3. REALY TEST> section performs instrument relay test, and test method consists of MANUAL / AUTO / USER test.

- **3.1 MANUAL TEST**: The relay elements other than the relay elements to be tested are

tested after disabling them arbitrarily in the test.

3.1 MANUAL TEST		
Device	**Item**	**Explanation**
NEW ACB	3.1.1 L	Test the long-time relay element.
	3.1.2 S1	Test the short-time relay element.(STAGE1)
	3.1.2.2 S2	Test the short-time relay element.(STAGE2) (S-type only)
	3.1.3 I	Test the instantaneous-time relay element.
	3.1.4 G	Test the ground fault relay element.
	3.1.5 LN	Test the phase N long-time relay element.
	3.1.6 PTA	Test the PTA relay element.
SMART MCCB	3.1.1 L	Test the long-time relay element.
	3.1.2 S	Test the short-time relay element.
	3.1.3 I	Test the instantaneous-time relay element.
	3.1.4 G	Test the ground fault relay element.
	3.1.5 LN	Test the phase N long-time relay element.
Existing ACB	3.1.1 L	Test the long-time relay element.
	3.1.2 S	Test the short-time relay element.
	3.1.3 I	Test the instantaneous-time relay element.
	3.1.4 G	Test the ground fault relay element.

However, the existing ACB should be tested in MANUAL test while other relay elements are OFF.

- **3.2 AUTO TEST**: For the relay elements that are enabled among the current relay elements of the device, the automatic test is performed with the default value set in the test.

3.2 AUTO TEST		
Device	**Item**	**Explanation**
NEW ACB	3.2 AUTO TEST -TEST PROCEDURE	L-> S Stage1 -> S Stage2 -> I -> G-> LN -> PTA
SMART MCCB		L -> S -> I -> G-> LN
Existing ACB		L -> S -> I -> G-> LN

However, in the case of the existing ACB, the test should be conducted in the OFF state with respect to the other relay elements in the AUTO test.

- **3.3 USER TEST**: User Test is carried out by user setting in the state of the set relay element.

3.3 USER TEST		
Device	**Item**	**Explanation**
기기 공통	3.3 USER TEST	The user relay test is a test in which the test is performed by the user setting in the state of the set relay element of the apparatus. - Select basic base current (In or Ir): UP key - AMP size and phase selection: select with A ~ N keys and ENTER key : AMP output = Set Value * Base current

2.2.5 <4. CONTROL>

<4. CONTROL> section consists of clearing or resetting the device's DATA and controlling the DO and CB.

- 4.1 DATA CLEAR: Performs the function of clearing or resetting DATA (FAULT, EVENT, ...) of the device.

4.1 DATA CLEAR		
Device	**Item**	**Explanation**
NEW ACB **Or** **SMART MCCB**	4.1.1 FAULT	It performs a function of resetting the fault state of the device.
	4.1.2 SYSTEM EVENT	It clears the system event state of the device.
	4.1.3 FAULT EVENT	It performs the function to clear the fault event status of the device.
	4.1.4 ENERGY DATA	It performs a function of clearing the energy data of the apparatus.
	4.1.5 DEVICE OP TIME	It performs a function of clearing the operation time of the device.
	4.1.6 CB ON TIME	It performs a function to clear the CB On time of the device.
Existing ACB	-	Data clear function is not provided.

- 4.2 DO CONTROL: It controls the DO or CB of the device.

4.2 DO CONTROL		
Device	**Item**	**Explanation**
COMMON	DO 및 CB 제어	. DO # 1 ~ 3 control function executes ON control command when the device status is OFF, and OFF control command when ON.

4.2 DO CONTROL		
Device	**Item**	**Explanation**
		. The CB control function performs the OPEN control function when the device status is CLOSE, and performs the CLOSE function when it is OPEN.

2.2.6 <5. SYSTEM INFORMATION>

<5. SYSTEM INFORMATION> section consists of the part that displays the system information of the device, the relay status and the system information of the tester.

- 5.1 DEVICE SYSTEM INFO: It provides the common information of the device and the function to display the DI, DO and the device self-diagnosis status.

5.1 DEVICE SYSTEM INFO		
Device	**Item**	**Explanation**
NEW ACB Or SMART MCCB	5.1.1 COMMON INFO	Check the Common area (Basic, Regular, Extended) information of the device. : Device Vendor name, software version, product name, serial number, and product code.
	5.1.2 SET INFO	Check the system configuration information of the device. : Device Name and Type, Pole & Wire Information, Frequency and AF, Rated Voltage and Current, Knob Information, and Option Information
	5.1.3 OP STATUS	Check the device operation (L / R, Croup, current direction, PF, etc.).
	5.1.4 DI STATUS	Check the status of the DI input (ZSI, ERMS, CB, R / L Reset, etc.).
	5.1.5 DO STATUS	Check the device DO output (ZSI DO, TRIP PULSE, DO # 1 ~ 3) status.
	5.1.6 DIAGNOSIS	Check the device self-diagnosis (Alarm and Error, Fail status).
Existing ACB	5.1.1 SET INFOMATION	Check the system configuration information of the device. : Device Name and Type, Pole & Wire Information, Frequency and AF, Rated Voltage and Current, Knob Information, and Option Information
	5.1.2 DIO STATUS	Check the status of the DIO input/output (ZSI, Remote Reset, PAL).
	5.1.3 SELF DIAGNOSIS	Check the device self-diagnosis (Hot / Cold, Calibration, FIM Lock, Battery status, External low pressure and DO

5.1 DEVICE SYSTEM INFO		
Device	**Item**	**Explanation**
		status).

- 5.2 DEVICE RELAY STATUS: It is a function to display the relay status of the device and display the basic and complex relay status.

5.2 DEVICE RELAY STATUS		
Device	**Item**	**Explanation**
NEW ACB	5.2.1 BASIC RELAY OP	Check the operation status of the basic relay (L, S1, S2, I, G, Gext, LN, PTA, D, S (V1), S (V2).
	5.2.2 COMPLEX RELAY OP	Confirm the equipment complex relay (OF1, UF1, RQ1, OQ, ROCOF, UV1,2, OV1,2, IU, OP). However, this function only supports NEW ACB OCR products.
SMART MCCB	5.2.1 BASIC RELAY OP	Check the operating status of the basic relay (L, S1, S2, I, G, Gext, LN).
Existing ACB	-	It is a function that does not support.

- 5.3 TESTER SYSTEM INFO: It provides the common information of the tester and the ability to display the self-diagnostic status of the tester.

5.3 TESTER SYSTEM INFO		
Device	**Item**	**Explanation**
COMMON	5.3.1 TESTER COMMON INFO	Check the common area (Basic, Regular, Extended) information of OCR TESTER.
	5.3.2 TESTER SELF DIAGNOSIS	Check the self-diagnosis (connection, battery, communication, memory) status of OCR TESTER.

2.2.7   <6. TEST HISTORY>

<6. TEST HISTORY> section consists of confirming the test history stored in the tester and deleting the stored history.

- 6.1 TEST HISTORY: It is a function to check the test history stored in the tester.

6.1 TEST HISTORY		
Device	**Item**	**Explanation**
COMMON	ROLL OVER COUNT	Roll Over status counter of saved FRAM memory

6.1 TEST HISTORY		
Device	**Item**	**Explanation**
		'0': No Roll Over '1' or higher: Roll Over Ex) If it is '5', it rolls over five times Detailed information can be checked by using the Record function of Manager S / W.
	POSITION INDEX	0: nothing stored 1 to 256: 255 stores .Position Index to check the current location of test results Ex) If Position Index is '10', 10 is the most recent information, then the latest information is '9'.

- 6.2 TEST HISTORY DEL: This function deletes the history of tests stored in the tester.

6.2 TEST HISTORY DEL		
Device	**Item**	**Explanation**
COMMON	TEST HISTORY DEL	Delete all stored history information.

3. Device Connection & Relay Test

3.1 Device Connection

① Connect OCR TESTER to the device using the cable provided with the OCR TESTER as shown in [3-1], and then apply power to the OCR TESTER. When the power is turned on, the initial screen of OCR TESTER appears with the message <**PRESS ANY KEY**>.

Figure 3-1: Device Connection

- OCR TESTER can be used with both ACB and ACB or MCCB. However, since different types of cables are used, please refer to the above picture for connection.

Note1) **NEW ACB/MCCB**

1. Do not connect the test signal cable when the OCR control power is applied.

2. Connect the OCR and TESTER using the supplied MOLDED SIGNAL CABLE. At this time, do not apply the control power of OCR when connected.

3. After connecting the OCR and TESTER, turn on the power of TESTER and press any button to connect the OCR automatically.

4. When the test is completed, press STOP button for about 3 seconds to stop control power generation of OCR. After that, turn off the power switch of TESTER.

Note2) **Existing ACB**

1. Do not connect the test signal cable when the OCR control power is applied.

2. Connect the OCR, TESTER, and the supplied FLAT SIGNAL CABLE to the unit. At this time, do not apply the control power of OCR when connected.

3. How to use after this is the same as above.

② If you press the ANY key among the OCR TESTER keys while the device and cable are connected, the device information is automatically read using Modbus communication to recognize and connect the device. If the connection is successful, <MAIN MENU> screen will appear. If connection fails, "Connection FAIL" will appear.

Figure 3-2: Initial Display

③ If the connection with the device fails, "FAIL" message appears. If you press "ENTER" key at this time, it will switch to the screen before initial connection. Press "ESC" key to go to <MAIN MENU> OCR TESTER's DEFAULT information is used instead of actual device information that OCR TESTER has.

④ If you press "STOP" key for 3 seconds while it is normally connected with the device, it switches to the initial screen.

In other words, if the Any Key button of the OCR Tester is connected while the device and the cable are connected, the device information is automatically read and recognized.

- Attempt to connect automatically by using ANY KEY when connecting device in initial screen

- In OCR TESTER, you can automatically connect the device

- The <MAIN MENU> screen is displayed when connection is successful, the "FAIL" screen
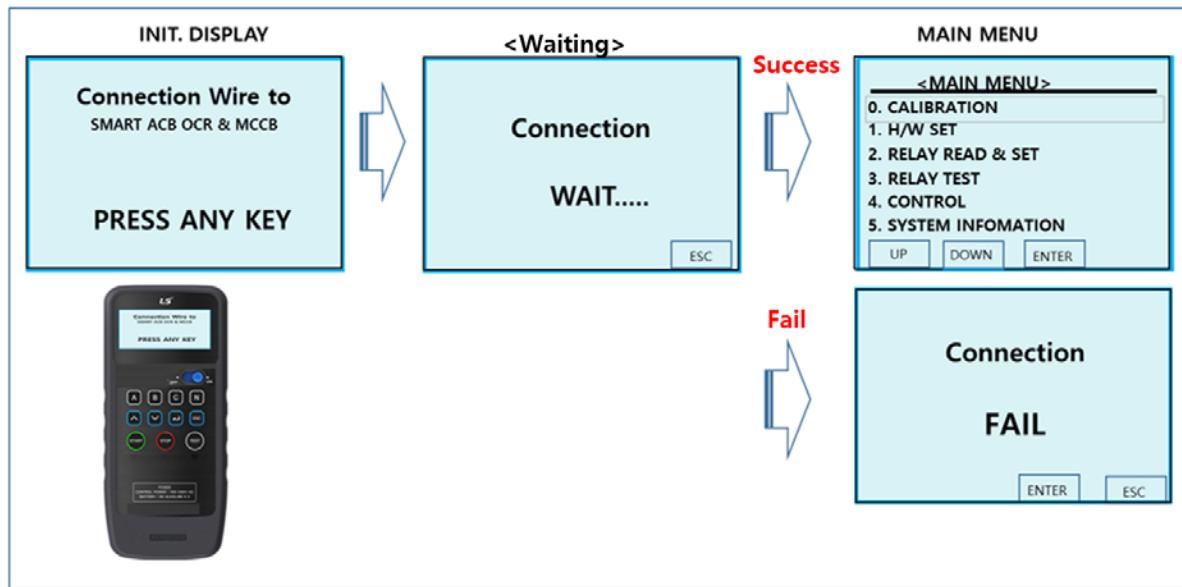
Figure 3-3: Connection Display

3.2 Device Test-3.RELAY TEST/3.3 USER TEST

The device test is a simple method of testing using the "H/T" button, which is the home & test switch button. The device test is performed by user setting with the relay element set as <3.3 USER TEST>. If you press "Home" button "H/T" button of OCR TESTER while it is connected to the device, you can switch to the test screen as shown below. Also, if you press the "H/T" button again on the test screen, it switches to the Home screen <MAIN MENU>.
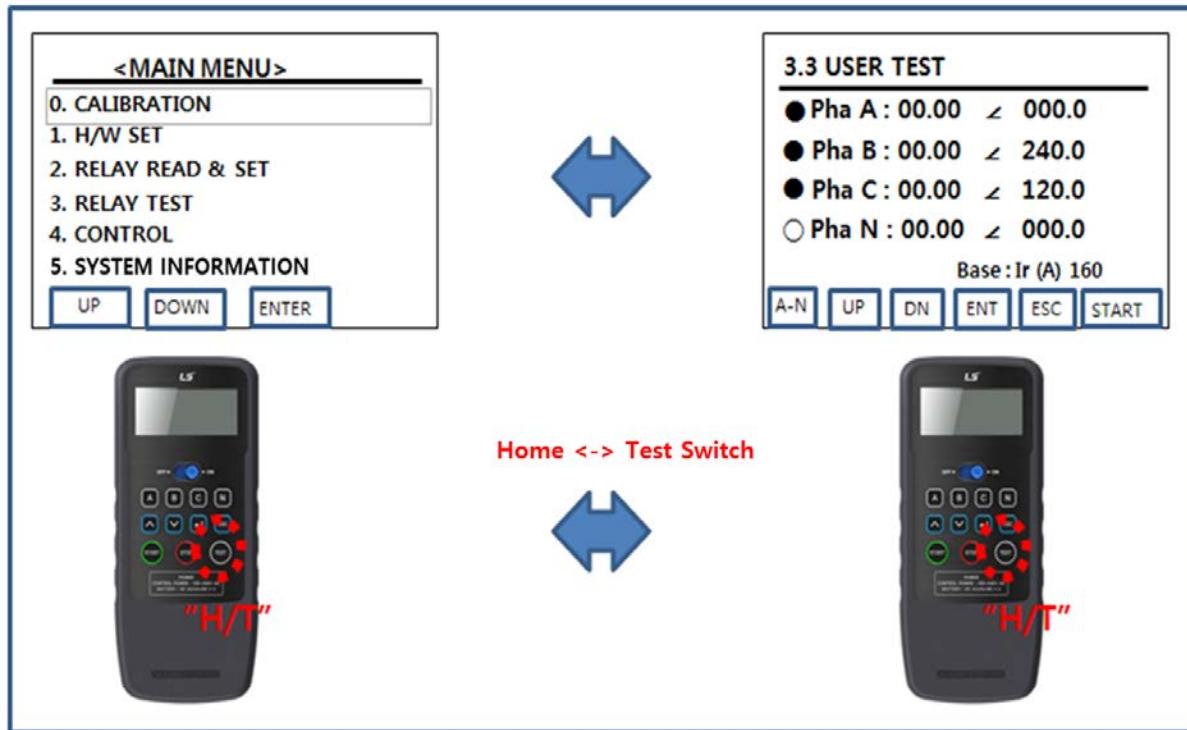
Figure 3-4: User Test-Home & Test Switch

① The "H/T" key of OCR TESTER switches to the user relay test screen by pressing the "H/T" button with Home & Test switch button.

② You can select the basic base current (In or Ir) by pressing "UP" key in the user test screen (3.3 USER TEST).

③ After selecting the base current, use "A ~ N" key to select output phase and press "ENTER" key to select output size and phase.

   ✓ **Only one Selection of the "A ~ N" buttons : Amplitude and phase Setting**

   ✓ **Multiple Selection of the "A ~ N" buttons : Only Amplitude Setting**

   ✓ **No Selection of the "A ~ N" buttons : Relay Information of Device**

④ After selecting the output amplitude and phase, press the "START" key and the set value will be output.

   ✓ **Output Current(A) = Amplitude * Base current**
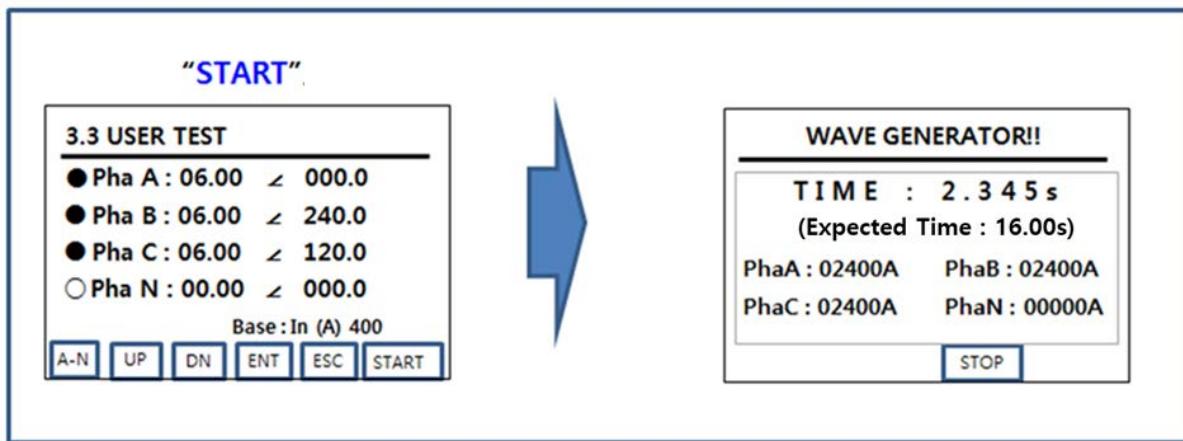
Figure 3-5: User Test-Testing

3.2.1 Relay Test-Base Current selection

The base current is to select a reference current of the current to be output.

① The example below is an example of changing the reference current from the Ir reference to the In reference.

② In the the user relay test screen of the figure, press the "UP" button to switch to <Base current selection> screen. Select "Ir" by using "UP / DOWN" button in < Base current selection > screen and input "ENTER".

③ In the user test screen, you can check the changed Ir value (Base: In (A)_400 -> Base: Ir (A) 160)
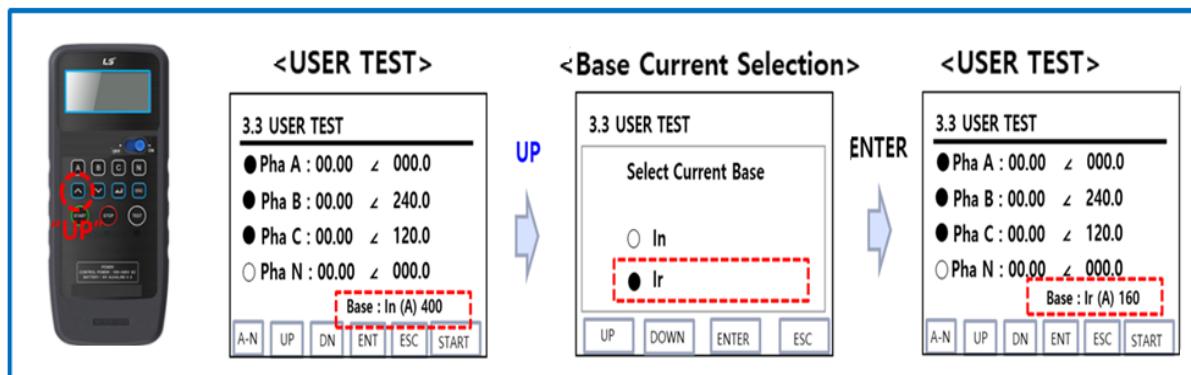
Similarly, the same method can be used to change the reference current from In to Ir (Ir, In in the figure depends on the set value of each device).

## 3.2.2 Relay Test-Output Amplitude setting
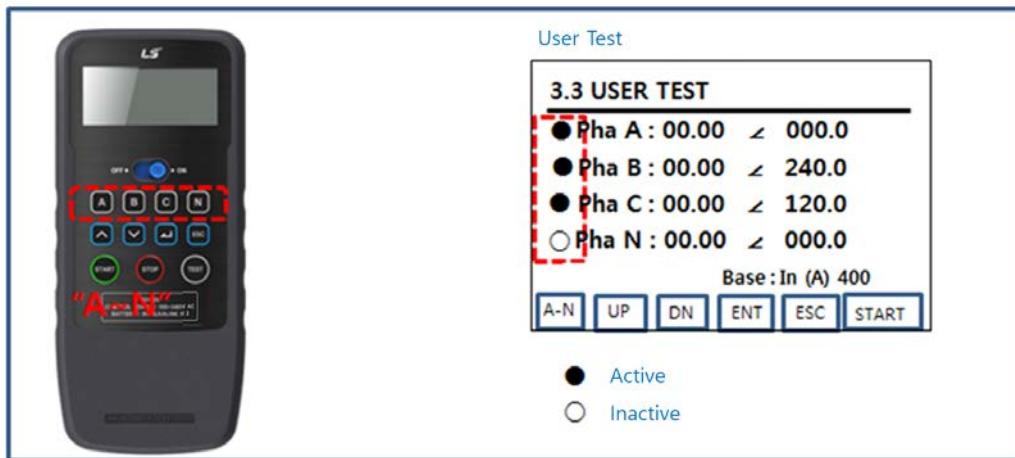
Figure 3-6: User test-Amplitude

① To select the output amplitude and phase, first use "A ~ N" button to select the image to be output.

② In the user relay test, press the "A ~ N" button for each phase to show the activation / deactivation status.

● : Active status

○ : Inactive status

③ Select the phase to output by using "A ~ N" key and press "ENT" key to select output size and phase.

✓ Only one Selection of the "A ~ N" buttons : Amplitude and phase Setting

✓ Multiple Selection of the "A ~ N" buttons : Only Amplitude Setting

✓ No Selection of the "A ~ N" buttons : Relay Information of Device

### 3.2.1.1 No Selection – Relay information of device

User Relay Test If there is NO selection of "A ~ N" buttons in <3.3 USER TEST>, you can check relay information set in the device.
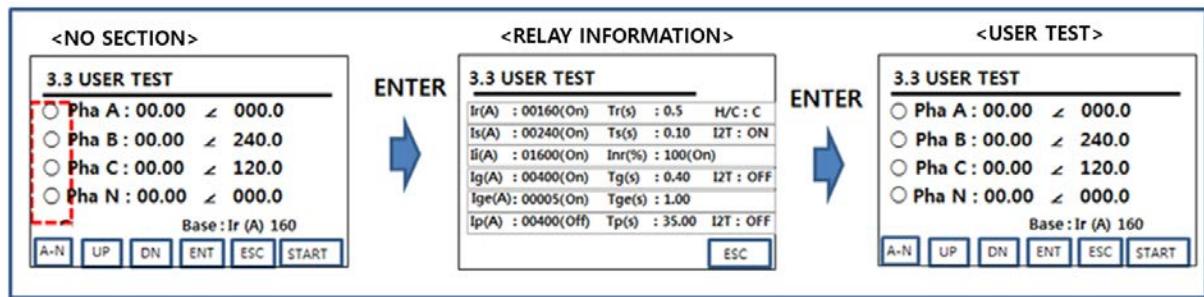
  If you want to check the information set on the device in the relay setting information window and then switch to the user relay test screen, press "ENTER" key to switch the screen.

3.2.1.2 Only one selection- Amplitude & Phase

User Relay Test When selecting one of "A to N" in <3.3 USER TEST>, you can set output size and phase for that phase.
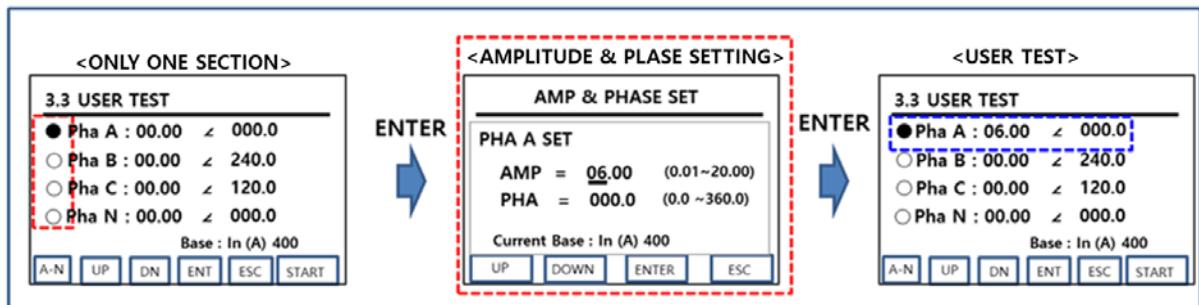

   Output and phase setting screen In <AMP & PHASE SET> using "ENTER" button, you can select the value to output by using "UP / DOWN" button and set the value by moving BAR. After setting the last phase, press "ENTER" button. Press to switch to the user test screen <3.3 USER TEST> screen.

- ✓ **AMP :   0.01 to 21.00 (MCCB : 0.01 ~ 17.00) in 0.01 unit**

- ✓ **PHA : 0.0 to 360.0 in 0.1 degree**

3.2.1.3 Multiple selection- Only Amplitude

User Relay Test In <3.3 USER TEST>, you can set the output size for the selected phases when multiple of "A to N" is selected.
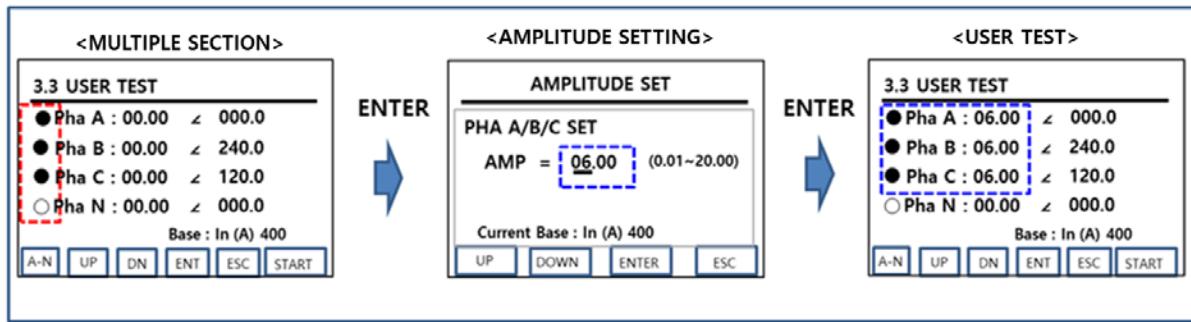
ex)The output value is set to 6 times by selecting the A, B, C phase using the "A ~ N" buttons. First, activate the A, B, C phase by using the "A ~ N" buttons in the user test screen <3.3 USER TEST> and press the "ENTER" button to switch to the screen to set the output amplitude. To set 6 times, set it to 06.00, move BAR to the second decimal place and press "ENTER" again to switch to user test screen.

✓   **AMP :   0.01 to 21.00 (MCCB : 0.01 ~ 17.00) in 0.01 unit**

3.2.3 Relay Test

The device test is a simple test method using the "H / T" button, which is the home & test switch button. The device test is performed by the user setting in the state of the relay element set in the <3.3 USER TEST> screen

**ex) In : 400A, Base Current: In, Amp: Phase A, B, C is 6.00**

.
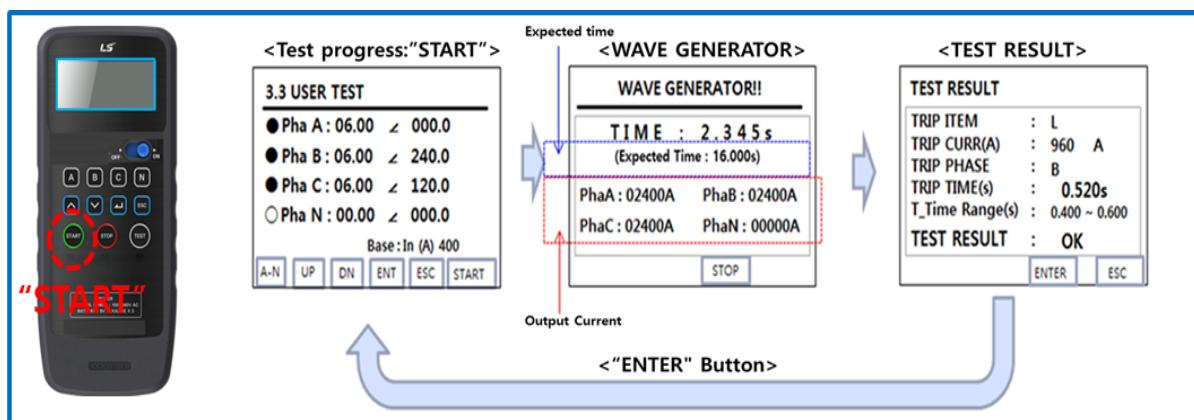
Figure 3-7: User Test

① Press the "START" button on the user test screen (3.3 USER TEST) to perform the relay test. The output waveform screen (WAVE GENERATOR !!) shows the running

time, estimated operation time and output current value

② The output current is indicated by the current(= set value * base current) (A). If the value is not displayed in the expected operation time, the current or relay setting that does not perform the relay operation is set to the "NOT USE" state and the relay is not operated.

③ If you want to stop the test, press the "STOP" button to stop the test immediately.

④ When TRIP occurs in the device, OCR TESTER displays the test result by switching the output value to the stop and test result screen (TEST RESULT).

⑤ Pressing the "**STOP**" button on the TEST RESULT screen will reset the instrument relay operation status. If you press the "**ENTER**" button, you can switch to the user test screen (3.3 USER TEST). Press "**ESC**" button to switch to the menu test list screen.

3.2.4 Relay Test Result

The test results show the type of TRIP generation, generated current, phase, operating time, minimum / maximum time of occurrence and test result.
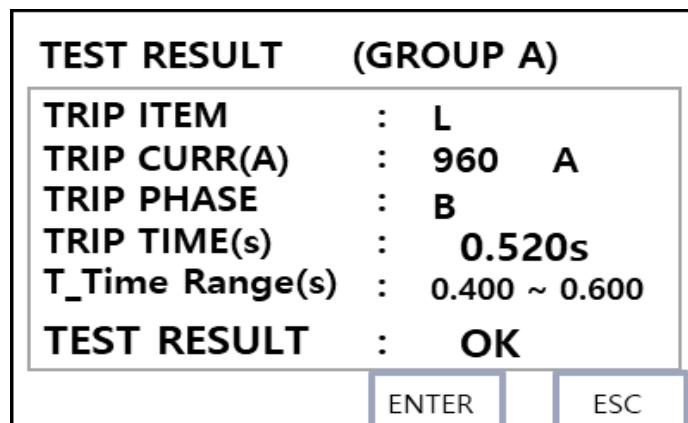
```
TEST RESULT     (GROUP A)
TRIP ITEM        :  L
TRIP CURR(A)     :  960    A
TRIP PHASE       :  B
TRIP TIME(s)     :    0.520s
T_Time Range(s)  :  0.400 ~ 0.600
TEST  RESULT     :    OK
                           ENTER        ESC
```

✓ TRIP ITEM : Long time(L), Short time(S1), Short time(S2), Instantaneous Time(I), inner Ground(G), Neutral Long time(LN), PTA

✓ TRIP CURR(A) : The largest value among the A to N phase currents applied in the test with trip current

    ✓ TRIP PHASE : A, B, C, N in trip phase, G represents Ground trip

    ✓ TRIP TIME(s): Relay operation time

    ✓ T_Time Range(s) :   Trip time range of relay

    ✓ TEST RESULT : "**OK**" is displayed during the relay operation within the relay operation time range (T_Time Range). If the relay operation time range is exceeded, "**FAIL**" is displayed. Also, after waiting 10 seconds after the maximum operation time, Even if there is no operation, "FAIL" is displayed.

Pressing the "**STOP**" key on the <TEST RESULT> screen performs the function of resetting the fault status of the relay equipment like the 4.CONTROL / 4.1 DATA CLEAR / 4.1.1 FAULT function.

* The test results are stored in the memory of the OCR TESTER and can be reported to the test result in PDF using the PC Manager software.

4. Using OCR TESTER

This section shows what the device and OCR TESTER are connected to in the <MAIN MEN> screen in the previous section.

4.1 Calibration-0.CALIBRATION

Calibration function (0.CALIBRATION) is common to NEW ACB, SMART MCCB and existing ACB, and if calibration is performed by OCR TESTER calibration function, it corrects the generated error by using the output value set in the tester and the measuring current of the device,

    ⑥ In the calibration screen (0.AUTO CALIBRATION) screen, it takes approximately 20 seconds to complete the calibration using the "ENTER" key. "COMPLETE" is displayed on success and "FAIL" on the display.

    ⑦ If the calibration is successful, the calibration correction factor is updated in the OCR TESTER. If it fails, the saved coefficient is used.

    ⑧ Calibration value will be changed to DEFAULT value which is held by the first tester when power is turned OFF and then ON again.
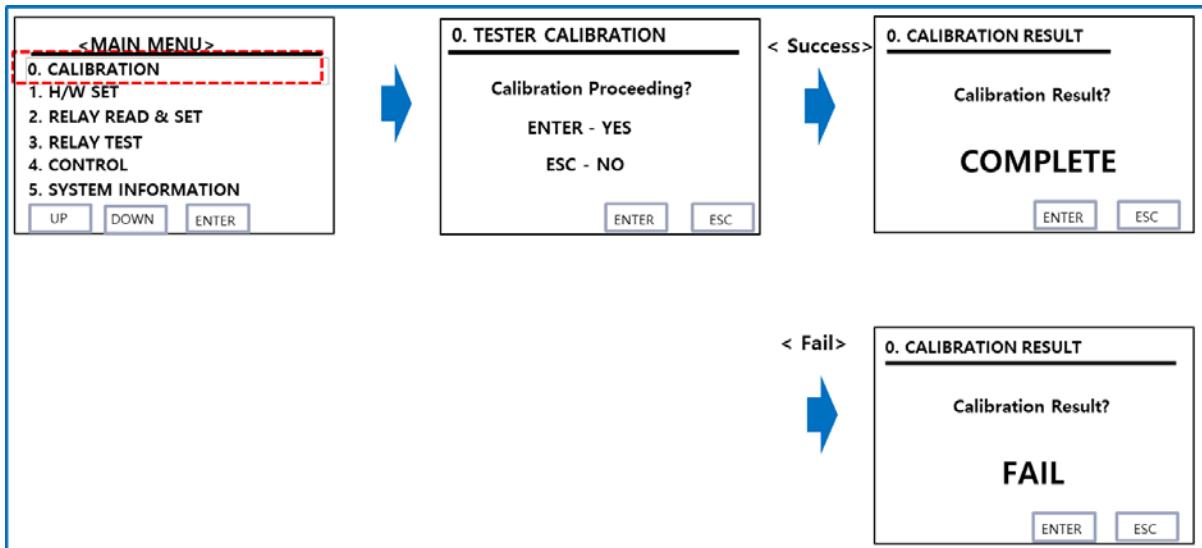
**Figure 4-1: TESTER Calibration**

4.2 Hardware setting-1.H/W SET

<1.H / W SET> function provides the function to read and set the system configuration information of the device.

(1) NEW ACB
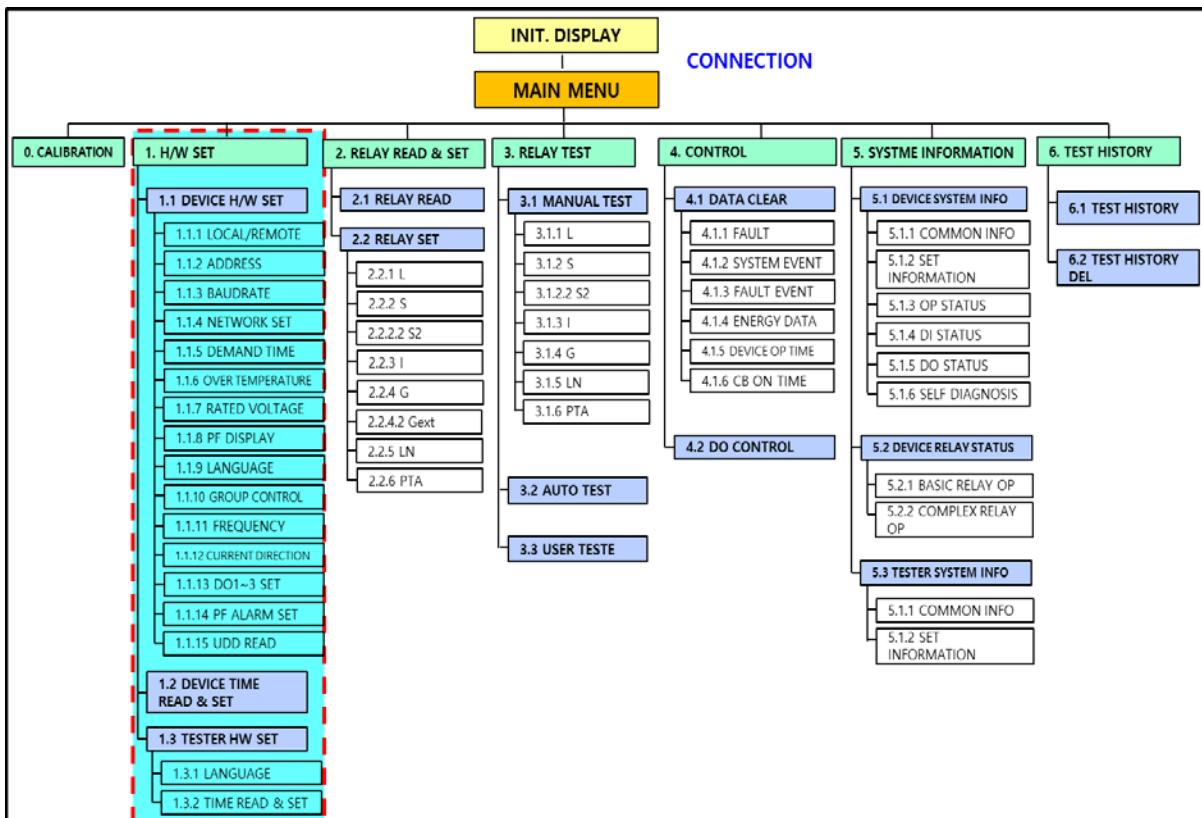
(2) SMART MCCB
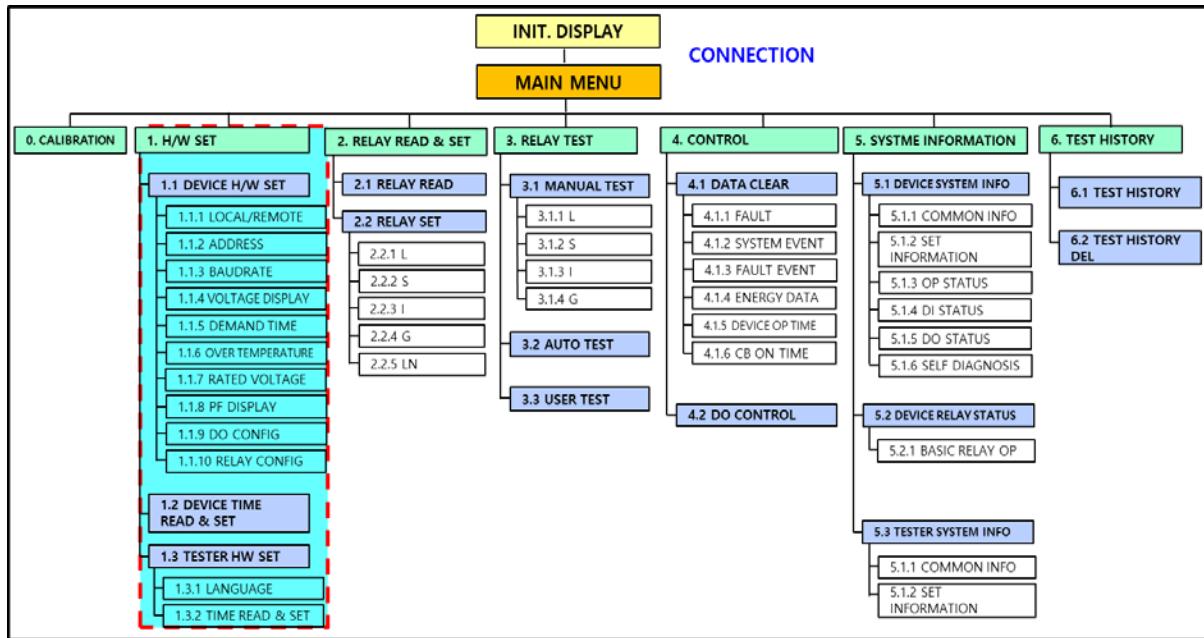
(3) Existing ACB
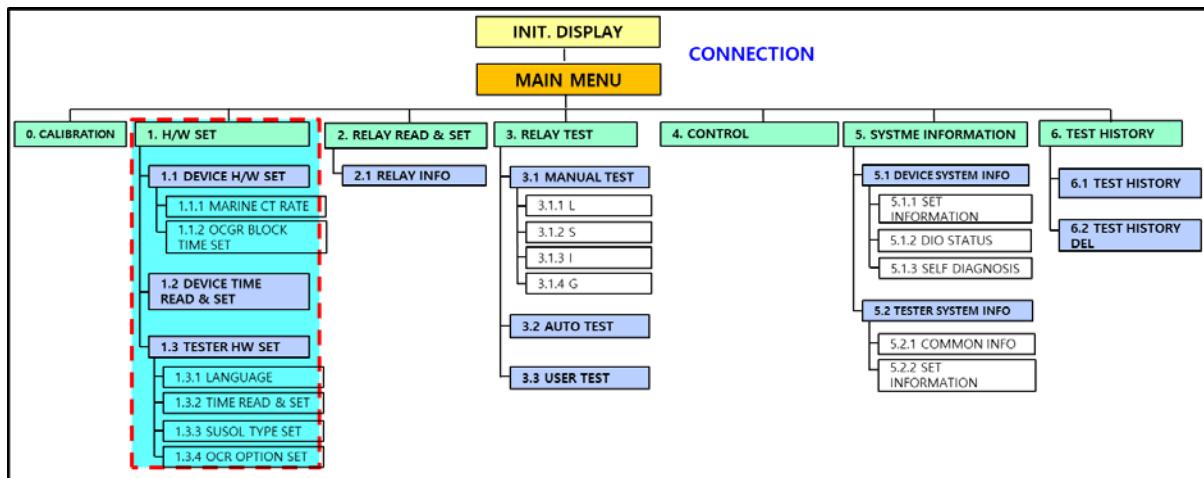
4.2.1 Device Hardware set

<1.1 DEVICE H/W SET> function provides the function to read and set the system configuration information of the device.

4.2.1.1   Hardware set-NEW ACB

(1) LOCAL/REMOTE

Set the Local / Remote function of the device

- Local Mode : You can set Local but remote cannot set using 485 communication

－   Remote Mode : You cannot set local but can set remote using 485 communication

However, OCR TESTER can be set regardless of Local / Remote mode.
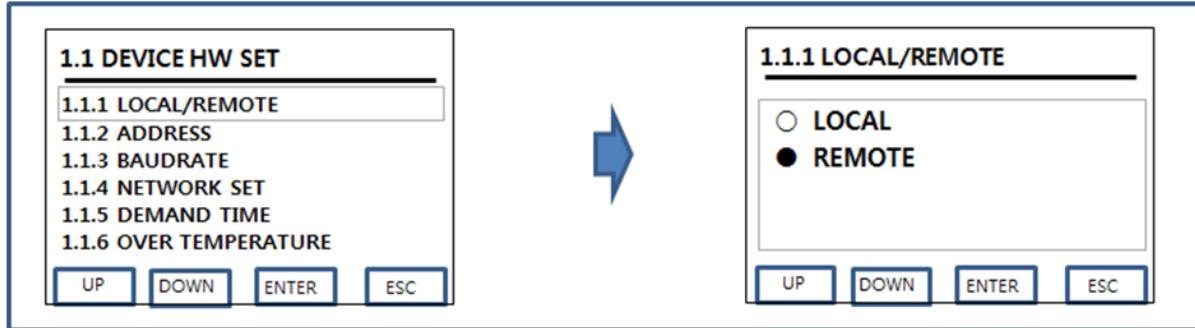
(2) Address

The device's station number can be set from 1 to 247 using "UP / DOWN" key and "ENTER".
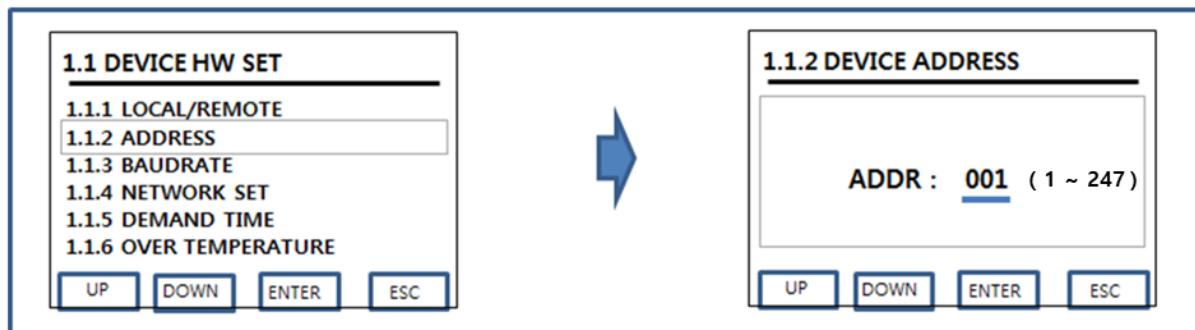

(3) Baud-rate

You can set 485 baud rate of the device (9600, 19200,38400, 57600 bps).
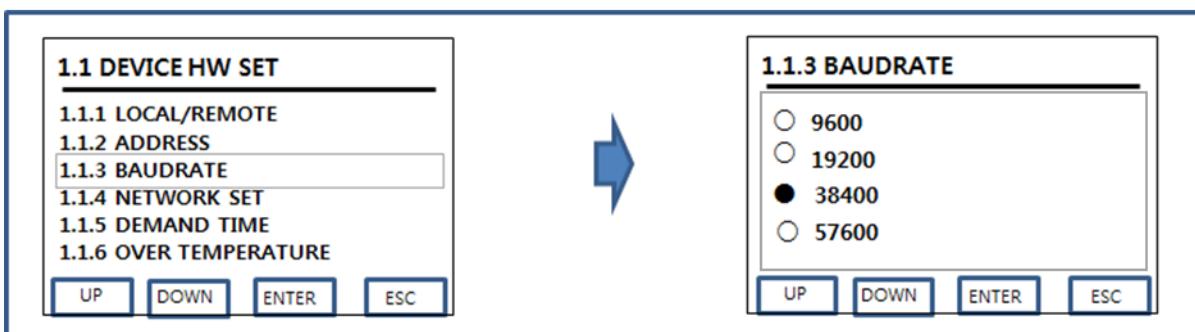

(4) Network

The network of the device can set the wiring status (Y-connection or Delta connection). However, Y-connection and Delta connection can be selected only when the network

setting is 4P. In other cases, it is only possible to read the setting status.
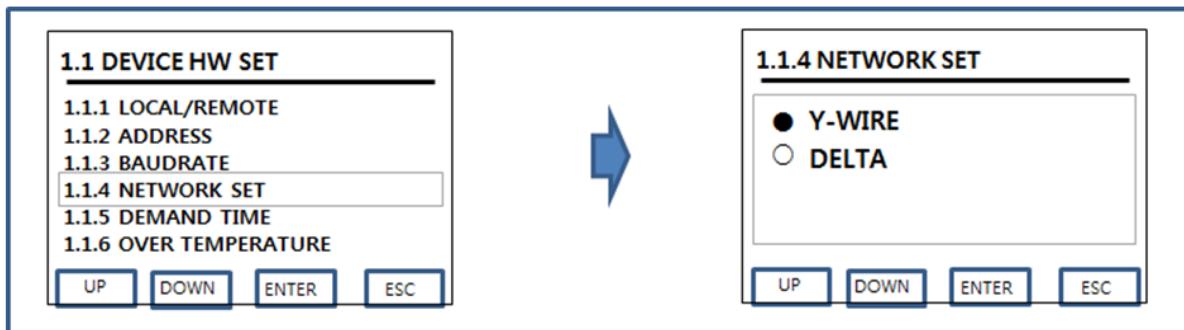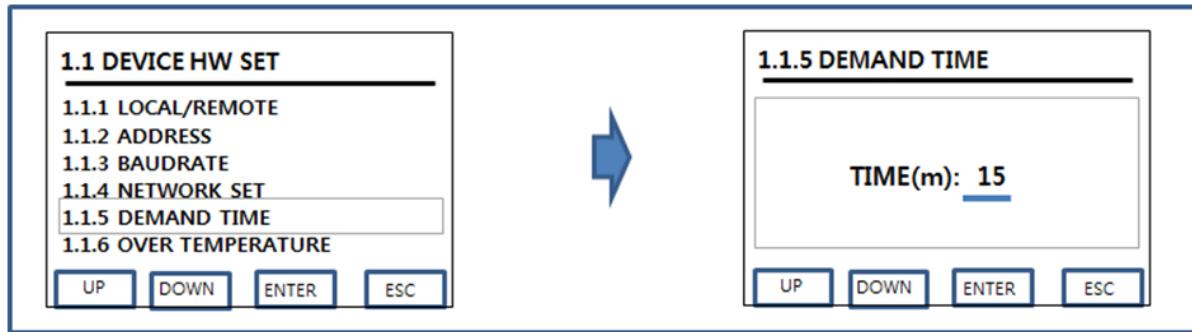
1.1 DEVICE HW SET				1.1.4 NETWORK SET

1.1.1 LOCAL/REMOTE
1.1.2 ADDRESS
1.1.3 BAUDRATE
1.1.4 NETWORK SET
1.1.5 DEMAND TIME
1.1.6 OVER TEMPERATURE

● Y-WIRE
○ DELTA

UP | DOWN | ENTER | ESC

UP | DOWN | ENTER | ESC

(5) Demand time

Set the demand time of the equipment (5, 10, 15, 20, 30, 60 minutes).

1.1 DEVICE HW SET

1.1.1 LOCAL/REMOTE
1.1.2 ADDRESS
1.1.3 BAUDRATE
1.1.4 NETWORK SET
1.1.5 DEMAND TIME
1.1.6 OVER TEMPERATURE

UP | DOWN | ENTER | ESC

1.1.5 DEMAND TIME

TIME(m): 15

UP | DOWN | ENTER | ESC

(6) Over temperature TRIP mode

You can set ((TRIP or No Trip) for the operation when the over temperature is generated.

1.1 DEVICE HW SET

1.1.1 LOCAL/REMOTE
1.1.2 ADDRESS
1.1.3 BAUDRATE
1.1.4 NETWORK SET
1.1.5 DEMAND TIME
1.1.6 OVER TEMPERATURE

UP | DOWN | ENTER | ESC

1.1.6 OVER TEMPERATURE

● NO TRIP
○ TRIP

UP | DOWN | ENTER | ESC
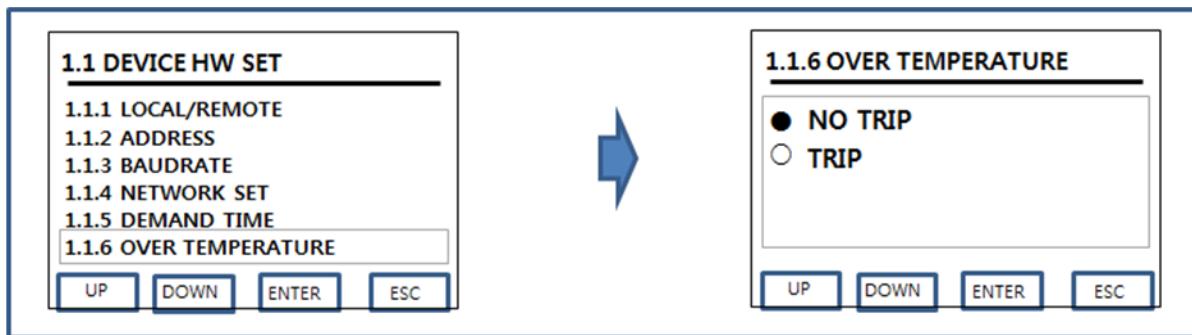
(7) Rated voltage

Set the rated voltage of the device (100 ~ 1000V: line-to-line voltage reference).

However, only NEW ACB P, S type can be set.
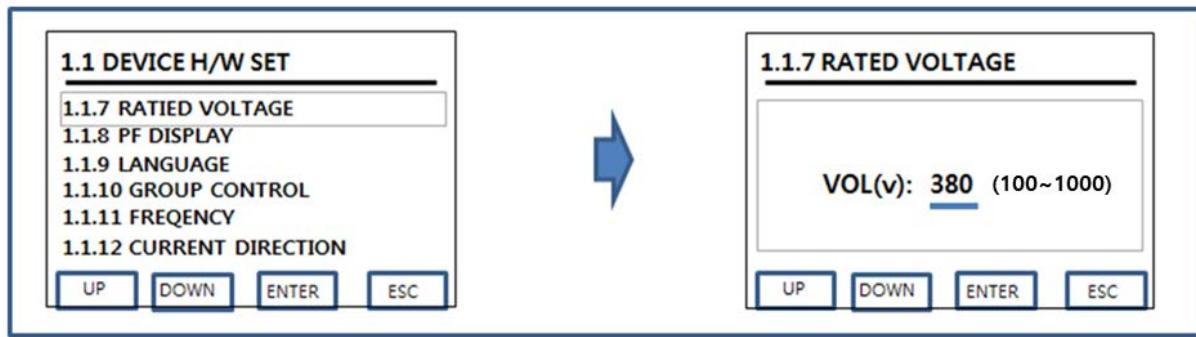
(8) PF Display

Set power factor indication (LS, IEC, IEEE) of the device.
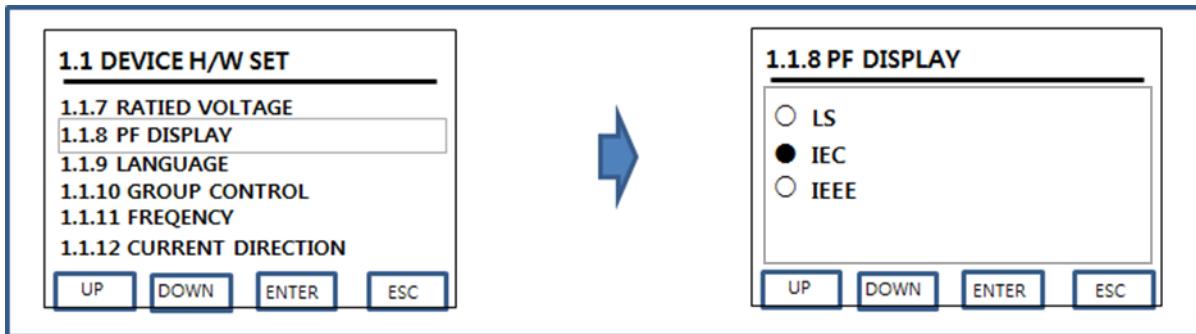
(9) Device display language

Set the language (English, Chinese, Russian) to be displayed on the HMI of the machine. However, language selection only supports New ACB P or S type.

- NEW ACB N or A type : English(Fixed)

- NEW ACB P or S type : English / Chinese/ Russian
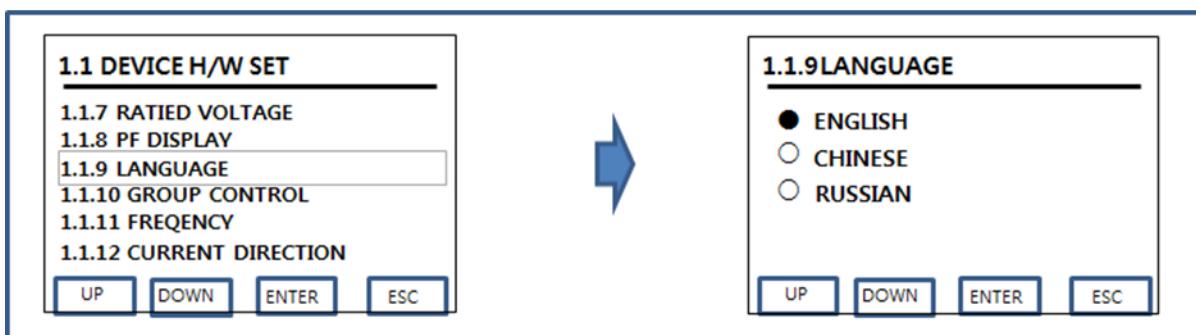
(10) Group mode

Set the NEW ACB relay operation group (A or B group) of the unit.

- NEW ACB N, A, P type : Group A(Fixed)

- NEW ACB S type : Group A or B

1.1 DEVICE H/W SET

1.1.7 RATIED VOLTAGE
1.1.8 PF DISPLAY
1.1.9 LANGUAGE
1.1.10 GROUP CONTROL
1.1.11 FREQENCY
1.1.12 CURRENT DIRECTION

| UP | DOWN | ENTER | ESC |

1.1.8 PF DISPLAY

● GROUP A
○ GROUP B

| UP | DOWN | ENTER | ESC |
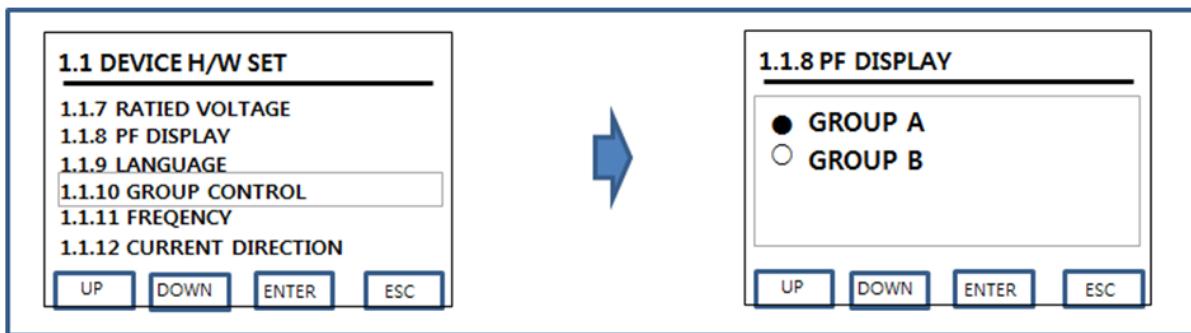
(11) Frequency

Set the operating frequency of the unit (50 / 60Hz).

1.1 DEVICE H/W SET

1.1.7 RATIED VOLTAGE
1.1.8 PF DISPLAY
1.1.9 LANGUAGE
1.1.10 GROUP CONTROL
1.1.11 FREQENCY
1.1.12 CURRENT DIRECTION

| UP | DOWN | ENTER | ESC |

1.1.11 FREQUENCY

○ 50Hz
● 60Hz

| UP | DOWN | ENTER | ESC |
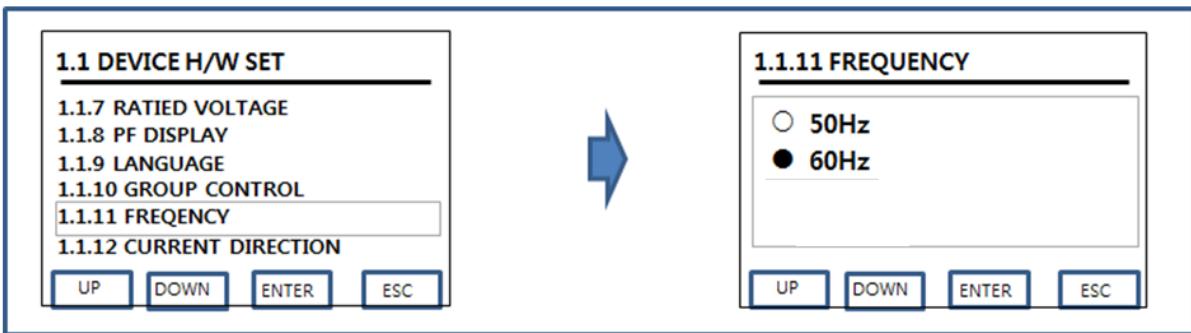
(12) Current direction

Set the current direction of the device (forward / reverse direction).

1.1 DEVICE H/W SET

1.1.7 RATIED VOLTAGE
1.1.8 PF DISPLAY
1.1.9 LANGUAGE
1.1.10 GROUP CONTROL
1.1.11 FREQENCY
1.1.12 CURRENT DIRECTION

| UP | DOWN | ENTER | ESC |

1.1.12 CURRENT DIRECTION

● Forward
○ Reverse

| UP | DOWN | ENTER | ESC |
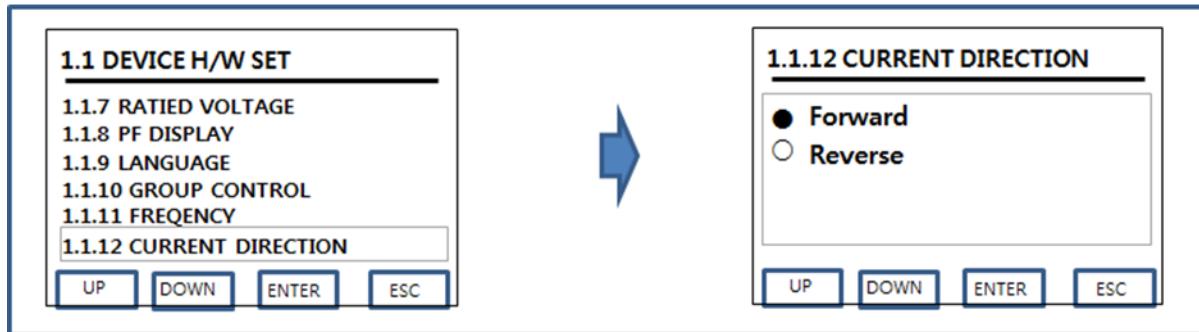
(13) DO Set

Set the use of DO1 ~ DO3 (RELAY, CB CLOSE, CB OPEN) mode. However, the DO setting can be set when the SMPS / Comm. selection mode of NEW ACB is set to SMPS / DO or SMPS / DO + communication function. RELAY can be set to DO1 ~ DO3, but only one of DO1 ~ DO3 can be set for CB CLOSE and CB OPEN. For example, when DO1 is set to CB CLOSE, DO2 and DO3 must set the CB OPEN or RELAY function.

- RELAY : RELAY operation in DO operation

- CB CLOSE : CB CLOSE action in DO operation

- CB OPEN : CB OPEN action in DO operation
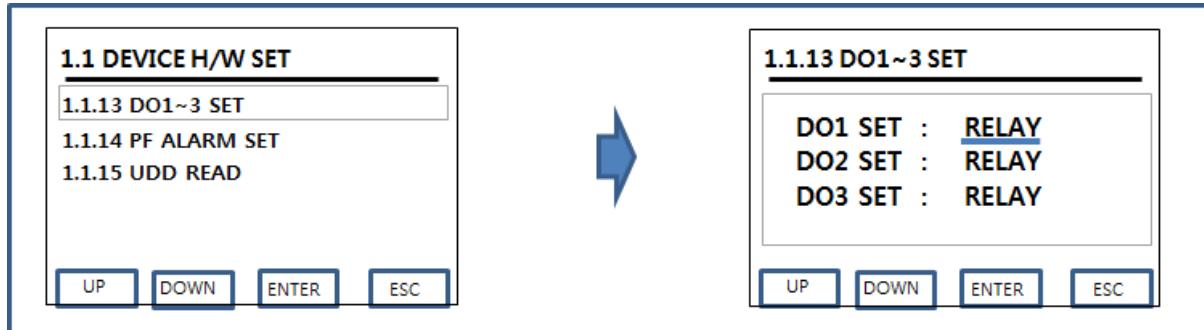
**(14) PF Alarm**

Set the device's power factor alarm.

- Under PF(%) : 10 ~ 90%

- Over PF(%) :   60 ~ 100%

However, the under power factor alarm setting value should be less than the over power factor alarm setting value.
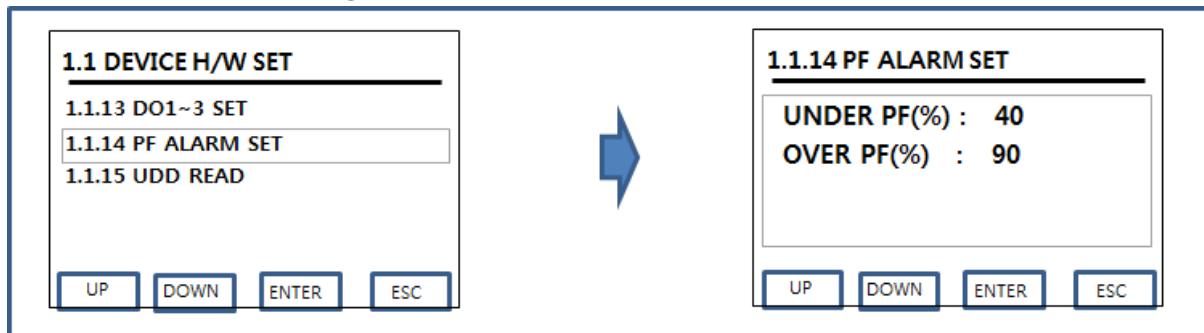
(15) UDD read

The UDD is a function used by the OCR HMI (see ACB memory map for details).
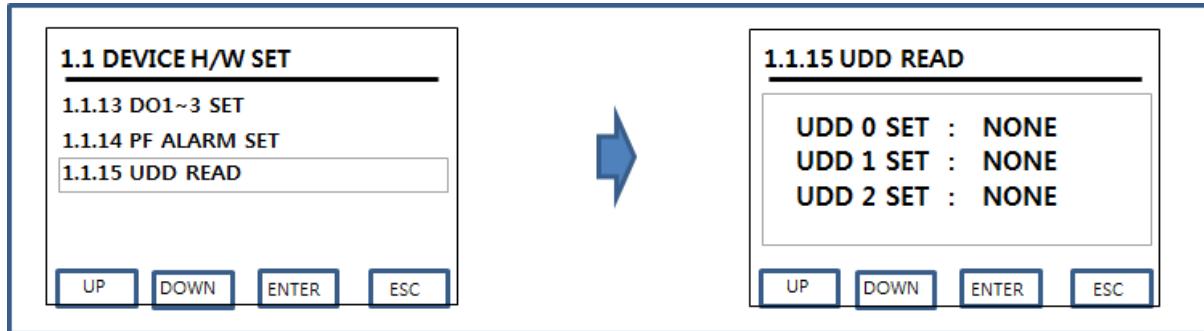
4.2.1.2   Hardware set-SMART MCCB

(1) LOCAL/REMOTE

Set the Local / Remote function of the device

- Local Mode : You can set Local but remote cannot set using 485 communication

- Remote Mode : You cannot set local but can set remote using 485 communication

However, OCR TESTER can be set regardless of Local / Remote mode.
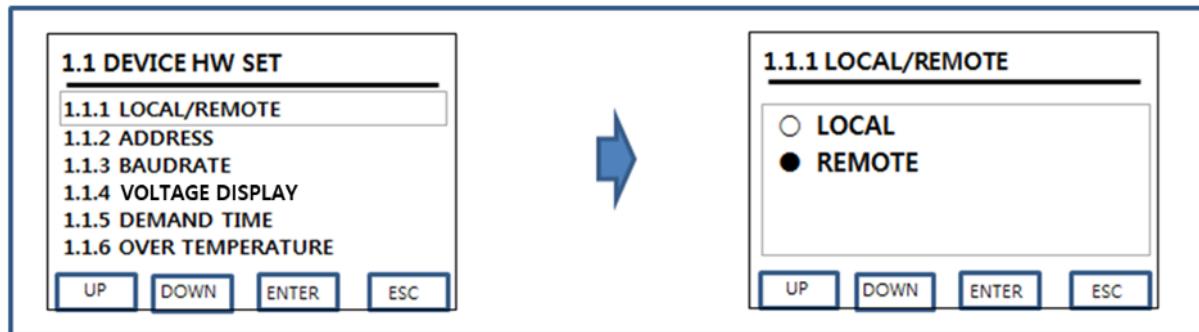
(2) Address

The device's station number can be set from 1 to 247 using "UP / DOWN" key and "ENTER".
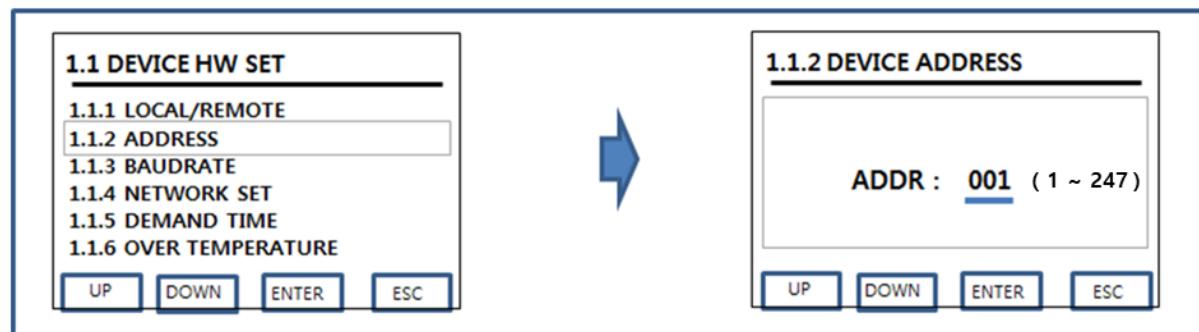

(3) Baud-rate

You can set 485 baud rate of the device (9600, 19200, 38400 bps).
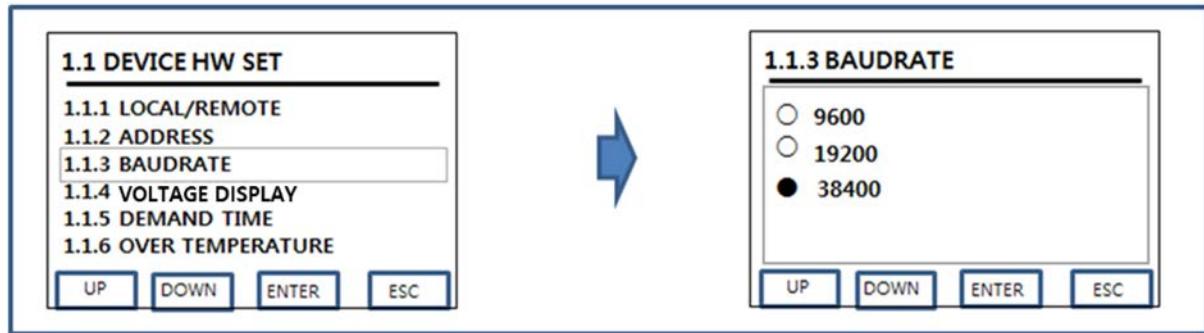
**(4) Reference voltage display**

SMART MCCB supports voltage display setting, and can change the setting of voltage to phase voltage indication (Vpn) or line voltage indication (Vpp).
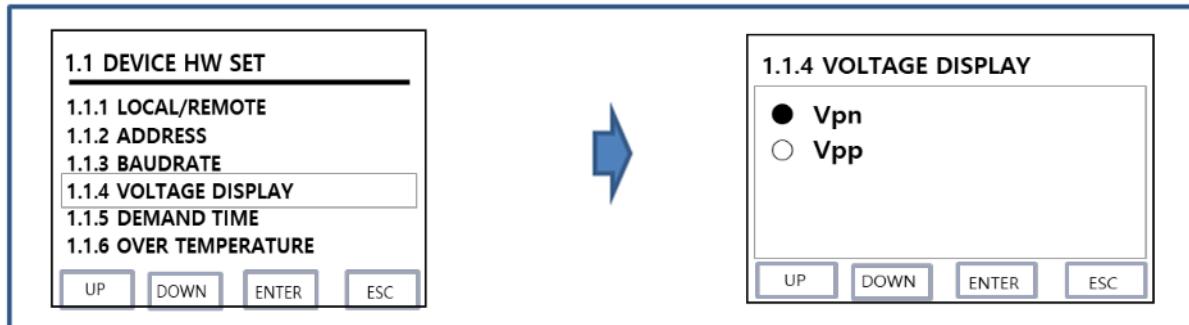
(5) Demand time

Set the demand time of the equipment (5, 10, 15, 20, 30, 60 minutes).

(6) Over temperature TRIP mode

You can set ((TRIP or No Trip) for the operation when the over temperature is generated.
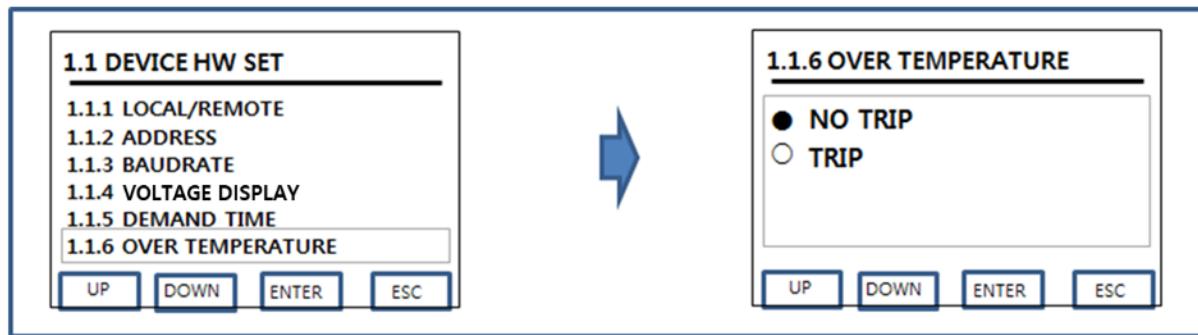
(7) Rated voltage

Set the rated voltage of the device (100 ~ 1000V: line-to-line voltage reference).
However, only SMART MCCB H, L type can be set.
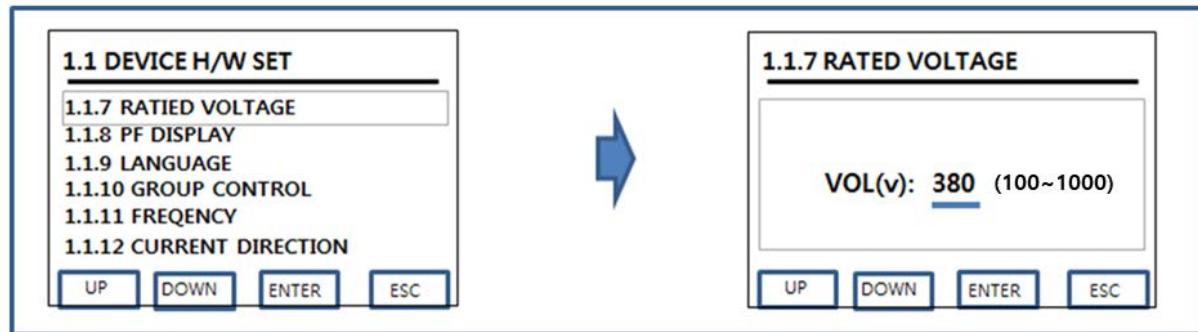
(8) PF Display

Set power factor indication (LS, IEC, IEEE) of the device.
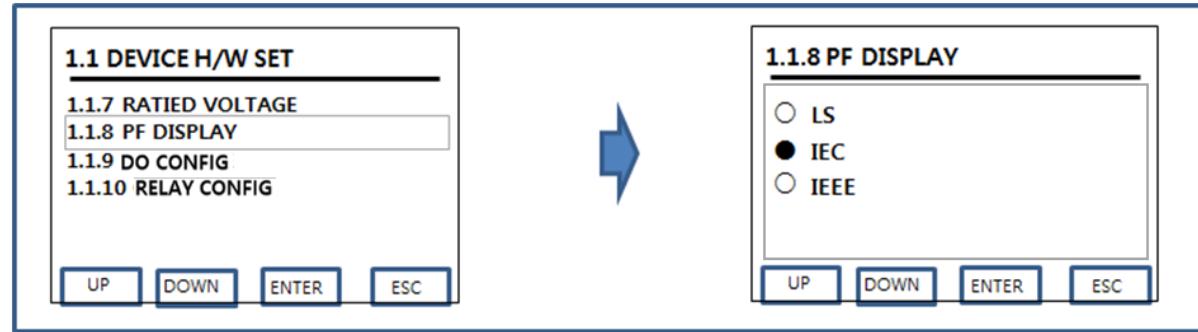
(9) DO set

The DO CONFIG section is the function to set the DO function

- RELAY OP : Relay operation function

- CB CONTROL : CB Control function
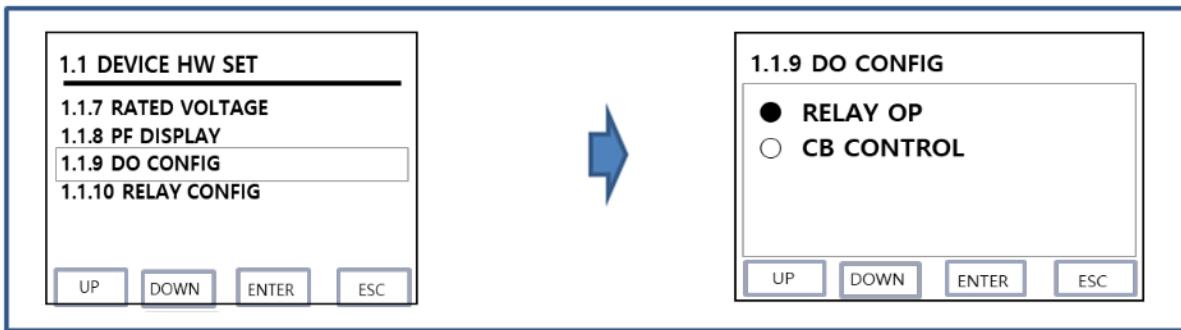
(10) Relay function

Set DO output DO1 and DO2 for long time (L), short time (S), instantaneous (I), and ground (G) relay operation.

- DO1:L   DO2:S/I   or DO1:L   DO2:G or DO1:L/G   DO2:S/I/G

4.2.1.3   Hardware set-Existing ABC

Existing ACB does not provide hardware configuration function.

4.2.2   Read and Set time of device

You can check the time of the device and reset the set time (Year / Month / Day / Hour / Minute / Sec).
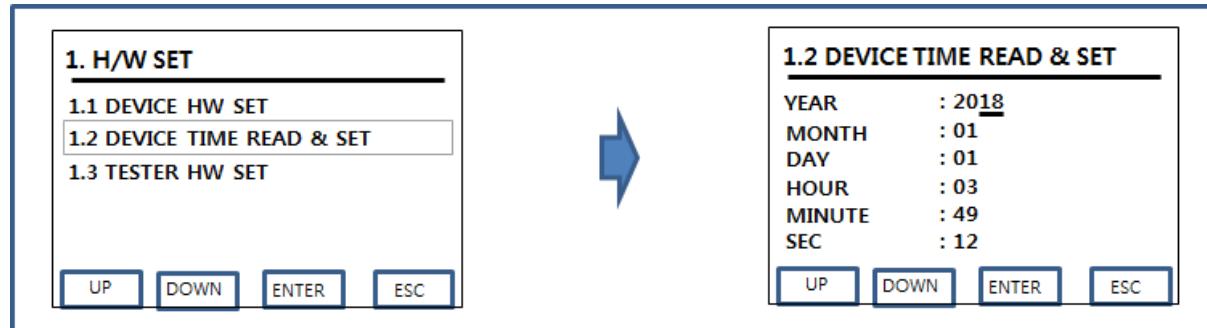
Example) If you want to set the machine time to 14:41:20 on March 15, 2019

If you press the "ENTER" key after setting it to 19 years to set the YEAR first, if you set the time of the device when you press the "ENTER" key, it moves to the next tab. Likewise, if you enter "ENTER" after setting the month / day / hour / minute / second to the same as the year setting, you can set the time of the device.
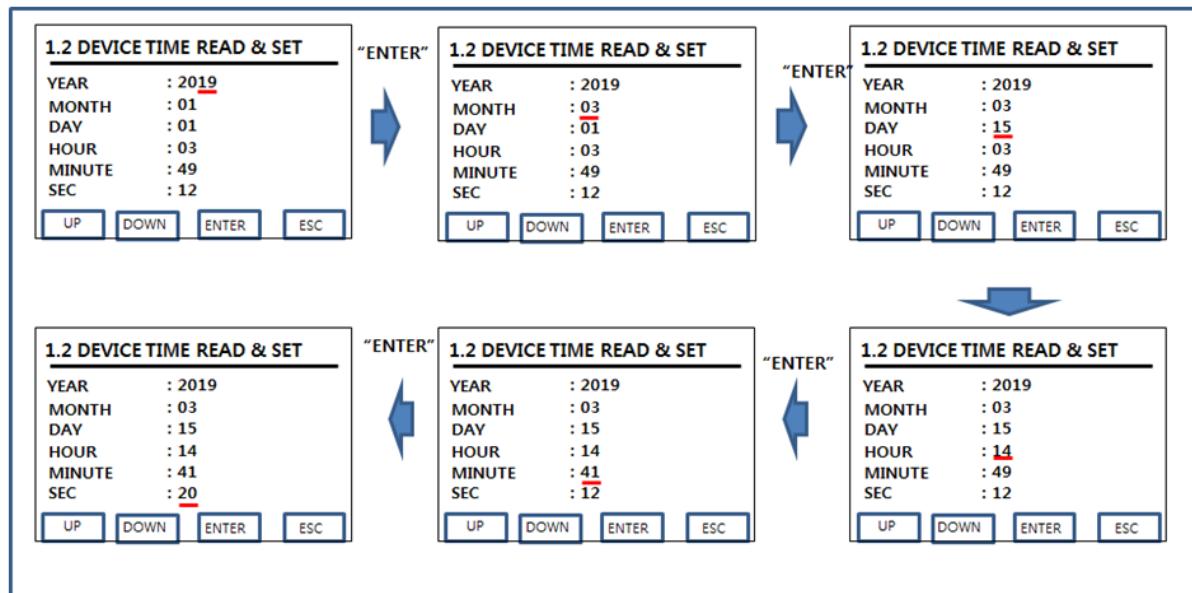
If you want to check the set time again, move to all menu by using "ESC" key, and then enter the device time reading and setting menu.
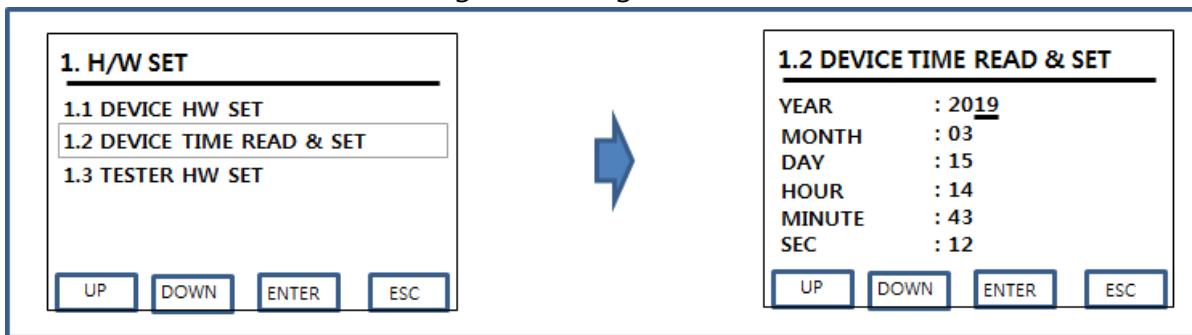
4.2.3 TESTER Hardware set

<1.3 TESTER H/W SET> function provides the function to set the language and time displayed in OCR TESTER.

(1) TESTER Language set

<1.3.1 LANGUAGE> section supports the language (English / Chinese / Russian) to be displayed in OCR TESTER.
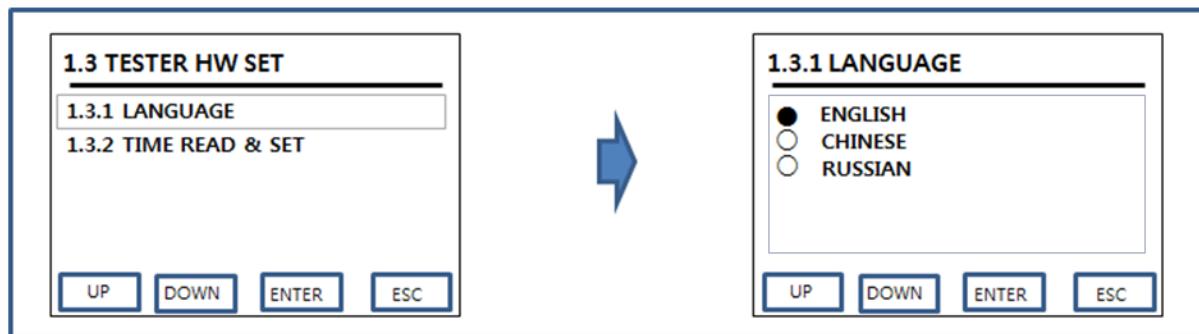
Set the language (English / Chinese / Russian) to be displayed in OCR TESTER.

(2) **TIME READ & SET**

You can check the time of OCR TESTER and reset the set time (Year / Month / Day / Hour / Minute / Sec).
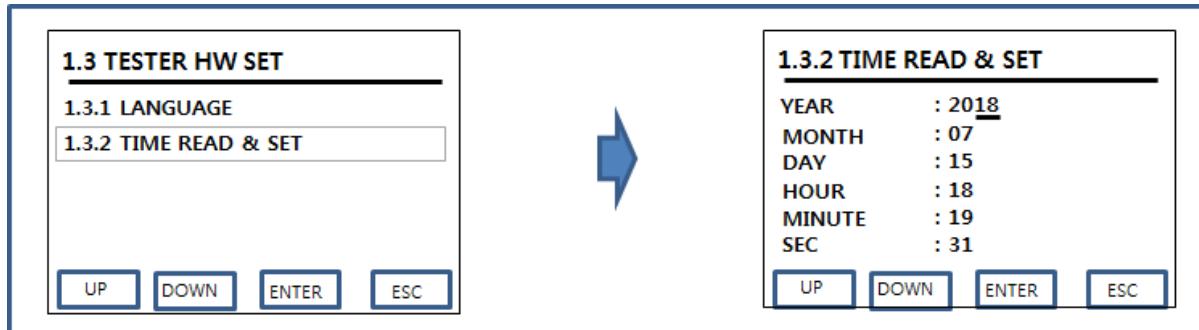
**Example) If you want to set the time of OCR TESTER to 09:30:25 on May 30, 2019**

If you press the "ENTER" key after setting it to 19 years to set the YEAR first by using "UP / DOWN" key as same as the time setting of the device, you can set the time of the device when you press "ENTER" Then, it moves to the next tab. Likewise, set the month / day / hour / minute / second in the same way as the year setting, and enter "ENTER" to set the OCR TESTER time.
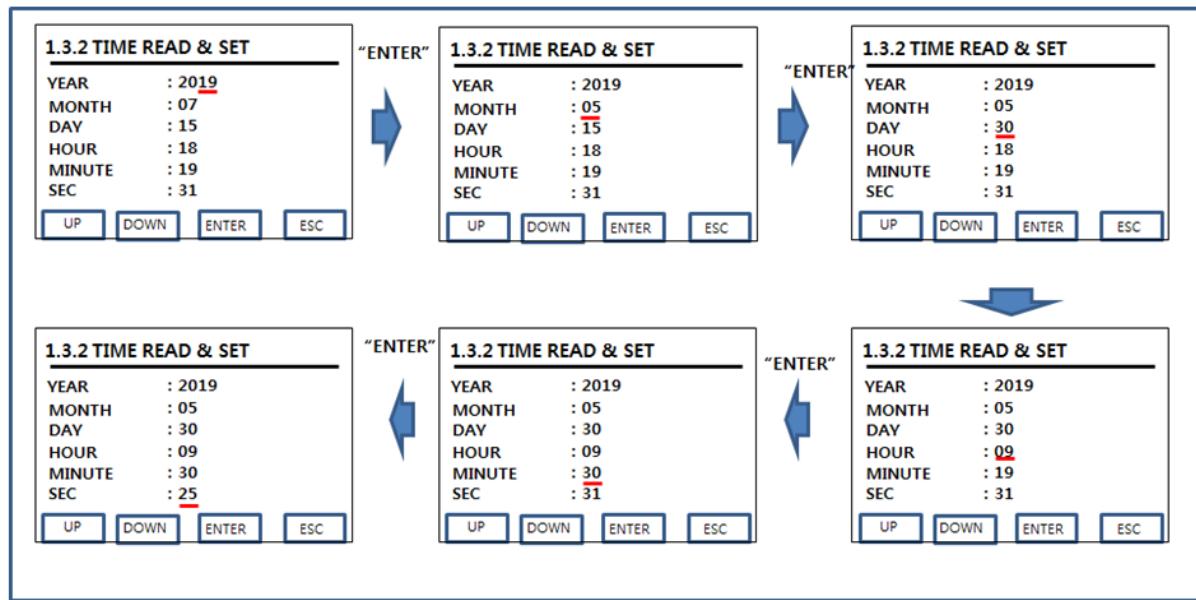
If you want to check the set time of OCR TESTER, move to all menu by using "ESC" key and enter the setup menu, and the time set on the device will be displayed.
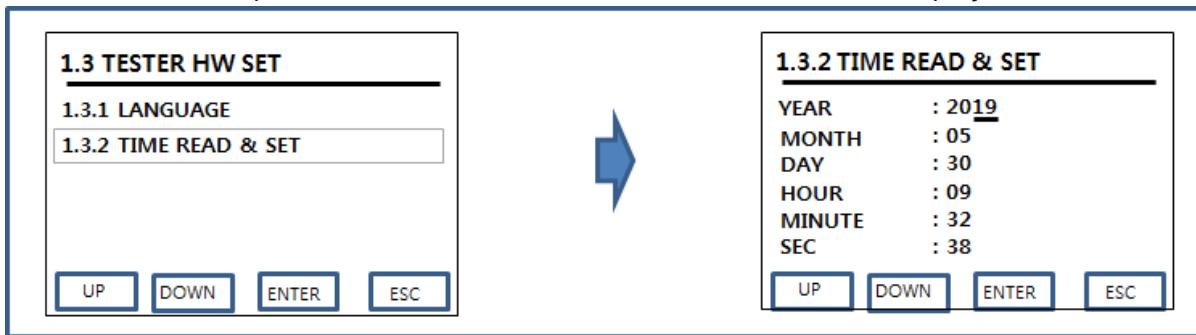
However, if the power is turned off, set time is set to the default time set in OCR TESTER.

(3) Existing ACB only

A) SUSOL TYPE SET

Existing Susol Type (1.3.3 SUSOL TYPE SET) can be used for Normal and Hynix. Default value is Normal, so if Existing Susol Type is used for Hynix, it can be set for Hynix before use.

B) OCR OPTION SET

The OCR option (1.3.3 OCR OPTION SET) can be selected for UL and IEC.

4.3 Relay set-2. RELAY READ & SET

(1) NEW ACB
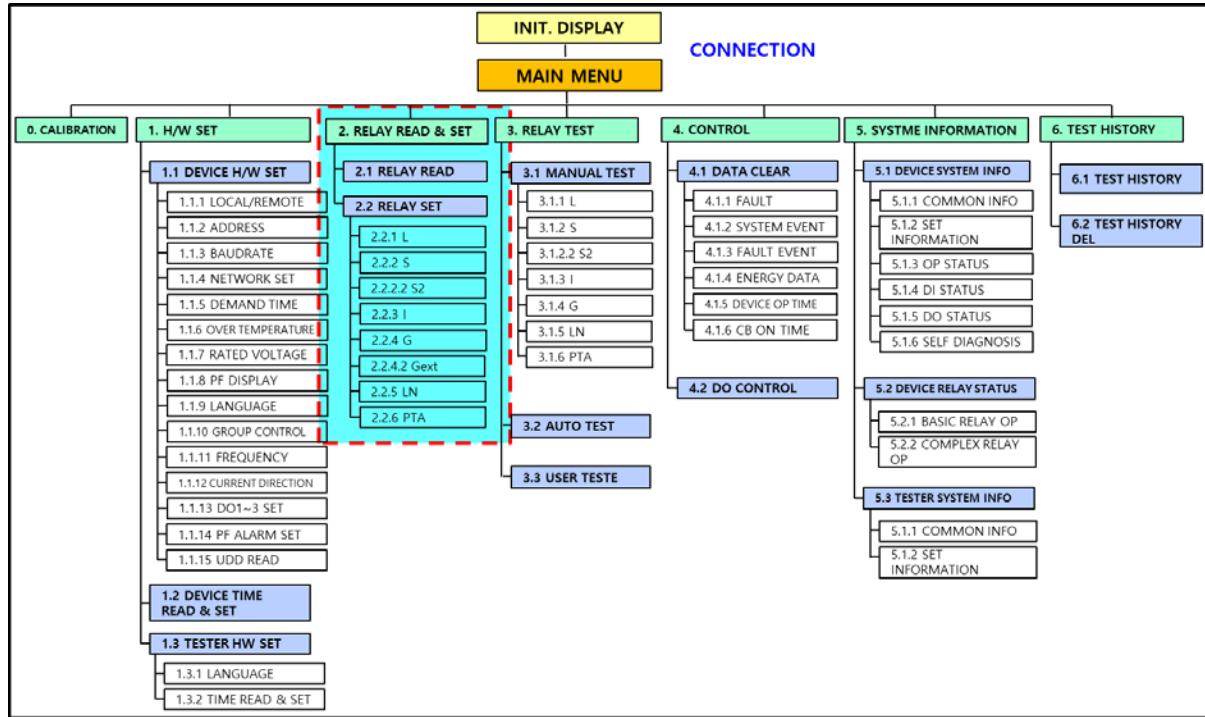
(2) SMART MCCB
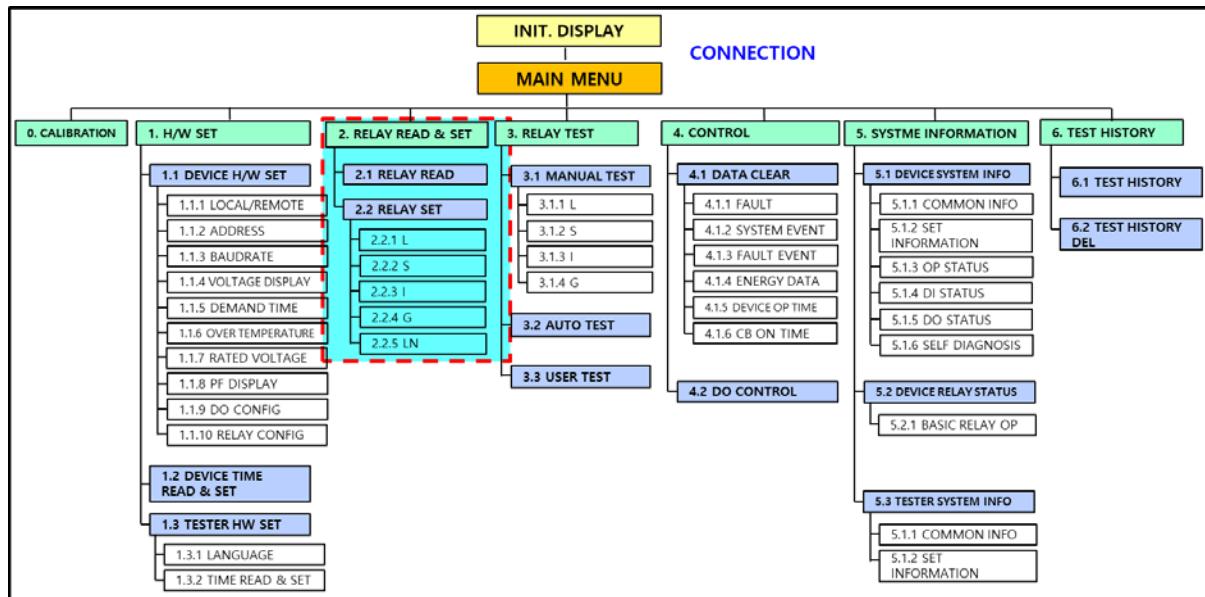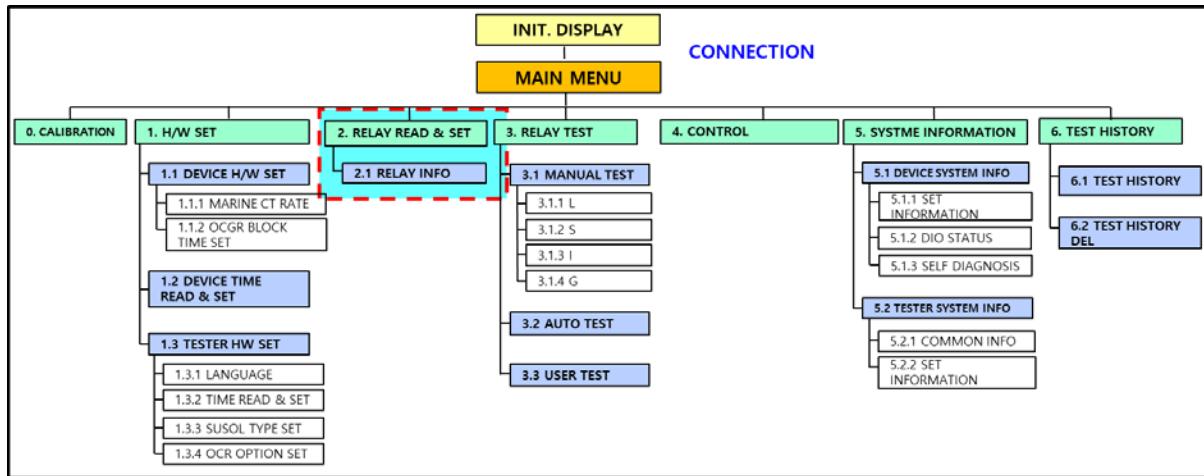
(3) Existing ACB

4.3.1 Overall Relay Read

The <2.1 RELAY READ> function provides a function to view the main information on the screen of the current relay setting of the device. However, the existing ACB does not provide the relay setting (2.2 RELAY SET).

4.3.1.1 Relay Read-NEW ACB

The <2.1 RELAY READ> function provides a function to view the main information on the screen of the current relay setting of the device.
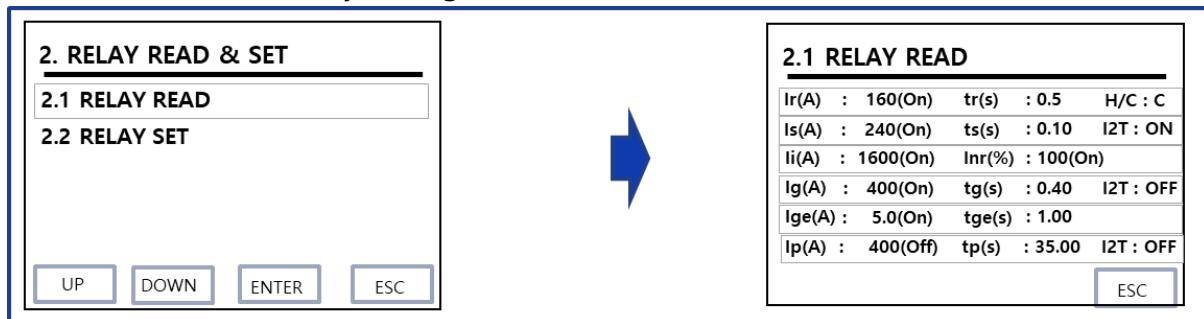
① Long time overcurrent relay element: Pick-Up value(Ir), Use or Not(On/Off), Time Delay(tr), Hot/Cold(H/C)

② Short time overcurrent relay element: Pick-Up value (Is), Use or Not (On/Off), Time Delay(ts), I2T(On/Off)

③ Instantaneous overcurrent relay element: Pick-Up value (Ii), Use or Not (On/Off)

④ Ground fault relay element: Pick-Up value (Ig), Use or Not (On/Off), Time Delay(tg), I2T (On/Off)

⑤ External ground fault relay element: Pick-Up value (Ige), Use or Not (On/Off), Time Delay(tge)

⑥ PTA relay element : Pick-Up value (Ip), Use or Not (On/Off), Time Delay(tp), I2T (On/Off)

⑦ Phase N long time overcurrent relay element: Pick-Up value (Inr)

4.3.1.2 Relay Read-SMART MCCB

2. RELAY READ & SET
2.1 RELAY READ
2.2 RELAY SET

| UP | DOWN | ENTER | ESC |

2.1 RELAY READ				
Ir(A) : 160(On)	tr(s)	: 16.0		
Is(A) : 240(On)	ts(s)	: 0.10	I2T : ON	
Ii(A) : 1600(On)				
Ig(A) : 160(On)	tg(s)	: 0.40	I2T : OFF	
Inr(%) : 0(Off)	tge(s)	: 1.00		
ZSI : OFF	In(A))	: 160		ESC
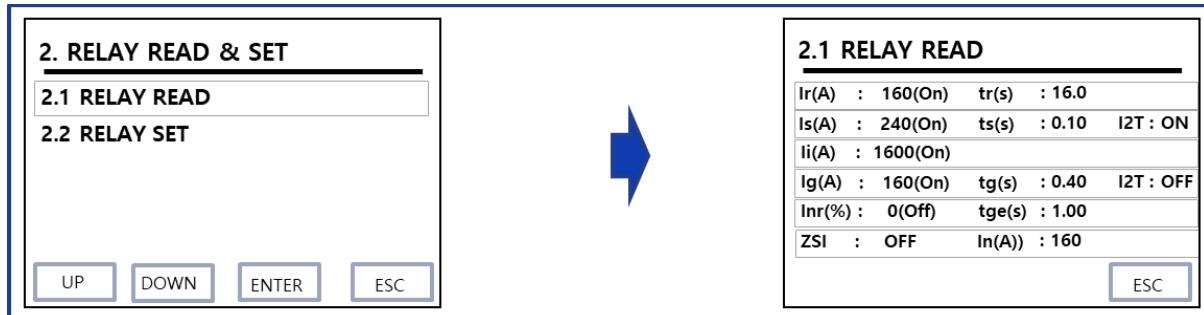
① Long time overcurrent relay element: Pick-Up value (Ir), Use or Not (On/Off), Time Delay(tr) 표시

② Short time overcurrent relay element: Pick-Up value (Is), Use or Not (On/Off), Time Delay(ts), I2T (On/Off)

③ Instantaneous overcurrent relay element: Pick-Up value (Ii), Use or Not (On/Off)

④ Ground fault relay element: Pick-Up value (Ig), Use or Not (On/Off), Time Delay(tg), I2T (On/Off)

⑤ ZSI and rated current(In)

4.3.1.3 Relay Read-Existing ACB

2. RELAY INFO				
Ir(A) : 160(On)	tr(s)	: 16.0		
Is(A) : 240(On)	ts(s)	: 0.10	I2T : ON	
Ii(A) : 1600(On)				
Ig(A) : 160(On)	tg(s)	: 0.40	I2T : OFF	
In(A) : 400				
Ver Info : 4.04				ESC
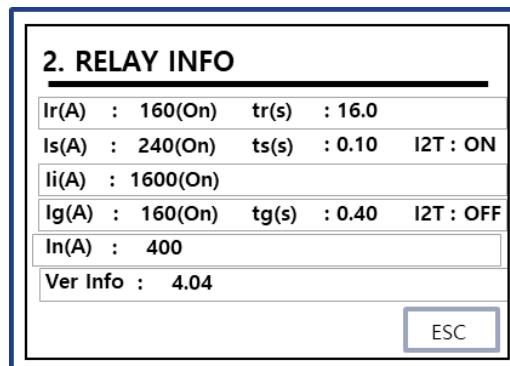
① Long time overcurrent relay element: Pick-Up value (Ir), Use or Not (On/Off), Time Delay(tr)

② Short time overcurrent relay element: Pick-Up value (Is), Use or Not (On/Off), Time Delay(ts), I2T (On/Off)

③ Instantaneous overcurrent relay element: Pick-Up value (Ii), Use or Not (On/Off)

④ Ground fault relay element: Pick-Up value (Ig), Use or Not (On/Off), Time Delay(tg), I2T (On/Off)

⑥ Rated current (In) and software version

4.3.2   Relay Set

The <2.2 RELAY SET> function provides the function to set the current relay element of the device. The relay setting function is to set the relay element (L, LN), short time (S1, S2), instantaneous (I), ground fault (G, Gext) and PTA relay element for ACB. S2) Relay element is supported only when it is S-type. In the case of the MCCB, it provides the function to set the relay elements (L, LN), short time (S), instantaneous (I) and ground (G) relay elements. However, existing ACB does not provide relay setting function.

4.3.2.1   Relay Set-NEW ACB

(1) Long time overcurrent relay element (L)

Set the overcurrent relay element when the device is in a long time. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed.
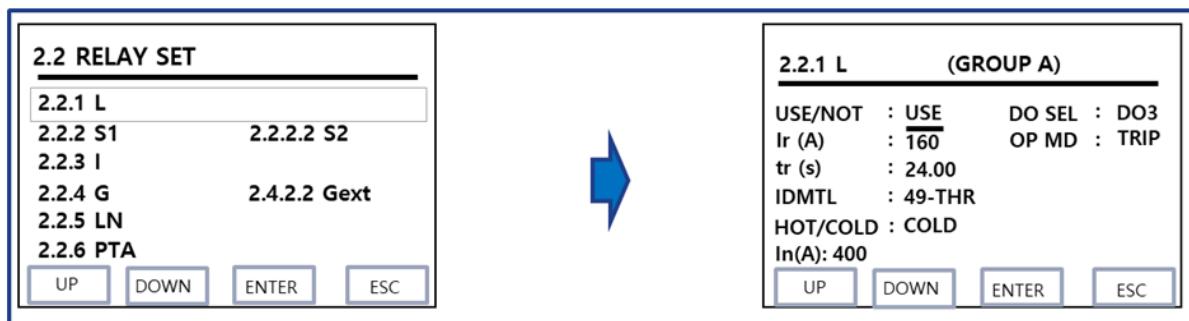
Set	List	설 Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.1 L	USE/NOT	USE or NOT USE	X	X	X	O
	Ir(A)	Pick-up : (0.4~1) * In	X	X	X	O
	tr(s)	Time Delay : 0.5 ~ 24s	X	X	X	O
	IDMTL	0: None(49-Thermal), 1: DT, 2: SIT, 3: VIT, 4: EIT, 5: EIT50	O	O	O	O
	HOT/COLD	NONE / HOT / COLD	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP / TRIP	O	O	O	O

 * * The X mark is the part that needs to be set directly on the device with the knob of NEW ACB.

(2) Short time overcurrent relay element (S1)

Set the short-time overcurrent relay element (S1) of the device. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed.
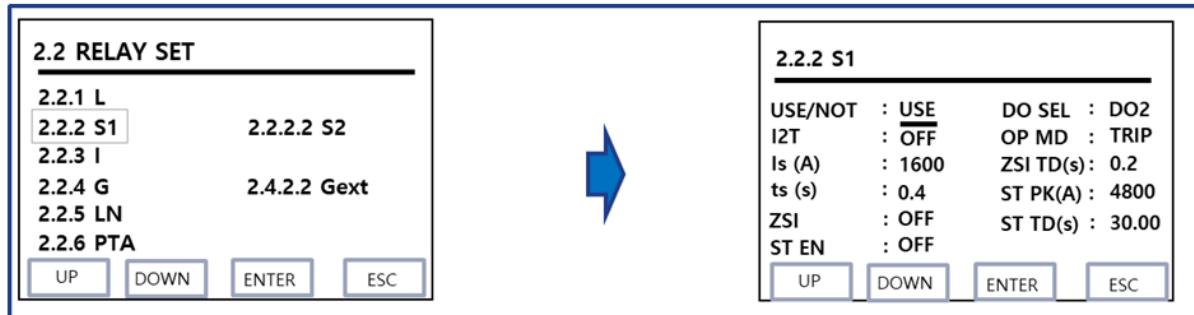
Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.2 S1	USE/NOT	USE or NOT USE	X	X	X	O
	I2T	I2T : ON / OFF	X	X	X	O
	Is(A)	Pick-up : (1.5~10) * Ir	X	X	X	O
	ts(s)	Time Delay : 0.05~0.80s	X	X	X	O
	ZSI	ZSI : ON / OFF	O	O	O	O
	ST EN	Start Up Enable : ON / OFF	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP / TRIP	O	O	O	O
	ZSI TD(s)	ZSI Time Delay (s): 0.04 ~ 0.20s	O	O	O	O
	ST PK(A)	Start Up Pick-up : 1.2 Is or more	O	O	O	O
	ST TD(s)	Start Up Time Delay(s) : 0.01 ~ 30.00s	O	O	O	O

(3) Short time overcurrent relay element (S2)

Set the device's STAGE 2 short time overcurrent relay element (S2). STAGE 2 of the over-current overcurrent relay element only supports the function of NEW ACB S-TYPE.
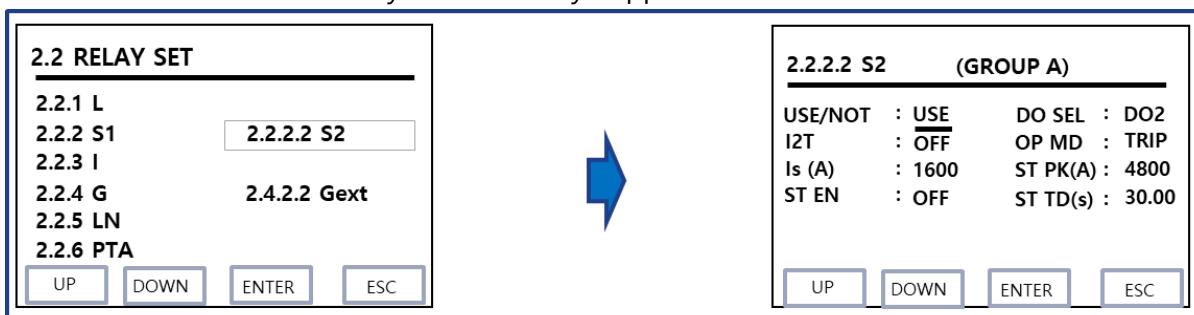
Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.2.2 S2	USE/NOT	USE or NOT USE	X	X	X	O
	Is(A)	Pick-up : (1.5~10) * Ir	X	X	X	O
	ts(s)	Time Delay : 0.05~0.80s	X	X	X	O
	ST/EN	Start Up enable: ON / OFF	X	X	X	O
	DO SEL	NONE / DO1~3	X	X	X	O
	ZSI TD(s)	ZSI Time Delay (s): 0.04 ~ 0.20s	X	X	X	O
	ST PK(A)	Start Up Pick-up : 1.2Is 이상	X	X	X	O
	ST TD(s)	Start Up Time Delay(s) : 0.01 ~ 30.00s	X	X	X	O

(4) Instantaneous time overcurrent relay element (I)

Set the instantaneous overcurrent relay element (I) of the device. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed.
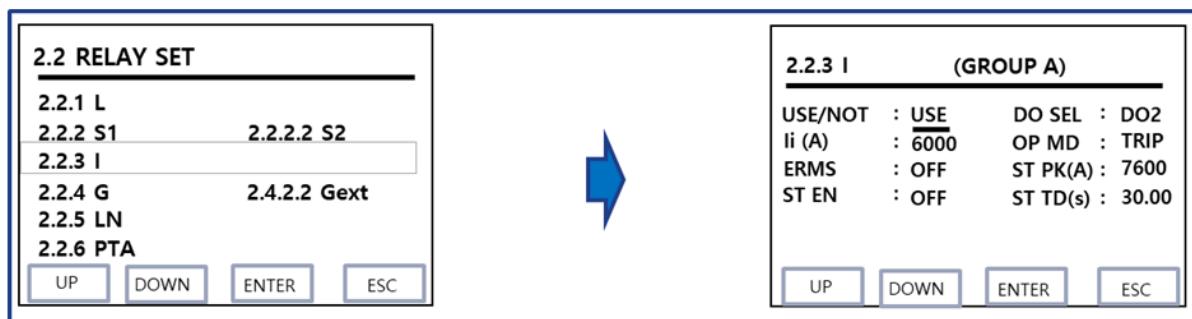

Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.3 I	USE/NOT	USE or NOT USE	X	X	X	O
	Ii(A)	Pick-up : (2~16) * In	X	X	X	O
	ERMS	ERMS set : ON / OFF	O	O	O	O
	ST/EN	Start Up enable : ON / OFF	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP / TRIP	O	O	O	O
	ST PK(A)	Start Up Pick-up : 1.2Is or more	O	O	O	O
	ST TD(s)	Start Up Time Delay(s) : 0.01 ~ 30.00s	O	O	O	O

(5) Ground fault relay element (G)

Set the internal ground fault protection relay element (G) of the equipment. However,

in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed.

Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.4 G	**USE/NOT**	USE or NOT USE	X	X	X	O
	I2T	I2T : ON / OFF	X	X	X	O
	Ig(A)	Pick-up : (0.2~1) * In	X	X	X	O
	tg(s)	Time Delay : 0.05~0.40s	O	O	O	O
	ZSI	ZSI : ON / OFF	O	O	O	O
	ST/EN	Start Up enable : ON / OFF	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP / TRIP	O	O	O	O
	ZSI TD(s)	ZSI Time Delay (s): 0.04 ~ 0.20s	O	O	O	O
	ST PK(A)	Start Up Pick-up : 1.2Is or more	O	O	O	O
	ST TD(s)	Start Up Time Delay(s) : 0.01 ~ 30.00s	O	O	O	O

However, the range that can be set according to NEW ACB Option may be different.

(6) External ground fault relay element (Gext)

Set the ground fault protection relay element (Gext) of the equipment. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed. External ground fault protection relay element setting provides only NEW ACB function.
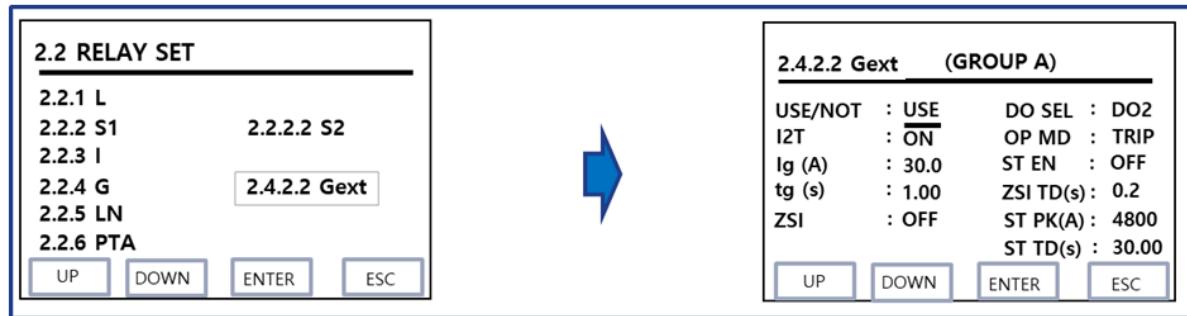
Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.4.2.2 Gext	USE/NOT	USE or NOT USE	X	X	X	O
	I2T	I2T : ON / OFF	X	X	X	O
	Ig(A)	Pick-up : (0.2~1) * In	X	X	X	O
	tg(s)	Time Delay : 0.05~0.40s	X	X	X	O
	ZSI	ZSI : ON / OFF	O	O	O	O
	ST/EN	Start Up enable : ON / OFF	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP / TRIP	O	O	O	O
	ZSI TD(s)	ZSI Time Delay (s): 0.04 ~ 0.20s	O	O	O	O
	ST PK(A)	Start Up Pick-up : 1.2Is or more	O	O	O	O
	ST TD(s)	Start Up Time Delay(s) : 0.01 ~ 30.00s	O	O	O	O

However, the range that can be set according to NEW ACB Option may be different.

(7) Phase N Long time overcurrent relay element (LN)

Set the overcurrent line overcurrent relay element (LN) when the equipment is in the long-term. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed.
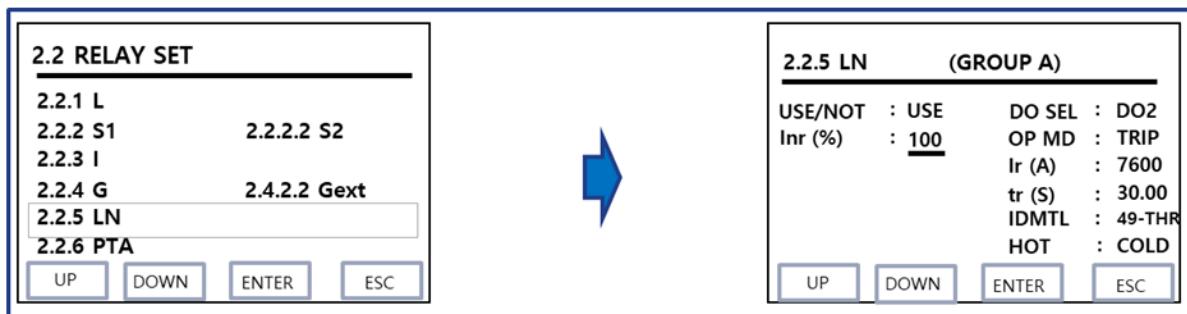

Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S

Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.5 LN	**USE/NOT**	USE or NOT USE	O	O	O	O
	Inr(%)	Pick-up : 40~200 %	O	O	O	O

The following items depend on the value set in the overcurrent relay (L) when the long-time overcurrent relay (L) element is installed.

Set	List	Explanation
2.2.1 L	**DO SEL**	NONE / DO1~3
	OP MD	Operation Mode : NO TRIP / TRIP
	Ir(A)	Pick-up : (0.4~1) * In
	tr(s)	Time Delay : 0.5~24s
	IDMTL	0: None(49-Thermal), 1: DT, 2: SIT, 3: VIT, 4: EIT, 5: EIT50
	HOT/COLD	NONE / HOT / COLD

(7) Pre Tree Alarm relay element (PTA)

Set the Pre Tree Alarm Relay Element (PTA) of the instrument. However, in the case of the knob type, since the setting in the knob takes precedence, the setting items in the knob cannot be set. In the OCR TESTER, the setting items are automatically recognized and only the setting items are displayed. The PTA relay element setting provides the NEW ACB only function.
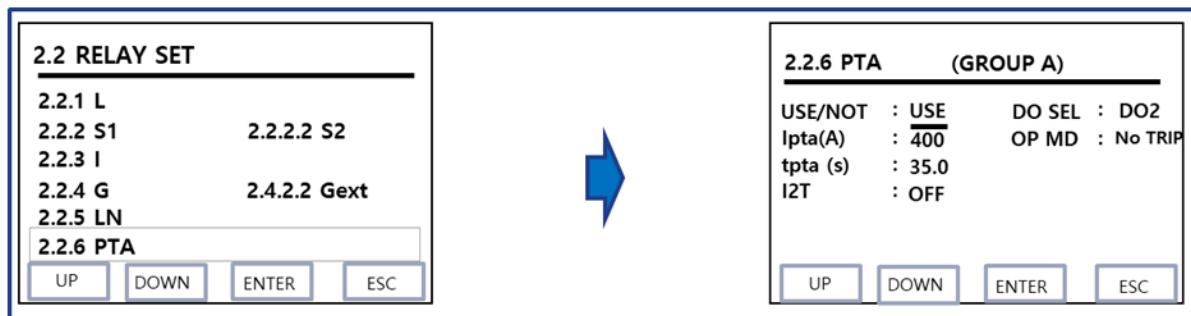

Set	List	Explanation	NEW ACB TYPE			
			N	A	P	S
2.2.6 PTA	**USE/NOT**	USE or NOT USE	O	O	O	O
	I2T	I2T : ON / OFF	O	O	O	O
	Ipta(A)	Pick-up : (0.4~1) * In	O	O	O	O
	tpta(s)	Time Delay : 0.5~24s	O	O	O	O
	DO SEL	NONE / DO1~3	O	O	O	O
	OP MD	Operation Mode : NO TRIP(Fix)	X	X	X	X

However, the range that can be set according to NEW ACB Option may be different.

4.3.2.2   Relay Set-SMART MCCB

(1) Long time overcurrent relay element (L)

The OCR TESTER automatically recognizes and sets the overcurrent relay element at the time of installation.

Set	List	Explanation
	USE/NOT	USE (Fixed)
2.2.1 L	Ir(A)	Pick-up : (0.4~1) * In
	tr(s)	Time Delay : 0.5 ~ 16 @ 6Ir : (0.5, 1, 2, 4, 8, 16)

(2) Short time overcurrent relay element (S)

The overcurrent relay element (S) is set at the short time, and the OCR TESTER automatically recognizes it and displays only the setting items.
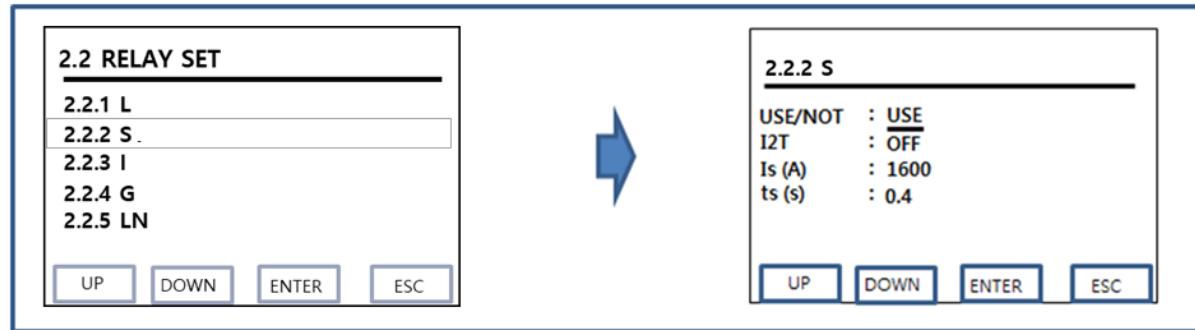
| Set	List	Explanation
	USE/NOT	USE (Fixed)
	I2T	I2T : ON / OFF
	Is(A)	Pick-up : 1.5Ir~10Ir, 0.5Ir Step
2.2.2 S	ts(s)	Time Delay : 0 ~ 0.4Sec . I2T On: 0.1, 0.2, 0.3, 0.4s . I2T Off: 0, 0.1, 0.2, 0.3, 0.4s
	ZSI	ZSI : ON / OFF

(3) Instantaneous time relay element (I)

The instantaneous overcurrent relay element (I) is set, and the OCR TESTER automatically recognizes it and displays only the setting items.
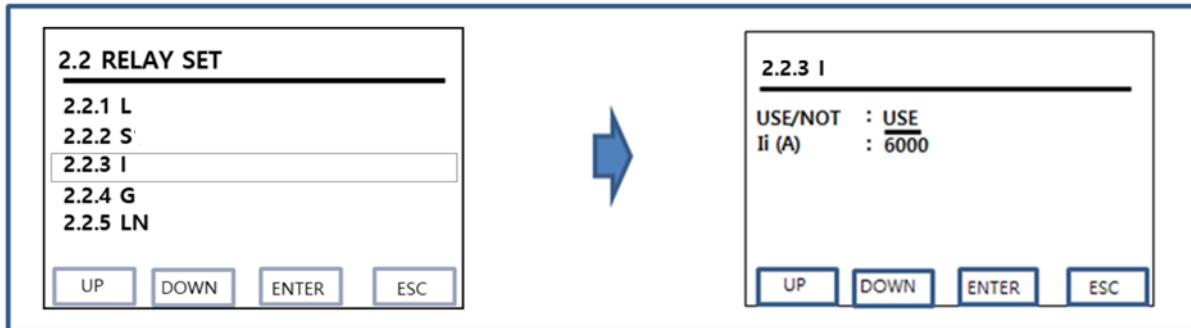
Set	List	Explanation
2.2.3 I	USE/NOT	USE (Fixed)
	Ii(A)	Pick-up : . 40A~160A: 1.5In~15In . 250A~400A: 1.5In~12In . 630A~800A: 1.5In~11In

(4) Ground fault relay element (G)

The internal ground fault protection relay element (G) is set. In OCR TESTER, it is recognized automatically and only the setting items are displayed immediately.
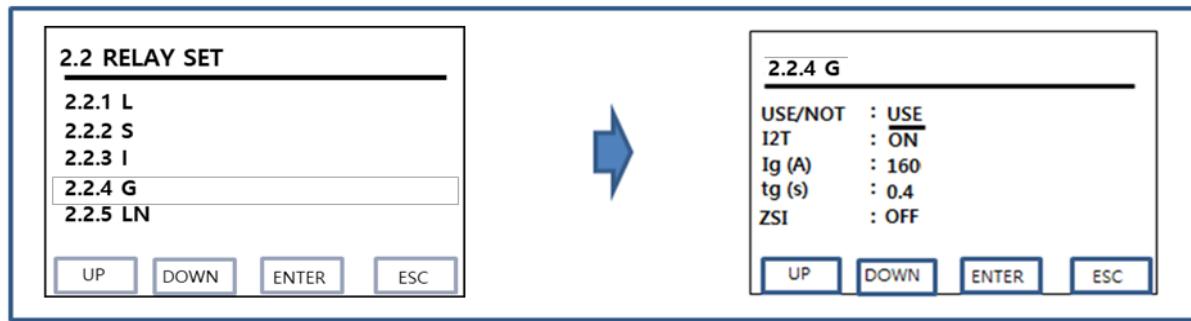
Set	List	Explanation
2.2.4 G	USE/NOT	USE or NOT USE
	I2T	I2T : ON / OFF
	Ig(A)	Pick-up : . In=40A : 0.4~1.0 x In . In>40A : 0.2~1.0 x In
	tg(s)	Time Delay : 0 ~ 0.4Sec . I2T On: 0.1, 0.2, 0.3, 0.4s

Set	List	Explanation
		. I2T Off: 0, 0.1, 0.2, 0.3, 0.4s
	ZSI	ZSI : ON / OFF

(5) **Phase N Long time overcurrent relay element (LN)**

The overcurrent line overcurrent relay element (LN) is set at the long time, and the OCR TESTER automatically recognizes it and displays only the setting items immediately.
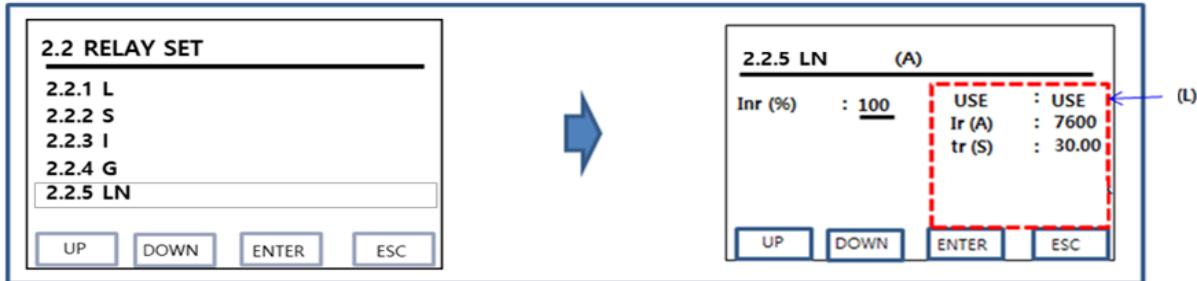
Set	List	Explanation
2.2.5 LN	**Inr(%)**	. 3 wire: NoC - No Connection . 4 wire: NoP - No Protection, 100%, 50%, OSN(OverSized Neutral))

The following items represent the values set in the overcurrent relay (L) when long-time overcurrent relay (L) element is installed.

Set	List	Explanation
2.2.1 L	**USE/NOT**	USE or NOT USE
	Ir(A)	Pick-up : (0.4~1) * In
	tr(s)	Time Delay : 0.5, 1, 2, 4, 8, 16

### 4.3.2.3   Relay Set-Existing ACB

: Existing ACB does not support relay element setting function.

## 4.4 Relay Test-3. RELAY TEST

(1) NEW ACB
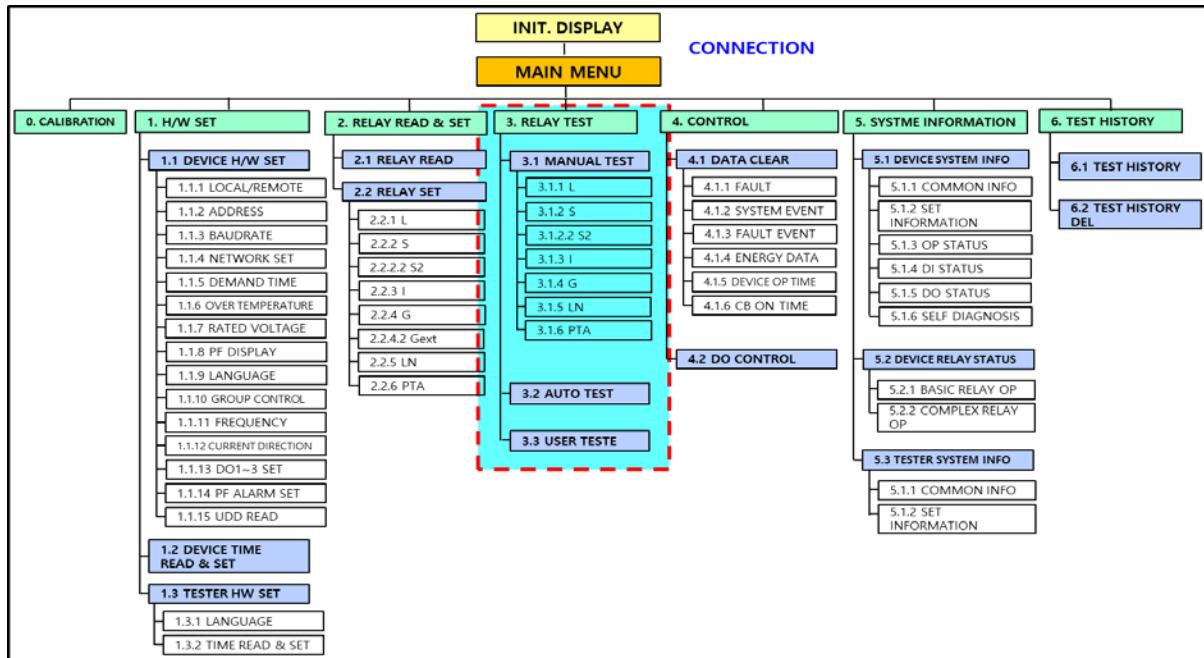
(2) SMART MCCB
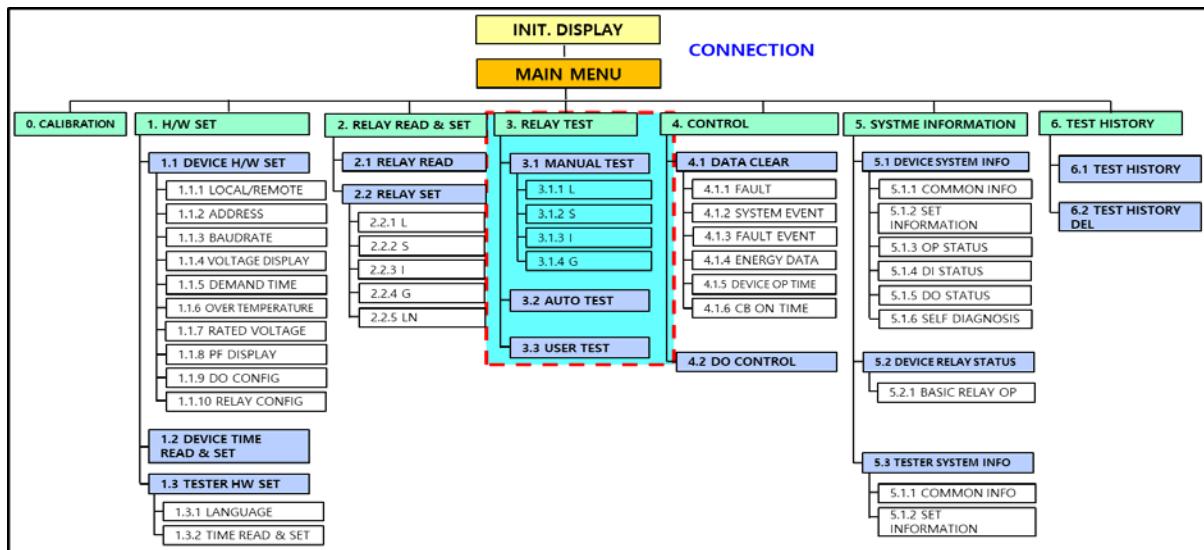
(3) Existing ACB
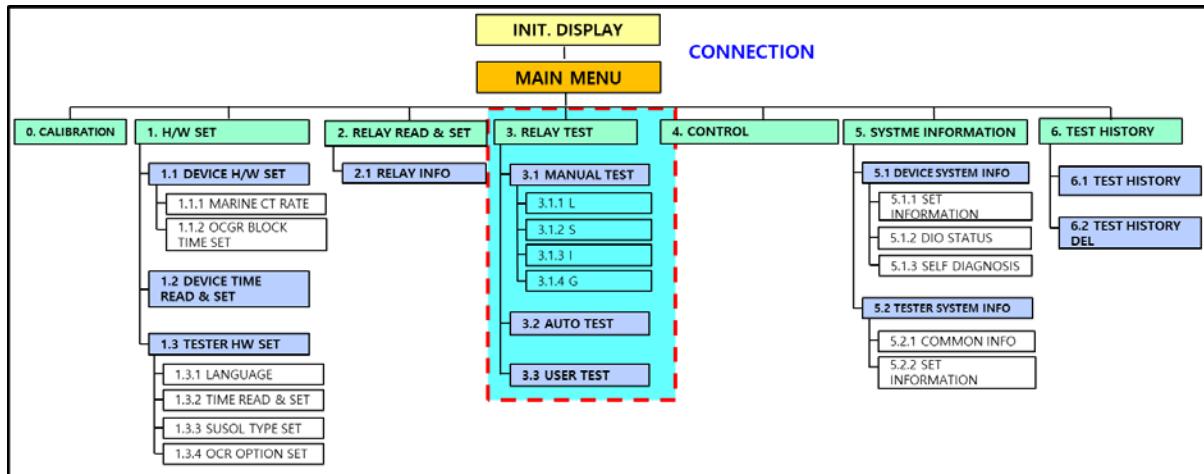
4.4.1   Manual Test

4.4.1.1   Manual Test -NEW ACB

The <3.1 MANUAL TEST> function is a test for each item. It provides a function to test the components other than the corresponding relay test by disabling it at the tester arbitrarily.

설 정	항목	설 명
	3.1.1 L	Long time overcurrent test
	3.1.2 S1	Short time overcurrent test_STAGE1
3.1	**3.1.2.2 S2**	Short time overcurrent test _STAGE2 (ACB-S TYPE)
MANUAL	**3.1.3 I**	Instantaneous time overcurrent test
TEST	**3.1.4 G**	Ground fault overcurrent
	3.1.5 LN	Phase N long time overcurrent test
	3.1.6 PTA	PRE TRIP ALARM

However, external ground contact (Gext) requires an external CT separately and can not be tested with OCR TESTER.

(1) Long time overcurrent (L) test

<3.1.1 L> is the item to test the relay element (L) when the equipment is long. The long time overcurrent relay element selects the IDMTL curve as a protection element that operates at the time set by the user when the analog signal input to A, B, C is larger than the user's fixed value, and sets the HOT/COLD setting to NONE If set to 51, it will operate as a relay of 49. If one of HOT/COLD characteristics is selected without selecting the IDMTL curve, it will operate as a thermal relay.

(A) Operating characteristic

　　　(a) Thermal Reference Formulas

　　T = τ*ln(I² - Ip²)/(I² - K²)

　　　　　T = operating time [ms]

　　　　　τ = 29249.2170920972 * tr   (τ = tr / ln(6^2/(6^2 − K^2)))

　　　　　I = load factor

　　　　　Ip = Overload pre-load ratio

　　　　　K = 1.10(Service Factor)

　　　(b) Inverse time characteristic curve formula

　　. for normal type

　　　- EIT : T(s)= (6^2-1)*t/(I^2-1)

　　　- VIT : T(s)= (6^1-1)*t/(I^1-1)

　　　- SIT : T(s)= (6^0.5-1)*t/(I^0.5-1)

　　　- DT : T(s)= (6^0-1)*t/(I^0-1)

　　　- EIT50 : T(s)= 1/(ln(6^2/(6^2 − 1.02^2) * t * ln(I^2/(I^2 − 1.02^2)) (ln: log
　　　function)

　　　(Fixed to 150 msec when T (s) is 150 msec or less)

　　　(t : set time I: load ratio (Fixed to 10 when load ratio exceeds 10))


　　. for marine type

　　　-**NV : T(s)= (1.2^2 * t) / I^2** : for marine type is unified in one NV
　　　characteristic curve

　　　(Fixed to 150 msec when T (s) is 150 msec or less)

　　　(t : set time I: load ratio (Fixed to 10 when load ratio exceeds 10))

(B) Test method
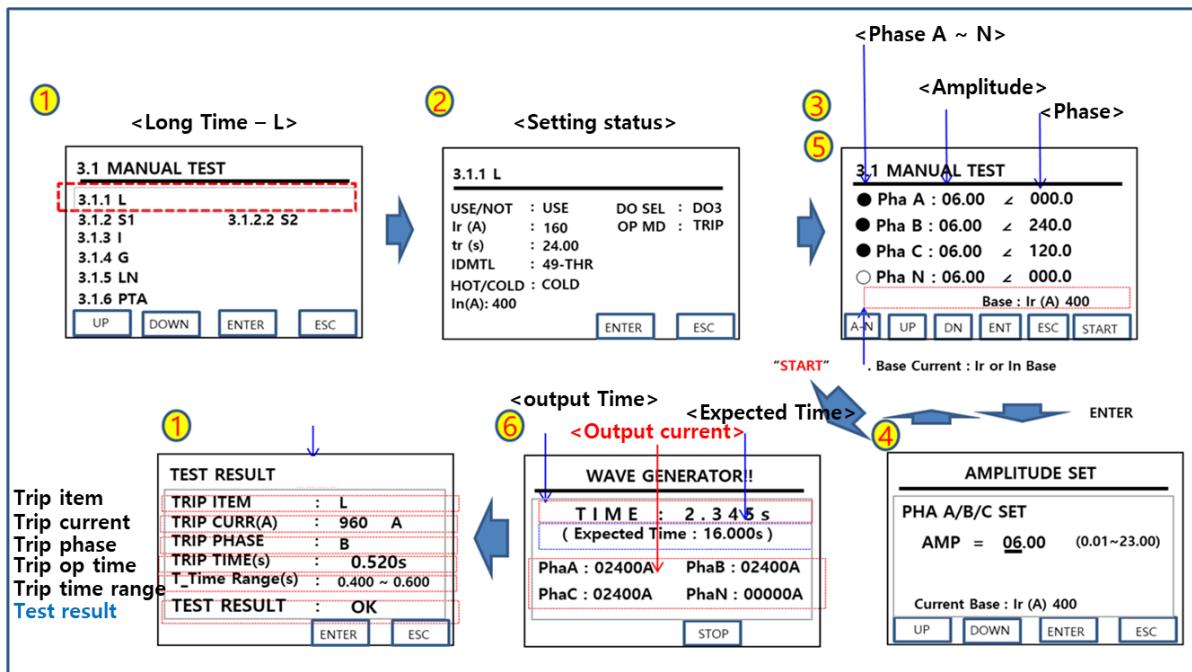
① To test the relay element (L) at the longest time, select the 3.1 MANUAL TEST-3.1 L item and press the "ENTER" key to check the information about the relay element set at the device.

② When the USE / NOT part is set to USE, the TRIP occurrence can be confirmed. However, if not used as NOT, TRIP does not occur in the OCR TESTER.

③ You can set the output size by pressing the "ENTER" key after selecting the output image to be generated by using the A to N keys.
   ✓ Only one Selection of the "A ~ N" buttons : Amplitude and phase Setting
   ✓ Multiple Selection of the "A ~ N" buttons : Only Amplitude Setting
   ✓ No Selection of the "A ~ N" buttons : Relay Information of Device

 The output current size is determined based on the Ir base current (Base: Ir (A) 160).

④ If you select A, B, C image to output in ③, you can set size of A, B, C at once. The output size can be set in 0.01 units from 0.01 to 21.00 times (MCCB is 17 times). For example, if you want to apply 6 times as shown in the figure, select 6.00 and input "ENTER".

⑤ A, B, C phase is displayed as 06.00 and N phase not selected is indicated as 00.00, press "START" key to proceed with the test here.

⑥ "WAVE GENERATOR" screen shows the time elapsed and the expected time of device operation (Expected Time), and the current applied on A to N is displayed. The magnitude of the applied current is applied to the size set in (3) and (5) by the product of the base current (ex, 6 times * 400A (Ir) = 2400A).

⑦ When the relay operation of the device occurs, the current applied from the OCR TESTER to the device stops and the test result screen "TEST RESULT" appears and the test result can be confirmed.

  ✓ TRIP ITEM: Long time(L), Short time(S1), Short time(S2), Instantaneous Time(I), inner Ground(G), Neutral Long time(LN), PTA

  ✓ TRIP CURR(A): The largest value among the A to N phase currents applied in the test with trip current

  ✓ TRIP PHASE: A, B, C, N in trip phase, G represents Ground trip

  ✓ TRIP TIME(s): Relay operation time

  ✓ T_Time Range(s): Available trip time range of relay

  ✓ TEST RESULT: Test result(OK or FAIL)

Pressing the "**STOP**" button on the **<TEST RESULT>** screen will reset the instrument relay operation status.

(2) Short time overcurrent (S1) test

The short-time overcurrent relay element is a protection element that operates at the time set by the user when the analog signal input to A, B, C is larger than the user's fixed value. It operates as a relay at the time or inverse time characteristic set by I2t setting can do.

(A) Operating characteristic

  a) Inverse time characteristic curve formula

   - $T(s) = ts / (I^2)$

   T(s) : operating time

   ts : Short time operation time setting value

   I : Load ratio (actual current / (10 * Ir))

  b) Time constant characteristic (I2T OFF): Operation when load ratio (I)> PickUp current (Isd1)

   Operation time ts: Within the set operation time (tsd1)

(B) Testing method

    <3.1.2 S1> The test is carried out in the same way as the relay element (L) test in the previous section, selecting the item to be tested, selecting the output and phase, Can be confirmed.
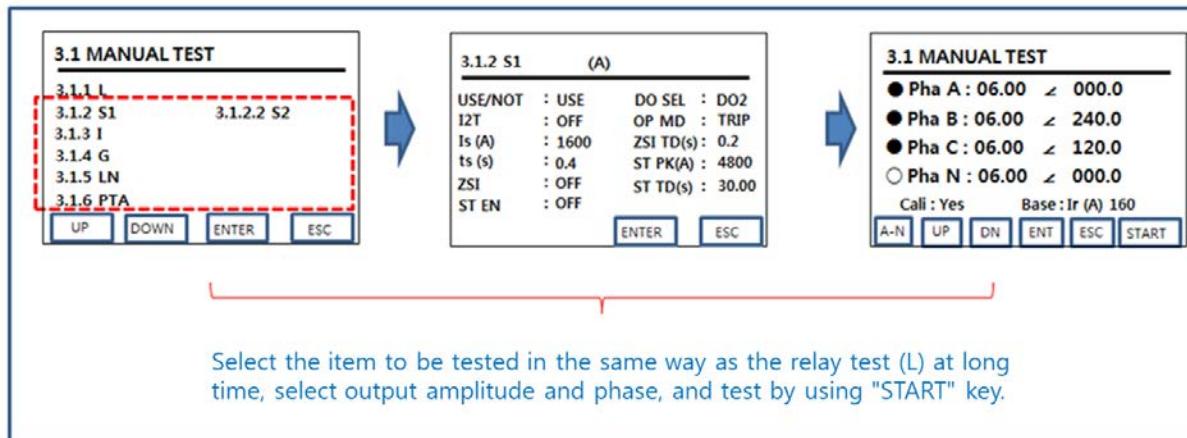
(3) Short time overcurrent (S2) test

  Stage2 short time relay element supports function only in NEW ACB S type. Stage2 The short-time overcurrent relay element has a characteristic that it operates at the time set by the user when the analog signal inputted to the A, B, C phase is larger than the user's fixed value.

  (A) Operating characteristic

      a) Inverse time characteristic curve formula

         - $T(s) = ts / (I^2)$

         $T(s)$: operating time

         ts : Short time operation time setting value

         I : Load ratio (actual current / (10 * Ir))

      b) Time constant characteristic (I2T OFF)

         Operation when load ratio (I)> PickUp current (Isd2)

         Operation time ts: Within the set operation time (tsd2)

  (B) Testing method

<3.1.2.2 S2> The test is carried out in the same manner as the relay element (L) test in the previous section.

(4) Instantaneous time overcurrent (I) test

The instantaneous overcurrent relay element is a protection element that operates instantaneously when the analog signal input to the A, B, C phase is larger than the user's fixed value.

(A) Operating characteristic

The instantaneous overcurrent relay element operates within 40ms when the pick-up current (Ii) is applied.

(B) Testing method

<3.1.3 I> The test shall be carried out in the same manner as the relay element (L) test in the previous section.

(5) Ground fault relay (G) test

The internal ground fault protection relay element is designed so that the magnitude of the ground fault current detected by the Vector sum of currents input in A, B, C phase (3P) or A, B, C, N (4P) It is a working protective element.

(A) Operating characteristic

a) Inverse time characteristic curve formula

- $T(s) = tg / (I^2)$

T(s) : operating time

tg : ground fault operating time setting value

I : Load Factor (Actual Current / In): fixed at 1.0 if load factor exceeds 1.0

b) Time constant characteristic (I2T OFF):

If It / Ir> Ig, operation within the set operation (tg)

(B) Testing method

<3.1.4 G> The test shall be carried out in the same manner as the relay element (L) test in the previous section.

(6) Phase N long time overcurrent (Inr) test

If the analog signal input to the N phase is longer than the user's fixed value, select the IDMTL curve as the protection element that operates at the time set by the user and set the HOT/COLD setting to NONE 51 It works as a relay and does not select the IDMTL curve, but selects one of the HOT/COLD characteristics and operates as a thermal relay. If N type, it can be set using USB or communication.

(A) Operating characteristic

The operating characteristics are the same as the long-time relay element (L).

(B) Testing method

<3.1.5 LN> The test shall be carried out in the same manner as the relay element (L) test in the previous section.

(7) PTA relay (PTA)

It is an auxiliary relay function to increase the stability of the whole system by operating the emergency generator or dropping the predetermined load when the probability of overload suddenly increases in the low voltage power system operated by the generator.

(A) Operating characteristic

a) Inverse time characteristic curve formula

* for normal characteristic curve

- $T(s) = tp * ((1.2^2 - 1) / (I^2 - 1)$

* for marine characteristic curve

- $T(s) = tp * (1.05)^2 / I^2$

T(s) : operating time

tp : PTA operating time setting value

I : Load ratio : Actual current / Ip

* If the load factor is 10 times or more, the operation time is maintained when the load factor is 10 times.

(B) Testing method

<3.1.6 PTA> The test shall be carried out in the same manner as the relay element (L) test in the previous section.

4.4.1.2   Manual Test - SMART MCCB

The <3.1 MANUAL TEST> function is a test for each item. It provides a function to test the components other than the corresponding relay test by disabling it at the tester arbitrarily.

설 정	항목	설 명
3.1 **MANUAL** **TEST**	**3.1.1 L**	Long time overcurrent test
	3.1.2 S1	Short time overcurrent test
	3.1.3 I	Instantaneous time overcurrent test
	3.1.4 G	Ground fault overcurrent
	3.1.5 LN	Phase N long time overcurrent test

(1) Long time overcurrent (L) test

<3.1.1 L> is the item to test the relay element (L) when the equipment is long. The long-time overcurrent relay element is a protection element that operates at the time set by the user when the analog signal inputted to the A, B, C phase is larger than the user's fixed value.

(A) Operating characteristic
    a) Inverse time characteristic curve formula

      - Operating characteristics (Thermal Reference Formulas)
        - $T = \tau * \ln(I^2 * I_p^2) / (I^2 * K^2)$
        T = operating time [ms]
        τ = 29250*tr
        I = overload ratio
        Ip = ration before overload
        K = 1.10(Service Factor)

(B) Testing method
  The test procedure is the same as the NEW ACB in the previous section.

(2) Short time overcurrent(S) ~ G test

The short-time overcurrent relay element is a protection element that operates at the time set by the user when the analog signal input to A, B, C is larger than the user's fixed value. It operates as a relay at the time or inverse time characteristic set by I2t setting can do.

(A) Operating characteristic
　　　a) Time constant characteristic (I2T OFF): 0/0.1/0.2/0.3/0.4/Off Sec

Set time(s)	0	0.1	0.2	0.3	0.4
Non operation time (s)	0.02	0.08	0.14	0.23	0.35
operation time (s)	0.08	0.14	0.20	0.32	0.50

　　　b) Inverse time characteristic (I2T OFF): 0.1/0.2/0.3/0.4/Off Sec

　　　(The operating time reference is 10 * Isd.)

　　　t = 100 x tsd / Iratio^2, Iratio = I / Isd

　　　- Relay based on the largest load current among A, B, and C phase currents

　　　　(Separate relay of N phase)

　　　- Operation time can be changed according to ZSI function

(B) Testing method
　　　<3.1.3 I> the test shall be carried out in the same manner as the relay element (L) test in the previous section.

(3) Instantaneous time overcurrent (I) test

The instantaneous overcurrent relay element is a protection element that operates instantaneously when the analog signal input to the A, B, C phase is larger than the user's fixed value.

(A) Operating characteristic

The instantaneous overcurrent relay element operates within 40ms when the pick-up current (Ii) is applied.

(B) Testing method

<3.1.3 I> the test shall be carried out in the same manner as the relay element (L) test in the previous section.

(4) Ground fault relay (G) test

The internal ground fault protection relay element is designed so that the magnitude of the ground fault current detected by the Vector sum of currents input in A, B, C phase (3P) or A, B, C, N (4P) It is a working protective element.

(A) Operating characteristic

a) Inverse time characteristic curve formula

- $T(s) = tg / (I^2)$

T(s) : operating time

tg : ground fault operating time setting value

I : Load Factor (Actual Current / In): fixed at 1.0 if load factor exceeds 1.0

b) Time constant characteristic (I2T OFF):
   If It / Ir> Ig, operation within the set operation (tg)

(B) Testing method
<3.1.4 G> The test shall be carried out in the same manner as the relay element (L) test in the previous section.

(5) Phase N long time overcurrent (Inr) test

Phase N long-time overcurrent relay element is a protection element that operates at the time set by the user when the analog signal input to the N phase is larger than the user's fixed value.

(A) Operating characteristic
   The operating characteristics are the same as the long-time relay element (L).

(B) Testing method

<3.1.5 LN> the test shall be carried out in the same manner as the relay element (L) test in the previous section.

4.4.1.3   Manual Test - Existing ACB

The <3.1 MANUAL TEST> function of the existing ACB is a test for each item, but other relay elements should be tested manually after manual disabling.

설 정	항목	설 명
3.1 MANUAL TEST	**3.1.1 L**	Long time overcurrent test
	3.1.2 S	Short time overcurrent test
	3.1.3 I	Instantaneous time overcurrent test
	3.1.4 G	Ground fault overcurrent

(1) Long time overcurrent (L) ~ G test

: The test procedure is the same as the NEW ACB in the previous section.

4.4.2 Auto Test
4.4.2.1   Auto Test -NEW ACB

The <3.2 AUTO TEST> function provides the function to test only relay elements that are ENABLE among the device current relay elements.

3.2 AUTO TEST					
Device	**List**	**Phase A**	**Phase B**	**Phase C**	**Phase N**	**Remark**
NEW ACB	Long time(L)	Ir * 6	Ir * 6	Ir * 6	0	A,B,C 600%
	Short time(S1)	Isd * 1.2	Isd * 1.2	Isd * 1.2	0	A,B,C 120%
	Short time(S2)	Isd2 * 1.2	Isd2 * 1.2	Isd2 * 1.2	0	A,B,C 120%
	Instantaneous(I)	Ii * 1.2	Ii * 1.2	Ii * 1.2	0	A,B,C 120%
	Ground fault(G)	Ig * 1.2	0	0	0	Phase A 120%
	Phase N long time(LN)	0	0	0	Ir * 6	Phase N 600%
	PTA	Ip * 1.2	Ip * 1.2	Ip * 1.2	0	A,B,C 120%

In the case of NEW ACB, the automatic test is performed in the case of LN -> Stage1 (S1) -> Stage2 (S2) -> Instantaneous (I) -> Internal Ground (G) -> PTA, and the test

items that are not applicable according to the setting in each device are automatically SKIP processed and the automatic test is performed with the default values set in the test for the enabled relay elements.
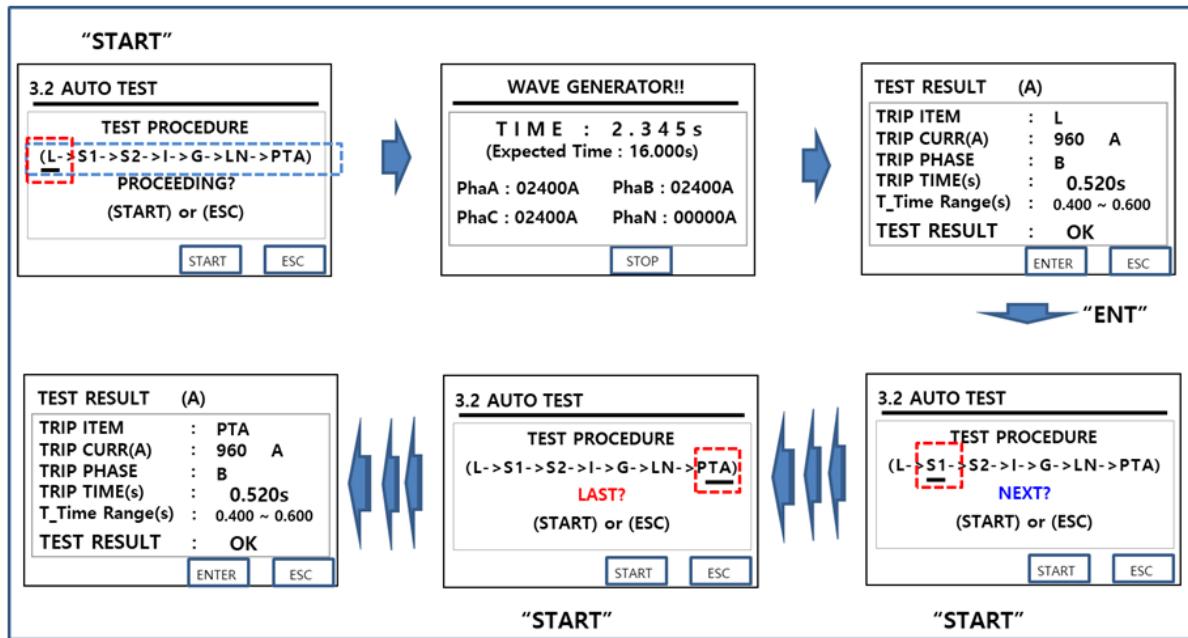
The automatic test is started by "**START**" key. When each test is completed, "TEST RESULT" result is displayed. Pressing the "**STOP**" button on the **<TEST RESULT>** screen will reset the instrument relay operation status. If you press "**ENTER**" key on the result screen, the test is carried out using the "**START**" key.

4.4.2.2   Auto Test –SMART MCCB

The <3.2 AUTO TEST> function provides the function to test only relay elements that are ENABLE among the device current relay elements.
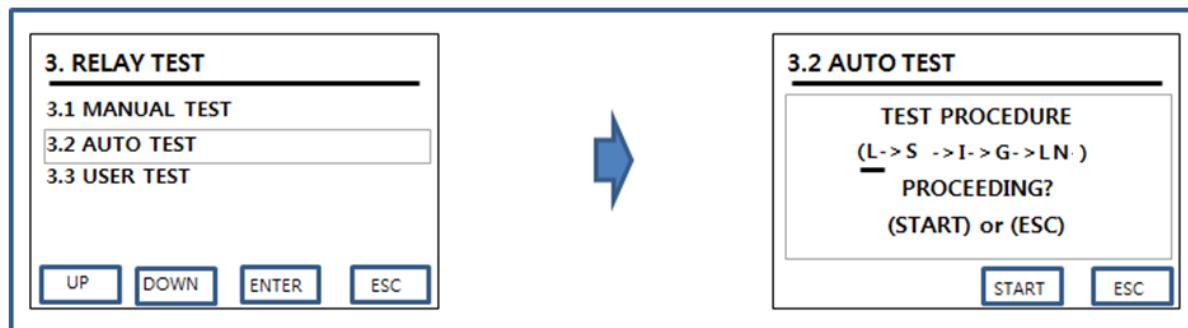
3.2 AUTO TEST					
Device	List	Phase A	Phase B	Phase C	Phase N	Remark

SMART MCCB	Long time(L)	Ir * 6	Ir * 6	Ir * 6	0	A,B,C 600%
	Short time(S)	Isd * 1.2	Isd * 1.2	Isd * 1.2	0	A,B,C 120%
	Instantaneous(I)	Ii * 1.2	Ii * 1.2	Ii * 1.2	0	A,B,C 120%
	Ground fault(G)	Ig * 1.2	0	0	0	Phase A 120%
	Phase N long time(LN)	0	0	0	Ir * 6	Phase N 600%

In the case of SMART MCCB, the automatic test is carried out in the order of long time (L) -> short time (S) -> instantaneous (I) -> internal ground fault (G) -> long lasting neutral line (LN), The test items that are not applicable according to the setting are automatically SKIP processed and the automatic test is performed with the default values set in the test for the relay elements that are enabled.

The automatic test is started using the "START" key, and the test method is the same as the NEW ACB in the previous section.

4.4.2.3   Auto Test –Existing ACB

The <3.2 AUTO TEST> function provides the function to test only relay elements that are ENABLE among the device current relay elements.
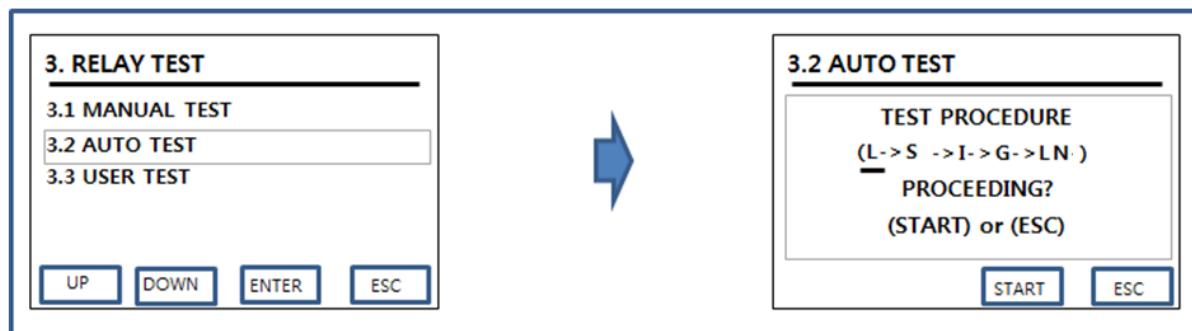
3.2 AUTO TEST					
Device	List	Phase A	Phase B	Phase C	Phase N	Remark
Existing ACB	Long time(L)	Ir * 6	Ir * 6	Ir * 6	0	A,B,C 600%
	Short time(S)	Isd * 1.2	Isd * 1.2	Isd * 1.2	0	A,B,C 120%
	Instantaneous(I)	Ii * 1.2	Ii * 1.2	Ii * 1.2	0	A,B,C 120%
	Ground fault(G)	Ig * 1.2	0	0	0	Phase A 120%
	Phase N long time(LN)	0	0	0	Ir * 6	Phase N 600%

In the case of NEW ACB, the test is performed in the order of long time (L) -> short time (S) -> instantaneous (I) -> internal ground fault (G) -> long lasting neutral line (LN). The test items that are not applicable according to the setting are automatically SKIP processed and the automatic test is performed with the default values set in the test for the relay elements that are enabled.

The automatic test is started using the "START" key, and the test method is the same as the NEW ACB in the previous section.

4.4.3 User Test

This section is the same as the <3.2 Device Test> section. Please refer to the relevant section for details.

<3.3 USER TEST> function provides the function to perform the relay test as it is set up (NEW ACB, SMART, ACB). It uses menu list or "**H/T**" button So that the test can be easily carried out.
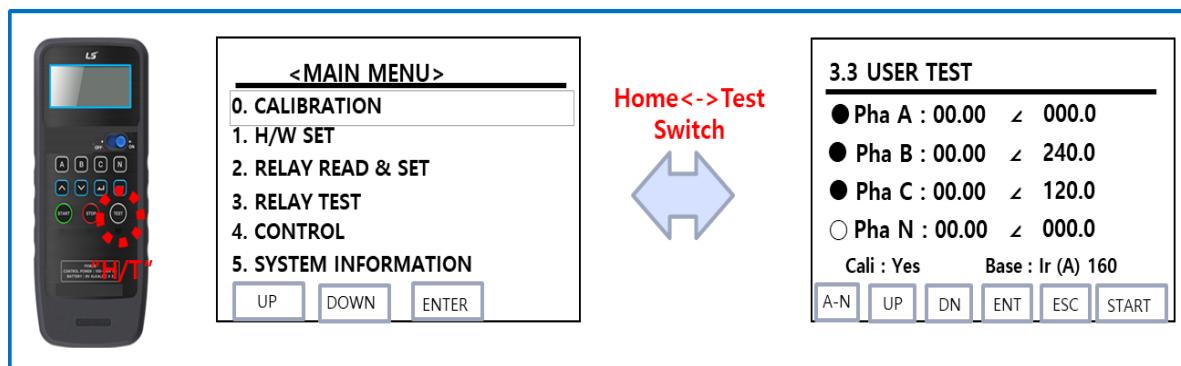
① 3.RELAY TEST / 3.3 USER TEST or "H/T" key by using OCR TESTER Menu TREE. Press "H/T" button as Home & Test switch button to switch to user relay test screen.

② You can select the basic base current (In or Ir) by pressing "UP" key in the user relay test screen

④ Select the phase to output by using "A ~ N" key and press "ENT" key to select output size and phase.

✓ Only one Selection of the "A ~ N" buttons : Amplitude and phase Setting

✓ Multiple Selection of the "A ~ N" buttons : Only Amplitude Setting

    ✓   No Selection of the "A ~ N" buttons : Relay Information of Device

③ Press the "START" button on the user test screen (3.3 USER TEST) to perform the relay test. The output waveform screen (WAVE GENERATOR !!) shows the running time, estimated operation time and output current value (Output Current(A) = Amplitude * Base current)

④ If you want to stop the test, press the "STOP" button to stop the test immediately.

⑤ When TRIP occurs in the device, OCR TESTER displays the test result by switching the output value to the stop and test result screen (TEST RESULT).

⑥ Pressing the "**STOP**" button on the **<TEST RESULT>** screen will reset the instrument relay operation status. If you press the "**ENTER**" button, you can switch to the user test screen (3.3 USER TEST). Press "**ESC**" button to switch to the menu test list screen.
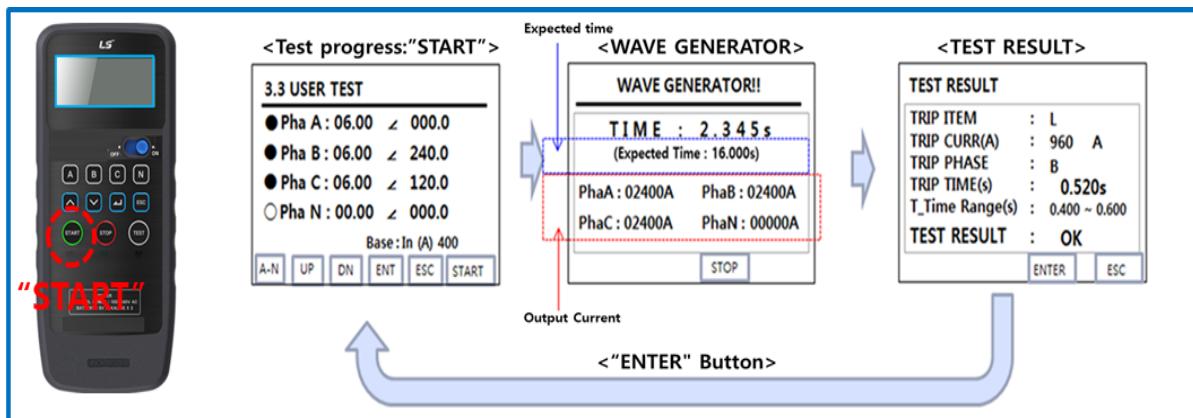
   * The test results are stored in the memory of the OCR TESTER and can be reported to the test result in PDF using the PC Manager software.

4.5 Control-4. CONTROL

<4. CONTOL> function provides device reset (or clear) and DO control function.

  (1) NEW ACB
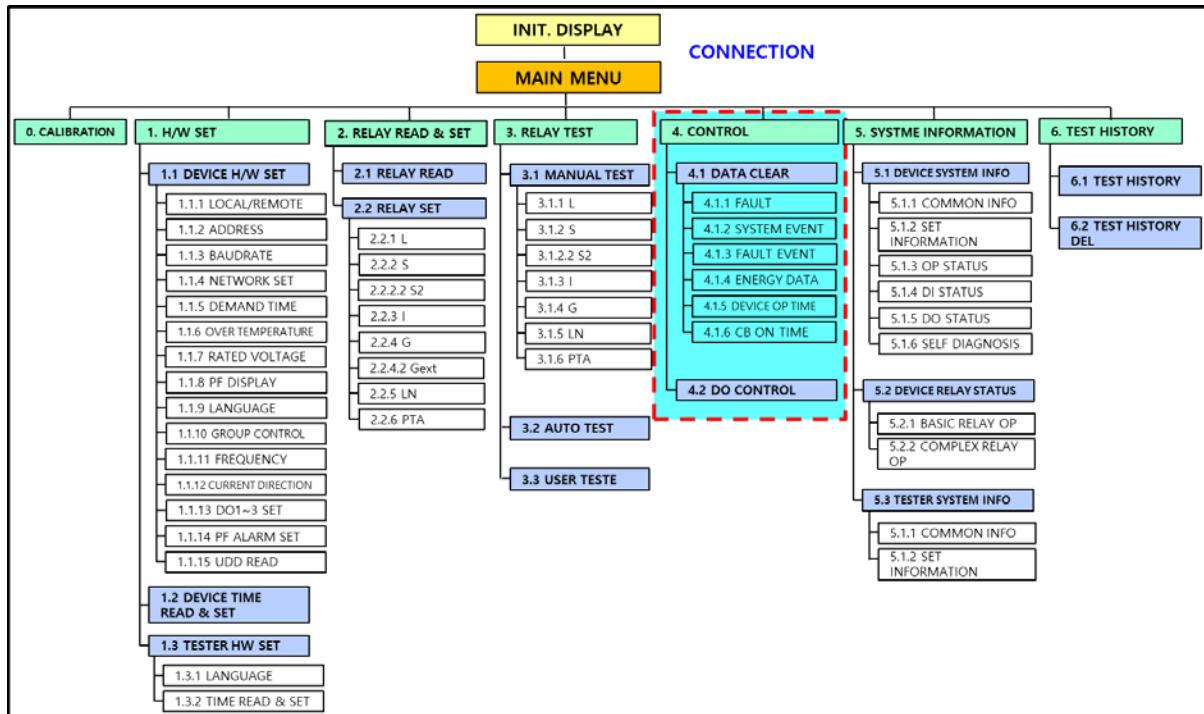
(2) SMART MCCB
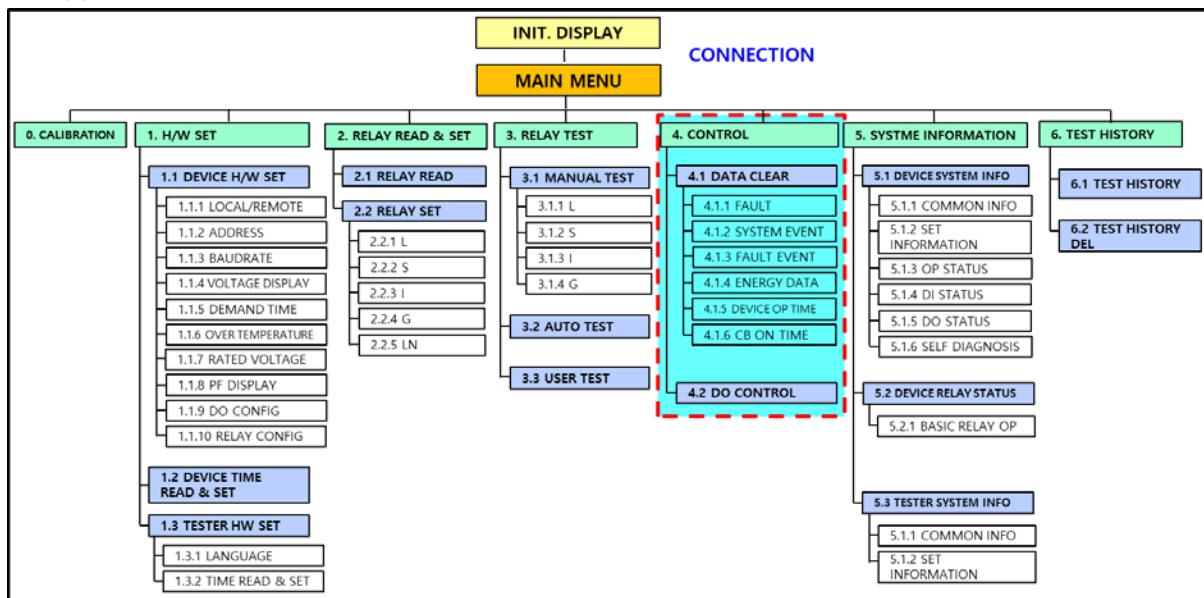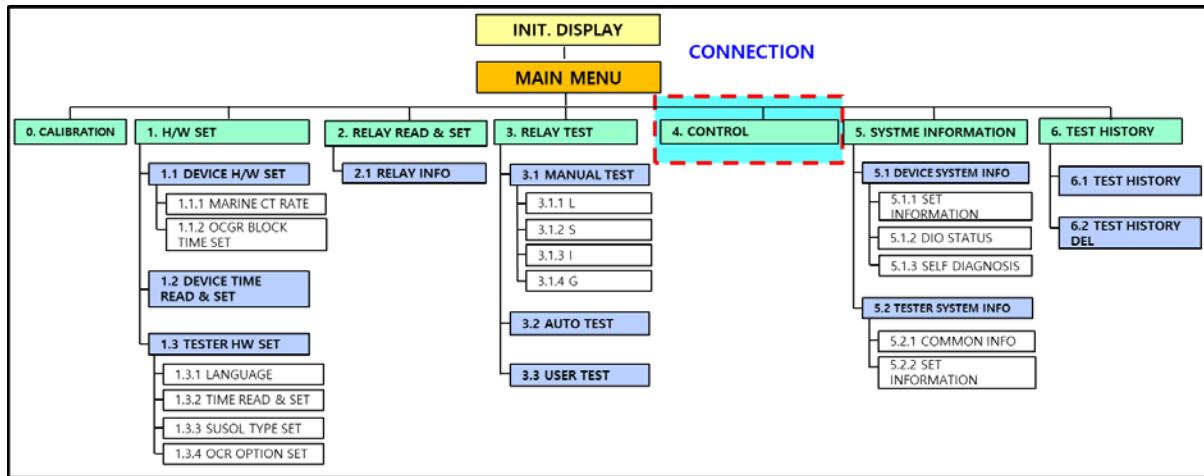
(3) Existing ACB

4.5.1 Data Clear

The <4.1 DATA CLEAR> function provides the function to clear or reset the device's DATA (FAULT, EVENT, ...). However, existing ACB does not provide data clear function.

4.5.1.1 Data Clear-NEW ACB & MCCB

It provides the function to clear or reset the DATA (FAULT, SYSTEM EVENT, FAULT EVENT, ENERGY DATA, OPTIME, CB ON TIME) of the device.

(1) Fault Reset

The <4.1.1 FAULT> function performs a function to reset the fault state that the device has.
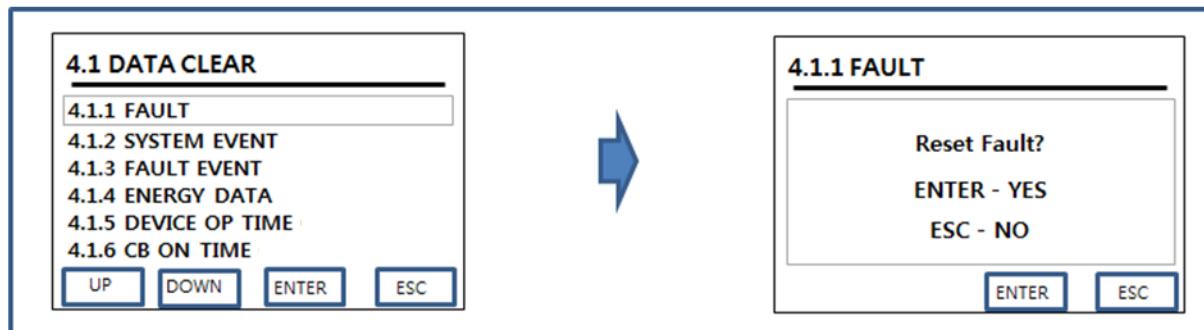
✓ "ENTER" key: Perform Reset function
✓ "ESC" key: Reset Cancel Reset function

If the reset function is normally performed normally, "ALL CLEAR" message is displayed on the screen and "FAIL" message is displayed on Nack.

(2) System Event Clear

The <4.1.2 SYSTEM EVENT> function clears the system event status that the device has.
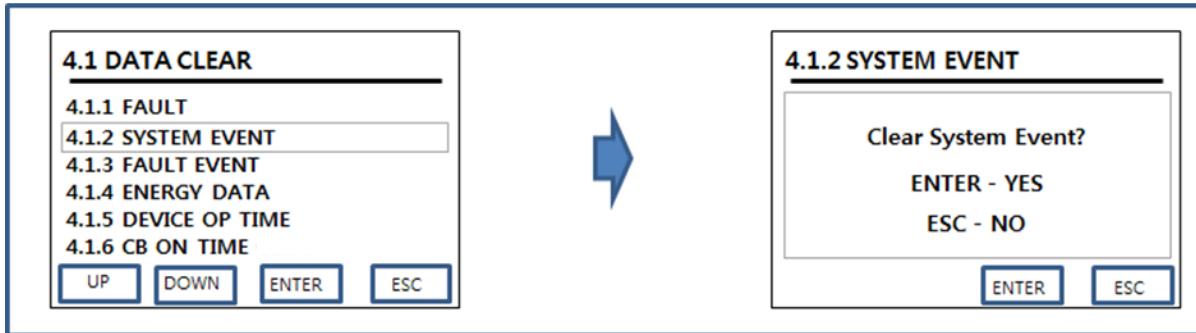

    ✓ "ENTER" key: Perform Clear function
    ✓ "ESC" key: Cancel Clear function

If the device normally performs the clear function normally, "ALL CLEAR" message will appear on the screen and "FAIL" message will appear on Nack.

(3) Fault Event Clear

The <4.1.3 FAULT EVENT> function clears the fault event status that the device has.
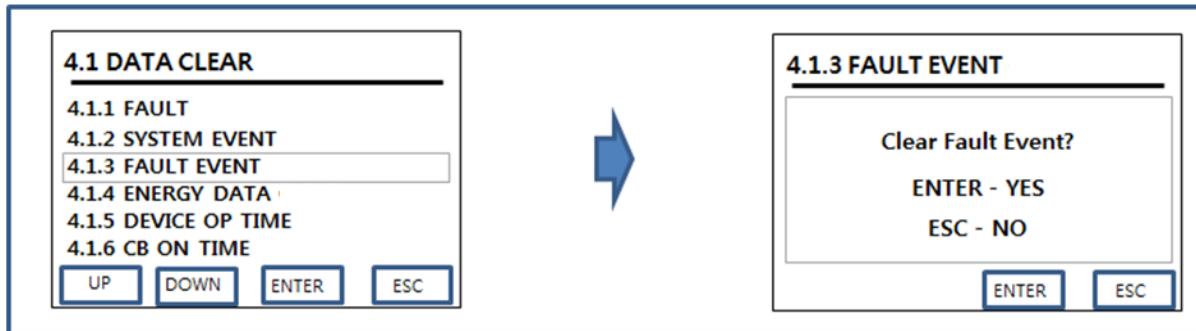
    ✓ "ENTER" key: Perform Clear function
   ✓ "ESC" key: Cancel Clear function

If the device normally performs the clear function normally, "ALL CLEAR" message will appear on the screen and "FAIL" message will appear on NACK.

(4) Energy Data Clear

The <4.1.4 ENERGY DATA> function performs the function of clearing the energy data stored in the device.
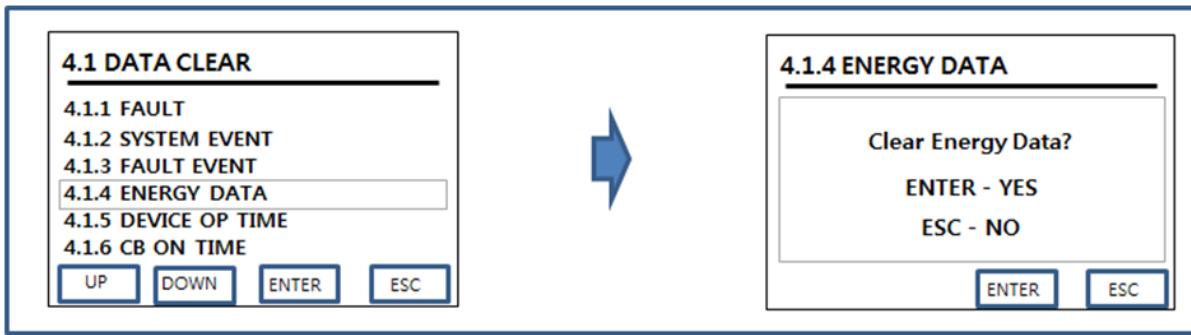
- ✓ "ENTER" key: Perform Clear function
- ✓ "ESC" key: Cancel Clear function

If the device normally performs the clear function normally, "ALL CLEAR" message will appear on the screen and "FAIL" message will appear on NACK.

(5) Device Operation Time Clear

The <4.1.5 DEVICE OP TIME> function clears the device operation time that the device has.
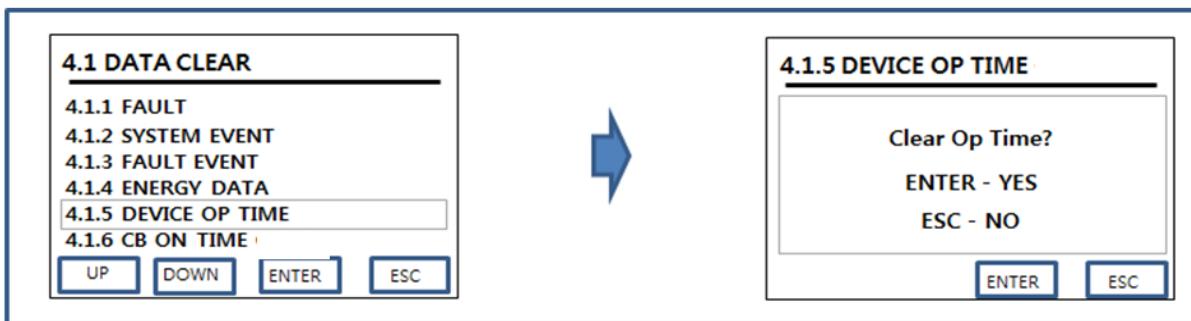
- ✓ "ENTER" key: Perform Clear function
- ✓ "ESC" key: Cancel Clear function

If the device normally performs the clear function normally, "ALL CLEAR" message will appear on the screen and "FAIL" message will appear on NACK.

(6) CB ON Time Clear

The <4.1.6 CB ON TIME> function performs a function to clear the CB ON time that the unit has.
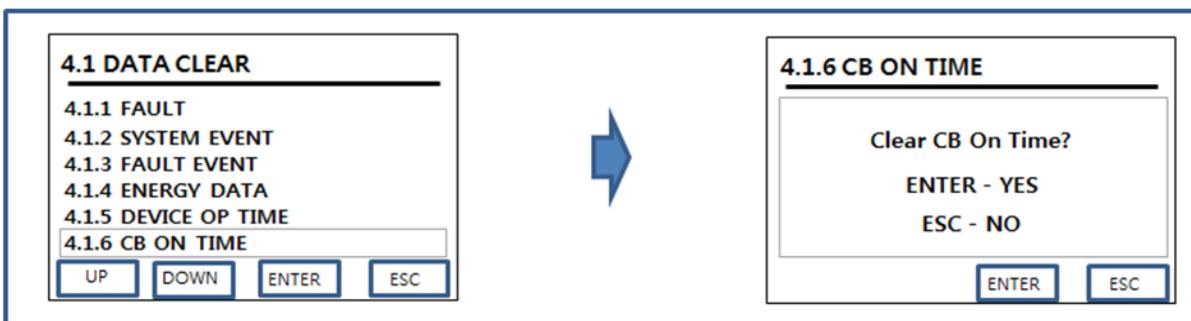
        ✓   "ENTER" key: Perform Clear function

        ✓   "ESC" key: Cancel Clear function

If the device normally performs the clear function normally, "ALL CLEAR" message will appear on the screen and "FAIL" message will appear on NACK.

4.5.1.2　　Data Clear-Existing ACB

: Existing ACB does not provide data clear function.

4.5.2　DO Control

The <4.2 DO CONTROL> function provides the function to control the DO or CB of the device.
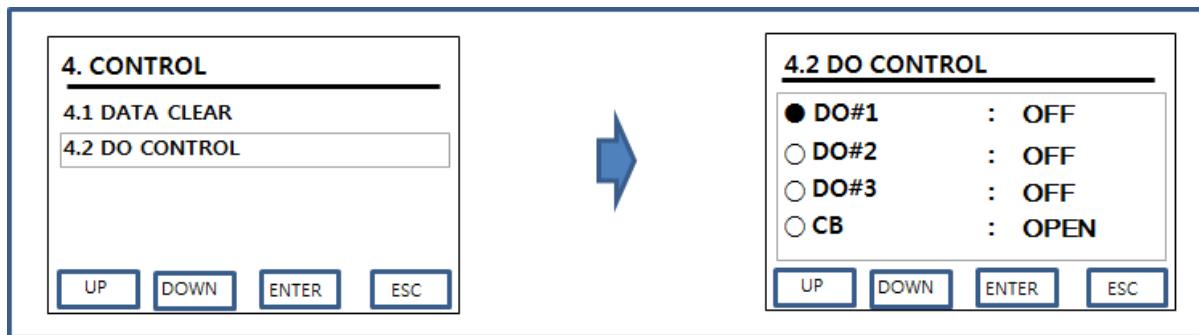
Press the "UP" or "DOWN" key to select DO (DO # 1 ~ # 3) or CB and press the "ENTER" key to switch to the control screen for the corresponding item. The following figure shows an example of controlling DO # 1.
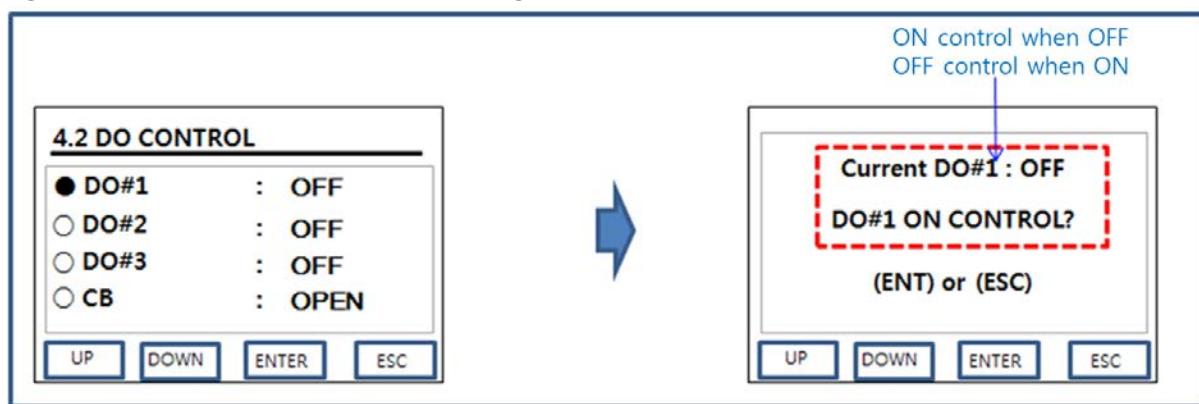
    ✓   DO Control: DO # 1 ~ 3 When the state of the device is OFF by the control function, ON control command is executed. When it is ON, OFF control command is executed.

    ✓   CB Control: CB control function performs the OPEN control function when the device status is in the CLOSE state, and performs the CLOSE function when it is OPEN.

4.6 System infomation-5. SYSTEM INFORMATION

<5. SYSTEM INFORMATION> section consists of the part that displays the system information of the device, the relay status and the system information of the tester.

(1) NEW ACB
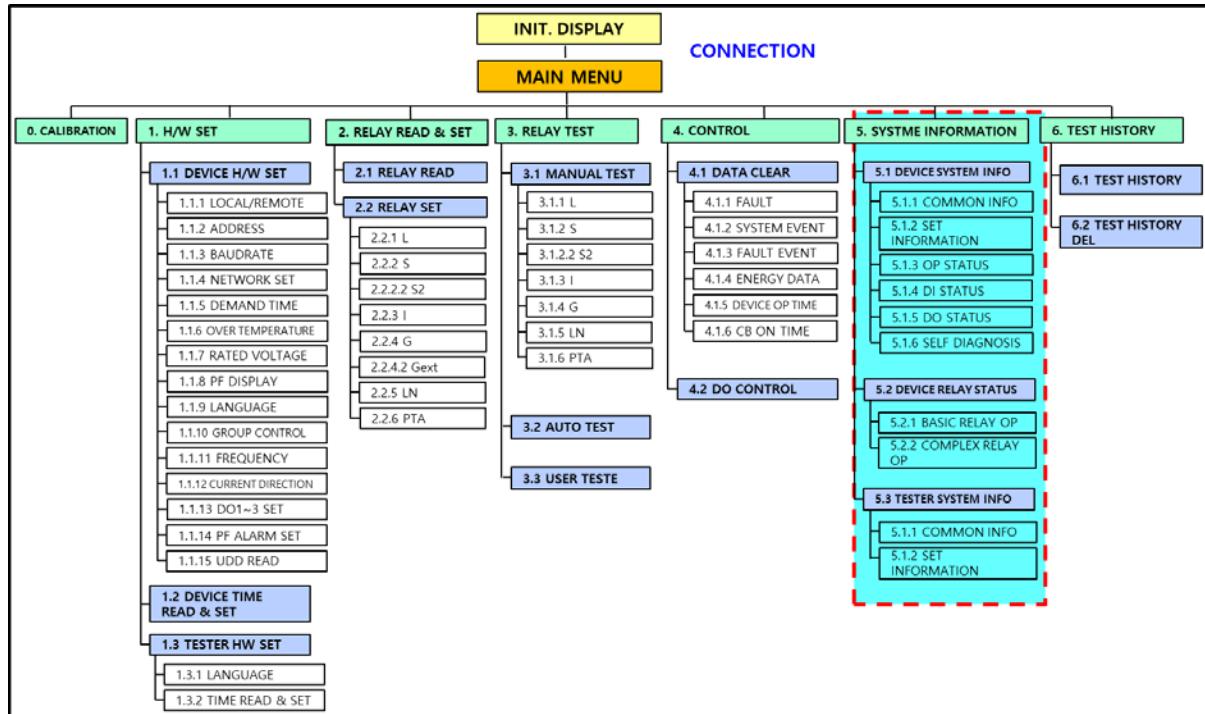
(2) SMART MCCB
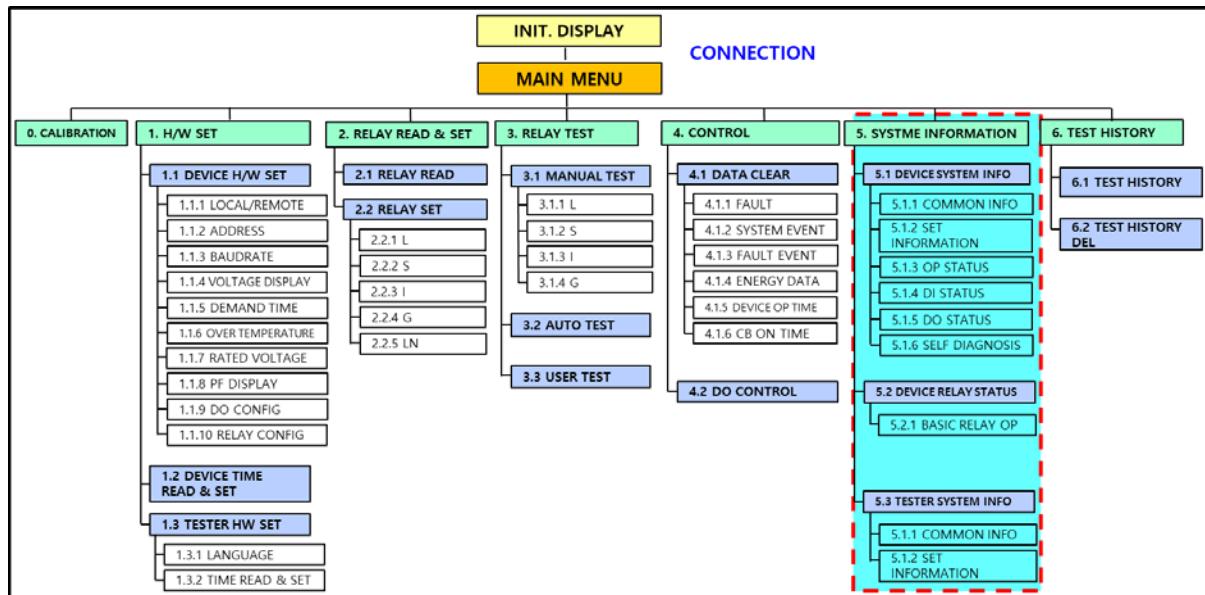

(3) Existing ACB
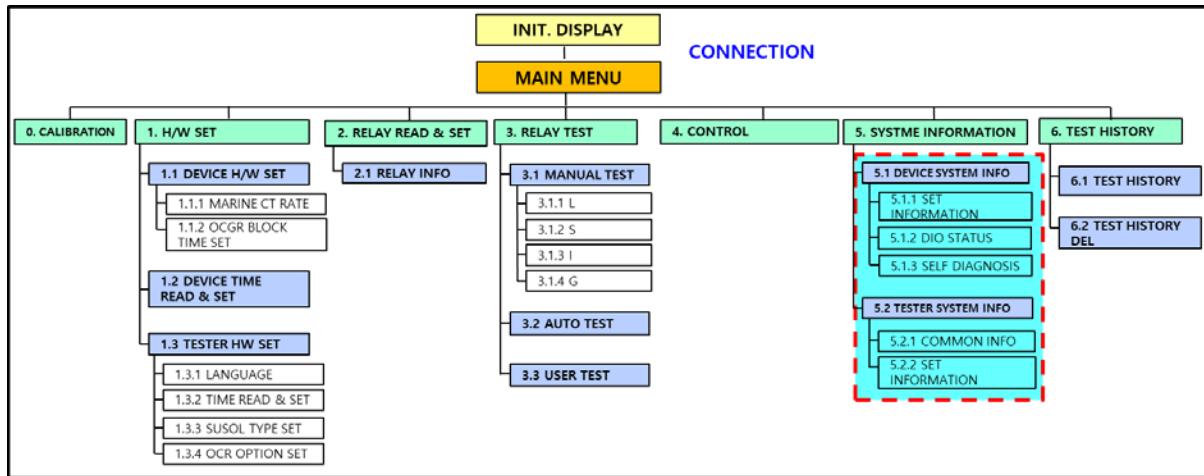
4.6.1 Device System Information

The <5.1 DEVICE SYSTEM INFO> function provides the function to display the common information of the device, DI, DO and the self-diagnosis status of the device.

4.6.1.1 System Information-NEW ACB

#### (1) Device Common Information

The <5.1.1 COMMON INFORMATION> function is the common information provided by the device. It identifies the vendor name, S/W version, product name, serial number and product code of the device.
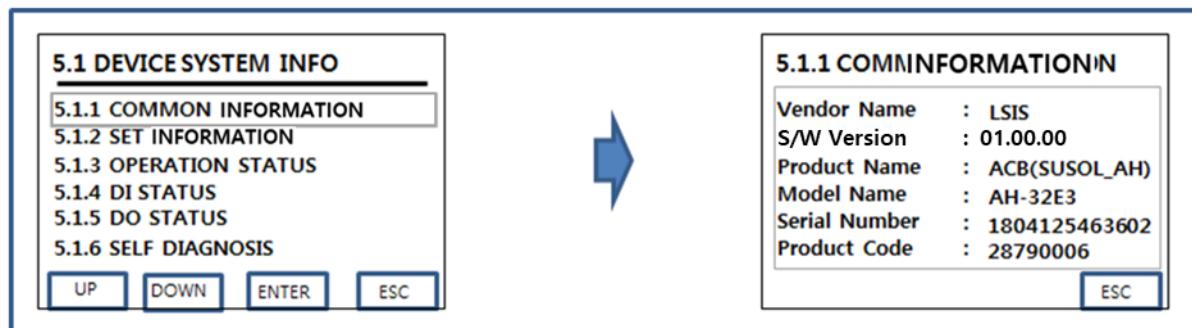
- ✓ **Vendor Name**: Vendor name of device
- ✓ **S/W Version**: Software version of device
- ✓ **Product Name**: Product name of device
- ✓ **Serial Number**: Serial number of device
- ✓ **Product Code**:   Product code of device

(2) Setting Information

<5.1.2 SET INFORMATION> function confirms device name, frequency, and rated voltage and current information.

✓ **Device Type**: Device name and type
   . ACB : NEW ACB N, A, P, S type
✓ **Pole & Wire Info**: Pole(3pole or 4pole) and Wire information(none(fixed))
✓ **Freq & AmpFrame**: Frequency(50/60Hz) and Ampere Frame(200~6300A) information
✓ **Rated Vol & Amp**: Rated voltage (100~1000V) and current (200~6300A) information
✓ **Knob & Relay Func**:   Device's option information
   - Knob function selection (OPT2) : G, PTA, Gext, G & NCT, PTA & NCT
   - Relay function selection (OPT3) : MARINE, NORMAL, HYNIX, SK
✓ **Knob Info**: Knob information
   – Iu, Ir, Tr, Is, Ts, Ii, Ig, Tg setting value

(3) Operation Status

The <5.1.3 OPERATION STATUS> function confirms the operation status of the device.
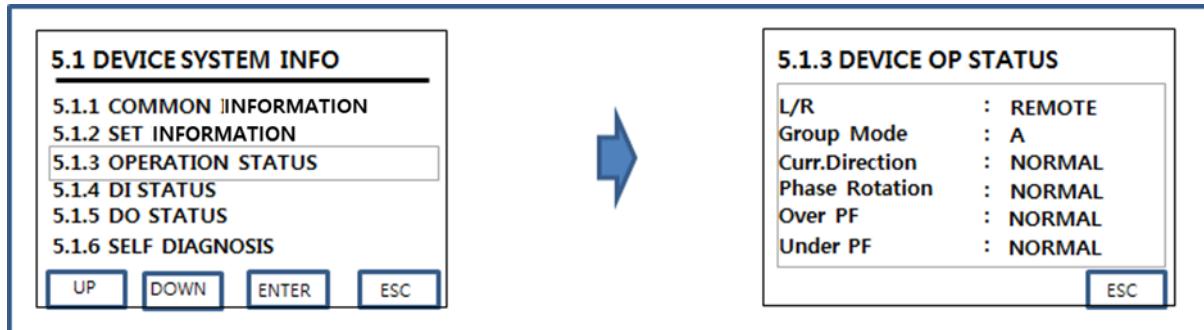
✓ **L/R**: Local / Remote setting status (LOCAL or REMOTE)
✓ **Group Mode**: Relay group setting status (A or B mode)
✓ **Curr. Direction**: Current direction status(NORMAL: Forward, REVERSE: Reverse direction):

- ✓ **Phase Rotation**: Phase rotation status(NORMAL: Forward, REVERSE: Reverse direction)
- ✓ **Over PF**:   Over power factor status(NORMAL or OCCUR)
- ✓ **Under PF**: Under power factor status(NORMAL or OCCUR)

### (4) DI Status

The <5.1.4 DI STATUS> function confirms the DI status of the unit.
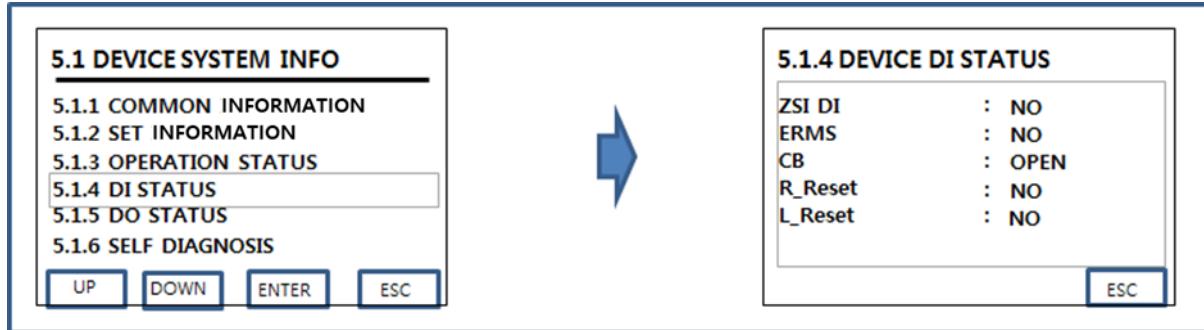
- ✓ **ZSI DI**: ZSI DI input(NO: No output, INPUT:ZSI DI input)
- ✓ **ERMS**: ERMS status of device(NO: No ERMS input, INPUT: ERMS input)
- ✓ **CB**: CB status of device(OPEN or CLOSE)
- ✓ **R_RESET**: Remote Reset status of device (NO: No reset, INPUT: Reset input)
- ✓ **L_RESET**: Local Reset status of device (NO: No reset, INPUT: Reset input)

(5) DO Status

The <5.1.5 DO STATUS> function checks the DO status of the instrument.
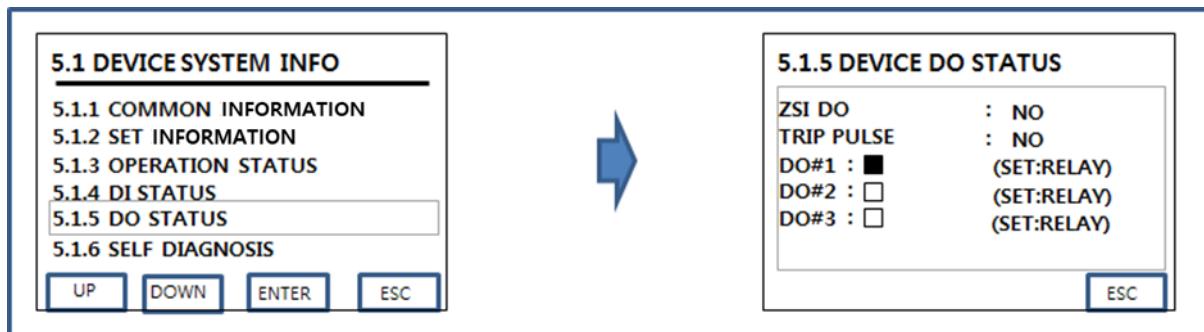
- ✓ **ZSI DO** : ZSI DO output(NO: No output, ZSI OUT:ZSI DO output)
- ✓ **TRIP PULSE** : TRIP Pulse output(NO: No pulse, PULSE:TRIP pulse output)
- ✓ **DO#1~3** : DO#1~3 setting status of device
    - (SET: RELAY): Set DO function to RELAY
    - (SET: CB CLOSE) : Set DO function to CB closed
    - (SET: CB OPEN) : Set DO function to CB opened

(6) Self-diagnosis

The <5.1.6 SELF DIAGNOSIS> function confirms the self-diagnosis status of the device.
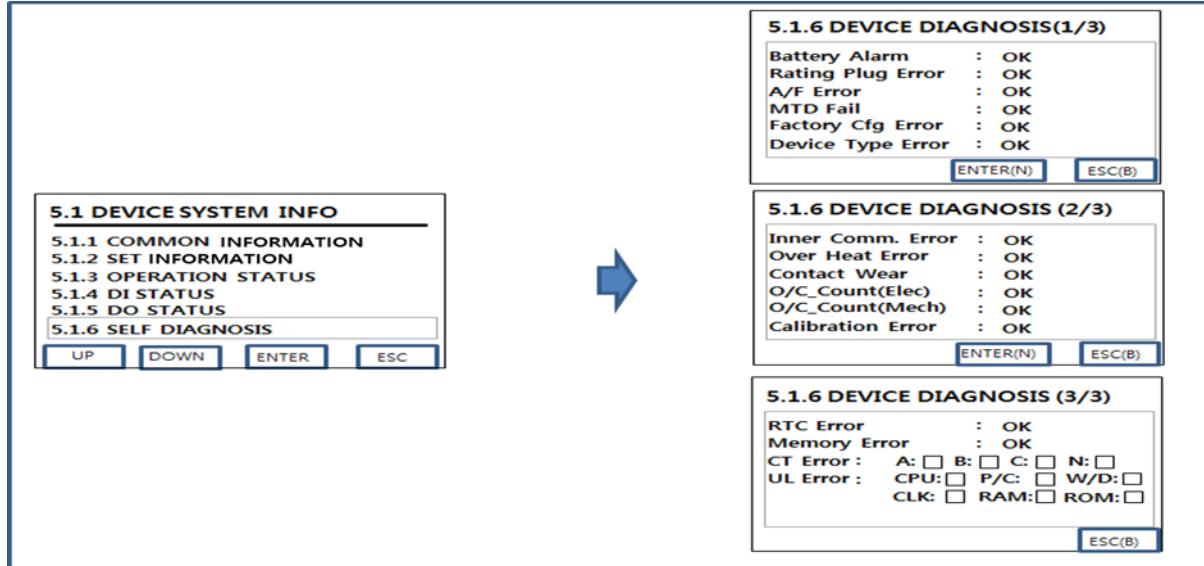

- ✓ **Battery Alarm**: Battery alarm of device(OK or LOW)
- ✓ **Rating Plug Status**: Ration Plug status(OK or ERROR)
- ✓ **A/F Status**: Ampere Frame status(OK or ERROR)
- ✓ **MTD Status**: MTD status(OK or ERROR)
- ✓ **Factory Cfg Status**:   Factory configuration mode status(OK or ERROR)
- ✓ **Device Type Status**: Device type status(OK or ERROR)
- ✓ **In Comm. Status**: OCR internal communication status(OK or ERROR)
- ✓ **Over Heat Status**: Over heat status of device(OK or ERROR)
- ✓ **Contact Wear**: Contact wear status of device(OK or ALARM)
- ✓ **O/C_Count(Elec)**: Electrical open count alarm status(OK or ERROR)
- ✓ **O/C_Count(Mech)**: Mechanical open count alarm status(OK:정상, ERROR:에러)
- ✓ **Calibration Status**: Calibration status of device(OK or ERROR)
- ✓ **RTC Status**: RTC status of device (OK or ERROR)
- ✓ **CT Error**: CT status of device(OK or ERROR)
- ✓ **UL Error** : UL status of device(OK or ERROR)

4.6.1.2   System Information-SMART MCCB

**(1) Device Common Information**

The <5.1.1 COMMON INFORMATION> function is the common information provided by the device. It identifies the vendor name, S/W version, product name, serial number and product code of the device.
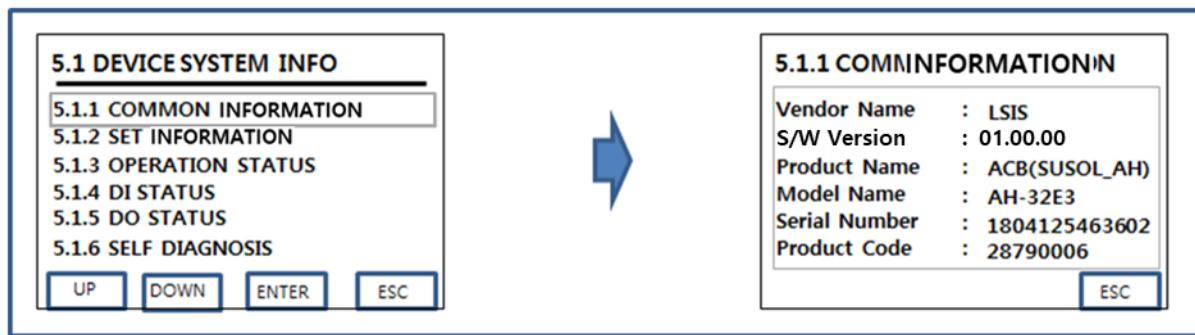
- ✓ **Vendor Name**: Vendor name of device
- ✓ **S/W Version**: Software version of device
- ✓ **Product Name**: Product name of device
- ✓ **Serial Number**: Serial number of device
- ✓ **Product Code**:   Product code of device

### (2) Setting Information

<5.1.2 SET INFORMATION> function confirms device name, frequency, and rated voltage and current information.
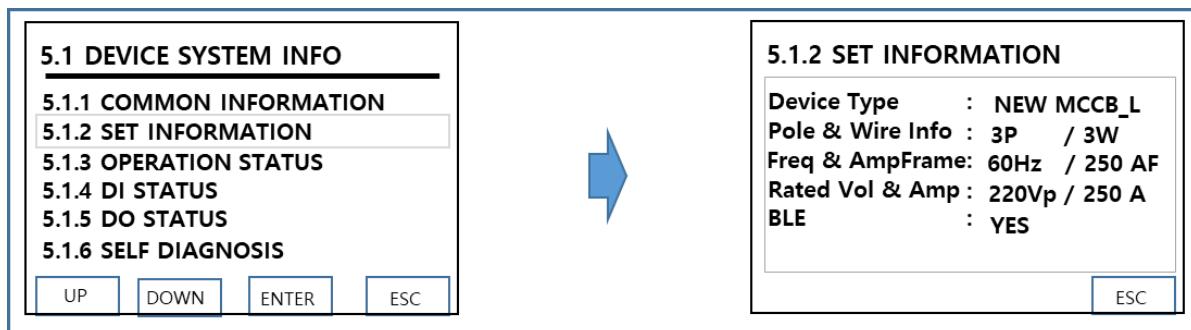
- ✓ **Device Type**: Device name and type
  - . NEW MCCB S(Standard), M(Medium), H(High), V(Visibility) type
- ✓ **Pole & Wire Info**: Pole(3pole or 4pole) and Wire information(3wire or 4wire)
- ✓ **Freq & AmpFrame**: Frequency(50/60Hz) and Ampere Frame(100~800A) information
- ✓ **Rated Vol & Amp**: Rated voltage(100~1000V) and current(40~800A) information
- ✓ **BLE**: BLE(Bluetooth Low Energy) Use   (YES or NO)

### (3) Operation Status

The <5.1.3 OPERATION STATUS> function confirms the operation status of the device.
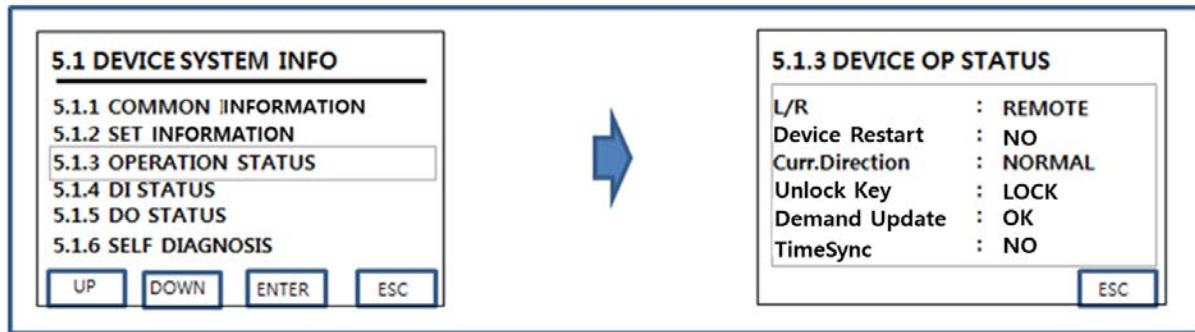
- ✓ **L/R**: Local / Remote setting status (LOCAL or REMOTE)
- ✓ **Device Restart**: Restart status of device (YES or NO)
- ✓ **Curr. Direction**: Current direction status(NORMAL: Forward, REVERSE: Reverse direction):
- ✓ **Unlock Key**: Lock status of device(LOCK or UNLOCK)
- ✓ **Demand Update**: Demand update status(OK or NO)
- ✓ **TimeSync**: Time sync status of device(NO or YES)

(4) DI Status

The <5.1.4 DI STATUS> function confirms the DI status of the unit.
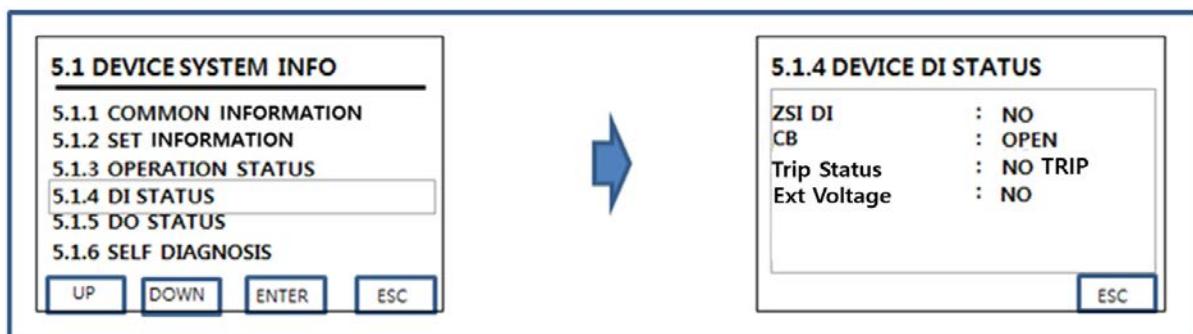
- ✓ **ZSI DI**: ZSI DI input(NO: No output, INPUT:ZSI DI input)
- ✓ **CB**: CB status of device(OPEN or CLOSE)
- ✓ **Trip Status**: Trip status of device (NO TRIP or TRIP)
- ✓ **Ext Voltage**:   External voltage status of device (NO or YEW)

(5) DO Status

The <5.1.5 DO STATUS> function checks the DO status of the instrument.
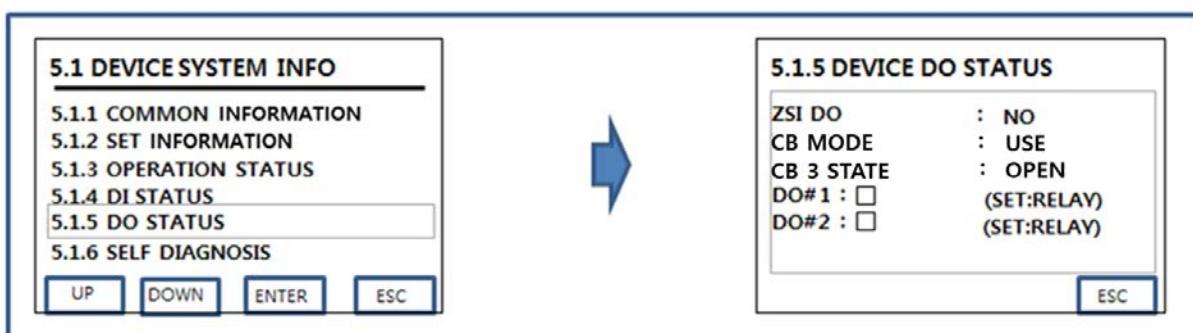
✓ **ZSI DO**: ZSI DO output(NO: No output, ZSI OUT:ZSI DO output)

✓ **CB MODE**: CB mode of device(USE or NOT USE)

✓ **CB 3 STATE**: CB 3 State of device(OPEN, CLOSE, TRIP and ERROR)

✓ **DO#1,2**: DO setting status(RELAY, CB CLOSE and CB OPEN)

(6) Self-diagnosis

The <5.1.6 SELF DIAGNOSIS> function confirms the self-diagnosis status of the device.
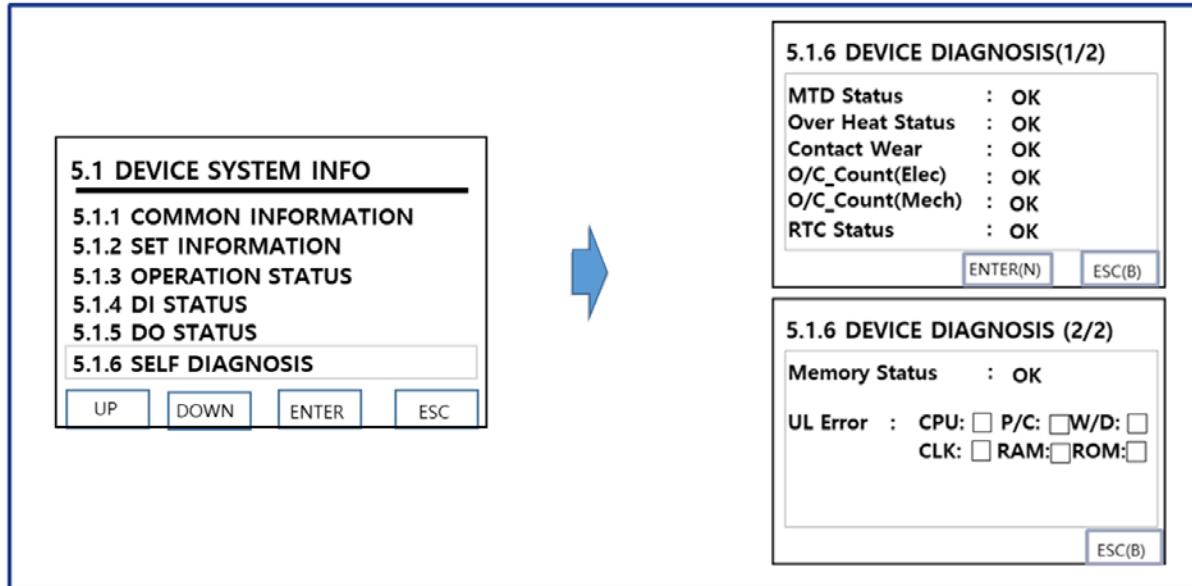

✓ **MTD Status**: MTD status(OK or ERROR)

✓ **Over Heat Status**: Over heat status of device(OK or ERROR)

✓ **Contact Wear**: Contact wear status of device(OK or ALARM)

✓ **O/C_Count(Elec)**: Electrical open count alarm status(OK or ERROR)

✓ **O/C_Count(Mech)**: Mechanical open count alarm status(OK or ERROR)

✓ **RTC Status**: RTC status of device (OK or ERROR)

✓ **Memory Status**: Memory status of device (OK or ERROR)

✓ **UL Error**: UL status of device(CPU, P/C(Program Count), Watchdog(W/D), CLK(Clock), RAM, ROM status)

4.6.1.3   System Information-Existing ACB

(1) Setting Information

The <5.1.1 SET INFORMATION> function confirms the device name and frequency and the rated voltage and current information.
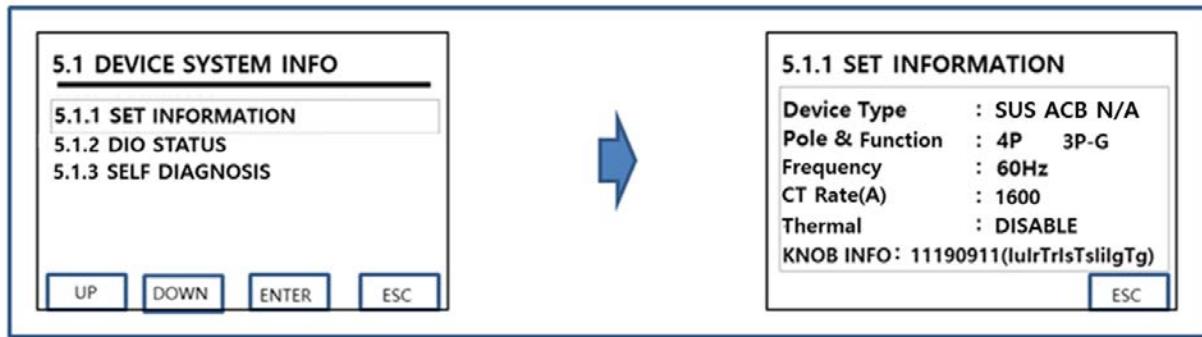
- ✓ **Device Type**: Device name and type
    - . Existing ACB: SUS ACB N,A,P, S
- ✓ **Pole & Function**: Pole Pole(3pole or 4pole) and function(3P-G, 3P-PTA,Gext,4P-G)
- ✓ **Frequency**: Frequency(50/60Hz) of device
- ✓ **CT Rate(A)**: CT Rate information(200 ~ 6300A) of device
- ✓ **Thermal**: Thermal use(ENABLE/DISABLE)
- ✓ **Knob Info**: Knob information
    - – Iu, Ir, tr, Is, ts, Ii, Ig, tg setting value

(2) DIO Status

The <5.1.2 DIO STATUS> function checks the DI and DO status of the unit.
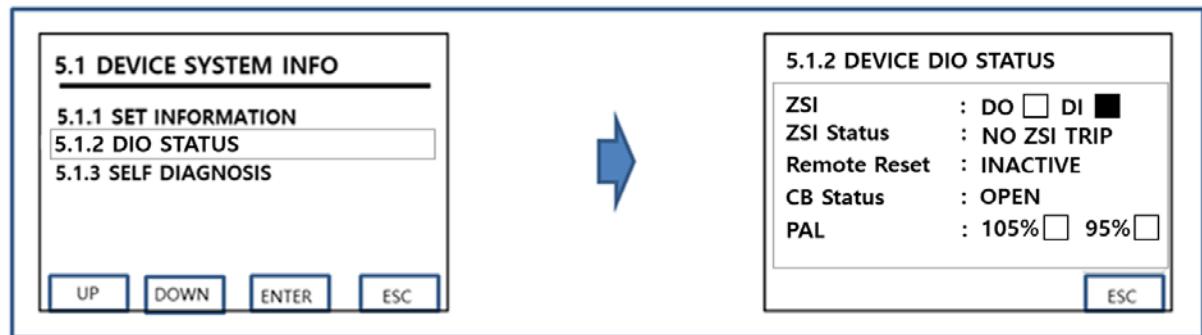
- ✓ **ZSI** : ZSI function of device(DO, DI)
- ✓ **ZSI Status**: ZSI status of device(NO ZSI TRIP, NO ZSI and ZSI)
- ✓ **Remote Reset** :   Remote reset status(INACTIVE or ACTIVE)
- ✓ **CB Status** :   CB status of device(OPEN or CLOSE)
- ✓ **PAL** :   PAL status of device(105%, 95%) <-v check : operation

(3) Self-diagnosis

The <5.1.3 SELF DIAGNOSIS> function confirms the self-diagnosis status of the device.
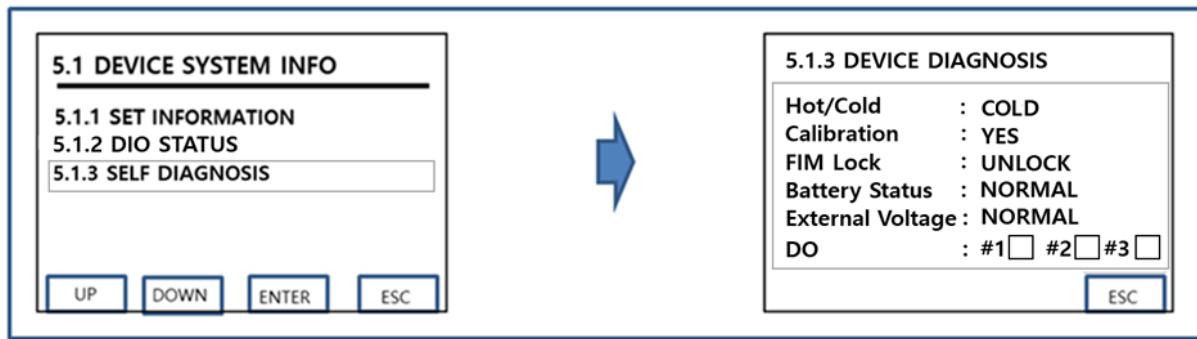
- ✓ **Hot/Cold**: Hot/Cold status of device(HOT or COLD)
- ✓ **Calibration**: Calibration status of device(YES or NO)
- ✓ **FIM Lock**: FIM Lock status of device(LOCK or UNLOCK)
- ✓ **Battery Status**: Battery status of device(LOW or NORMAL)
- ✓ **External Voltage**: External voltage status of device(NORMAL or ERROR)
- ✓ **DO**: DO operation status(v check : DO operation)

4.6.2 Device Relay Operation Status

The <5.2 DEVICE RELAY STATUS> function displays the relay status of the device and provides the function to display the basic and complex relay status.

4.6.2.1　Relay Operation-NEW ACB

(1) Basic Operation

The <5.2.1 DEVICE BASIC RELAY OP> function confirms the basic relay operation status of the device.
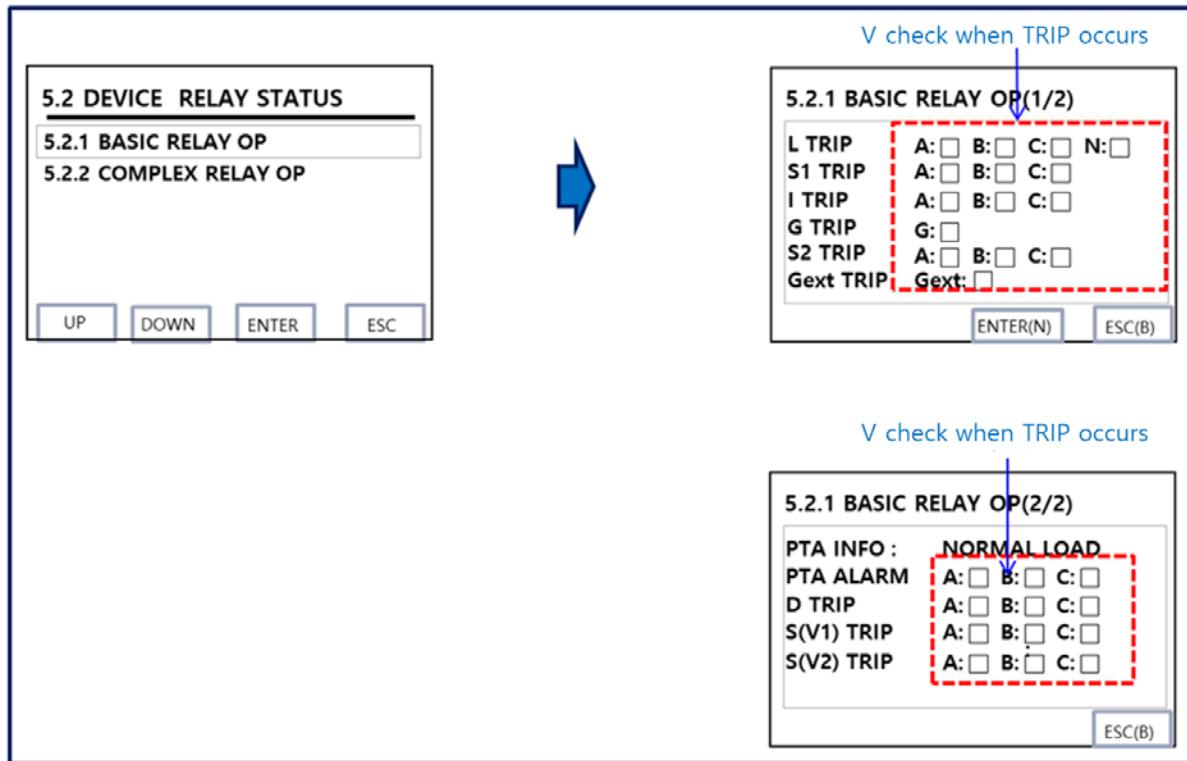
- ✓ **L TRIP**: Long time overcurrent relay operation status (phase A~N)
- ✓ **S1 TRIP**: Short time overcurrent relay operation status(phase A~C)
- ✓ **I TRIP**: Instantaneous time overcurrent relay operation status (phase A~C)
- ✓ **G TRIP**: Ground fault overcurrent relay operation status (G)
- ✓ **S2 TRIP**: Short time overcurrent relay operation status of Stage2 (phase A~C)
- ✓ **Gext TRIP**: External ground fault overcurrent relay operation status (Gext)
- ✓ **PTA INFO**: Pre Tree Alarm Setting information
    - – For Normal
        - . NORMAL LOAD : Normal load status
        - . 90 ~ 105%
        - . OVER 105%
    - – For marine
        - . NORMAL LOAD : Normal load status
        - . OVER 100%
        - . OVER SET CURR : If it is larger than PTA set current
- ✓ **PTA ALARM**: PTA Alarm status(A~C 상)
- ✓ **D TRIP**: Directional overcurrent relay operation status(phase A~C)
- ✓ **S(V1) TRIP**: Voltage control relay operation status of Stage1(phase A~C)
- ✓ **S(V2) TRIP**: Voltage control relay operation status of Stage2 (phase A~C)

(2) Complex Operation

<5.2.2 DEVICE COMPLEX RELAY OP> indicates the basic composite operation status of

the device and supports only the NEW ACB function.
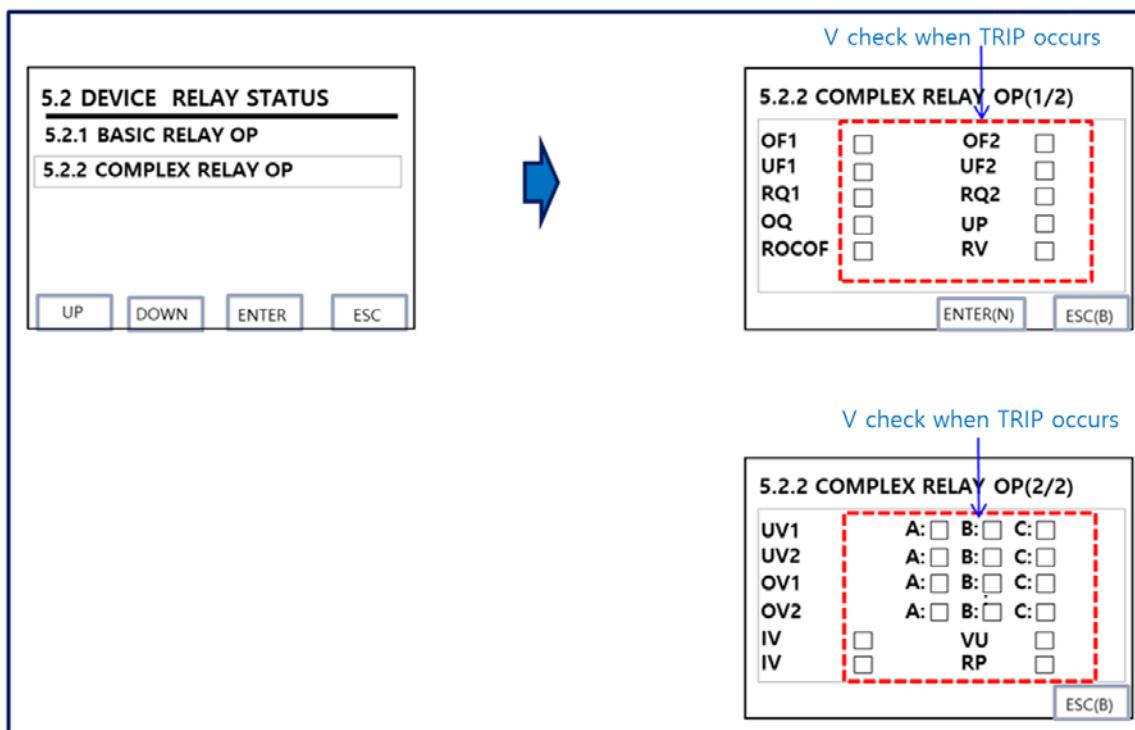
- ✓ **OF1, OF2**: Over frequency relay 1,2 operation status
- ✓ **UF1, UF2**: Under frequency relay 1,2 operation status
- ✓ **RQ1, RQ2**: Reverse Reactive Power relay 1,2 operation status
- ✓ **OQ**: Forward Reactive Power relay 1,2 operation status
- ✓ **UP**: Under active power relay operation status
- ✓ **ROCOF**: Rate of Change of Frequency relay operation status
- ✓ **RV**: Residual overvoltage relay operation status
- ✓ **UV1.UV2**: Under voltage relay 1,2 operation status (phase A~C)
- ✓ **OV1.OV2**: Overvoltage) relay 1,2 operation status (phase A~C)
- ✓ **IU**: Current unbalance relay operation status
- ✓ **VU**: Voltage unbalance relay operation status
- ✓ **OP**: Forward active overpower relay operation status
- ✓ **RP**: Reverse Active Power relay operation status

4.6.2.2   Relay Operation-SMART MCCB

SMART MCCB has basic relay operation status. SMART MCCB does not provide composite relay operation function.

(1) Basic Operation

The <5.2.1 DEVICE BASIC RELAY OP> function confirms the basic relay operation status of the device.
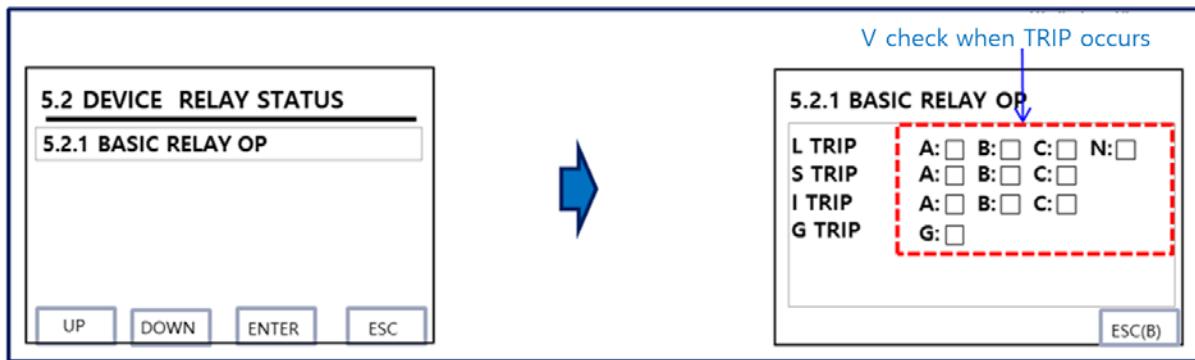
- ✓ **L TRIP**: Long time overcurrent relay operation status(phase A~N)
- ✓ **S TRIP** : Short time overcurrent relay operation status (phase A~C)
- ✓ **I TRIP**: Instantaneous time overcurrent relay operation status (phase A~C)
- ✓ **G TRIP**: Ground fault overcurrent relay operation status (G)

4.6.2.3   Relay Operation-Existing ACB

: Existing ACB relay operation status function is not provided.

4.6.3   TESTER System Information

The <5.3 TESTER SYSTEM INFO> function provides the common information of the OCR TESTER and the function to display the self-diagnosis status of the tester.

4.6.3.1   TESTER Common Information

<5.3.1 TESTER COMMON INFO> section is the common information provided by OCR TESTER. It confirms the vendor name, S/W version, product name, serial number and product code of the tester.
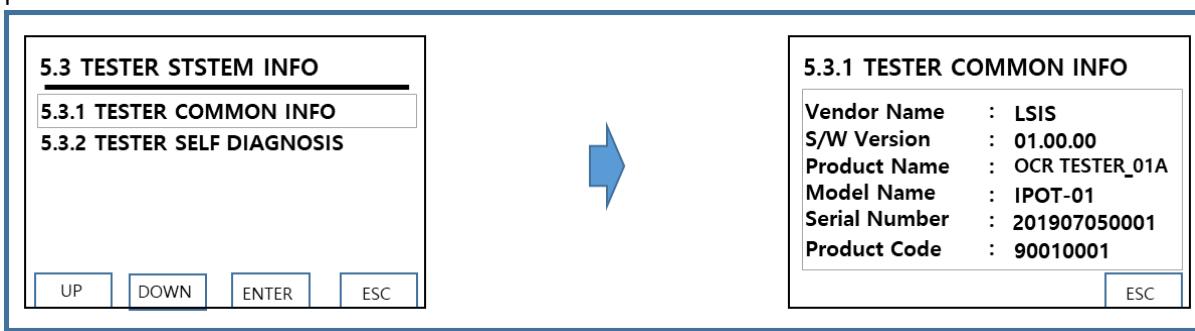
- ✓ **Vendor Name** : Vendor Name of TESTER
- ✓ **S/W Version** : Software version of TESTER
- ✓ **Product Name**: Product name of TESTER
- ✓ **Serial Number**: Serial number of TESTER

✓ **Product Code**: Product code of TESTER

4.6.3.2   TESTER Self Diagnosis

<5.3.2 TESTER SELF DIAGNOSIS> section confirms the self-diagnosis status of OCR TESTER.
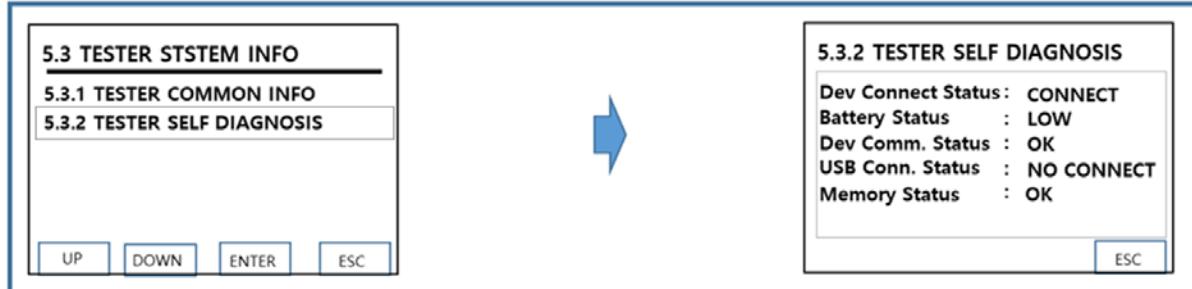

✓ **Dev Connect Status**: Connection status between device and TESTER(CONNECT or NO CONNECT)

✓ **Battery Status**: Battery status of TESTER(OK or LOW)

✓ **Dev Comm. Status**: Communication status between device and TESTER(OK or FAIL)

✓ **USB Conn. Status**: USB Connection status of TESTER(CONNECT or NO CONNECT)

✓ **Memory Status**:   Memory status of TESTER(OK or FAIL)

4.7 Test History-6. TEST HISTORY

4.7.1   Test History

<6.1 TEST HISTORY> function is to check test history stored in OCR TESTER. Detailed information can be checked by PC.

Roll Over Count and Position Index for stored TEST history. Detailed information can be checked using Record function of Manager S / W.
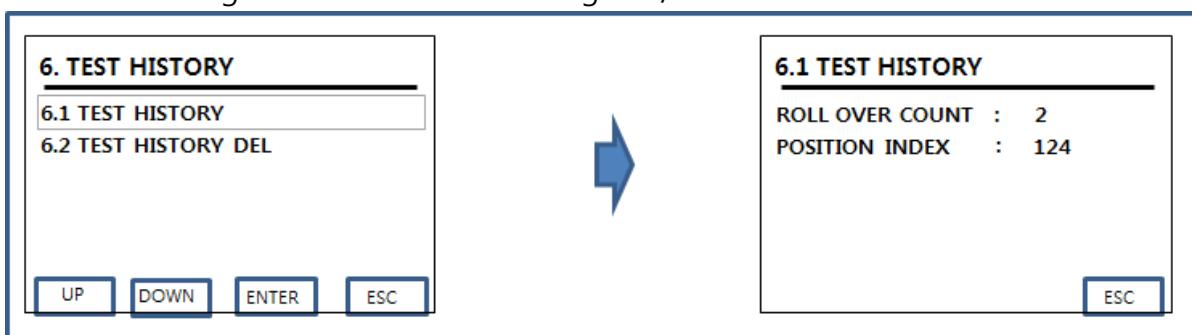

✓ **Roll Over Count**: Roll Over status counter of saved FRAM memory

'0' : No Roll Over

Over '1' : Roll Over

Ex) If 2, it indicates the state of Roll Over 2 times

✓ **Position Index**: location information for recent saved test results

0 : No saved test results

1~255 : Store up to 255

For example, if the Position Index is 124, it means that the latest stored position is 124, and 123 means the next saved test result information

4.7.2 Test History Deletion

The <6.2 TEST HISTORY DEL> function provides a function to delete the test history stored in the tester.
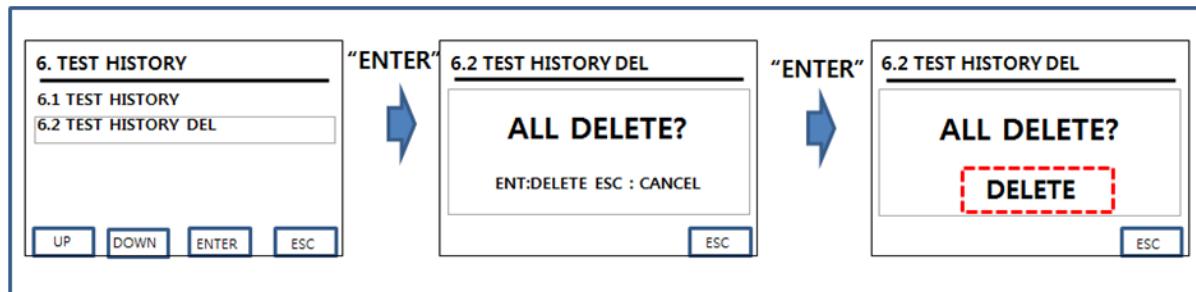
If you want to delete the whole history of the relay test result saved in the OCR TESTER in the <6.2 TEST HISTORY DEL> screen, press the "ENTER" key to execute the history delete function. Press the "ESC" key to <6. TEST HISTORY> menu list.

When the entire history information is deleted, it can be confirmed that the history information is deleted by the message 'DELETE', and there is no history information stored in <6.1 TEST HISTORY> as shown in the figure below.
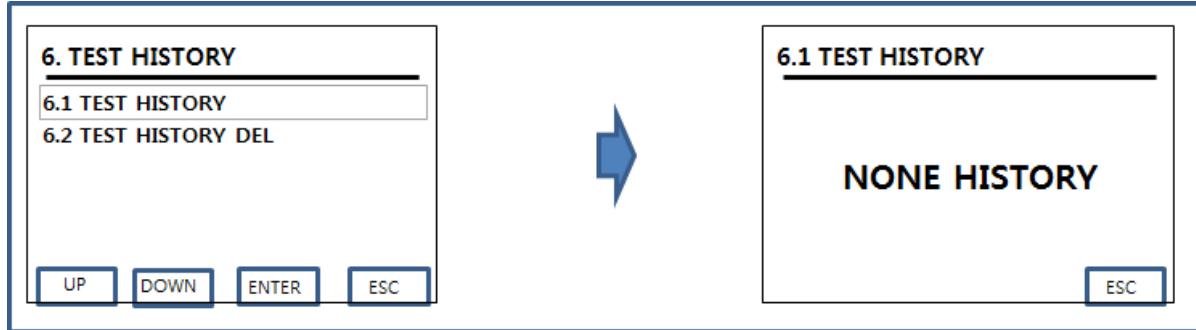
5 Using Manager S/W

5.1 TESTER Connection

① Connect OCR TESTER to Manager S / W via USB as shown below.

Figure 5-1: Manager S/W Connection

② Right-click the Temporary node at the bottom of the left project tree and select "Add New Device Manually ..." from the displayed context menu. Select> LV> TESTER> OCR TESTER.
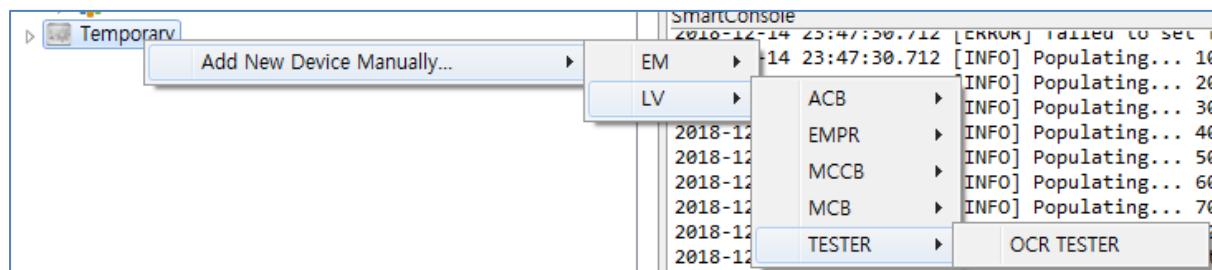
③ Enter the desired name in the "Set Browse Name" dialog box and click "OK" button to create the OCR tester device.
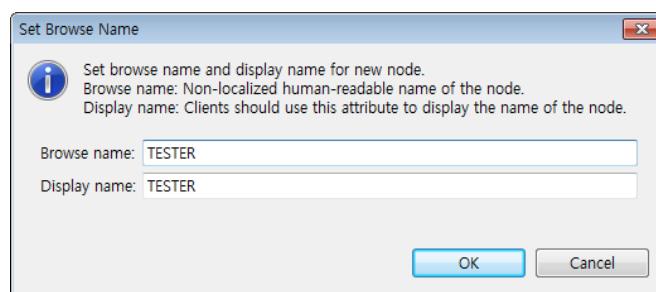
④ When OCR Tester screen opens, "Connect to device ... "Button to perform the communication connection with the device.

5.2 Relay Test

5.2.1 User Test

① Open the OCR Tester screen and click the "User (Default) Test" tab.
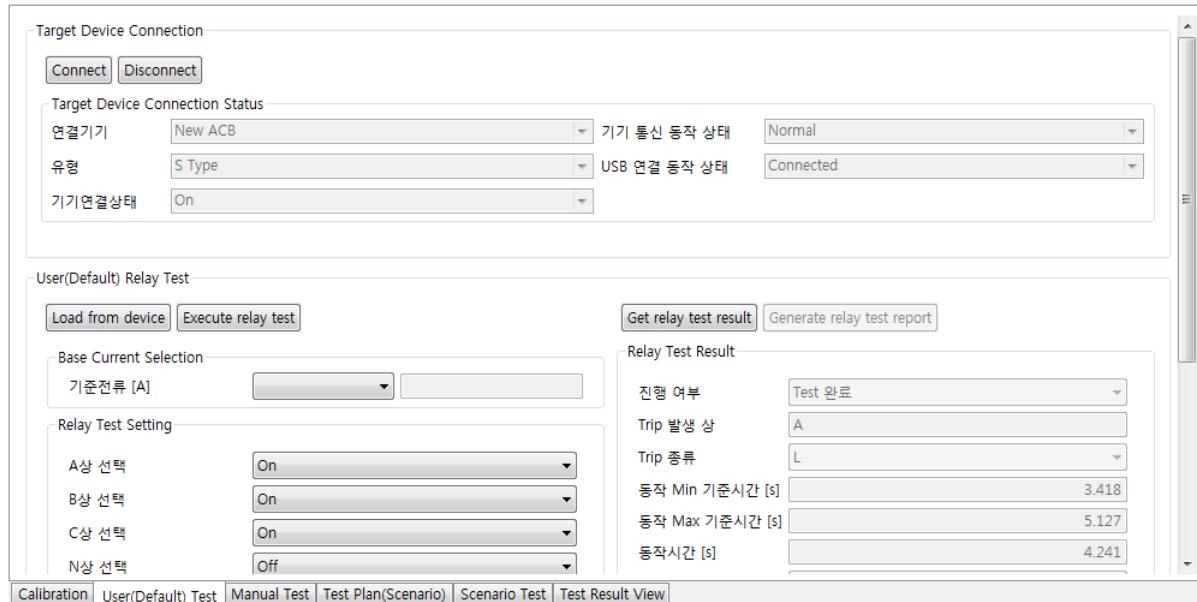
Figure 5-2: Manager S/W – User Test

② Enter parameters in "User (Default) Relay Test" group and click "Execute relay test to device" button to perform user test.

③ When the user test is completed, click the "Get relay test result from device" button to check the test result.

④ When the user test is completed, click the "Generate current relay test report" button to output the test result as a report.

5.2.2 Manual Test

① Open the OCR Tester screen and click the "Manual Test" tab.
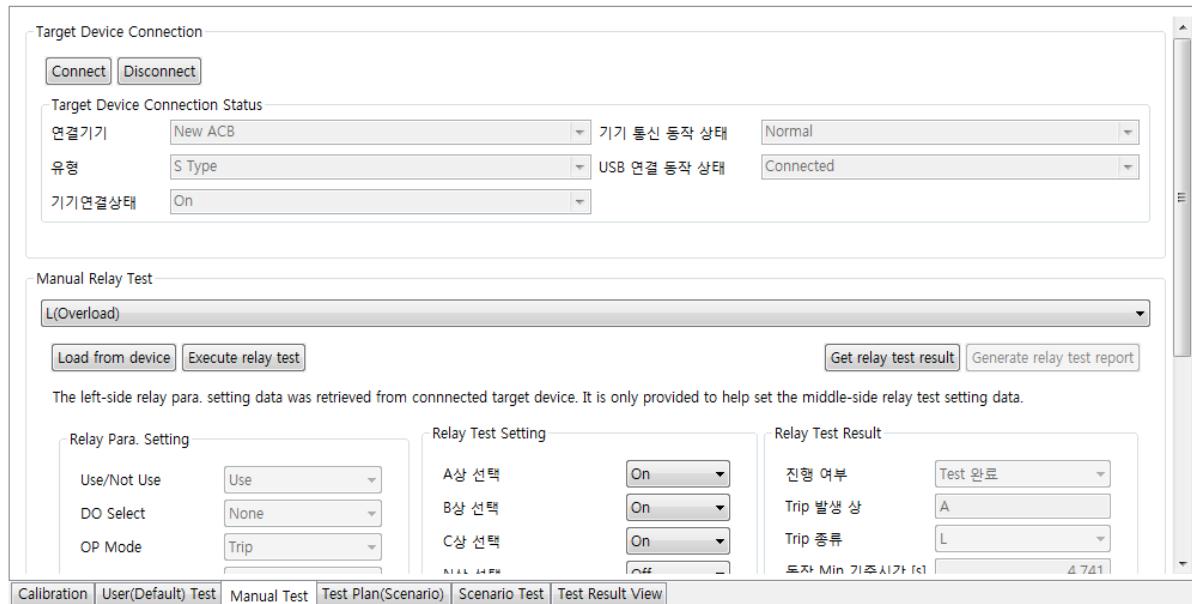
Figure 5-3: Manager S/W – Manual Test

② Enter the parameters in the "Manual Relay Test" group and perform the manual test by clicking the "Execute relay test to device" button.

③ When the manual test is completed, check the test result by clicking the "Get relay test result from device" button.

④ When the manual test is completed, click the "Generate current relay test report" button to output the test result as a report.

5.2.3   Scenario Test

(1) Scenario composition

① Open the OCR Tester screen and click the "Test Plan (Scenario)" tab.
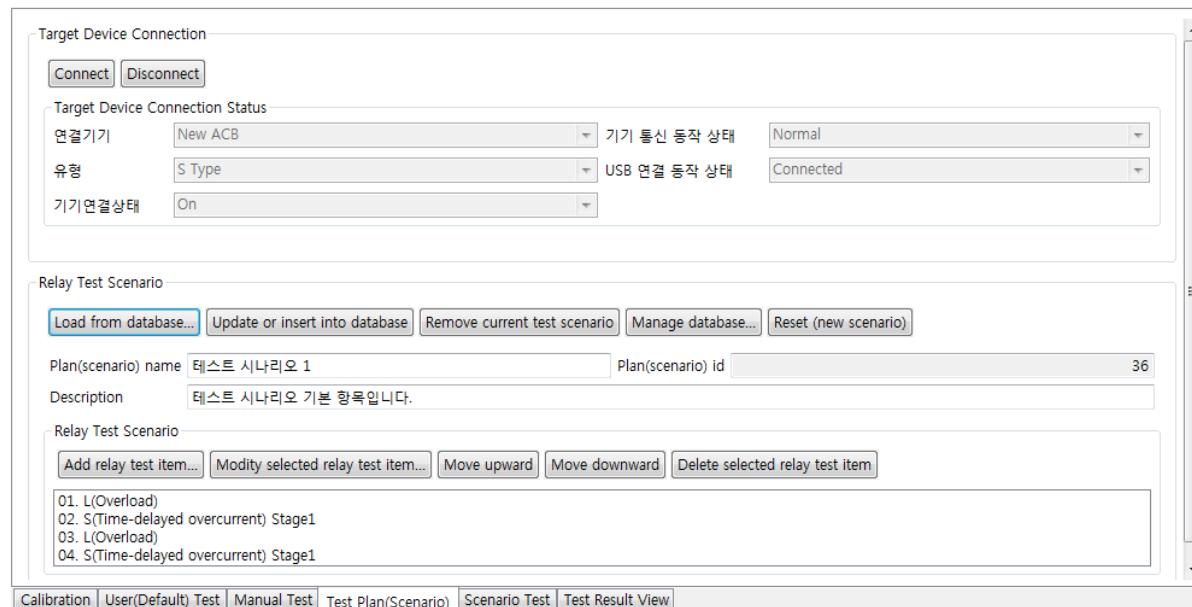
② Configure the "Relay Test Scenario" test scenario.

③ In the test scenario, you can add several tests under the scenario.

④ The test scenarios you configure are stored in the local database, so they can be called at any time.

(2) Scenario test

① Open the OCR Tester screen and click the "Scenario Test" tab.
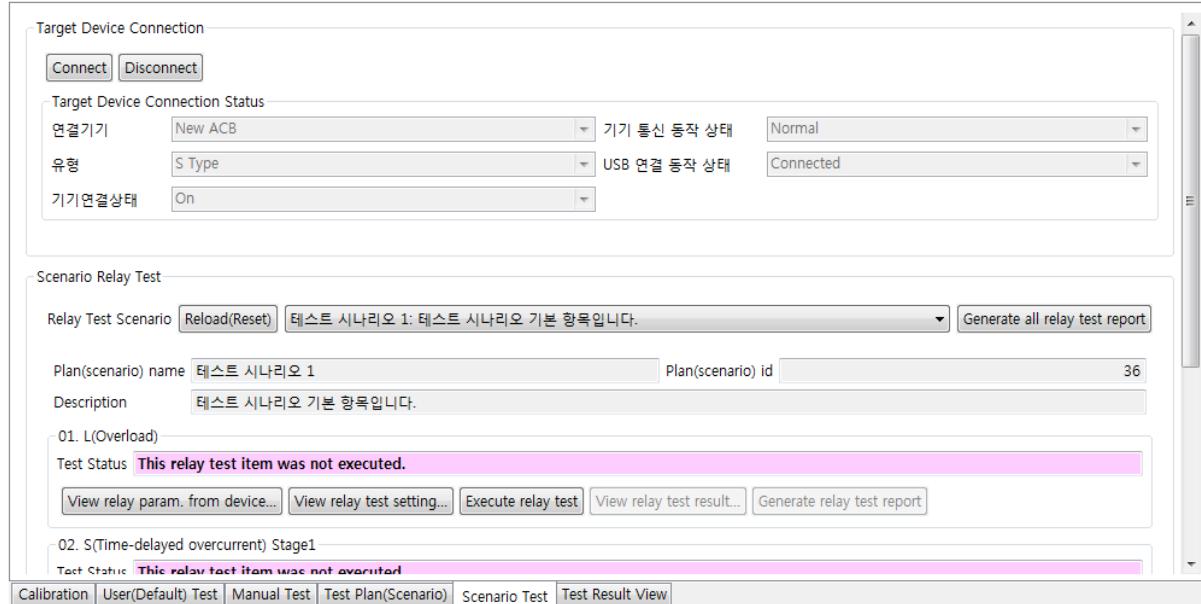
Figure 5-5: Manager S/W – Scenario Test

② The "Scenario Relay Test" group selects the desired scenarios and the test items included in the scenario are displayed below.

③ Perform the test by clicking the "Execute relay test" button for each test item.

④ When each test is completed, click the "Generate relay test report" button and output the test result as a report.

⑤

5.3 Relay Test Result & Reporting

5.3.1 Relay Test Result

① Open the OCR Tester screen and click the "Test Result View" tab.

Figure 5-6: OCR test result – list

② In the "Test Result Database" group, you can delete the test results of the current local database or import the test event data from the device.

③ In the "Test Result Query" group, you can query the test stored in the current local database.

5.3.2 Result Report

① Select "Report> Test Result Report ..." from the menu. "To open the" OCR Test Result Report Wizard "dialog box as shown below.
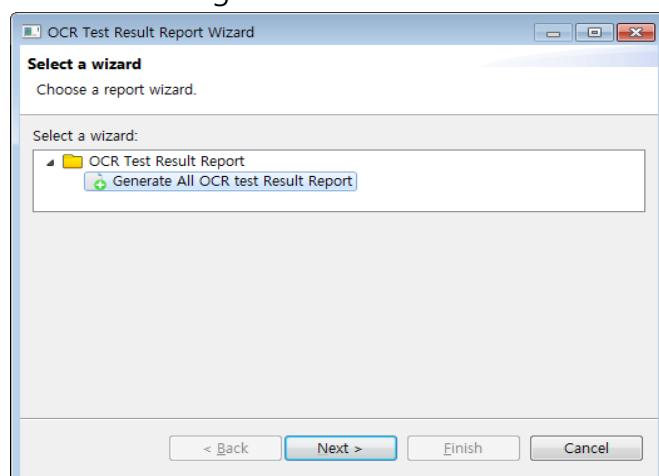
② Select "Generate Architecture Report", click the "Next>" button at the bottom, enter the name of the report file to be created, and click the "Next>" button.
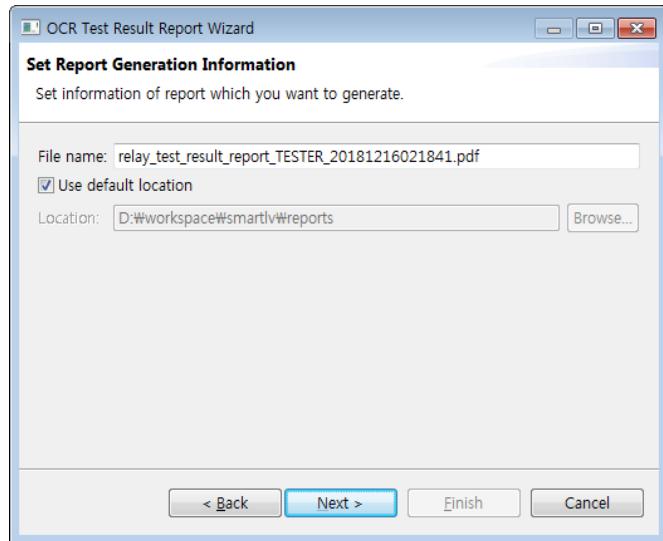
③ In the "Process Report Generation" page, click "Generate report: OCR_TEST_RESULT_REPORT" to generate the report.
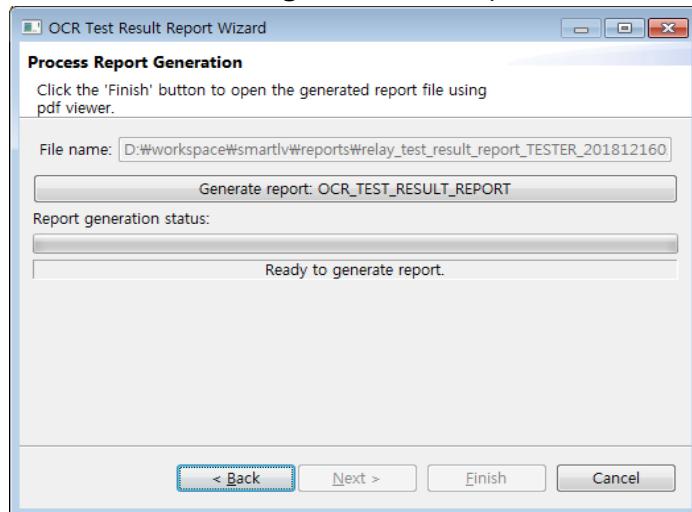
④ When the report is completed, the "Finish" button at the bottom is activated. Click the "Finish" button to open the report as a PDF file.
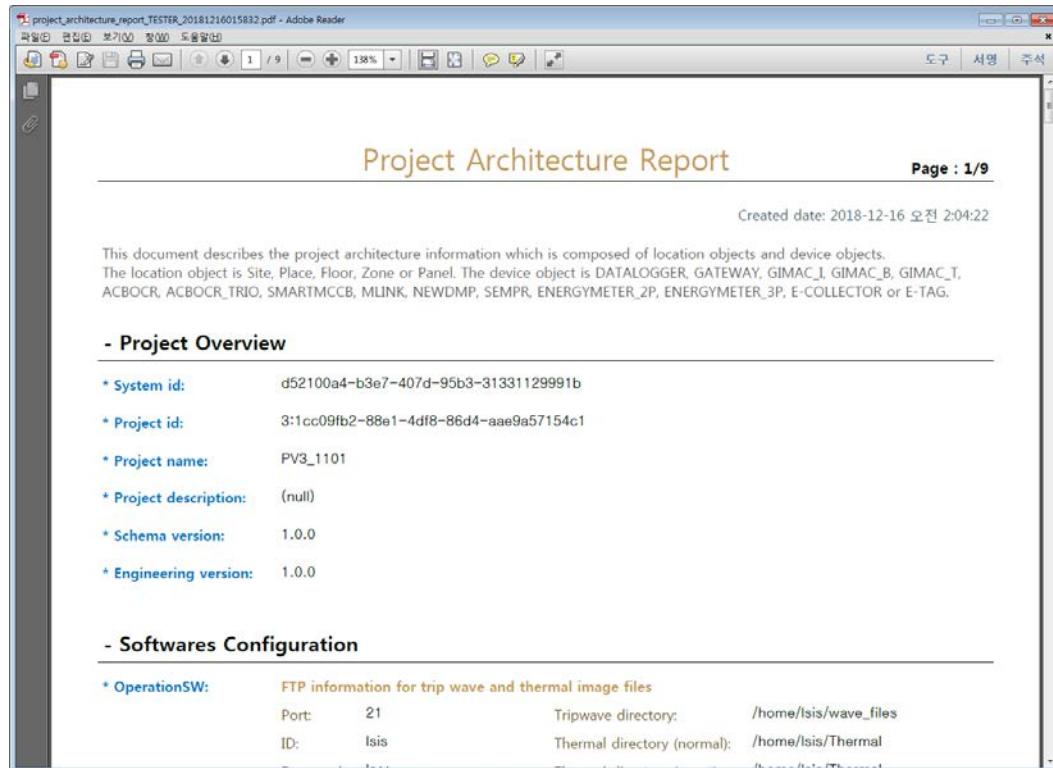
Figure 5-7: OCR test result – reporting

⑤   (Note) To open the report file, PDF Viewer must be installed first.

<Reference 1> Relay Element Testing Method

1.1 Long Time (3.3 USER TEST)

1) Change ACB/MCCB Setting value.

   - Set other relay elements (lsd / li / lg) to OFF.

   (When Test is performed with 3.2 MANUAL TEST/3.2.1 L, then relay element other than L relay element is automatically turned OFF in TESTER.)

2) Change OCR TESTER Setting Value

   : refer to Standard Table for Long Time Relay before setting.

3) Press "START" button.

4) The expected time is displayed in the LCD window.

5) Check whether the relay element is operating with the LCD window.

   - For details, refer to the ACB main unit operation manual.

After completing the relay element test, press the "STOP" button to clear the OCR relay operation status.

7) If you want to continue testing, press "ENTER" button to switch to the relay test screen (3.3 USER TEST).

<Standard table for Long time relay>

No.	Setting Condition						Operation Time(Sec) *() : MCCB
	OCR					TESTER (Base:lr)	
	ACB		P/S	MCCB		Output (A/B/C)	
	N/A						
	lu	lr	lr	lr	tr		
1	0.5	0.8	0.4	0.4	0.5	1.5	10.157 ～ 12.414 (9.029 ～13.543)
2	0.5	0.8	0.4	0.4	0.5	6.0	0.400 ～ 0.600 (0.400 ～ 0.600)
3	0.5	0.8	0.4	0.4	16	10.0	4.557 ～ 6.836 (4.557 ～ 6.836)
4	1.0	1.0	1.0	1.0	0.5	3.0	1.900 ～ 2.322 (1.689 ～ 2.533)
5	1.0	1.0	1.0	1.0	16	6.0	12.800 ～ 19.200 (12.800 ～ 19.200)

1.2 Short Time (3.3 USER TEST)

1) Change ACB/MCCB Setting value.

   - Set other relay elements(lr / li / lg) to OFF.

   (When Test is performed with 3.2 MANUAL TEST/3.2.2 S, then relay element

   other than S relay element is automatically turned OFF in TESTER.)

2) Change OCR TESTER Setting Value

   : refer to Standard Table for Short Time Relay before setting.

3) Press "START" button.

4) Repeat steps 1-1.(4) to (7).

<Standard table for Short time relay>

No.	Setting Condition							Operation Time(Sec)
	OCR						TESTER (Base:lr)	
	ACB		P/S	MCCB			Output (A/B/C)	*() : MCCB
	N/A							
	lu	lr	lr	lr	lsd	tsd(l²t)		
1	0.5	0.8	0.4	0.4	1.5	0.1(on)	2.0	2.125 ~ 2.875 (2.420 ~ 3.630)
2	0.5	0.8	0.4	0.4	1.5	0.4(on)	6.0	0.944 ~ 1.277 (1.075 ~ 1.613)
3	0.5	0.8	0.4	0.4	1.5	0.4(on)	10.0	0.320 ~ 0.480 (0.387 ~ 0.580)
4	0.5	0.8	0.4	0.4	1.5	0.4(off)	2.5	0.360 ~ 0.440 (0.350 ~ 0.500)
5	1.0	1.0	1.0	1.0	3.0	0.1(on)	4.65	0.393 ~ 0.531 (0.447 ~ 0.671)
6	1.0	1.0	1.0	1.0	8.0	0.2(on)	10.0	0.160 ~ 0.240 (0.193 ~ 0.290)
7	1.0	1.0	1.0	1.0	10.0	0.1(off)	11.0	0.060 ~ 0.140 (0.070 ~ 0.140)

1.3 Instantaneous Time (3.3 USER TEST)

1) Change ACB/MCCB Setting value.

    - Set other relay elements(lr / lsd / lg) to OFF.

      (When Test is performed with 3.2 MANUAL TEST/3.2.3 I, then relay element

      other than I relay element is automatically turned OFF in TESTER.)

2) Change OCR TESTER Setting Value

   : refer to Standard Table for Short Time Relay before setting.

3) Press "START" button.

4) Repeat steps 1-1.(4) to (7).

<Standard table for Instantaneous time relay>

No.	OCR ACB N/A Iu	OCR ACB N/A Ir	OCR ACB P/S Ir	OCR MCCB Ir	Ii	TESTER (Base:In) Output (A/B/C)	Operation Time
1					2	2.1	
2					2	10.0	
3					3	3.2	
4					4	4.2	
5	In Standard does not influence operating time with any value setting.				6	10.5	Within 50msec
6					8	9.0	
7					10	10.5	
8					12	13.0	
9					12	14.5	
10					15	15.7	

1.4 Ground Fault (3.3 USER TEST)

1) Change ACB/MCCB Setting value.

   - Set other relay elements(lr / lsd / li) to OFF.

     (When Test is performed with 3.2 MANUAL TEST/3.2.4 G, then relay element

     other than G relay element is automatically turned OFF in TESTER.)

2) Change OCR TESTER Setting Value

   : refer to Standard Table for Ground Relay before setting.

3) Press "START" button.

4) Repeat steps 1-1.(4) to (7).

5) The ground trip test applies current only to one of the A / B / C / N phases.

<Standard table for Ground fault relay>

No.	Setting Condition						TESTER (Base:In)	Operation Time(Sec)
	OCR							
	ACB		P/S	MC CB				
	N/A						Ouput (A/B/C)	*() : MCCB
	lu	lr	lr	lr	lg	tg(l²t)		
1	In Standard does not influence operating time with any value setting.				0.2	0.1(off)	0.3	0.060 ～ 0.140 (0.070 ～ 0.140)
2						0.2(on)	6.0	0.160 ～ 0.240 (0.150 ～ 0.250)
3						0.4(on)	10.0	0.340 ～ 0.460 (0.300 ～ 0.500)
4					1.0	0.3(off)	1.2	0.260 ～ 0.340 (0.240 ～ 0.350)
5						0.1(on)	3.0	0.060 ～ 0.140 (0.060 ～ 0.140)
6						0.4(on)	10.0	0.340 ～ 0.460 (0.300 ～ 0.500)

1.5 PTA for Marine (3.3 USER TEST)

1) Change ACB for marine Setting value.

   - Set other relay elements(Ir / Isd / Ii / Ig) to OFF.

     (When Test is performed with 3.2 MANUAL TEST/3.2.6 PTA, then relay element

     other than PTA relay element is automatically turned OFF in TESTER.)

2) Change OCR TESTER Setting Value

   : refer to Standard Table for PTA Relay before setting.

3) Press "START" button.

4) Repeat steps 1-1.(4) to (7).

<Standard table for PTA relay>

No.	Setting Condition						Operating Time (Sec)
	OCR					TESTER (Base:In)	
	ACB						
	N/A		P/S				
	Iu	Ir	Ir	Ip	tp	Output (A/B/C)	
1	In Standard does not influence operating time with any value setting.			0.7	5	1.3	1.278 ~ 1.917
2				0.8	10	3	0.627 ~ 0.940
3				0.85	20	3	1.416 ~ 2.124
4				0.9	35	5	1.000 ~ 1.500
5				0.95	40	5	1.273 ~ 1.910
6				1	40	6	0.980~1.470
7				1.05	45	6	1.215~1.823
8				1.1	45	10	0.480~0.720

※ When PTA relay element test and long relay factor test are performed at the same time, trip information is displayed after PTA trip information display according to relay setting.

※ MCCB does not support PTA relay element function.

<Reference 2> Using USB Power

The OCR TESTER can be driven by an external DC24V power supply and a 9V alkaline battery as well as an auxiliary battery as an operating power source.
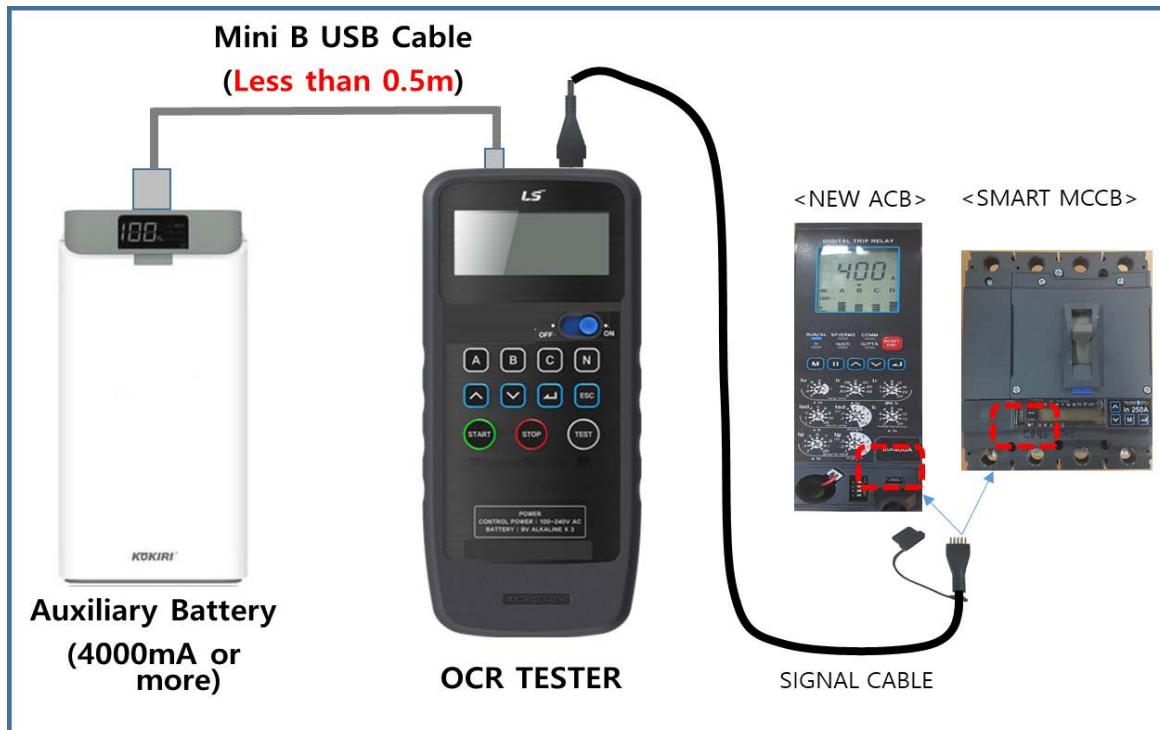
If you connect OCR TESTER to the USB port of OCR TESTER by using OCR TESTER's secondary battery and USB cable (Mini-B USB cable), you can test the ACB or MCCB device using the power of the auxiliary battery. The auxiliary battery and Mini-B USB cable specifications are as follows.

List	Contents	Explanation
Auxiliary Battery	4000mA or more auxiliary battery	5V, 2A output specification
USB Cable	Mini-B USB Cable (Less than 0.5m)	USB cable should be used **less than 0.5m cable** due to voltage drop.

Auxiliary battery and less than 0.5m Mini-B USB cable are easy to purchase via internet and are not available in OCR TESTER.

Technical Question or After-sales Service —
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Daegu Sales Team	TEL : (053)603-7711~13	FAX : (053)603-7777
Pohang Sales Office	TEL : (054)286-4528	FAX : (054)286-2813
Gwangju Sales	TEL : (062)510-1881~22	FAX : (062)528-7684
Jeonju Sales Office	TEL : (063)271-4014~16	FAX : (063)271-2613
Daejeon Sales	TEL : (042)820-4201~07	FAX : (042)820-4298

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Jeonju Service	TEL : (063)254-2080	FAX : (063)271-2613