



Numerical Protection Relay

MELPRO™-D Series

GENERAL OPERATION MANUAL

Request

Ensure that this Instruction Manual is delivered to the end users and the maintenance manager.

- Introduction -

Thank you for purchasing MITSUBISHI ELECTRIC **MELPRO™** – DASH Series Digital Protection Relay.

Please read this manual carefully before use to be familiar with the functions and performances enough to use the product properly.

Please note that end user is required to be provided with this general operation manual.

For operation of the product, this manual should be used in conjunction with the following materials:

Title of manual	Document No.
MELPRO – D Series Protection Relay Instruction Manual (specific to each model)	JEPO-IL□□□□ (varies by model)

When the protection relay is used with a together communication card, use the following documents too:

(For CC-Link)

Title of document	Document No.
MELPRO – D Series Protection Relay CC-COM Communication Card (CC-Link) Operation Manual (General information)	JEPO-IL9417
MELPRO – D Series Protection Relay CC-COM Communication Card (CC-Link) Operation Manual (Model-specific information)	JEPO-IL9418

(For MODBUS)

Title of document	Document No.
MELPRO – D Series Protection Relay RS-COM Communication Card (MODBUS) Operation Manual (General information)	JEPO-IL9419
MELPRO – D Series Protection Relay RS-COM Communication Card (MODBUS) Register Map (Model-specific information)	JEPO-IL□□□□ (varies by model)

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1 General description

1.1 Front control panel

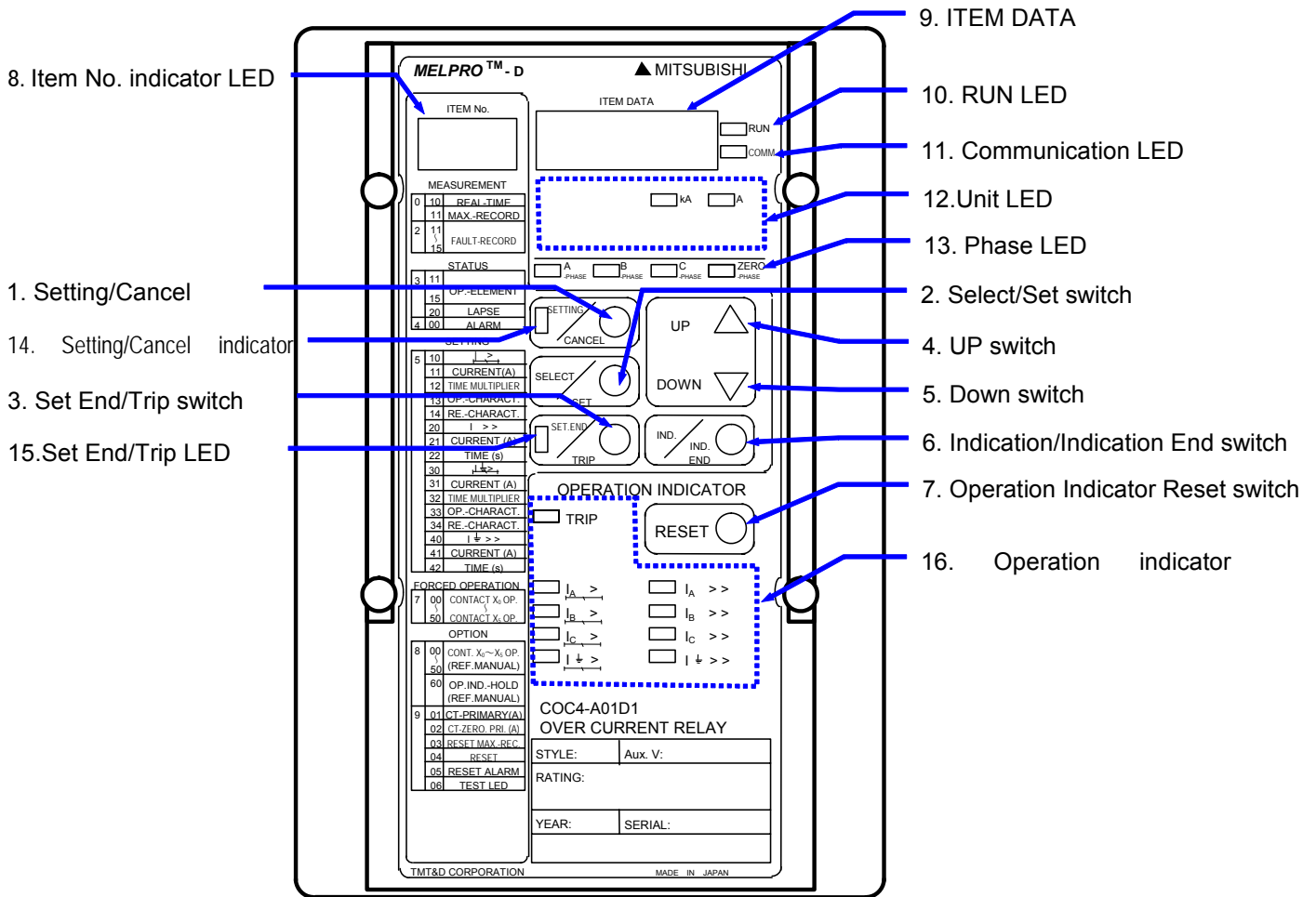

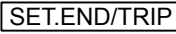








Figure 1.1 Front view (sample: COC4-A01D1)

Table 1.1 Front panel guide

No.	Designation		Symbol	Description
1	Setting / Cancel			Pressing this switch will start the procedure for setting, forced operation or option. When this switch is pressed again instead of the  switch, data that has been programmed will be all cleared to terminate the selected procedure. The SETTING/CANCEL indicator LED is lit during the procedure.
2	Select / Set			This switch is used to select an item number and program item data during setting, forced operation or option procedure. When data is programmed to be ready for replacing the currently used setting, the SET.END/TRIP LED will blink.
3	Set End / Trip			When the SET.END/TRIP switch is pressed with its LED blinking during setting, forced operation or option procedure, the current setting will be replaced by data given by programming. The new setting will be thus enabled.
4	UP select			These switches are used for selecting data elements. Pressing these switches for a while will allow fast forward. With the cover operating button, you can use the switches without removing the cover.
5	DOWN select			
6	Indication / Indication End			Pressing this switch will start or end the display of settings and measurements. With the cover operating button, you can use the switches without removing the cover.
7	Reset			Pressing this switch will reset output contacts after the relay operated and extinguish the operation indicator LEDs. With the cover operating button, you can use the switches without removing the cover.
8	Item No.	Green	-	A number allocated to the selected setting, forced operation or option item is indicated here.
9	Item Data	Red	-	Data that corresponds to the item number selected is displayed here. For the indication of individual letters, see the instruction manual specifically prepared for each model.
10	RUN	Green	-	Indicate the result of the self-diagnosis. The lamp will be lit for normal conditions while off for abnormal conditions.
11	Communication	Green	-	Indicate the operational status of the communication card. - With a communication card installed: the lamp will be lit for normal conditions, blinking during communication and off for abnormal conditions. - With a communication card not installed: the lamp will be off.
12	Unit	Yellow	-	Indicate the unit used for the item data.
13	Phase	Yellow	-	Indicate the phase that corresponds to the item data.
14	Setting / Cancel	Yellow	-	This lamp will be lit during setting, forced operation or option procedure.
15	Set End / Trip	Yellow	-	This lamp will blink when new data is programmed to be ready for replacing the current setting.
16	Operation	Red	-	Indicate the applicable operation elements and phases of the relay.

1.2 Control menu

The following shows the general system of the control menu:

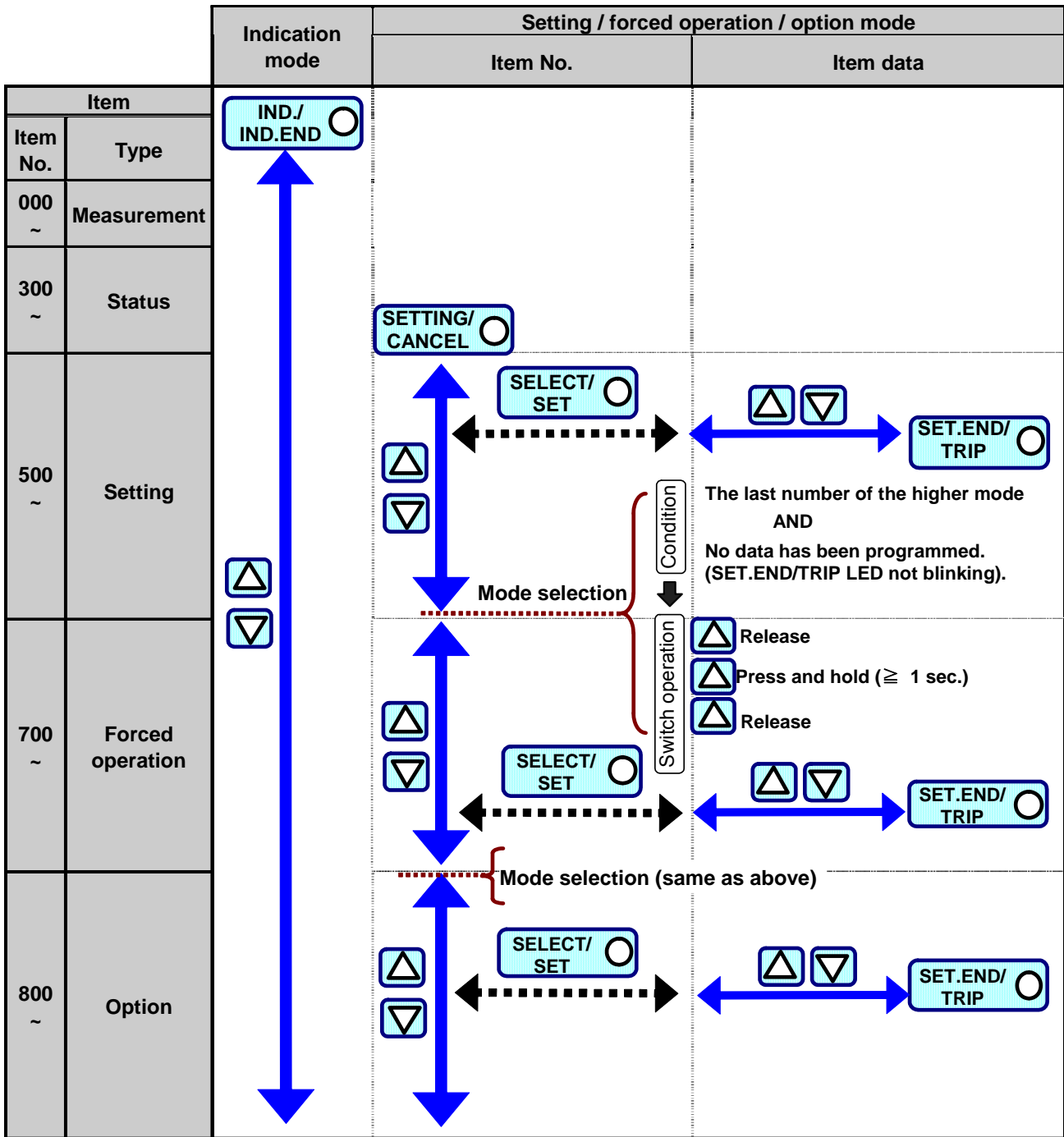
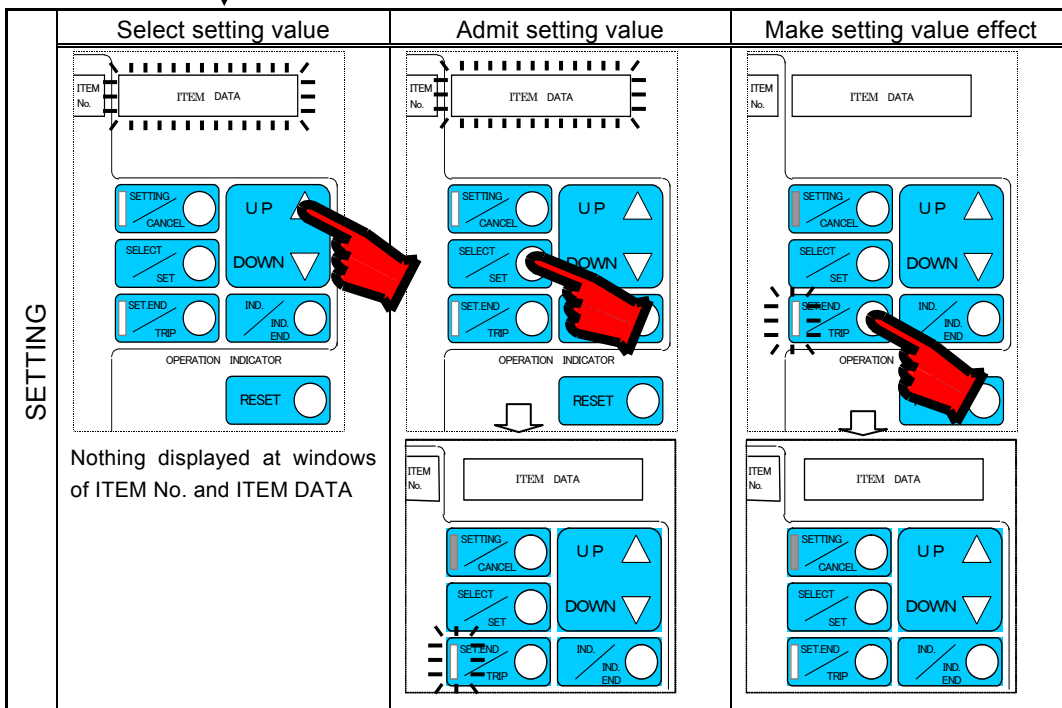
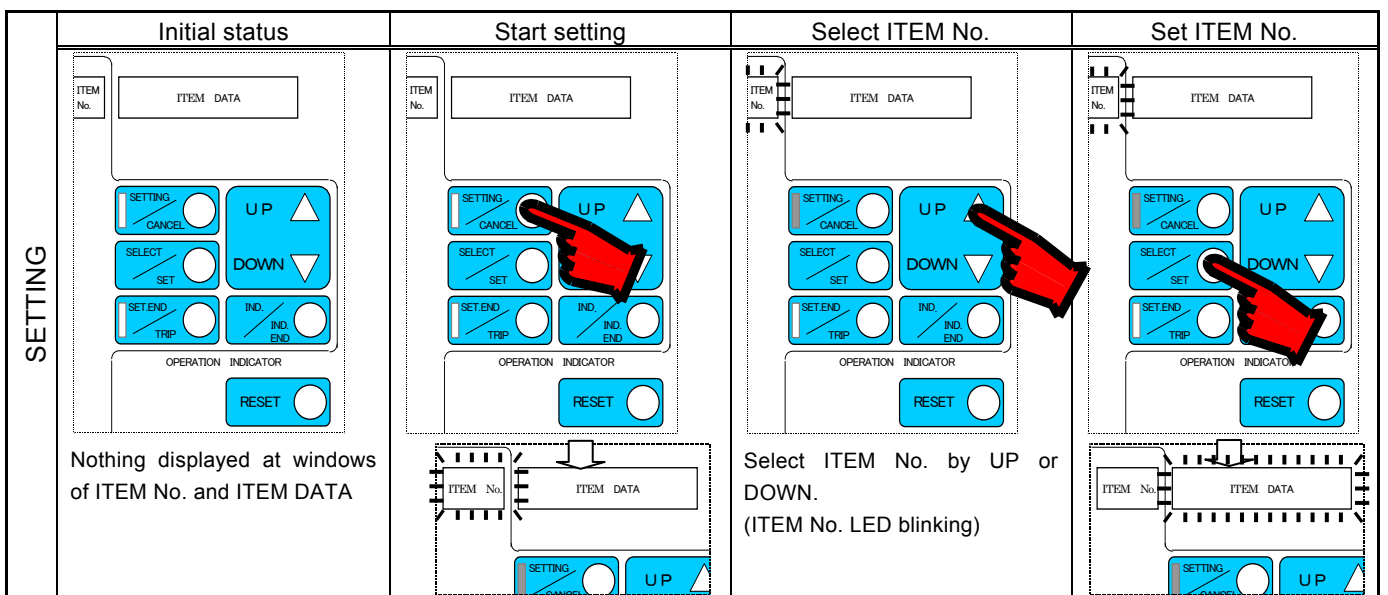
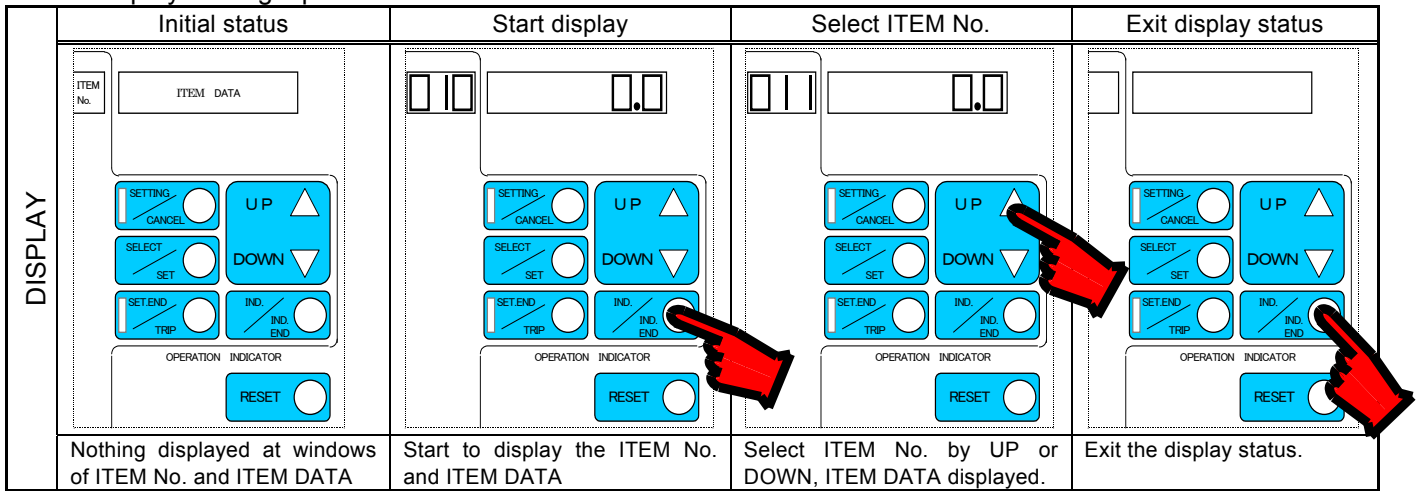
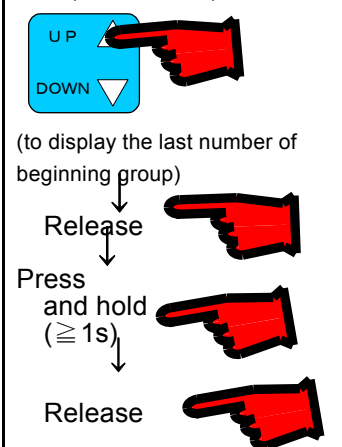


Figure 1.2 Operation menu

1.3 Display/Setting Operation



Note:
1) In setting status, to change the group of ITEM No. (500→700→800)



2) Plural setting values also can be set at one time. (same setting group only)

(Note) Since the initial setting value at the time of factory shipments is "LOCK" (or the minimum setting value for the element without LOCK setting), please change it into the arbitrary setting value desired from the initial value.

2 Detailed information

Using the COC4 – A01D1 overcurrent protection relay as a typical example, the following explains how to operate this type of relay. The item numbers and details depend on model. See the section of “Operational procedure” of the instruction manual of the model.

In this section, the lamp status of the indicator LEDs are shown according to the following rule using symbols:

Lamp status	Symbol	
	Simple indication	Numeric (7 segments) indication
Off		
On		(Ex. : showing “8.8.8.8.”)
Blinking		(Ex. : showing “8.8.8.8.”)

[A] Indication modes (Item No.: “000” ~ “900” range)

[A - 1] Real time – measurement indication

<< Example >> Where data has been input as in A-, B-, and C-phases = 0.04 kA, Zero-phase = 0 A:

To check data input for each phase, follow the procedure below:

Step	Description	Operation		Indication
		Switch	Press	
1	The indication mode starts. The A-phase current is indicated. Ex. : A-phase current: 0.04 kA	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. </p> <p>Item data </p> <p><input checked="" type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input checked="" type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
2	The B-phase current is indicated. Ex. : B-phase current: 0.04 kA	<input type="checkbox"/> UP	Once	<p>Item No. </p> <p>Item data </p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input checked="" type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
3	The C-phase current is indicated. Ex. : C-phase current: 0.04 kA	<input type="checkbox"/> UP	Once	<p>Item No. </p> <p>Item data </p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input checked="" type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
4	The zero-phase current is indicated. Ex. : Zero-phase : 0 A	<input type="checkbox"/> UP	Once	<p>Item No. </p> <p>Item data </p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input checked="" type="checkbox"/> Zero-phase</p>
5	The indication mode ends.	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. </p> <p>Item data </p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>

A - 2 Max. record – measurement indication

<< Example >> Where data is input as A-phase = 0.6 kA, B-phase = 0.7 kA, C-phase = 0.6 kA, Zero-phase = 0 A:

Step	Description	Operation		Indication	
		Switch	Press	Item No.	Item data
1	The indication mode starts.	<input type="checkbox"/> IND./IND.END	Once	<input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 0	<input type="checkbox"/> 0. <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> kA <input type="checkbox"/> A <input checked="" type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase
2	When the switch is kept depressed until the item number "011" appears, the A-phase current will be indicated. Ex. : A-phase current: 0.6 kA	<input type="checkbox"/> UP	-	<input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 1	<input type="checkbox"/> 0. <input type="checkbox"/> 6 <input checked="" type="checkbox"/> kA <input type="checkbox"/> A <input checked="" type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase
3	The B-phase current will be indicated. Ex. : B-phase current: 0.7 kA	<input type="checkbox"/> UP	Once	<input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 1	<input type="checkbox"/> 0. <input checked="" type="checkbox"/> 7 <input type="checkbox"/> kA <input type="checkbox"/> A <input type="checkbox"/> A-phase <input checked="" type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase
4	The C-phase current will be indicated. Ex. : C-phase current: 0.6 kA	<input type="checkbox"/> UP	Once	<input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 1	<input type="checkbox"/> 0. <input checked="" type="checkbox"/> 6 <input type="checkbox"/> kA <input type="checkbox"/> A <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input checked="" type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase
5	The zero-phase current will be indicated. Ex. : Zero-phase current: 0 A	<input type="checkbox"/> UP	Once	<input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 1	<input type="checkbox"/> 0. <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 0 <input type="checkbox"/> kA <input type="checkbox"/> A <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input checked="" type="checkbox"/> Zero-phase
6	The indication mode ends.	<input type="checkbox"/> IND./IND.END	Once	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> kA <input type="checkbox"/> A <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase

A - 3 Fault record – measurement indication

This item can only be displayed when fault record data has been stored. The item data will not be shown when there is no record data.

<< Example >> Where the following system fault currents have been recorded:

- (1) First phenomena : A-phase = 0.9 kA, B-phase = 0.9 kA, C-phase = 0 A, Zero-phase = 0 A
- (2) Second phenomena : A-phase = 0 A, B-phase = 1.8 kA, C-phase = 1.8 kA, Zero-phase = 0 A
- (3) Third and more : No records

Step	Description	Operation		Indication
		Switch	Press	
1	The indication mode starts.	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 0 <input type="checkbox"/> 0. <input type="checkbox"/> 0 <input type="checkbox"/> 0</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input type="checkbox"/> B- <input type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>
2	When this switch is kept depressed until the item number "211" appears, the A-phase current in the first phenomena will be indicated. Ex. : A-phase current: 0.9 kA	<input type="checkbox"/> UP	-	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 1 <input type="checkbox"/> 0. <input type="checkbox"/> 9</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input type="checkbox"/> B- <input type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>
3	The B-phase current in the first phenomena will be indicated. Ex. : B-phase current: 0.9 kA.	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 1 <input type="checkbox"/> 0. <input type="checkbox"/> 9</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input checked="" type="checkbox"/> B- <input type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>
4	The C-phase current in the first phenomena will be indicated. Ex. : C-phase current: 0 A	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 1 <input type="checkbox"/> 0. <input type="checkbox"/> 0 <input type="checkbox"/> 0</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input type="checkbox"/> B- <input checked="" type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>
5	The zero-phase current in the first phenomena will be indicated. Ex. : Zero-phase current: 0 A	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 1 <input type="checkbox"/> 0. <input type="checkbox"/> 0 <input type="checkbox"/> 0</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input type="checkbox"/> B- <input type="checkbox"/> C- <input checked="" type="checkbox"/> Zero- phase phase phase phase</p>
6	Changing the item number to "212" will display the A-phase current in the second phenomena. Ex. : A-phase current: 0 A	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 0. <input type="checkbox"/> 0 <input type="checkbox"/> 0</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input checked="" type="checkbox"/> A- <input type="checkbox"/> B- <input type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>
7	The B-phase current in the second phenomena will be indicated. Ex. : B-phase current: 1.8 kA.	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1. <input type="checkbox"/> 8</p> <p> <input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A- <input checked="" type="checkbox"/> B- <input type="checkbox"/> C- <input type="checkbox"/> Zero- phase phase phase phase</p>

Step	Description	Operation		Indication
		Switch	Press	
8	The C-phase current in the second phenomena will be indicated. Ex. : C-phase current: 1.8 kA.	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="text" value="2"/> <input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="1."/> <input type="text" value="8"/></p> <p><input checked="" type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input checked="" type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
9	The zero-phase current in the second phenomena will be indicated. Ex. : Zero-phase current: 0 A	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="text" value="2"/> <input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value=""/> <input type="text" value="0."/> <input type="text" value="0"/> <input type="text" value="0"/></p> <p><input checked="" type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input checked="" type="checkbox"/> Zero-phase</p>
10	When the item number is shifted to the next "311", the display shows that there is no records for the third and later phenomenon.	<input type="checkbox"/> UP	Once	<p>Item No. Item data</p> <p><input type="text" value="3"/> <input type="text" value="1"/> <input type="text" value="1"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/></p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
11	The indication mode ends.	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. Item data</p> <p><input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/></p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>

A - 4 Operation elements – status indication

This item is only displayed when record data on operation elements has been stored. The item data will not be displayed when there is no records.

<< Example >> Where the following operation elements operated when a system failure occurred:

- (1) First phenomena : Phase fault time-lag A-phase, phase fault time-lag B-phase
- (2) Second phenomena : Phase fault time-lag B-phase, phase fault time-lag C-phase
- (3) Third and more : No records

Step	Description	Operation		Indication
		Switch	Press	
1	The indication mode starts.			<p>Item No. Item data</p> <p>0 1 0 0. 0 0</p> <p> ■ kA □ A</p> <p> ■ A- □ B- □ C- □ Zero- phase phase phase phase</p> <p>□ TRIP</p> <p>□ I_A > □ I_A >></p> <p>□ I_B > □ I_B >></p> <p>□ I_C > □ I_C >></p> <p>□ I_∑ > □ I_∑ >></p>
2	When the switch is kept depressed until the item number “311” appears, the operation status of the first phenomena will be shown by the operation indicator LEDs. Ex. : The phase fault time-delayed A- and B-phases operated.	UP	-	<p>Item No. Item data</p> <p>3 1 1 □ □ □ □</p> <p> □ kA □ A</p> <p> □ A- □ B- □ C- □ Zero- phase phase phase phase</p> <p>■ TRIP</p> <p>■ I_A > □ I_A >></p> <p>■ I_B > □ I_B >></p> <p>□ I_C > □ I_C >></p> <p>□ I_∑ > □ I_∑ >></p>
3	Press the switch to get the item number “312”. The operation indicator LEDs will indicate the status of operation of the second phenomena. Ex. : Phase fault time-delayed B- and C-phases operated.	UP	Once	<p>Item No. Item data</p> <p>3 1 2 □ □ □ □</p> <p> ■ TRIP</p> <p>□ I_A > □ I_A >></p> <p>■ I_B > □ I_B >></p> <p>■ I_C > □ I_C >></p> <p>□ I_∑ > □ I_∑ >></p>
4	Changing the item number to the next “320” will indicate that there is no records for the third and more phenomenon.	UP	Once	<p>Item No. Item data</p> <p>3 2 0 □ □ □ □</p> <p> □ kA □ A</p> <p> ■ A- □ B- □ C- □ Zero- phase phase phase phase</p>
5	The indication mode ends.			<p>Item No. Item data</p> <p>□ □ □ □ □ □ □ □</p> <p> □ TRIP</p> <p>□ I_A > □ I_A >></p> <p>□ I_B > □ I_B >></p> <p>□ I_C > □ I_C >></p> <p>□ I_∑ > □ I_∑ >></p>

A - 5 Lapse of time-delayed timer – status indication

<< Example >> To input a current equal to or more than the setting to check the operation timer of the phase fault time-delayed element A-phase for proper operation:

Step	Description	Operation		Indication
		Switch	Press	
1	The indication mode starts.	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value="0."/> <input type="text" value="0"/> <input type="text" value="0"/></p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
2	When the switch is kept depressed until the item number “320” appears, the laps of time-delayed of the phase fault time-delayed A-phase will be indicated. With “0 A” input, nothing will be displayed in the item data box.	<input type="checkbox"/> UP	-	<p>Item No. <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/></p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>
3	When a current that is equal to or more than the setting is input, “0” will be displayed in the item data box. The value with which the “0” display appears first should be the starting value of the phase fault time-delayed element. At the same time, the operation indicator LED that corresponds to the element detected will blink.	None	No	<p>Item No. <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/></p> <p><input type="checkbox"/> TRIP</p> <p><input checked="" type="checkbox"/> I_A ></p> <p><input type="checkbox"/> I_B ></p> <p><input type="checkbox"/> I_C ></p> <p><input type="checkbox"/> I_∑ ></p> <p><input type="checkbox"/> I_A >></p> <p><input type="checkbox"/> I_B >></p> <p><input type="checkbox"/> I_C >></p> <p><input type="checkbox"/> I_∑ >></p>
4	Furthermore, keep inputting currents. The item data box will be counted up as in “1”, “2”, to “9”.	None	No	<p>Item No. <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="1"/></p> <p>⋮</p> <p>Item No. <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="9"/></p>
5	When “10” is shown at last, the output contact will be operated. Also, the corresponding operation indicator LED will come on.	None	No	<p>Item No. <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="0"/></p> <p>Item data <input type="text" value=""/> <input type="text" value="1"/> <input type="text" value="0"/></p> <p><input type="checkbox"/> TRIP</p> <p><input checked="" type="checkbox"/> I_A ></p> <p><input type="checkbox"/> I_B ></p> <p><input type="checkbox"/> I_C ></p> <p><input type="checkbox"/> I_∑ ></p> <p><input type="checkbox"/> I_A >></p> <p><input type="checkbox"/> I_B >></p> <p><input type="checkbox"/> I_C >></p> <p><input type="checkbox"/> I_∑ >></p>
6	The indication mode ends.	<input type="checkbox"/> IND./IND.END	Once	<p>Item No. <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/></p> <p>Item data <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/></p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p>

A - 6 Self-diagnosis – status indication

This item is only displayed when the self-diagnosis function detects an abnormal condition. The item number 400 (in the following example) will be skipped and moved straight from 010 to 511 in case of no detecting an abnormal condition.

<< Example >> To check the defect code after the following abnormal condition was detected by the self- diagnosis function:

- (1) RAM check faultDefect code = 0002
- (2) D/O operation check faultDefect code = 0009

Step	Description	Operation		Indication																																
		Switch	Press																																	
1	The indication mode starts.	IND./IND.END	Once	<p>Item No. Item data</p> <table style="border-collapse: collapse;"> <tr> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid blue; padding: 5px;">1</td> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">.</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> </tr> <tr> <td colspan="3"></td> <td style="text-align: center;"><input checked="" type="checkbox"/>kA</td> <td colspan="4"></td> </tr> <tr> <td colspan="3"></td> <td style="text-align: center;"><input type="checkbox"/>A</td> <td colspan="4"></td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/> A-phase</td> <td style="text-align: center;"><input type="checkbox"/> B-phase</td> <td style="text-align: center;"><input type="checkbox"/> C-phase</td> <td colspan="5" style="text-align: center;"><input type="checkbox"/> Zero-phase</td> </tr> </table>	0	1	0	0	.	0	0	0				<input checked="" type="checkbox"/> kA								<input type="checkbox"/> A					<input checked="" type="checkbox"/> A-phase	<input type="checkbox"/> B-phase	<input type="checkbox"/> C-phase	<input type="checkbox"/> Zero-phase				
0	1	0	0	.	0	0	0																													
			<input checked="" type="checkbox"/> kA																																	
			<input type="checkbox"/> A																																	
<input checked="" type="checkbox"/> A-phase	<input type="checkbox"/> B-phase	<input type="checkbox"/> C-phase	<input type="checkbox"/> Zero-phase																																	
2	When the switch is kept depressed until the item number “400” appears, the defect code that is the smallest in number will be indicated. Ex. : RAM check fault is indicated.	UP	-	<p>Item No. Item data</p> <table style="border-collapse: collapse;"> <tr> <td style="border: 1px solid blue; padding: 5px;">4</td> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">2</td> </tr> <tr> <td colspan="3"></td> <td style="text-align: center;"><input type="checkbox"/>kA</td> <td colspan="4" style="text-align: center;"><input type="checkbox"/>A</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> A-phase</td> <td style="text-align: center;"><input type="checkbox"/> B-phase</td> <td style="text-align: center;"><input type="checkbox"/> C-phase</td> <td colspan="5" style="text-align: center;"><input type="checkbox"/> Zero-phase</td> </tr> </table>	4	0	0	0	0	0	0	2				<input type="checkbox"/> kA	<input type="checkbox"/> A				<input type="checkbox"/> A-phase	<input type="checkbox"/> B-phase	<input type="checkbox"/> C-phase	<input type="checkbox"/> Zero-phase												
4	0	0	0	0	0	0	2																													
			<input type="checkbox"/> kA	<input type="checkbox"/> A																																
<input type="checkbox"/> A-phase	<input type="checkbox"/> B-phase	<input type="checkbox"/> C-phase	<input type="checkbox"/> Zero-phase																																	
3	Another defect code that is the second smallest will be displayed. Ex. : D/O operation check fault is indicated.	UP	Once	<p>Item No. Item data</p> <table style="border-collapse: collapse;"> <tr> <td style="border: 1px solid blue; padding: 5px;">4</td> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid blue; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">0</td> <td style="border: 1px solid red; padding: 5px;">9</td> <td></td> </tr> </table>	4	0	0	0	0	0	9																									
4	0	0	0	0	0	9																														
4	Changing the item number to the next “511” will indicate that there is no records any more.	UP	Once	<p>Item No. Item data</p> <table style="border-collapse: collapse;"> <tr> <td style="border: 1px solid blue; padding: 5px;">5</td> <td style="border: 1px solid blue; padding: 5px;">1</td> <td style="border: 1px solid blue; padding: 5px;">1</td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> </tr> </table>	5	1	1																													
5	1	1																																		
5	The indication mode ends.	IND./IND.END	Once	<p>Item No. Item data</p> <table style="border-collapse: collapse;"> <tr> <td style="border: 1px solid blue; padding: 5px;"></td> <td style="border: 1px solid blue; padding: 5px;"></td> <td style="border: 1px solid blue; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> <td style="border: 1px solid red; padding: 5px;"></td> </tr> </table>																																

A - 7 Indication of settings and options

This item indicates the settings with the item No. "500" range and option with "800" to "900" range.

<< Example >> To indicate the following settings and options:

- (1) Item No. "511" – "Phase fault time-delayed element operating current" : 1.0 A
- (2) Item No. "542" – "Earth fault instantaneous element operating time" : INST
- (3) Item No. "800" ("Contact X₀ arrangement") : Contact arrangement data setting 0100.
- (4) Item No. "902" ("CT Zero-phase primary current") : 5.0 A

Step	Description	Operation		Indication														
		Switch	Press															
1	The indication mode starts. The item number "010" will blink.	IND./IND.END	Once	<table border="0"> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;">0 1 0</td> <td style="text-align: center;">0. 0 0</td> </tr> <tr> <td></td> <td style="text-align: center;"> <input checked="" type="checkbox"/> kA <input type="checkbox"/> A </td> </tr> <tr> <td></td> <td style="text-align: center;"> <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase </td> </tr> </table>	Item No.	Item data	0 1 0	0. 0 0		<input checked="" type="checkbox"/> kA <input type="checkbox"/> A		<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase						
Item No.	Item data																	
0 1 0	0. 0 0																	
	<input checked="" type="checkbox"/> kA <input type="checkbox"/> A																	
	<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase																	
2	Indication of settings The settings of the item numbers of "511" to "542" will be displayed. Ex.: - With the item No. "511", it is indicated that the operating current of the phase fault time-delayed element is set to 1.0 A. - With the item No. "542", it is indicated that the operating time of the earth fault instantaneous element is set to "INST".	UP	-	<table border="0"> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;">5 1 1</td> <td style="text-align: center;">1. 0</td> </tr> <tr> <td></td> <td style="text-align: center;"> <input type="checkbox"/> kA <input type="checkbox"/> A </td> </tr> <tr> <td></td> <td style="text-align: center;"> <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase </td> </tr> <tr> <td></td> <td style="text-align: center;">⋮</td> </tr> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;">5 4 2</td> <td style="text-align: center;">I n s T</td> </tr> </table>	Item No.	Item data	5 1 1	1. 0		<input type="checkbox"/> kA <input type="checkbox"/> A		<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase		⋮	Item No.	Item data	5 4 2	I n s T
Item No.	Item data																	
5 1 1	1. 0																	
	<input type="checkbox"/> kA <input type="checkbox"/> A																	
	<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase																	
	⋮																	
Item No.	Item data																	
5 4 2	I n s T																	
3	"Forced operation" with the item number in the "700" range will not be displayed here.																	
4	Indication of selected option The options selected from the item numbers of "800" to "902" will be displayed. Ex.: - With the item number "800", it is shown that the contact X ₀ arrangement data has been set to "0100". - With the item number "902", it is shown that the CT Zero-phase primary current has been set to 5.0 A. The CT primary and CT Zero-phase primary currents will be indicated with the corresponding unit indicator lit.	UP	Once	<table border="0"> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;">8 0 0</td> <td style="text-align: center;">0 1 0 0</td> </tr> <tr> <td></td> <td style="text-align: center;">⋮</td> </tr> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;">9 0 2</td> <td style="text-align: center;">5</td> </tr> </table>	Item No.	Item data	8 0 0	0 1 0 0		⋮	Item No.	Item data	9 0 2	5				
Item No.	Item data																	
8 0 0	0 1 0 0																	
	⋮																	
Item No.	Item data																	
9 0 2	5																	
	"Max. record reset", "Fault record reset", "Self-check reset" and "LED lamp test" are not indicated here.																	
5	The indication mode ends.	IND./IND.END	Once	<table border="0"> <tr> <td>Item No.</td> <td>Item data</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td></td> <td style="text-align: center;"> <input type="checkbox"/> kA <input type="checkbox"/> A </td> </tr> <tr> <td></td> <td style="text-align: center;"> <input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase </td> </tr> </table>	Item No.	Item data				<input type="checkbox"/> kA <input type="checkbox"/> A		<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase						
Item No.	Item data																	
	<input type="checkbox"/> kA <input type="checkbox"/> A																	
	<input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase																	

[B] Setting mode (Item No. : “500” range)

(1) If the relay is in one of the following condition, the settings including operating current and time can be free changed by following the procedure [B - 1].

- The relay is without RS232C communication I/F
- RS232C communication I/F is located but the relay password function is in the “disable” status.

(refer to [D - 9])

Note that two or more items of setting can be changed at a time as long as all of them belong to the setting mode (the “500” range), but can not be changed if at least one of them belongs the forced operation (the “700” range) or option mode (the “800” to “900” range).

[B - 1] Establishing settings

<< Example >> To change the operating current and time of the earth fault time-delayed element to the following values:

- (1) Operating current 0.15 A → 0.25 A
- (2) Operating time multiplier..... 0.25 → 10

Step	Description	Operation		Indication
		Switch	Press	
1	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the corresponding item number blinks. The current setting for the item number is displayed in the item data box.	SETTING/CANCEL	Once	
2	Press and hold the UP switch to select the item number “531” (“Operating current of earth fault time-delayed element”).	UP	-	
3	Check that the item “531” is certainly displayed and press the SELECT/SET switch. The item data box will blink to become enabled to be changed. The item number and data boxes will blink alternately every time the SELECT/SET switch is pressed once.	SELECT/SET	Once	
4	Press the UP switch until the data shown in the item data box is changed from “0.15” to “0.25”.	UP	Twice	

Step	Description	Operation		Indication
		Switch	Press	
5	Make sure that the item data box actually shows the desired value. Press the SELECT/SET switch to carry out programming. When it is detected that new data has been programmed to be ready for replacing the current setting, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the setting being used for the current operation is still valid even if another value has been just programmed in the item data box.	SELECT/SET	Once	
6	Furthermore, press the UP switch to let the next item number "532" (Operating time multiplier of earth fault time-delayed element) appear in the item number box.	UP	Once	
7	Make sure that the item data box shows the desired value. Press the SELECT/SET switch to carry out programming.	SELECT/SET	Once	
8	Press the UP switch until the number shown in the item data box is changed from "0.25" to "10".	UP	-	
9	Make sure that the item data box shows the desired value. Press the SELECT/SET switch to carry out programming. The SET.END/TRIP indicator LED still remains blinking.	SELECT/SET	Once	
10	<ul style="list-style-type: none"> - To put the new data programmed in effect, press the SET.END/TRIP switch. The setting currently used will be replaced by the new data to complete the procedure. - To cancel the new data programmed, press the SETTING/CANCEL switch to delete all the data programmed, terminating the procedure. 	To put in effect: SET.END/TRIP To cancel: SETTING/CANCEL	Once	

(Note) Since the initial setting value at the time of factory shipments is "LOCK" (or the minimum setting value for the element without LOCK setting), please change it into the arbitrary setting value desired from the initial value.

(2) For the relay with RS232C communication I/F and relay password enable. The password inputting is necessary when setting.

The following procedure shows you how to input your relay password. Here the default password is "1234".

But if you want to change your relay password, the HMI software is necessary.

Step	Description	Operation		Indication	
		Switch	Press	Item No.	Item data
1	Press SETTING/CANCEL switch to shift to item data changing, the lowest digit of item data box will blink. And then the item data can be changed.	SETTING/CANCEL	Once		
2	To change the item data from "0000" to "1234" beginning the lowest digit.	UP	4 times		
		SELECT/SET	Once		
		UP	3 times		
		SELECT/SET	Once		
		UP	Twice		
		SELECT/SET	Once		
3	Make sure that the item data box showing desired value, and press SELECT/SET switch to verify the password. If the password is correct, the SET.END/TRIP indicator LED will blink. If the password is incorrect, the SET.END/TRIP indicator LED will not blink and still display the inputted value. At this time, you can input the password again beginning step 1.	SELECT/SET	Once		
4	- To shift to setting mode, press the SET.END/TRIP switch. - To cancel the above operation, press the SETTING/CANCEL switch. At this time, all the data programmed will be deleted, and terminating the procedure.	SET.END/TRIP SETTING/CANCEL	Once		

[C] Forced operation mode (Item No. : “700” range)

[C - 1] Performing forced operation

<< Example >> When the contacts X₁ (earth fault time-delayed element output) and X₃ (phase fault time-delayed element output) are both operated at the same time:

Step	Description	Operation		Indication
		Switch	Press	
1	Before starting the procedure of forced operation, press the RESET switch to reset the output contacts and operation indicator LEDs.	RESET	Once	<input type="checkbox"/> TRIP <input type="checkbox"/> I _A > <input type="checkbox"/> I _B > <input type="checkbox"/> I _C > <input type="checkbox"/> I _↓ > <input type="checkbox"/> I _A >> <input type="checkbox"/> I _B >> <input type="checkbox"/> I _C >> <input type="checkbox"/> I _↓ >>
2	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/CANCEL	Once	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 5 1 1</div> <div style="border: 1px solid black; padding: 5px;">Item data 2. 0</div> </div>
3	Mode selection (Setting → Forced operation) Mode is shifted from setting to forced operation. Press and hold the UP switch to let the item No. “542”, which is the last number in the setting mode, appear in the item No. box.	UP	-	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 5 4 2</div> <div style="border: 1px solid black; padding: 5px;">Item data</div> </div>
	Release the UP switch.	UP	Release	
	Press the UP switch again for a second. The item number shown will change from “542” to “700”.	UP	Press and hold (for 1 sec. or more)	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 7 0 0</div> <div style="border: 1px solid black; padding: 5px;">Item data o F</div> </div>
	Release the UP switch again to complete the mode selection.	UP	Release	
4	Select the item number “710” (Contact X ₁).	UP	Once	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 7 1 0</div> <div style="border: 1px solid black; padding: 5px;">Item data o F</div> </div>
5	Make sure that the item number “710” is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	SELECT/SET	Once	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 7 1 0</div> <div style="border: 1px solid black; padding: 5px;">Item data o F</div> </div>
6	Instead of “oF” (disabled), select “on” (enabled) for forced operation in the item data box. A figure that appears in the lowest digit of the item data box indicates the number of contacts that have been selected for forced operation.	UP	Once	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 7 1 0</div> <div style="border: 1px solid black; padding: 5px;">Item data o n 1</div> </div>
7	When the SELECT/SET switch is pressed for programming, the SET.END/TRIP indicator LED will blink indicating that the contact selected for forced operation has been specified. At the same time, the item number box will start blinking, instead of the item data box. Note that pressing the SELECT/SET switch here will not execute the forced operation yet.	SELECT/SET	Once	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Item No. 7 1 0</div> <div style="border: 1px solid black; padding: 5px;">Item data o n 1</div> </div>

Step	Description	Operation		Indication
		Switch	Press	
8	Use the UP switch to let the item number "730" (Contact X ₃) appear in the item No. box.	<input type="button" value="UP"/>	Once	
9	Make sure that the item number "730" is displayed in the box and press the <input type="button" value="SELECT/SET"/> switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	<input type="button" value="SELECT/SET"/>	Once	
10	Instead of "oF" (disabled), select "on" (enabled) for forced operation in the item data box. Then, the figure shown in the lowest digit of the item data box, which indicates the number of contacts selected for forced operation, will be added by one.	<input type="button" value="UP"/>	Once	
11	When the <input type="button" value="SELECT/SET"/> switch is pressed then for programming, the item No. box will start blinking, instead of the item data box. In this case, the SET.END/TRIP indicator LED still remains blinking, which means that the specified forced operation has not been executed.	<input type="button" value="SELECT/SET"/>	Once	
12	- To execute forced operation of the selected contacts, press the <input type="button" value="SET.END/TRIP"/> switch. Forced operation will be performed only while this switch is depressed. During forced operation, the figure shown in the lowest digit in the item data box which indicates the number of contacts selected for forced operation is blinking. Also, the operation indicator LEDs that correspond to the selected programmable contacts come on.	<input type="button" value="SET.END/TRIP"/>	Press and hold (operation)	
	When the <input type="button" value="SET.END/TRIP"/> switch is released, the indication of contact operation, item No. and data will end. Also, the data programmed for forced operation in the step above will be all cleared. However, the operation indicator LEDs will remain the same status. To extinguish the operation indicator LED lamps, press the <input type="button" value="RESET"/> switch.			
	- To terminate the procedure without executing forced operation, press the <input type="button" value="SETTING/CANCEL"/> switch to delete all the data programmed in the step above.			

[D] Option mode (Item No. : “800” to “900” range)

This mode can be used to establish contact arrangement, hold the operation indicator LEDs, set the primary current of the combined current transformer, reset records and test the LED lamps.

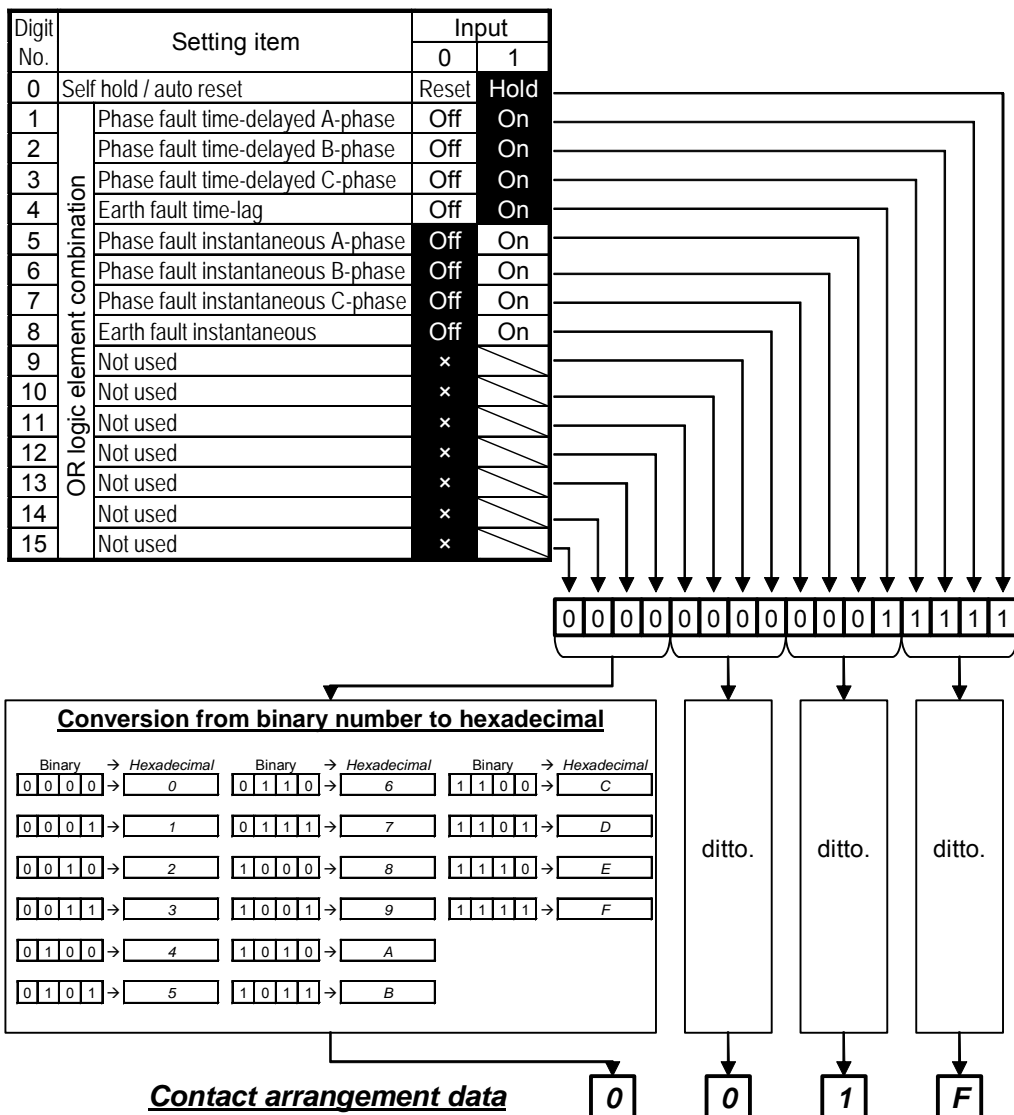
D - 1 Specifying contact arrangement

Establish your desired contact arrangement according to the contact arrangement data setting table shown in the instruction manual of the model.

<< Example >> To change the setting of the contact X₁ (item No. “810”) according to the following specification:

		Currently used specification (factory default setting)	Target specification
Specification	Output condition	Earth fault time-delayed only	Phase fault time-delayed A-, B- or C-phase or earth fault time-delayed
	Contact hold	Auto reset	Self hold
Contact arrangement data		0010	001F

To get your contact arrangement data, first give a desired value for each setting item for which a digit number is allocated as listed in the contact arrangement data setting table shown below. This will make up a 16-digit binary code. Then, convert the binary code into a 4-digit hexadecimal code. Note that the arrangement shown in the table below varies by model. Please refer to the instruction manual that is specifically prepared for your model.



Step	Description	Operation		Indication
		Switch	Press	
1	Before starting the procedure of contact arrangement setting, press the RESET switch to reset the output contacts as well as the operation indicator LEDs.	RESET	Once	
2	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/CANCEL	Once	
3	Mode selection (Setting → Forced Operation → Option) Mode is shifted from setting to option.	UP	Press and hold	
	Press and hold the UP switch to let the item No. "542", which is the last number in the setting mode, appear in the item No. box.			
	Release the UP switch.	UP	Release	
	Press and hold the UP switch for a second or more. The item number shown will change from "542" to "700". (Mode has been transferred from Setting to Forced Operation.)	UP	Press and hold (for 1 sec. or more)	
	Release the UP switch.	UP	Release	
	Change the item number to "750", which is the lowest number of the forced operation mode.	UP	Press and hold	
	Release the UP switch.	UP	Release	
Next, press the UP switch for a second or more again. The item number will change from "750" to "800".	UP	Press and hold (for 1 sec. or more)		
Release the UP switch to complete the mode selection. (Mode has been transferred from Forced Operation to Option).	UP	Release		
4	Select the item number "810" (Contact X ₁). The operation indicator LED that corresponds to the item data set for the contact X ₁ will come on.	UP	-	

Step	Description	Operation		Indication	
		Switch	Press	Item No.	Item data
5	Make sure that the item number "810" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	SELECT/SET	Once	8 1 0	0 0 1 0
6	Use the UP switch to change data from "0010" to "001F". In this case, the data should be input in such a way that individual letters are put separately from the lowest digit to the higher sequentially.	UP	15 times	8 1 0	0 0 1 F
		SELECT/SET	Once	8 1 0	0 0 1 F
		SELECT/SET	Once	8 1 0	0 0 1 F
		SELECT/SET	Once	8 1 0	0 0 1 F
7	Make sure that the desired value is shown in the item data box, and press the SELECT/SET switch for programming. In this case, the operation indicator LED according to the condition programmed here will come on. So, check if the LED indication matches the condition you want to set. When it is detected that new data has been programmed to be ready for replacing the currently used setting, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the setting being used for the current operation is still valid even if another value has been programmed in the item data box.	SELECT/SET	Once	8 1 0	0 0 1 F
8	- To put the new data into effect, press the SET.END/TRIP switch. The currently used setting will be replaced by the new data programmed to complete the procedure. - To cancel the new data, press the SETTING/CANCEL switch to delete all the data programmed in the step above.	To put in effect: SET.END/TRIP To cancel: SETTING/CANCEL	Once	Item No. box: [] [] [] Item data box: [] [] [] []	Item data box: [] [] [] []

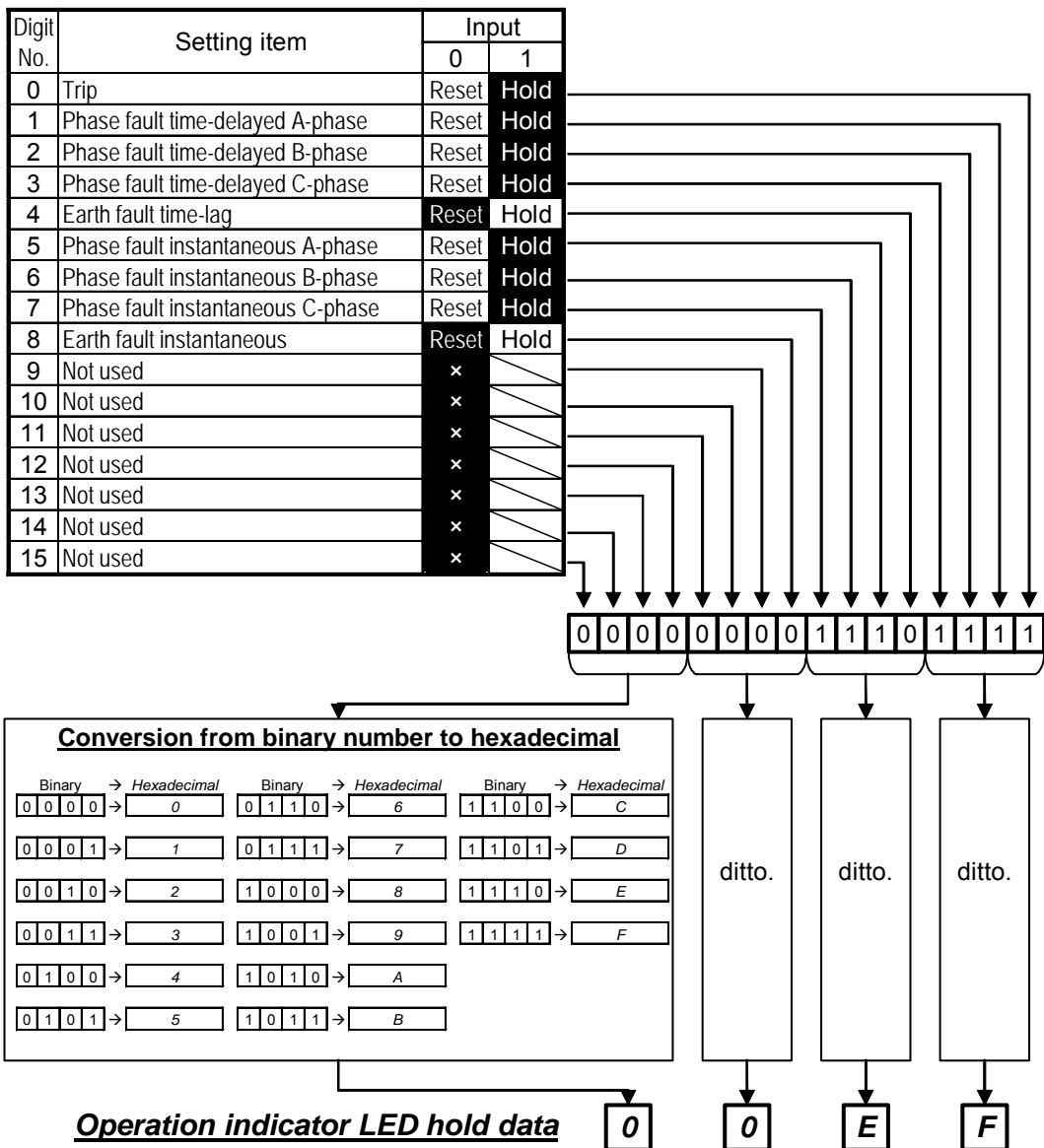
D - 2 Specifying operation indicator LED hold (Item No. : “860” range)

Select operation indicator LEDs to be held or reset according to the operation indicator LED hold data shown in the instruction manual specifically prepared for the model.








<< Example >> To change the setting for the operation indicator LEDs of the earth fault time-delayed and instantaneous elements from self hold to automatic reset:

	Currently used specification (factory default setting)	Target specification
Operation indicator LEDs to be automatically reset	None	Earth fault time-delayed and earth fault instantaneous
Operation indicator LED hold data	01FF	<u>00EF</u>

To get the operation indicator LED hold data, first give a desired value for each setting item to which a digit number is allocated as listed in the operation indicator LED hold data setting table shown below. This will make up a 16-digit binary code. Then, convert the binary code into a 4-digit hexadecimal code. Note that the arrangement shown in the table below varies by model. Please refer to the instruction manual specifically prepared for the model.



Step	Description	Operation		Indication
		Switch	Press	
1	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/CANCEL	Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.		-	
3	Select the item number "860" (Operation indicator LED hold).	UP		
4	Make sure that the item number "860" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	SELECT/SET	-	
5	Change the item data from "01FF" to "00EF". The data should be input in such a way that individual letters are put separately from the lowest digit to the higher sequentially.	SELECT/SET	Once	
		DOWN	Once	
		SELECT/SET	Once	
		DOWN	Once	
		SELECT/SET	Once	
6	Make sure that the desired value is shown in the item data box, and press the SELECT/SET switch to program the data. When it is detected that new data has been programmed to be ready for replacing the current setting, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the setting being used for the current operation is still valid even if another data has been programmed in the item data box.	SELECT/SET	Once	

Step	Description	Operation		Indication								
		Switch	Press									
7	<p>- To put the new data programmed in effect, press the SET.END/TRIP switch. The setting currently used will be replaced by the new data to complete the procedure.</p> <p>- To cancel the new data programmed, press the SETTING/CANCEL switch to delete all the data programmed, terminating the procedure.</p>	<p>To put in effect: SET.END/TRIP</p> <p>To cancel: SETTING/CANCEL</p>	Once	<p>Item No.</p> <table border="1"> <tr> <td></td> <td></td> <td></td> </tr> </table> <p>Item data</p> <table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p> <input type="checkbox"/> SETTING/CANCEL  </p> <p> <input type="checkbox"/> SELECT/SET  </p> <p> <input type="checkbox"/> SET.END/TRIP  </p> <p> UP  DOWN  </p> <p> IND./INDI.END  </p> <p> RESET  </p>								

D - 3 Specifying CT primary rating

<< Example >> To change the primary current rating of the current transformer (CT) from 5A to 1,000 A:
 (The same procedure can be applied when changing the CT Zero-phase primary current only by changing the item number.)

Step	Description	Operation		Indication
		Switch	Press	
1	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.		Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)	(Omitted)	
3	Select the item number “901” (CT primary side).		-	
4	Make sure that the item number “901” is shown in the box, and press the switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.		Once	
5	Change the item data from “5” to “1000”.		-	
6	Make sure that the desired data is shown in the item data box, and press the switch to program the data. When it is detected that new data has been programmed to be ready for replacing the currently used setting, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the setting being used for the current operation is still valid even if another value has been programmed in the item data box.		Once	

Step	Description	Operation		Indication									
		Switch	Press										
7	<ul style="list-style-type: none"> - To put the new data programmed in effect, press the SET.END/TRIP switch. The setting currently used will be replaced by the new data to complete the procedure. - To cancel the new data programmed, press the SETTING/CANCEL switch to delete all the data programmed, terminating the procedure. 	<p>To put in effect:</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">SET.END/TRIP</div>	<p>To cancel:</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">SETTING/ CANCEL</div>	<p>Once</p>	<p>Item No.</p> <table border="1" style="border-collapse: collapse; width: 100px; height: 30px;"> <tr> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> </tr> </table> <p>Item data</p> <table border="1" style="border-collapse: collapse; width: 100px; height: 30px;"> <tr> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> </tr> </table> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">SETTING/ CANCEL</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">○</div> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">SELECT/ SET</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">○</div> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">SET.END/ TRIP</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">○</div> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="text-align: center; margin-right: 5px;">UP DOWN</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">○</div> <div style="margin-left: 5px;">▲ ▼</div> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="text-align: center; margin-right: 5px;">IND./ INDI.END</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">○</div> </div> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 5px;">RESET</div> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">○</div> </div> </div>								

D - 4 Performing record reset

This option can be used to clear the max. records / fault records / self-diagnosis records.

[We recommend that refer to the following procedure to clear the records saved in relay before using the relay into protection system.]

<< Example >> To clear the max. record:

(The same procedure can be applied when clearing the fault or self-diagnosis record only by changing the item number).

Step	Description	Operation		Indication
		Switch	Press	
1	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.			
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)		
3	Select the item number "903" (Max. record reset).		UP	
4	Make sure that the item number "903" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.		SELECT/SET	
5	Change the item data from "no" (not clear) to "YES" (clear).		UP	
6	Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data. With the "YES" data, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the record will not be cleared only by programming the "YES" data.		SELECT/SET	

Step	Description	Operation		Indication								
		Switch	Press	Item No.	Item data							
7	<p>- To execute the clearing of the record, press the SET.END/TRIP switch.</p> <p>The record will be cleared. The data programmed will also be all cleared to complete the procedure.</p> <p>- To cancel the data programmed without clearing the record, press the SETTING/CANCEL switch. The data programmed will be all cleared to terminate the procedure.</p>	<p>To put in effect: SET.END/TRIP</p> <p>To cancel: SETTING/CANCEL</p>		<p>Item No.</p> <table border="1" style="width: 100px; height: 30px; border-collapse: collapse;"> <tr> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> </tr> </table> <p>Item data</p> <table border="1" style="width: 100px; height: 30px; border-collapse: collapse;"> <tr> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> <td style="width: 25px; height: 20px;"></td> </tr> </table> <p>SETTING/CANCEL <input type="radio"/></p> <p>SELECT/SET <input type="radio"/></p> <p>SET.END/TRIP <input type="radio"/></p> <p>UP <input type="radio"/></p> <p>DOWN <input type="radio"/></p> <p>IND./INDI.END <input type="radio"/></p> <p>RESET <input type="radio"/></p>								

D - 5 Performing LED lamp test

This option is used to carry out forced illumination of all the LEDs located on the front panel.

Step	Description	Operation		Indication
		Switch	Press	
1	The setting mode starts. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/ CANCEL	Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D – 1 for how to select mode.			
3	Select the item number “906” (LED lamp test).	UP	-	
4	Make sure that the item number “906” is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	SELECT/SET	Once	
5	Change the item data from “NO” (not test) to “YES” (test).	UP	Once	
6	Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data. With the “YES” data, the SET.END/TRIP indicator LED will blink. At the same time, the item number box will start blinking instead of the item data box. Note that the test will not start only by programming the data here.	SELECT/SET	Once	

Step	Description	Operation		Indication
		Switch	Press	
7	<p>To start the test, press the SET.END/TRIP switch. All the LEDs will come on for 20 seconds to complete the procedure.</p> <p>To cancel the test, press the SETTING/CANCEL switch. The programmed data will be cleared, terminating the procedure.</p>	<p>To start: SET.END/TRIP</p> <p>To cancel: SETTING/CANCEL</p>	<p>Once</p>	<p>Item No. Item data</p> <p>8. 8. 8. 8. 8. 8. 8. <input type="checkbox"/> RUN</p> <p><input type="checkbox"/> COMM.</p> <p><input type="checkbox"/> kA <input type="checkbox"/> A</p> <p><input type="checkbox"/> A-phase <input type="checkbox"/> B-phase <input type="checkbox"/> C-phase <input type="checkbox"/> Zero-phase</p> <p><input type="checkbox"/> SETTING/CANCEL <input type="radio"/></p> <p><input type="radio"/> SELECT/SET <input type="radio"/></p> <p><input checked="" type="checkbox"/> SET.END/TRIP <input type="radio"/></p> <p><input type="radio"/> UP <input type="radio"/></p> <p><input type="radio"/> DOWN <input type="radio"/></p> <p><input type="radio"/> IND./INDI.END <input type="radio"/></p> <p><input type="radio"/> RESET <input type="radio"/></p> <p><input type="checkbox"/> TRIP</p> <p><input type="checkbox"/> I_A > <input type="checkbox"/> I_A >></p> <p><input type="checkbox"/> I_B > <input type="checkbox"/> I_B >></p> <p><input type="checkbox"/> I_C > <input type="checkbox"/> I_C >></p> <p><input type="checkbox"/> I_∑ > <input type="checkbox"/> I_∑ >></p>

D - 6 Specifying ZCT error adjustment

For the earth fault directional relay connected with ZCT like as CFP1-A01,2 and so on, this ZCT error adjustment function is applied to improve its composite characteristic through correcting the error of ZCT transformation ratio
 ZCT error can be adjusted that its nominal transformation ratio within the range of 200mA/1.5mA ~ 4.1mA ($\pm 0 \sim +2.6$ mA).

For this function the real ZCT transformation ratio needs to be remembered in advance before putting the relay into service. Please input 200mA zero phase current into ZCT primary, then remember and adjust the real measured value of ZCT secondary.

<< Example >> To change the ZCT secondary current from 1.5mA (set at time of shipment) to 2.1mA that its real transformation ratio is 200 : 2.1mA when the relay is connected with ZCT.

Step	Description	Operation		Indication
		Switch	Press	
1	According to each corresponding instruction manual to connect ZCT with I ₀ input circuit of earth fault directional element, then to achieve the status that is able to input 200mA zero phase current into ZCT primary. Start setting mode. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/ CANCEL	Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)	(Omitted)	
3	Select the item number "905" (ZCT error adjustment). At this time, the previous remembered adjustment value is displayed as ZCT secondary current value in the item data box. Example: 200/1.5mA (set at time of shipment)	UP	-	
4	Make sure that the item number "905" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, and to start measure the secondary current value of ZCT connected with relay. According to differential indication status the following adjustment value will be remembered. (1)When "1.5 ~ 4.1" was displayed It means that it is in available range of error correction, and the displayed value can be remembered. (2)When item data at "4.1" blinking Please make sure again about the ZCT connection and input current.	SELECT/SET	Once	

Step	Description	Operation		Indication
		Switch	Press	
	<p>(Reference step 1 above, please) If correctly, it means ZCT secondary output is more than 4.1mA, at this time due to outside of correction range, in order to correct the error as possible as it can the value 4.1mA will be remembered.</p> <p>(3)When item data at "1.5" blinking Please make sure again about the ZCT connection and input current. (Reference step 1 above, please) If correctly, it means ZCT secondary output is less than 1.5mA, at this time due to outside of correction range, in order to correct the error as possible as it can the value 1.5mA will be remembered.</p> <p>Example: Here, 200:2.1mA as connected ZCT transformation ratio is shown on the right.</p>			Continue step 4
5	<p>Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data.</p> <p>When it is detected that new data has been programmed to be ready for replacing the currently used setting, the SET.END/TRIP indicator LED will blink.</p> <p>At the same time, the item number box will start blinking instead of the item data box.</p> <p>Note that the setting being used for the current operation is still valid even if another value has been programmed in the item data box.</p>	SELECT/SET	Once	
6	<p>- To put the new data programmed in effect, press the SET.END/TRIP switch. The setting currently used will be replaced by the new data to complete the procedure.</p> <p>- To cancel the new data programmed, press the SETTING/CANCEL switch to delete all the data programmed, terminating the procedure.</p>	<p>To put in effect: SET.END/TRIP</p> <p>To cancel: SETTING/CANCEL</p>	Once	



In CFP1-A02 type, since the sensitivity for input current is low value which is 1/10 of CFP1-A01 type, the input at the time of adjustment needs to set at 2A which is 10 times the CFP1-A01 type. In adjustment, please transpose all the above-mentioned current values to 10 times the value of them.

D - 7 Performing ZCT error correction option

To set ZCT error correction function effect (on) or null (oF).

Before put this function effect, implement the item **D - 6** in advance first, please.

<< Example >> To change ZCT error correction function from null to effect.

Step	Description	Operation		Indication
		Switch	Press	
1	Implement the item D - 6 at first. Start the setting mode. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/ CANCEL	Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)		
3	Select the item number "904" (ZCT error correction option). At this time, the current option status will be displayed in the item data box. Effect = "on" Null = "oF" (set at time of shipment)	UP		
4	Make sure that the item number "904" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking, instead of the item No. box, so that data can be changed.	SELECT/SET	Once	
5	Change the item data from "oF" (null) to "on" (effect).	UP	Once	
6	Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data. With the "on" data, the SET.END/TRIP indicator LED will blink. At the same time, the item No. box will start blinking instead of the item data box. Notice that at this status the "on" data is not put into effect.	SELECT/SET	Once	
7	- To execute ZCT error correction, press the SET.END/TRIP switch, the error correction will become effective. The data programmed will be implemented and complete the procedure. - To cancel the data programmed without implementing, press the SETTING/CANCEL switch. The data programmed will be all cleared to terminate	To put in effect: SET.END/TRIP To cancel: SETTING/ CANCEL	Once	

Step	Description	Operation		Indication
		Switch	Press	
	the procedure.			<p>SETTING/CANCEL</p> <p>SELECT/SET</p> <p>SET.END/TRIP</p> <p>UP</p> <p>DOWN</p> <p>IND./INDI.END</p> <p>RESET</p>

D - 8 Performing CT polarity check

To detect the connection (Polarity error or Phase sequence error) of CT connected with primary side and secondary side of protected transformer, and to display the error codes.

(Refer to the “Protection Relay Instruction Manual” of each model for detailed codes please.)

Step	Description	Operation		Indication
		Switch	Press	
1	Start the setting mode. The SETTING/CANCEL indicator LED comes on and the item number blinks.	SETTING/ CANCEL	Once	
2	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)		
3	Select the item number “905” (CT polarity check).	UP		
4	Make sure that the item number “905” is shown in the box, and press the SELECT/SET switch. The item data box will start blinking instead of the item No. box.	SELECT/SET	Once	
5	Change the item data from “no” (not check) to “YES” (check).	UP	Once	
6	Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data. With the “YES” data, the SET.END/TRIP indicator LED will blink. At the same time, the item No. box will start blinking instead of the item data box. Notice that at this status the “YES” data is not put into effect.	SELECT/SET	Once	
7	- To execute CT polarity check, press the SET.END/TRIP switch, the checked result (code) will come on in the item data box for 20 seconds, and then complete the procedure. For example: When A-phase polarity error is detected out, the code 0001 will be display. To cancel the data programmed without implementing, press the SETTING/CANCEL switch. The data programmed will be all cleared to terminate the procedure.	To put in effect: SET.END/TRIP To cancel: SETTING/ CANCEL	Once	

D - 9 Password enable/disable option

This function is available in the case of the relay with RS232C I/F.

This function provides security for the relay setting.

Once the password was set enable, the password is necessary when pressing the button of setting.

And if the password was set disable, anybody can enter the setting mode by pressing the button of setting.

<< Example >> Change the password enable/disable function from disable to enable.

Step	Description	Operation		Indication
		Switch	Press	
1	Mode selection (Setting → Forced Operation → Option) See the section D - 1 for how to select mode.	(Omitted)	(Omitted)	
2	Select the item number "903" (Relay password enable/disable option). At this time, the current option status will be displayed in the item data box. Enable = "on" Disable = "oF" (set at time of shipment)	UP	—	
3	Make sure that the item number "903" is shown in the box, and press the SELECT/SET switch. The item data box will start blinking instead of the item No. box.	SELECT/SET	Once	
4	Change the item data from "oF" (disable) to "on" (enable).	UP	Once	
5	Make sure that the desired data is shown in the item data box, and press the SELECT/SET switch to program the data. With the "on" data, the SET.END/TRIP indicator LED will blink. At the same time, the item No. box will start blinking instead of the item data box. Notice that at this status the "on" data is not put into effect.	SELECT/SET	Once	
6	<ul style="list-style-type: none"> To execute password enable, press the SET.END/TRIP switch, the relay password will become effective. The data programmed will be implemented and complete the procedure. To cancel the data programmed without implementing, press the SETTING/CANCEL switch. The data programmed will be all cleared to terminate the procedure. 	To put in effect: SET.END/TRIP To cancel: SETTING/CANCEL	Once	

Note) To change relay password enable/disable function from "on" (enable) to "oF" (disable), the relay password inputting is necessary. At that time, please refer to **[B]** Setting mode of this manual to input password.

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