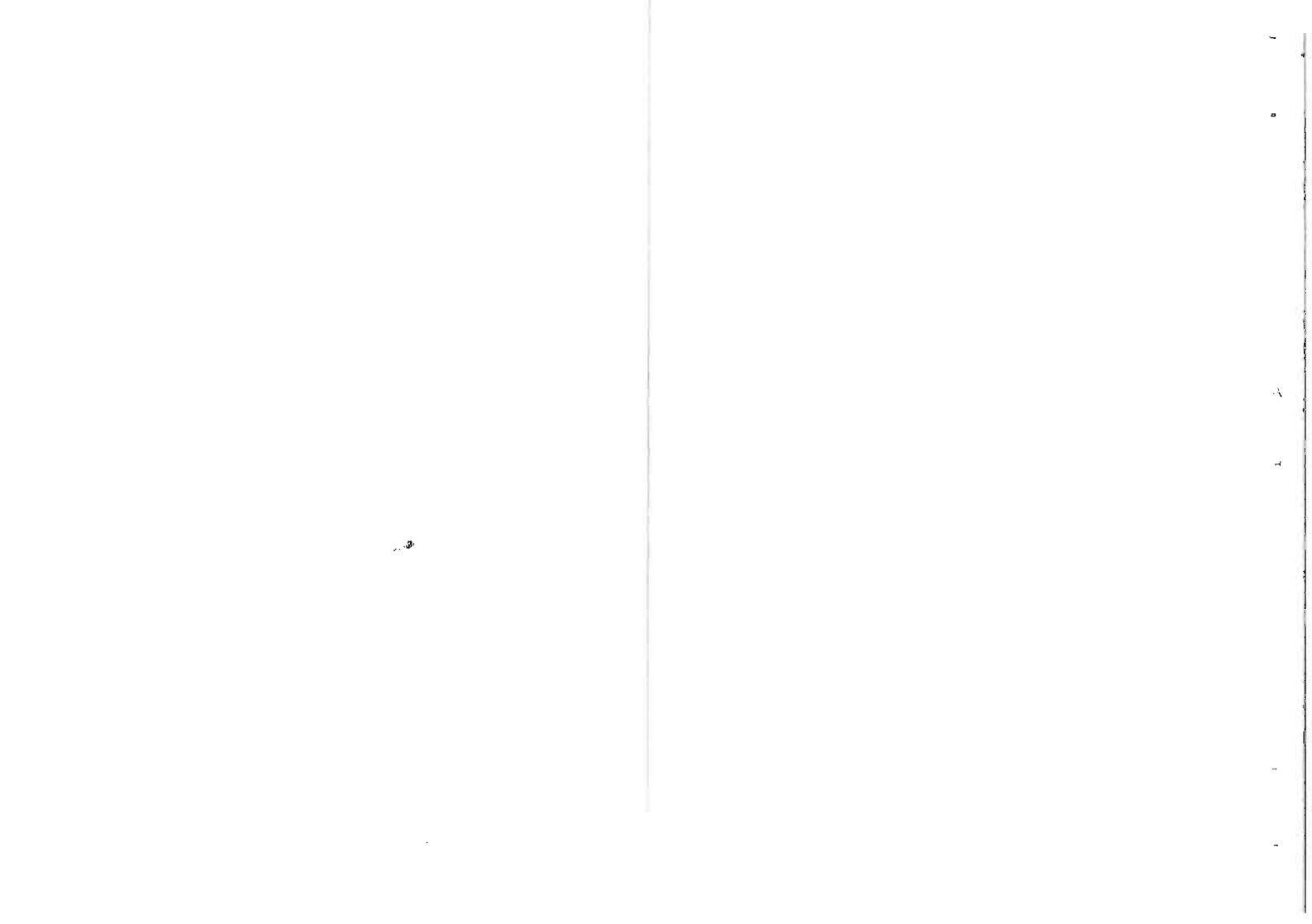


INSTRUCTION MANUAL FOR  
TYPE ANU-1 OCR CHECKER  
For AR Series Air Circuit Breakers

APPLICABLE OCR TYPES : AGR-11L  
(BASIC TYPES) AGR-21L  
AGR-22L  
AGR-11R  
AGR-21R  
AGR-22R  
AGR-11S  
AGR-21S  
AGR-22S

Please retain this manual for future reference.

 **TERASAKI ELECTRIC CO., LTD.**



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This portable type dedicated testing instrument allows you to easily test on the spot the AGR series overcurrent tripping relay (OCR) mounted on the *Tempower2* AR series air circuit breaker. Please carefully read this instruction manual to ensure the proper use.

## I. Safety Notices

This chapter gives you the important information on safety. Prior to the use of the Type ANU-1 OCR Checker, be sure to thoroughly read this and subsequent chapters of this instruction manual and all the other documents that come with this product. To ensure the proper use, gain the full knowledge of the OCR checker and familiarize yourself with all the safety information and precautions. This chapter classifies the following safety precautions as “**⚠ CAUTION**”, which indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury, or otherwise may result in physical property damage only. A failure in observing any instruction given under “**⚠ CAUTION**” might lead to a more serious result depending on the situation. Be sure to observe these instructions, all of which include very important information.

### **⚠ CAUTION**

- Common to transportation, operations, and storage
  - Do not store the OCR checker in an abnormal environment where it is exposed to high temperature, high humidity, excessive dust, corrosive gas, vibrations, shocks, or any other similar condition. Avoid direct sunlight and maintain the ambient temperature in a range between  $-20^{\circ}\text{C}$  and  $60^{\circ}\text{C}$  and relative humidity in a range between 45% and 85% (without condensation). Otherwise, a failure may result.
- Transportation
  - Do not drop the OCR checker, nor give a shock to it. The OCR checker is an electronic product requiring careful handling. Improper handling will result in a failure.
- Operations
  - The test using the OCR checker shall be performed by a qualified operator who has the necessary expertise. The operator shall be familiar with the knowledge, safety information, and precautions on air circuit breakers, OCRs, and OCR checkers. Improper handling may lead to an unexpected accident.
  - Before testing an OCR, be sure to make preparations for the test in accordance with Chapter IV Preparation Before the Test. Otherwise, undesired tripping or a failure may result.
  - To insert the power plug into or remove it from the OCR checker, or to insert the signal plug into or remove it from the OCR, be sure to check in advance that the OCR checker is OFF. Otherwise, a failure may result.
  - To use each switch located on the OCR checker, press it with your finger at a force of 2–4 N. Using excessive force or a sharp-tipped hard tool can cause a failure.
  - After the test, be sure to put the set values on the OCR back to the previous ones. Otherwise, fire or undesired tripping may occur.
  - Do not apply voltage to the output signal check port. This may result in a failure of the OCR checker.

## II. Ratings and Specification

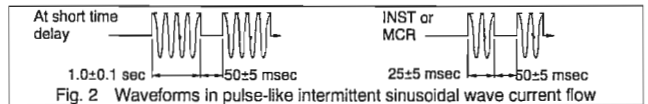
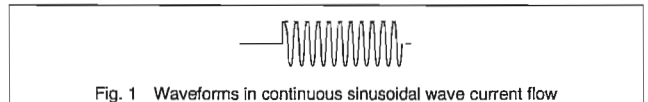
Tables 1 and 2 show the ratings and specification of the OCR checker.

Table 1 Rating and specification 1 of the type ANU-1 OCR checker

| Item                             | Description  |
|----------------------------------|--|
| Applicable OCR types             | All the following basic OCR types and their derivatives:<br>AGR-11L, AGR-21L, AGR-22L,<br>AGR-11R, AGR-21R, AGR-22R,<br>AGR-11S, AGR-21S, AGR-22S  |
| Rated voltage                    | Dual power sources<br><ul style="list-style-type: none"> <li>● External power source (a power cord with an AC adapter is provided)<br/>Specify either 100 – 120 VAC or 200 – 240 VAC (both 50/60 Hz) when placing an order.</li> <li>● Built-in power source<br/>6 VDC: 4 pieces of AA alkali batteries</li> </ul> |
| Life of battery                  | Approx. 10 minutes   |
| Power consumption                | 7 VA   |
| Output for OCR power source      | 18 VDC (100 mA max.)   |
| Auto power-off function          | This function is activated if there has been no operation or output for 1 minute when the ANU-1 is operated with the built-in batteries. (The settings are saved, and displayed at the next time when the ANU-1 is turned ON.)   |
| External dimensions of main unit | W101 mm × H195 mm × D44 mm   |
| Weight of main unit              | Approx. 400 g (approx. 550 g including batteries)  |
| Force for pressing a switch      | 2 – 4 N  |
| Allowable ambient temperature    | –10 to 40°C during use, –20 to 60°C during storage   |
| Allowable humidity               | During use and storage: RH 45% – 85%   |
| Vibration resistance             | Conforming to JIS C0911  |
| Shock resistance                 | Conforming to JIS C0912  |
| Insulation resistance            | 1 MΩ min. (as measured with a 500 VDC Megger between the case and the power source)  |
| Immunity                         | EN50082-2  |
| EMI (Interference)               | EN50081-2  |
| Applicable safety standard       | EN61010-1  |
| Accessories                      | Power cord with AC adaptor (approx. 2 m)<br>power plug adapter (in case of AC200-240V of rated voltage)<br>Signal cable (approx. 3 m)<br>Instruction manual (this document)  |

Table 2 Ratings and specification for the ANU-1

| Item  | Description   |
|---|---|
| Measurable OCR functions  |   |
| * For (1) through (6), see the following "Output for signals" rows.   |   |
| <ul style="list-style-type: none"> <li>● Pickup current value for long time delay trip function (LT) ..... (1)(3)</li> <li>● Trip time setting value for long time delay trip function (LT) ..... (1)(4)(6)</li> <li>● Trip current setting value for short time delay trip function (ST) ..... (2)(5)</li> <li>● Trip time setting value for short time delay trip function (ST) ..... (2)(5)(6)</li> <li>● Trip current setting value for instantaneous trip function (INST) ..... (2)(5)</li> <li>● Trip current setting value for making current release trip function(MCR)..... (2)(5)</li> <li>● Trip current setting value for ground fault trip function (GF) ..... (1)(3)</li> <li>● Trip time setting value for ground fault trip function (GF) ..... (1)(3)(6)</li> <li>● Pickup current value for N-phase protective trip function (NP) ..... (1)(3)</li> <li>● Trip time setting value for N-phase protective trip function (NP) ..... (1)(4)(6)</li> <li>● Pickup current value for pretrip alarm function (PTA) ..... (1)(3)</li> <li>● Alarm time setting value for pretrip alarm function (PTA) ..... (1)(3)(6)</li> </ul> |   |
| Output phase setting  | Select one phase from the R-, S-, T-, and N-phase.  |
| Output method   | (1) Continuous sinusoidal wave current flow (see Fig. 1)<br>(2) Pulse-like intermittent sinusoidal wave current flow (see Fig. 2) |
| Output frequency  | 60 Hz ±0.5%   |
| Waveform distortion factor  | Within 0.5%   |
| CT rated primary current/output signal ratio  | CT rated primary current ( $I_{CT}$ )[A] /0.1500[V]   |
| Output signal value setting range   | (3) 0.0000 – 0.3000V ( 0.0002V)<br>(4) 0.0000 – 1.5000V ( 0.001 V at 0.3000 V max. 0.01 V at more than 0.3000 V)                  |
| * The values in parentheses indicate increments/decrements  | (5) 0.0000 – 3.5000V ( 0.001 V at 0.3000 V max. 0.01 V at more than 0.3000 V)   |
| Accuracy of output signal value   | ±2% (voltage)   |
| Output time measurement range   | (6) 0 – 9999 (sec) Display changes as follows:<br>(0.00–9.99 → 10.0–99.9 → 100–9999 → TIME ELAPSE)                                |



### III. Parts Names and Functions

Parts names and functions of the OCR checker are given below. Figs. 3 and 4 show the appearance of the OCR checker.

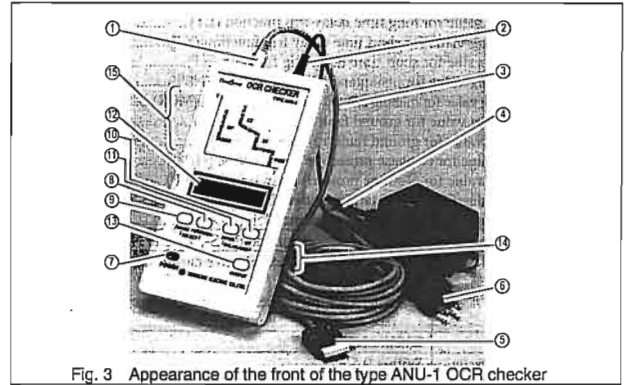


Fig. 3 Appearance of the front of the type ANU-1 OCR checker

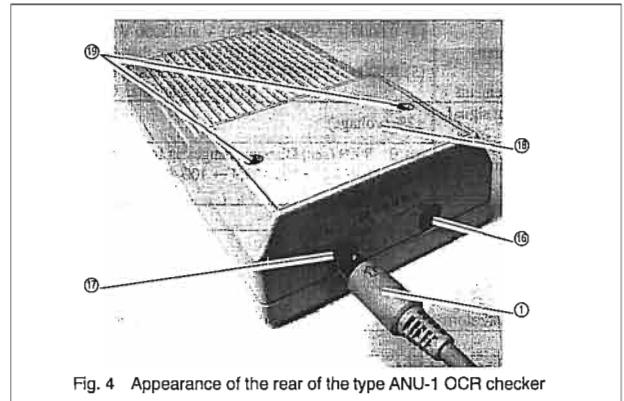



Fig. 4 Appearance of the rear of the type ANU-1 OCR checker



- ① Signal connector (round type): A signal cable connector for the OCR checker
- ② Power connector (round type): A power cable connector for the OCR checker
- ③ Signal cable (approx. 3 m): A cable connecting between the OCR and the OCR checker. The OCR checker gives the output for power and signals to the OCR and receives the trip signal and pretrip alarm signal from the OCR via this cable.
- ④ Power cord (approx. 2 m): A cord used to supply power to the OCR checker. The external power voltage is converted into 9 VDC by the AC adaptor provided in the middle of the cord, and then enters the OCR checker.
- ⑤ Signal connector (square type): A signal cable connector for the OCR.
- ⑥ Power plug: A power cord plug for the power outlet.
- ⑦ POWER switch: A switch used to turn ON/OFF the OCR checker.
- ⑧ FUNCTION switch: A switch used to select a measurement item.
- ⑨ PHASE switch: A switch used to select an output phase.
- ⑩ UP switch: A switch used to increase the output signal value.
- ⑪ DOWN switch: A switch used to decrease the output signal value.
- ⑫ LCD: A part that displays the selected measurement item, output phase, output signal value, measured output time, and other information.
- ⑬ OUTPUT switch: A switch used to turn ON/OFF the output signal. When the output signal is OFF, the output signal value indicated on the LCD (see Fig. 4) blinks. If the output signal is turned ON, the indicated output signal value is illuminated.
- ⑭ Output signal check port (with a lid): The figure shows this port with the lid removed. Insert a connector from an instrument into the port and check the output signal value (voltage). For further information, see "VI. Procedure for Checking the Output."
- ⑮ LED indicators: The LED indicator for the selected measurement item blinks. It is illuminated if the trip signal is detected.
- ⑯ Power connector socket: A socket for the power connector (round type).
- ⑰ Signal connector socket: A socket for the signal connector (round type).
- ⑱ Battery lid: Retained with screws.
- ⑲ Battery lid screws: 2 pieces of M2.6 × 12


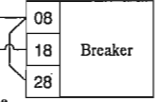
#### IV. Preparation Before the Test

|   |   |
|---|---|
| <br><b>CAUTION</b> | <ul style="list-style-type: none"> <li>● Before testing an OCR, be sure to make preparations for the test in accordance with Chapter IV Preparation Before the Test. Otherwise, undesired tripping or a failure may result.</li> <li>● To insert the power plug into or remove it from the OCR checker, or to insert the signal plug into or remove it from the OCR, be sure to check in advance that the OCR checker is OFF. Otherwise, a failure may result.</li> </ul> |
|---|---|

This chapter describes the preparations for the test. Make the preparations in accordance with the following steps:

- (1) Open the ACB and turn off an upstream breaker to isolate the ACB main and control circuits from any power.
- (2) If the ACB is of draw-out type, draw out the breaker body to the TEST position.
- (3) If the ACB has the undervoltage trip device (UVT), make sure existing UVT control power cables are not energized, unplug the cables and then connect the UVT power to the control circuit terminals shown in Fig. 3.

Table 3 UVT power connection

| Type of OCR      | Terminal No. and voltage   |   |      |      |
|------------------|--|---|------|------|
| AGR-11           | Terminal No.   | UVT voltage rating (single phase) $U_c$ [V] |      |      |
|                  | 08 - 09  | 100V  | 200V | 380V |
|                  | 18 - 09  | 110V  | 220V | 415V |
|                  | 28 - 09  | 120V  | 240V | 440V |
| AGR-21<br>AGR-22 | Single-phase ac power supply  <br>Breaker power supply arrangement:<br>Supply single-phase power having the same voltage as 3-phase rated voltage. |   |      |      |

- (4) Open the OCR cover (Fig. 5). Push the right end of the OCR cover to the left at the hollow on the front cover to unlatch and open the OCR cover. If the OCR cover is padlocked, first remove the padlock.

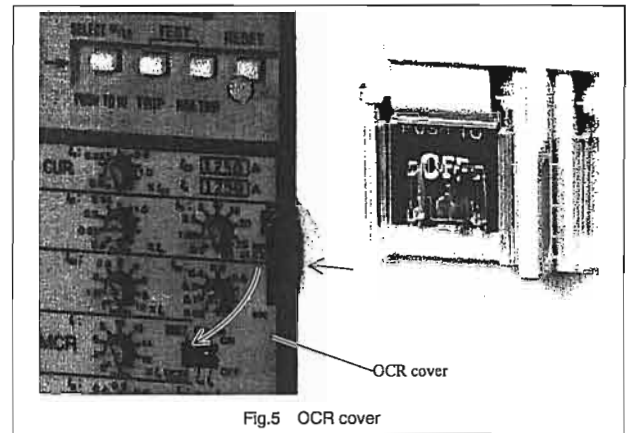


Fig.5 OCR cover

- (5) Make sure there are no indications on the LEDs and LCD of the OCR checker and connect the OCR checker to the OCR using the signal cable as follows:  
 Plug the square signal connector (Fig. 7) face up into the OCR testing terminal port (Fig. 6) and plug the round signal connector (① in Fig. 4) into the signal connector socket (⑩ in Fig. 4) with the arrow mark facing down.
- (6) Make sure there are no indications on the LEDs and LCD of the OCR checker and prepare the power supply to the OCR checker as described in the next step. If the OCR checker is supplied with external power, insert the round power connector (② in Fig. 3) into the power connector socket (⑮ in Fig. 4) and insert the power plug (⑤ in Fig. 3) into an outlet. (When rated voltage of OCR checker is AC200-240V, connect the power plug adapter (⑧ in Fig. 8), between power plug and an outlet shown in Fig. 8.) If a battery is used to supply power to the OCR checker, loosen the battery lid screws (⑯ in Fig. 4), remove the battery lid (⑰ in Fig. 4), insert four AA batteries in the battery holder, and reinstall the battery lid and the battery lid screws.

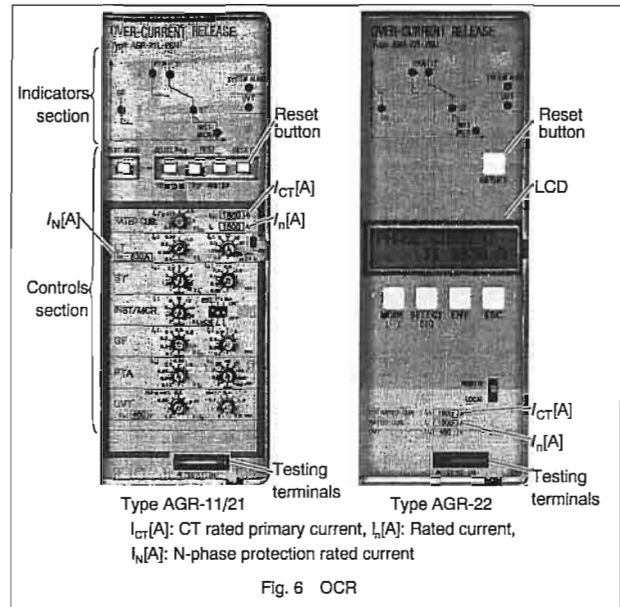


Fig. 6 OCR

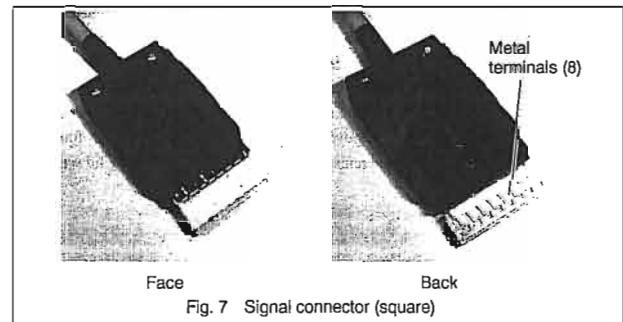
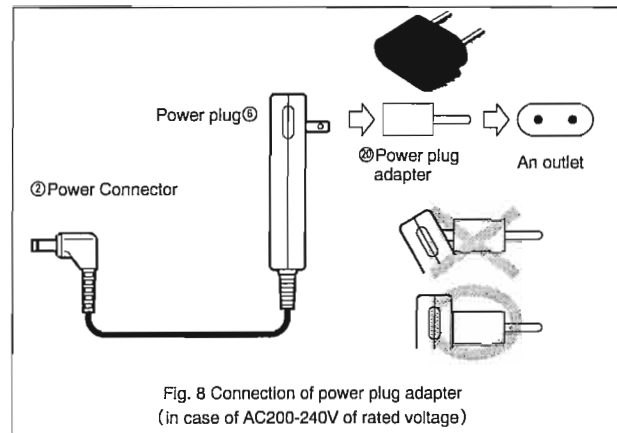


Fig. 7 Signal connector (square)



- (7) Check the rated current value  $I_n$ [A], the primary CT rated current value  $I_{CT}$ [A], and if with the N-phase protection, the rated current value  $I_{N}$ [A] for the N-phase protection. Read each current value indicated on the controls section of the OCR shown in Fig. 6. To check the N-phase protection pickup current of the Type AGR-22 OCR, turn ON the OCR checker to supply control power to the OCR, and then display the current value on the LCD using the switches located on the OCR. For the Type AGR-22 OCR, also display the setting scale value for each tripping characteristic on the LCD. For using the switches located on the OCR, refer to the instruction manual for the AR type air circuit breaker.
- (8) The test includes the procedure for changing the set values on the OCR. To prevent the pre-test settings from being forgotten after the test, it is recommended that you make a note of those settings. For this purpose, use the form given in "Table 4 OCR settings before test."


Table 4 OCR settings before test

| ACB type                     | AR _____                      | OCR type                                  | AGR-2 _____                |                                |
|------------------------------|-------------------------------|---|----------------------------|--------------------------------|
| Serial No                    | _____ - _____                 |   | Customer ID symbol _____   |                                |
| Function                     | Setting item                  |   | Setting scale              | Condition and unit             |
| With/without                 | Rated current [ $I_n$ ]       |   |                            | $\times I_{CT}$                |
| With                         | Long time delay trip (LT)     | Current setting [ $I_R$ ]                 |                            | $\times I_n$                   |
|                              |                               | Time setting [ $t_R$ ]                    |                            | sec                            |
|                              | HOT/COLD select switch        |   | HOT/COLD                   | /                              |
|                              | Short time delay trip (ST)    | Current setting [ $I_{sd}$ ]              |                            | $\times I_n$                   |
|                              |                               | Time setting [ $t_{sd}$ ]                 |                            | sec                            |
| I <sup>2</sup> select switch |                               | ON/OFF                                    | I <sup>2</sup> SW $t_{sd}$ |                                |
| Instantaneous trip (INST)    | Current setting [ $I_i$ ]     |   | $\times I_n$               |                                |
|                              | INST/MCR select switch        |   | INST/MCR                   | /                              |
| With/without                 | Ground fault trip/ alarm (GF) | Current setting [ $I_g$ ]                 |                            | $\times I_{CT}$                |
|                              |                               | Time setting [ $t_g$ ]                    |                            | sec                            |
|                              | I <sup>2</sup> select switch  |   | ON/OFF                     | I <sup>2</sup> SW $t_g$        |
| With/without                 | N-phase protection (NP)       | Current setting [ $I_N$ ]                 |                            | $\times I_{CT}$                |
|                              |                               | Time setting [ $t_N$ ]                    | $t_N = t_R$                | sec                            |
|                              |                               | HOT/COLD select switch                    |                            | Common to long time delay trip |
| With/without                 | Pretrip alarm (PTA)           | Current setting [ $I_p$ ] or [ $I_{p1}$ ] |                            | $\times I_n$                   |
|                              |                               | Time setting [ $t_p$ ] or [ $t_{p1}$ ]    |                            | sec                            |
| With/without                 | Pretrip alarm (PTA2)          | Current setting [ $I_{p2}$ ]              |                            | $\times I_n$                   |
|                              |                               | Time setting [ $t_{p2}$ ]                 | $t_{p1} \times 1.5$        | sec                            |
| With/without                 | Earth leakage trip (ELT)      | Current setting [ $I_{dR}$ ]              |                            | [A]                            |
|                              |                               | Time setting [ $t_{dR}$ ]                 |                            | sec                            |
| With/without                 | Reverse power trip (RPT)      | Power setting [ $P_R$ ]                   |                            | $\times P_n$                   |
|                              |                               | Time setting                              |                            | sec                            |
| NOR/REV select switch        |                               | NOR/REV                                   | /                          |                                |
| With/without                 | Under-voltage trip (UVT)      | Attraction voltage setting                |                            | $\times U_{c[V]}$              |
|                              |                               | Time setting                              |                            | sec                            |

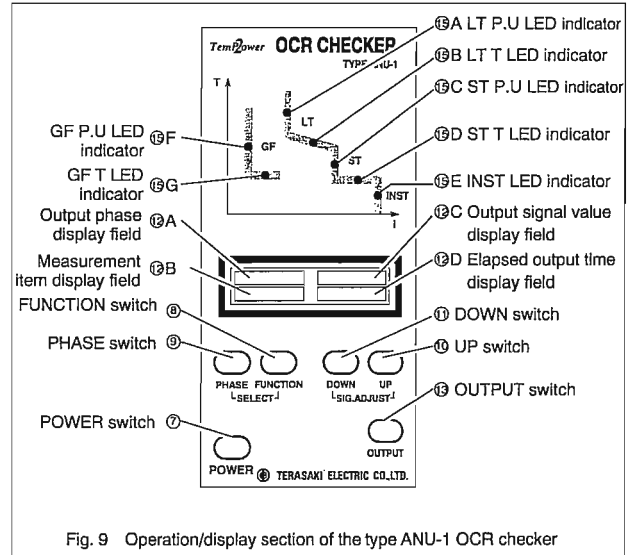
- Enter values in the fields enclosed with thick lines. For the with/without and ON/OFF fields, encircle whichever appropriate.

## V. Testing Procedures

This chapter describes the procedures for testing the OCR checker. Perform the following steps for the test:

|   |   |
|---|---|
| <br><b>CAUTION</b> | <ul style="list-style-type: none"> <li>● To use each switch located on the OCR checker, press it with your finger at force of 2 – 4 N. Using excessive force or a sharp-tipped hard tool can cause a failure.</li> <li>● After the test, be sure to put the OCR setting values back to the previous ones. Otherwise, fire or undesired tripping may occur.</li> </ul> |
|---|---|

### 1. Turning ON the power and selecting a measurement item



- When the output is turned ON, the FUNCTION and PHASE switches are disabled.
- To stop the output while it is ON, press the OUTPUT switch.
- Holding down the UP or DOWN switch for one second or more will increase the increment or decrement speed.

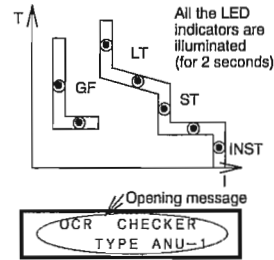


Fig. 10 Display appearing when the ANU-1 is turned ON

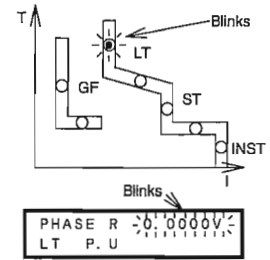


Fig. 11 Display appearing 2 seconds after the ANU-1 has been turned ON

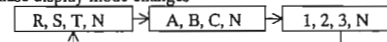
(1) Press the POWER switch (Ⓞ in Fig. 9) to turn ON the OCR checker. All the LED indicators (Ⓟ in Fig. 9) will be illuminated for 2 seconds with the opening message appearing on the LCD (Ⓢ in Fig. 9) (See Fig. 10). Check that all the LED indicators are illuminated (the LED indicators are normal). Two seconds later, the indications will change to the state shown in Fig. 11. Now various settings are possible.

- If the OCR checker is turned ON after it has been turned OFF by the auto power-off function, the indications shown in Fig. 11 will not appear, but those shown just before the auto power-off will appear. The auto power-off function automatically turns OFF the power when (a) the OCR checker is operated with built-in batteries, (b) no output signal is output, and (c) no switch has been used for 1 minute or more.

(2) The phase display mode of the OCR checker defaults to "R, S, T". It can be changed to "A, B, C" or "1, 2, 3" using the following procedure.

- 1) Press the POWER switch (Ⓞ in Fig. 9) to turn off the power.
- 2) While holding down both the DOWN and UP switches (Ⓢ and Ⓣ in Fig. 9), press the POWER switch (Ⓞ in Fig. 9) again to turn on the power.
- 3) Press both the DOWN and UP switches (Ⓢ and Ⓣ in Fig. 9) simultaneously and hold them down (for 5 or 6 seconds) until the phase display field (ⓈA in Fig. 9) shows "PHASE A".
- 4) To change the phase display mode to "1, 2, 3", repeat steps 1), 2), and 3) above.

- Phase display mode changes





- (3) Press the FUNCTION switch (ⓐ in Fig. 9) and select the measurement item corresponding to the OCR function to be tested (see Table 5). The selected measurement item is shown in the “B” field of ⓑ in Fig. 9 in combination with the blinking LED indicator (ⓓ in Fig. 9). For the detailed testing procedure for each function, see the page indicated in the Ref. page column. Table 6 on page 38 is Evaluation Standard and Test Result Entry Sheet, which is provided for your use.

Table 5 Measurement items available for your selection

| OCR function tested   |                                | Measurement item selected | Blinking LED | Ref. page |
|-----------------------|--------------------------------|---------------------------|--------------|-----------|
| Long time delay trip  | Pickup current value           | LT P.U                    | ⓐ-A          | 14        |
|                       | Time setting value             | LT T                      | ⓐ-B          | 16        |
| Short time delay trip | Current setting value          | ST P.U                    | ⓐ-C          | 18        |
|                       | Time setting value             | ST T                      | ⓐ-D          | 20        |
| Instantaneous trip    | Current setting value          | INST                      | ⓐ-E          | 22        |
| Ground fault trip     | Current setting value          | GF P.U                    | ⓐ-F          | 24        |
|                       | Time setting value             | GF T                      | ⓐ-G          | 26        |
| N-phase protection    | Pickup current value           | LT P.U                    | ⓐ-A          | 28        |
|                       | Time setting value             | LT T                      | ⓐ-B          | 29        |
| Pretrip alarm         | Pickup current value           | LT P.U                    | ⓐ-A          | 30        |
|                       | Time setting value             | LT T                      | ⓐ-B          | 32        |
|                       | Time setting value (2nd stage) | LT T                      | ⓐ-B          | 34        |
| MCR trip              | Current setting value          | INST                      | ⓐ-E          | 36        |
| Ground fault alarm    | Current setting value          | GF P.U                    | ⓐ-F          | 37        |
|                       | Time setting value             | GF T                      | ⓐ-G          | 37        |

## 2. Testing Procedure for Pickup Current Value for Long Time Delay Trip Function (LT)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR | Changes in setting values on OCR  |
|-------------------|---|
| AGR-□□L           | If (scale value for $I_{d0}$ ) is 1.5 or less, change it to 2 or more.<br>If ground fault trip is available, change (scale value for $I_g$ ) to NON, and set the COLD/HOT switch to COLD. |
| AGR-□□R           | If (scale value for $I_{d0}$ ) is 1.5 or less, change it to 2 or more.<br>If ground fault trip is available, change (scale value for $I_g$ ) to NON.                                      |
| AGR-□□S           | None  |

- (2) Press the PHASE switch (ⓐ in Fig. 9) to change the displayed output phase ("A" field of ⓐ in Fig. 9). Select the R-, S-, or T-phase.  
 (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

● For  $I_n$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR | Evaluation standard value [ $V_T$ ], unit: V   |
|-------------------|--|
| AGR-□□L           | $a \times 1.05 < V_T \leq a \times 1.2$  |
| AGR-□□R           | $a: 0.15 \times (\text{scale value for } I_n) \times (\text{scale value for } I_n)$                              |
| AGR-□□S           | $b \times 0.95 < V_T \leq b \times 1.05$<br>$b: 0.15 \times (I_n / I_{CT}) \times (\text{scale value for } I_g)$ |

- (4) Press the OUTPUT switch (ⓑ in Fig. 9) to turn ON the output.  
 \* See Fig. 12.  
 (5) Press the UP switch (ⓐ in Fig. 9) to increase the output signal value (displayed in the "C" field of ⓐ in Fig. 9) until the "LT" LED indicator located on the indicators section of the OCR in the breaker starts blinking (at intervals of approximately 0.8 second).  
 \* See Fig. 13.  
 (6) Once the "LT" LED indicator starts blinking, press the DOWN switch (ⓑ in Fig. 9) to slightly decrease the output signal value. The "LT" LED indicator will then turn OFF.  
 (7) Slowly repeat increasing and decreasing the output signal value a few times, and read the output signal value at the point when the "LT" LED starts blinking. This value is the pickup current value for "LT".  
 (8) Compare the pickup current value for "LT" indicated by the OCR checker with the evaluation standard value [ $V_T$ ]. If the indicated value falls within the range defined by the evaluation standard value, the pickup current value for "LT" is normal.  
 (9) After the above check, press the OUTPUT switch (ⓑ in Fig. 9) to turn OFF the output.

- (10) To perform the test for a different test phase, repeat the steps starting with (2).  
 (11) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

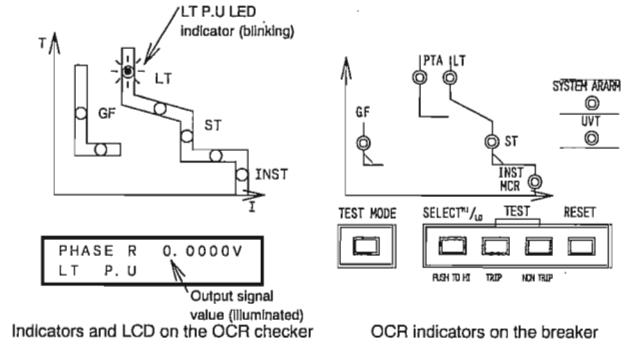


Fig. 12 Indications appearing when the output signal is ON

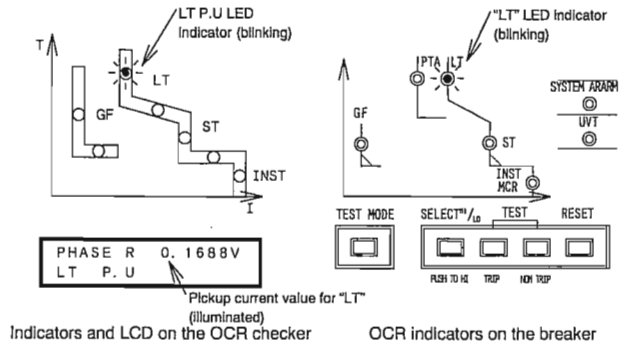


Fig. 13 Indications appearing when the pickup current value for "LT" is detected

3. Testing Procedure for Trip Time Setting Value for Long Time Delay Trip Function (LT)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR | Changes in setting values on OCR  |
|-------------------|---|
| AGR-□□L           | If (scale value for $I_{ad}$ ) is 6 or less, change it to 8 or more.<br>If ground fault trip is available, change (scale value for $I_g$ ) to NON, and set the COLD/HOT switch to COLD. |
| AGR-□□R           | If (scale value for $I_{ad}$ ) and (scale value for $I_d$ ) are 3 or less, change them to 4 or more.<br>If ground fault trip is available, change (scale value for $I_g$ ) to NON.      |
| AGR-□□S           | None  |

- (2) Press the PHASE switch (Ⓢ in Fig. 9) to change the displayed output phase ("A" field of Ⓢ in Fig. 9). Select the R-, S-, or T-phase.

- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

● For  $I_a$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR | Evaluation standard value [ $V_T$ ], unit: V  |
|-------------------|---|
| AGR-□□L           | $V_T = 0.15 \times (\text{scale value for } I_a) \times (\text{scale value for } I_g) \times 6$ |
| AGR-□□R           | $V_T = 0.15 \times (\text{scale value for } I_a) \times (\text{scale value for } I_g) \times 3$ |
| AGR-□□S           | $V_T = 0.15 \times (I_{CT}) \times (\text{scale value for } I_g) \times 1.2$                    |

- (4) Increase and decrease the output signal value (displayed in the "C" field of Ⓢ in Fig. 9) by pressing the UP switch (Ⓢ in Fig. 9) and the DOWN switch (Ⓢ in Fig. 9), and then set it to the evaluation standard value [ $V_T$ ].

- (5) To test both the OCR functions and the breaker operation, turn ON the breaker.

- (6) Press the OUTPUT switch (Ⓢ in Fig. 9) to turn ON the output.

- (7) When the output is turned ON, indications appear as illustrated in Fig. 14. After the given time has elapsed, the indications change to the state shown in Fig. 15. When the "LT" LED is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal and displays the trip time value for "LT".

- (8) Compare the trip time value for "LT" indicated by the OCR checker with the following value. If the indicated value falls within the following range defined by the following value, the trip time setting value for "LT" is normal.

| Basic type of OCR | Allowable trip time range for "LT" unit: sec                                  |
|-------------------|---|
| AGR-□□L, AGR-□□S  | (scale value for $t_R$ ) $\pm 15\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$ |
| AGR-□□R           | (scale value for $t_R$ ) $\pm 20\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$ |

- (9) Press the RESET button (see Fig. 15) located on the controls section of the OCR. The "LT" LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn

- OFF. At this time, the output signal value set in step (4) will appear.
- (10) To perform the test for a different test phase, repeat the steps starting with (2).
  - (11) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

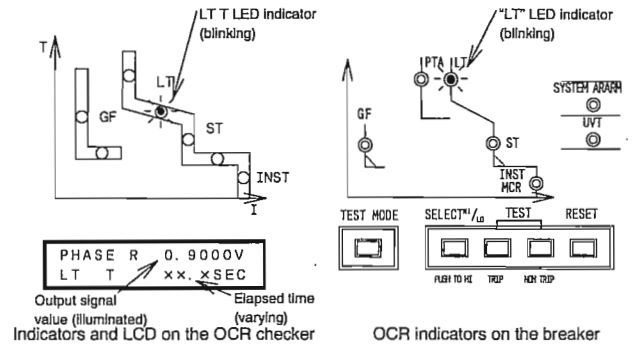
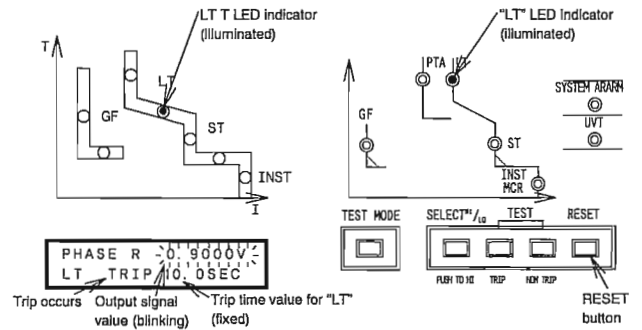


Fig. 14 Indications appearing when the output signal is ON



Indicators and LCD on the OCR checker

Fig. 15 Indications appearing when long time delay trip occurs

4. Testing Procedure for Trip Current Setting Value for Short Time Delay Trip Function (ST)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_{R}$ ) and (scale value for $I_{I}$ ) to NON.<br>If ground fault trip is available, change (scale value for $I_{G}$ ) to NON.<br>Set the I <sup>t</sup> $I_{d}$ switch to OFF. |
| AGR-□□S            | Change (scale value for $I_{R}$ ) and (scale value for $I_{I}$ ) to NON.<br>Set the I <sup>t</sup> $I_{d}$ switch to OFF.   |

- (2) Press the PHASE switch (Ⓣ in Fig. 9) to change the displayed output phase (“A” field ofⓉ in Fig. 9). Select the R-, S-, or T-phase.  
 (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

● For  $I_n$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR  | Evaluation standard value [ $V_T$ ], unit: V  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | $c \times 0.85 < V_T \leq c \times 1.15$<br>$c: 0.15 \times (\text{scale value for } I_n) \times (\text{scale value for } I_{d})$ |
| AGR-□□S            | $d \times 0.9 < V_T \leq d \times 1.1$<br>$d: 0.15 \times (I_n/I_{CT}) \times (\text{scale value for } I_{d})$                    |

- (4) Increase and decrease the output signal value (displayed in the “C” field ofⓉ in Fig. 9) by pressing the UP switch (Ⓢ in Fig. 9) and the DOWN switch (Ⓣ in Fig. 9), and then set it to any evaluation standard value [ $V_T$ ].

\* See Fig. 16.

- (5) To test both the OCR function and the breaker operation, turn ON the breaker.  
 (6) Press the OUTPUT switch (Ⓣ in Fig. 9) to turn ON the output.  
 (7) If the output is turned ON and the short time trip function is activated, indications appear as illustrated in Fig. 17 after the given time has elapsed. When the “ST” LED indicator in Fig. 17 is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal.  
 (8) Press the RESET button (see Fig. 17) located on the controls section of the OCR. The “ST” LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn OFF. At this time, the output signal value set in step (4) will appear.  
 (9) Repeat steps (4) through (8) using different values near the evaluation standard value [ $V_T$ ], and measure the minimum tripping value and the maximum non-tripping value. The minimum tripping value is the trip current value for “ST”.  
 (10) Compare the trip current value for “ST” with the evaluation standard value [ $V_T$ ]. If the trip current value for “ST” falls within the range defined by the evaluation standard value [ $V_T$ ], the trip current setting value for “ST” is normal.

- (11) To perform the test for a different test phase, repeat the steps starting with step (2).
- (12) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

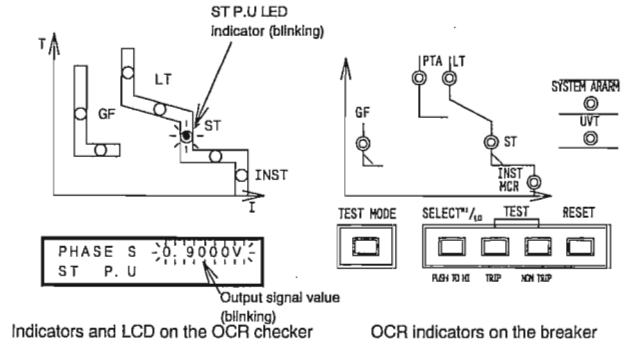


Fig. 16 Indications appearing when the output signal is OFF

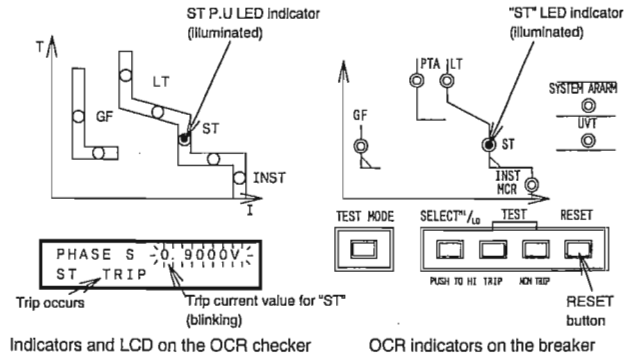


Fig. 17 Indications appearing when short time delay trip occurs

5. Testing Procedure for Trip Time Setting Value for Short Time Delay Trip Function (ST)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_b$ ) and (scale value for $I_f$ ) to NON.<br>If ground fault trip is available, change (scale value for $I_b$ ) to NON.<br>Set the $I^2t$ $t_{sd}$ switch to OFF. |
| AGR-2□S            | Change (scale value for $I_b$ ) and (scale value for $I_f$ ) to NON.<br>Set the $I^2t$ $t_{sd}$ switch to OFF.   |

- (2) Press the PHASE switch (Ⓢ in Fig. 9) to change the displayed output phase (“A” field of Ⓢ in Fig. 9). Select the R-, S-, or T-phase.
- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

● For  $I_b$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR  | Evaluation standard value [ $V_T$ ], unit: V   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | $V_T = 0.15 \times (\text{scale value for } I_b) \times (\text{scale value for } I_{sd}) \times 1.2$ |
| AGR-□□S            | $V_T = 0.15 \times (I_b/I_{CT}) \times (\text{scale value for } I_{sd}) \times 1.2$                  |

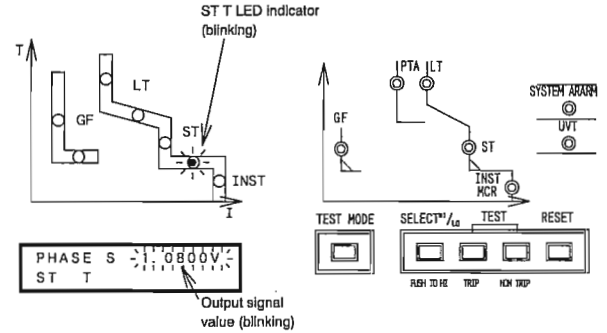
- (4) Increase and decrease the output signal value (displayed in the “C” field of Ⓢ in Fig. 9) by pressing the UP switch (Ⓢ in Fig. 9) and the DOWN switch (Ⓣ in Fig. 9), and then set it to any evaluation standard value [ $V_T$ ].

\* See Fig. 18.

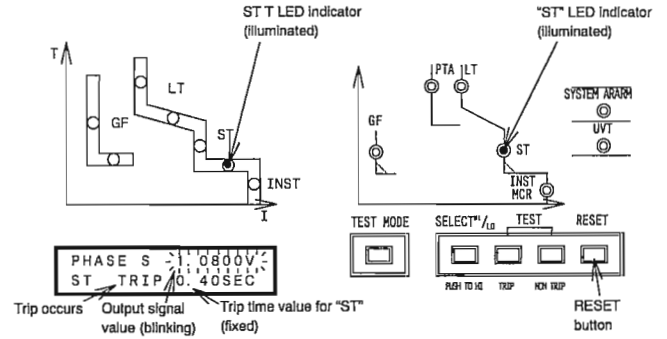
- (5) To test both the OCR function and the breaker operation, turn ON the breaker.
- (6) Press the OUTPUT switch (Ⓢ in Fig. 9) to turn ON the output.
- (7) When the output is turned ON, indications appear as illustrated in Fig. 19 after the given time has elapsed. When the “ST” LED indicator in Fig. 19 is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal and displays the trip time value for “ST”.
- (8) If the trip time value for “ST” indicated by the OCR checker falls within the range defined by (scale value for  $t_{sd}$ )<sup>0.07</sup> / 1000 [sec], the trip time setting value for “ST” is normal.
- (9) Press the RESET button (see Fig. 19) located on the controls section of the OCR. The “ST” LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn OFF. At this time, the output signal value set in step (4) will appear.
- (10) To perform the test for a different test phase, repeat the steps starting with step (2).



(11) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



Indicators and LCD on the OCR checker      OCR indicators on the breaker  
 Fig. 18 Indications appearing when the output signal is OFF



Indicators and LCD on the OCR checker      OCR indicators on the breaker  
 Fig. 19 Indications appearing when short time delay trip occurs

6. Testing Procedure for Trip Current Setting Value for Instantaneous Trip Function (INST)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | If ground fault trip is available, change (scale value for $I_g$ ) to NON.<br>Set the INST/MCR switch to INST. |
| AGR-□□S            | Set the INST/MCR switch to INST.   |

- (2) Press the PHASE switch (Ⓔ in Fig. 9) to change the displayed output phase ("A" field ofⒺ in Fig. 9). Select the R-, S-, or T-phase.
- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.
- For  $I_a$  and  $I_{CT}$ , see P. 8.

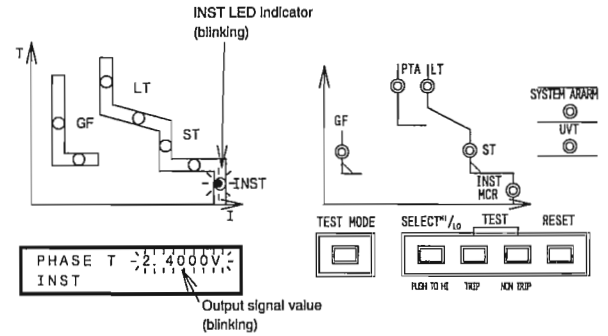
| Basic type of OCR  | Evaluation standard value [ $V_T$ ], unit: V  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | $e \times 0.8 < V_T \leq e \times 1.2$<br>$e: 0.15 \times (\text{scale value for } I_a) \times (\text{scale value for } I_f)$ |
| AGR-□□S            | $f \times 0.8 < V_T \leq f \times 1.2$<br>$f: 0.15 \times (I_{CT}) \times (\text{scale value for } I_f)$                      |

- (4) Increase and decrease the output signal value (displayed in the "C" field ofⒺ in Fig. 9) by pressing the UP switch (Ⓒ in Fig. 9) and the DOWN switch (Ⓓ in Fig. 9), and then set it to any evaluation standard value [ $V_T$ ].

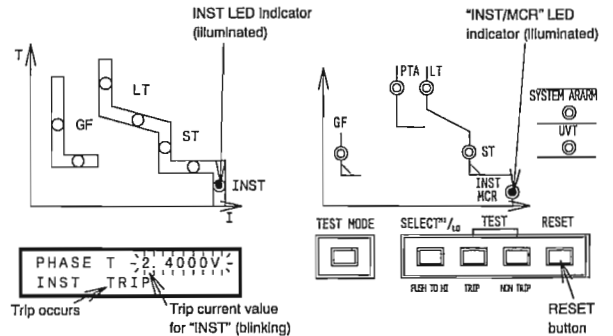
\* See Fig. 20.

- (5) To test both the OCR function and the breaker operation, turn ON the breaker.
- (6) Press the OUTPUT switch (Ⓔ in Fig. 9) to turn ON the output.
- (7) If the output is turned ON and the instantaneous trip function is activated, indications appear as illustrated in Fig. 21. When the "INST/MCR" LED indicator in Fig. 21 is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal.
- (8) Press the RESET button (see Fig. 21) located on the controls section of the OCR. The "INST/MCR" LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn OFF. At this time, the output signal value set in step (4) will appear.
- (9) Repeat steps (4) through (8) using different values near the evaluation standard value [ $V_T$ ], and measure the minimum tripping value and the maximum non-tripping value. The minimum tripping value is the trip current value for "INST".
- (10) Compare the trip current value for "INST" with the evaluation standard value [ $V_T$ ]. If the trip current value for "INST" falls within the range defined by the evaluation standard value [ $V_T$ ], the trip current setting value for "INST" is normal.
- (11) To perform the test for a different test phase, repeat the steps starting with step

- (2).  
 (12) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



Indicators and LCD on the OCR checker      OCR indicators on the breaker  
 Fig. 20 Indications appearing when the output signal is OFF



Indicators and LCD on the OCR checker      OCR Indicators on the breaker  
 Fig. 21 Indications appearing when instantaneous trip occurs

## 7. Testing Procedure for Trip Current Setting Value for Ground Fault Trip Function (GF)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_R$ ) to NON and set the 1 <sup>st</sup> $t_b$ switch to OFF.<br>If (scale value for $I_{ad}$ ) is 3 or less, change it to 4 or more.<br>If (scale value for $I_f$ ) is 2, change it to 4 or more. |

- (2) Press the PHASE switch (Ⓔ in Fig. 9) to change the displayed output phase ("A" field of Ⓔ in Fig. 9). Select the R-, S-, T-, or N-phase.

- (3) Calculate the evaluation standard value  $[V_T]$  for the phase under test.

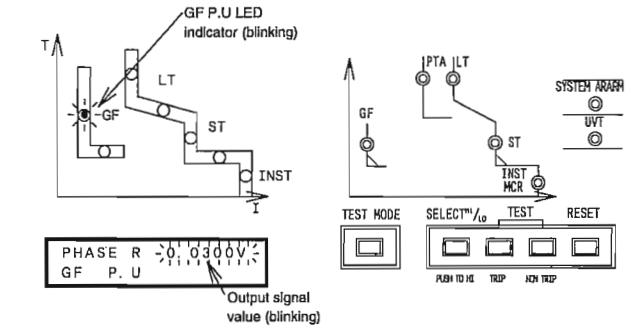
| Basic type of OCR  | Evaluation standard value $[V_T]$ , unit: V  |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | $w \times 0.8 < V_T \leq w \times 1.2$<br>$w: 0.15 \times (\text{scale value for } I_f)$ |

- (4) Increase and decrease the output signal value (displayed in the "C" field of Ⓔ in Fig. 9) by pressing the UP switch (Ⓕ in Fig. 9) and the DOWN switch (Ⓖ in Fig. 9), and then set it to any evaluation standard value  $[V_T]$ .

\* See Fig. 22.

- (5) To test both the OCR function and the breaker operation, turn ON the breaker.
- (6) Press the OUTPUT switch (Ⓖ in Fig. 9) to turn ON the output.
- (7) If the output is turned ON and the ground fault trip function is activated, indications appear as illustrated in Fig. 23 after the given time has elapsed. When the "GF" LED indicator in Fig. 23 is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal.
- (8) Press the RESET button (see Fig. 23) located on the controls section of the OCR. The "GF" LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn OFF. At this time, the output signal value set in step (4) will appear.
- (9) Repeat steps (4) through (8) using different values near the evaluation standard value  $[V_T]$ , and measure the minimum tripping value and the maximum non-tripping value. The minimum tripping value is the trip current value for "GF".
- (10) Compare the trip current value for "GF" with the evaluation standard value  $[V_T]$ . If the minimum tripping value falls within the range defined by the evaluation standard value  $[V_T]$ , the trip current setting value for "GF" is normal.
- (11) To perform the test for a different test phase, repeat the steps starting with step (2).
- (12) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

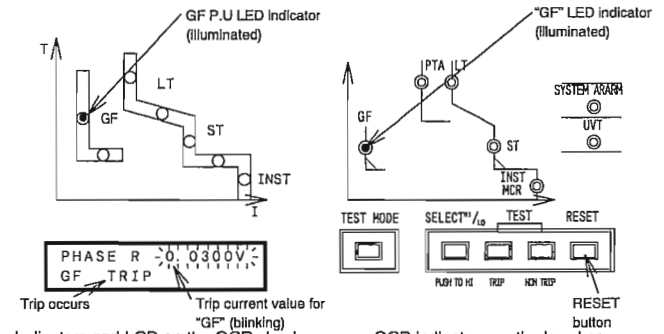
*Note: If the ground fault trip test for the N-phase is performed on the version with the N-phase protection, the N-phase protective trip function may be activated earlier.*



Indicators and LCD on the OCR checker

OCR indicators on the breaker

Fig. 22 Indications appearing when the output signal is OFF



Indicators and LCD on the OCR checker

OCR indicators on the breaker

Fig. 23 Indications appearing when ground fault trip occurs

8. Testing Procedure for Trip Time Setting Value for Ground Fault Trip Function (GF)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_b$ ) to NON and set the I <sup>1</sup> t <sub>1</sub> t <sub>2</sub> switch to OFF.<br>If (scale value for $I_{a0}$ ) is 3 or less, change it to 4 or more.<br>If (scale value for $I_l$ ) is 2, change it to 4 or more. |

- (2) Press the PHASE switch (Ⓔ) in Fig. 9) to change the displayed output phase (“A” field of Ⓔ in Fig. 9). Select the R-, S-, T-, or N-phase.
- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

| Basic type of OCR  | Evaluation standard value [ $V_T$ ], unit: V                 |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | $V_T = 0.15 \times (\text{scale value for } I_b) \times 1.2$ |

- (4) Increase and decrease the output signal value (displayed in the “C” field of Ⓔ in Fig. 9) by pressing the UP switch (Ⓕ in Fig. 9) and the DOWN switch (Ⓖ in Fig. 9), and then set it to any evaluation standard value [ $V_T$ ].  
\* See Fig. 24.
- (5) To test both the OCR function and the breaker operation, turn ON the breaker.
- (6) Press the OUTPUT switch (Ⓖ in Fig. 9) to turn ON the output.
- (7) When the output is turned ON, indications appear as illustrated in Fig. 25 after the given time has elapsed. When the “GF” LED indicator in Fig. 25 is illuminated, this indicates that the OCR has tripped. If the breaker operation is tested together, the breaker turns OFF. At this time, the OCR checker automatically turns OFF the output signal and displays the trip time value for “GF”.
- (8) If the trip time value for “GF” indicated by the OCR checker falls within the range defined by (scale value for  $t_b$ )<sup>0.07</sup>/<sub>0.05</sub> [sec], the trip time setting value for “GF” is normal.
- (9) Press the RESET button (see Fig. 25) located on the controls section of the OCR. The “GF” LED indicator will turn OFF. Also press any of the switches located on the OCR checker. The trip indication on the OCR checker will turn OFF. At this time, the output signal value set in step (4) will appear.
- (10) To perform the test for a different test phase, repeat the steps starting with step (2).
- (11) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

*Note: If the ground fault trip test for the N-phase is performed on the version with the N-phase protection, the N-phase protective function may be activated earlier.*

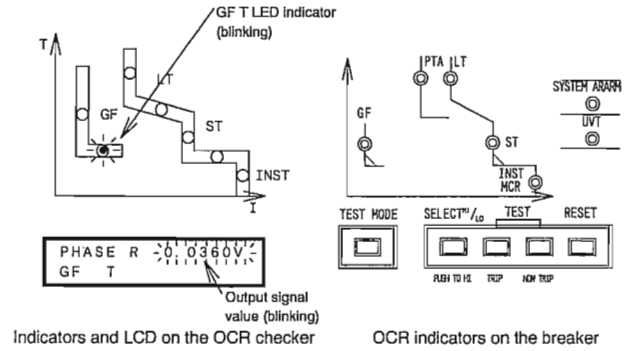


Fig. 24 Indications appearing when the output signal is OFF

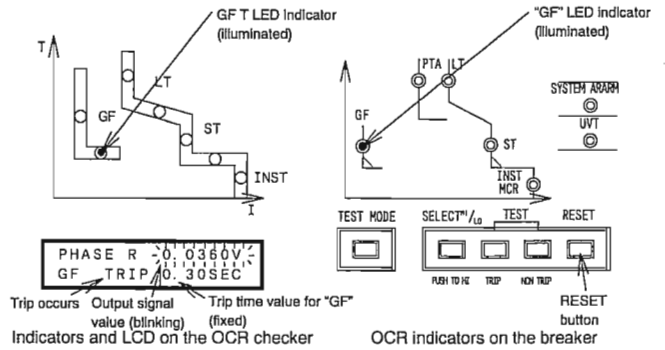


Fig. 25 Indications appearing when ground fault trip occurs

9. Testing Procedure for Pickup Current Value for N-phase Protective Trip Function (NP)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR | Changes in setting values on OCR   |
|-------------------|--|
| AGR-□□L           | If ground fault trip is available, change (scale value for $I_g$ ) to NON.<br>Set the COLD/HOT switch to COLD. |
| AGR-□□R           | If ground fault trip is available, change (scale value for $I_g$ ) to NON.                                     |
| AGR-□□S           | None   |

- (2) Press the PHASE switch (⑨ in Fig. 9) to change the displayed output phase ("A" field of ⑩ in Fig. 9). Select the N-phase.

- (3) Calculate the evaluation standard value [ $V_T$ ] for the N-phase.

| Basic type of OCR | Evaluation standard value [ $V_T$ ], unit: V                                |
|-------------------|---|
| AGR-□□L           | $x \times 1.05 < V_T \leq x \times 1.2$                                     |
| AGR-□□R           | $x: 0.15 \times (I_N/I_{CT})$   |
| AGR-□□S           | $y \times 0.925 < V_T \leq y \times 1.075$<br>$y: 0.15 \times (I_N/I_{CT})$ |

- (4) Measure the pickup current value for "NP" by the same procedure as steps as (4) through (9) of the testing procedure for pickup current value for "LT" on P. 14.
- (5) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



10. Testing Procedure for Trip Time Setting Value for N-phase Protective Trip Function (NP)

(1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR | Changes in setting values on OCR   |
|-------------------|--|
| AGR-□□L           | If ground fault trip is available, change (scale value for $I_g$ ) to NON.<br>Set the COLD/HOT switch to COLD. |
| AGR-□□R           | If ground fault trip is available, change (scale value for $I_g$ ) to NON.                                     |
| AGR-□□S           | None   |

(2) Press the PHASE switch (Ⓢ in Fig. 9) to change the displayed output phase (“A” field ofⓈ in Fig. 9). Select the N-phase.

(3) Calculate the evaluation standard value [ $V_T$ ] for the N-phase.

● For  $I_N$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR | Evaluation standard value [ $V_T$ ], unit: V |
|-------------------|--|
| AGR-□□L           | $V_T = 0.15 \times (I_N/I_{CT}) \times 6$    |
| AGR-□□R           | $V_T = 0.15 \times (I_N/I_{CT}) \times 3$    |
| AGR-□□S           | $V_T = 0.15 \times (I_N/I_{CT}) \times 1.2$  |

(4) Measure the trip time value for “NP” by the same procedure as steps as (4) through (9) of the testing procedure for trip time setting value for “LT” on P. 16. The allowable range of time setting value for “NP” is the same as in (8) on P. 16.

(5) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.

11. Testing Procedure for Pickup Current Value for Pretrip Alarm Function (PTA)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_B$ ) to NON.<br>If ground fault trip is available, change (scale value for $I_B$ ) to NON.<br>If (scale value for $I_{cr}$ ) is 1.5 or less, change it to 2 or more. |
| AGR-□□S            | Change (scale value for $I_B$ ) to NON.   |

- (2) Press the PHASE switch (Ⓣ in Fig. 9) to change the displayed output phase ("A" field of Ⓣ in Fig. 9). Select the R-, S-, or T-phase.

- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.

● For  $I_B$  and  $I_{cr}$ , see P. 8.

| Basic type of OCR           | Evaluation standard value [ $V_T$ ], unit: V   |
|-----------------------------|--|
| AGR-□□L<br>AGR-□□R          | $z_1 \times 0.975 < V_T \leq z_1 \times 1.075$<br>$z_1: 0.15 \times (\text{scale value for } I_B) \times (\text{scale value for } I_p)$  |
| AGR-□□S                     | $z_2 \times 0.95 < V_T \leq z_2 \times 1.05$<br>$z_2: 0.15 \times (I_p / I_{cr}) \times (\text{scale value for } I_p)$   |
| AGR-□□S<br>(2-stage output) | 1st stage: $z_3 \times 0.95 < V_T \leq z_3 \times 1.05$<br>$z_3: 0.15 \times (I_p / I_{cr}) \times (\text{scale value for } I_{p1})$<br>2nd stage: $z_4 \times 0.95 < V_T \leq z_4 \times 1.05$<br>$z_4: 0.15 \times (I_p / I_{cr}) \times (\text{scale value for } I_{p2})$ |

- (4) Press the OUTPUT switch (Ⓢ in Fig. 9) to turn ON the output.

\* See Fig. 26.

- (5) Press the UP switch (Ⓡ in Fig. 9) to increase the output signal value (displayed in the "C" field of Ⓡ in Fig. 9) until the "PTA" or "PTA2" LED indicator located on the controls section of the OCR starts blinking at intervals of approximately 0.8 second. \* See Fig. 27.

- (6) Once the "PTA" or "PTA2" LED indicators located on the controls section of the OCR starts blinking, press the DOWN switch (Ⓡ in Fig. 9) to slightly decrease the output signal value. The LED indicator will turn OFF.

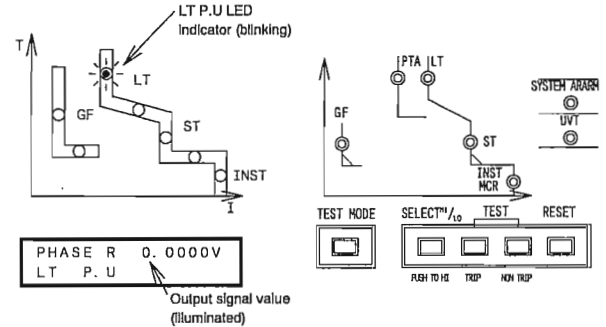
- (7) Slowly repeat increasing and decreasing the output signal value a few times and then read the output signal value at the point when the "PTA" or "PTA2" LED indicator starts blinking. This value is the pickup current value for "PTA".

- (8) Compare the pickup current value for "PTA" indicated by the OCR checker with the evaluation standard value [ $V_T$ ]. If the indicated value falls within the range defined by the evaluation standard value, the pickup current value for "PTA" is normal.

- (9) After checking that the pretrip alarm function is normal, press the OUTPUT switch (Ⓢ in Fig. 9) to turn OFF the output. The displayed output signal value

(displayed in the "C" field of ⑩ in Fig. 9) will start blinking without changing from the value set in (7).

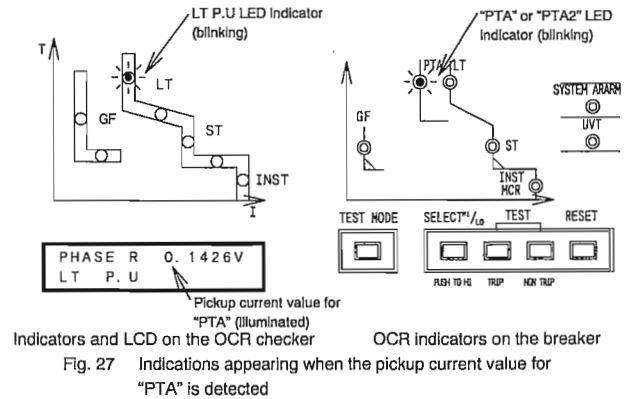
- (10) To perform the test for a different test phase, perform the steps starting with step (2).
- (11) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



Indicators and LCD on the OCR checker

OCR indicators on the breaker

Fig. 26 Indications appearing when the output signal is ON



Indicators and LCD on the OCR checker

OCR indicators on the breaker

Fig. 27 Indications appearing when the pickup current value for "PTA" is detected

12. Testing Procedure for Alarm Time Setting Value for Pretrip Alarm Function (PTA)

- (1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | Change (scale value for $I_R$ ) to NON.<br>If ground fault trip is available, change (scale value for $I_R$ ) to NON.<br>If (scale value for $I_R$ ) is 1.5 or less, change it to 2 or more. |
| AGR-□□S            | Change (scale value for $I_R$ ) to NON.  |

- (2) Press the PHASE switch (Ⓢ in Fig. 9) to change the displayed output phase (“A” field of Ⓢ in Fig. 9). Select the R-, S-, or T-phase.
- (3) Calculate the evaluation standard value [ $V_T$ ] for the phase under test.
- For  $I_R$  and  $I_{CT}$ , see P. 8.

| Basic type of OCR  | Evaluation standard value [ $V_T$ ], unit: V   |
|--------------------|--|
| AGR-□□L<br>AGR-□□R | $V_T = 0.15 \times (\text{scale value for } I_R) \times (\text{scale value for } I_R) \times 1.2$  |
| AGR-□□S            | $V_T = 0.15 \times (I_R / I_{CT}) \times (\text{scale value for } I_R) \times 1.2$ or<br>$V_T = 0.15 \times (I_R / I_{CT}) \times (\text{scale value for } I_{R1}) \times 1.2$ |

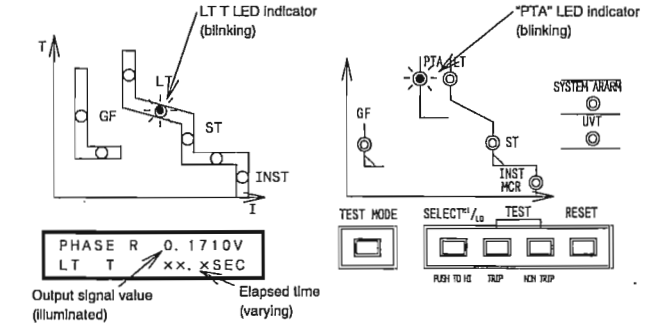
- (4) Increase and decrease the output signal value (displayed in the “C” field of Ⓢ in Fig. 9) by pressing the UP switch (Ⓢ in Fig. 9) and the DOWN switch (Ⓢ in Fig. 9), and then set it to the evaluation standard value [ $V_T$ ].
- (5) Press the OUTPUT switch (Ⓢ in Fig. 9) to turn ON the output.
- \* See Fig. 28.
- (6) When the output is turned ON, indications appear as illustrated in Fig. 28. After the given time has elapsed, the indications change to the state shown in Fig. 29. When the “PTA” LED indicator shown in Fig. 29 is illuminated, this indicates that the OCR has output the pretrip alarm signal. After the “PTA” LED indicator is illuminated, the OCR checker continues the output and displays the alarm time value for “PTA”.
- (7) Compare the alarm time value for “PTA” indicated by the OCR checker with the following values. If the indicated value falls within the range defined by those values, the alarm time setting value for “PTA” is normal.

| Basic type of OCR | Allowable alarm time range for “PTA”, unit: sec.   |
|-------------------|--|
| AGR-□□L           | (scale value for $t_p$ ) $\pm 15\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$  |
| AGR-□□R           | (scale value for $t_p$ ) $\pm 20\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$  |
| AGR-□□S           | (scale value for $t_p$ ) $\pm 15\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$ or<br>(scale value for $t_{p1}$ ) $\pm 15\%$ $\begin{matrix} +0.15 \\ -0 \end{matrix}$ |

- (8) Press the OUTPUT switch (Ⓢ in Fig. 9) to turn OFF the output. The pretrip alarm indication on the OCR checker will turn OFF and the “PTA” LED indicator located on the controls section of the OCR will also turn OFF. At this

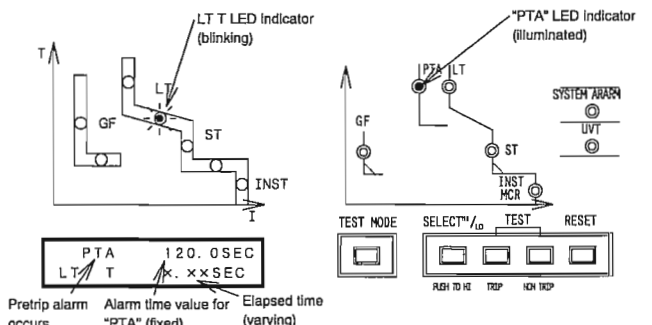
time, the output signal value set in step (4) will be displayed.

- (9) To perform the test for a different test phase, perform the steps starting with step (2).
- (10) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



Indicators and LCD on the OCR checker      OCR indicators on the breaker

Fig. 28 Indications appearing when the output signal is ON



Indicators and LCD on the OCR checker      OCR indicators on the breaker

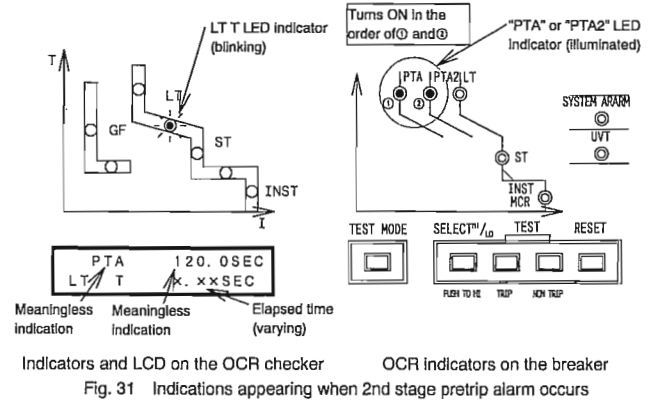
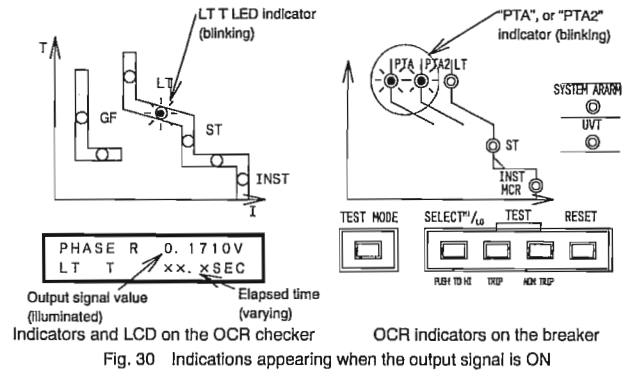
Fig. 29 Indications appearing when the pretrip alarm occurs

### 13. Testing Procedure for 2nd Stage Alarm Time Setting Value for 2-Stage Output Type Pretrip Alarm Function

The test for the time setting value may be performed as described in "12. Testing Procedure for Alarm Time Setting Value for "PTA" (P. 32). However, the OCR checker does not detect the 2nd stage signal for pretrip alarm, preventing you from measuring the time setting ( $t_{P2}$ ). Using a stopwatch or the like, manually measure the time period from the point when the output is turned ON in step (5) to the point when the "PTA2" LED indicator is illuminated (see Fig. 31). For the evaluation standard value [ $V_T$ ] for the phase under the test, use the following value:

| Basic type of OCR | Evaluation standard value [ $V_T$ ], unit: V  |
|-------------------|---|
| AGR-□□S           | $V_T = 0.15 \times (I_a/I_{CT}) \times (\text{scale value for } I_{P2}) \times 1.2$ |

If the measured alarm time value for "PTA" falls within the range of (scale value for  $t_{P2}$ )  $\pm 5\%$  <sup>45</sup> [sec], the alarm time setting value for "PTA" is normal. Because of the manual measurement, the measured value includes a minor error.



#### 14. Testing Procedure for Trip Current Setting Value for Making Current Release Trip Function (MCR)

This section includes the procedure for turning ON the breaker. Prepare the breaker as described in Chapter IV for testing both the OCR functions and the breaker operation.

(1) If there are the following OCR setting values, first change them and then perform the test:

| Basic type of OCR  | Changes in setting values on OCR  |
|--------------------|---|
| AGR-□□L<br>AGR-□□R | If ground fault trip is available, change (scale value for $I_g$ ) to NON.<br>Set the INST/MCR switch to MCR. |
| AGR-□□S            | Set the INST/MCR switch to MCR.   |

(2) Measure the trip current value for "MCR" by performing steps (2) through (4) and (6) through (10) in "6. Testing Procedure for Trip Current Value for "INST" (P. 22). Prior to the test, turn OFF the breaker.

(3) Turn ON the breaker. Turn ON the output by pressing the OUTPUT switch (Ⓢ in Fig. 9) at a value more than the trip current value for "MCR". Check that the "INST/MCR" LED indicator located on the controls section of the OCR does not turn ON. This indicates that the MCR trip function is normal.

(4) To perform the test for a different test phase, repeat the steps starting with step (2).

(5) After the test, put the setting values on the OCR, which have been changed in step (1), back to the previous ones.



#### 15. Testing Procedure for Alarm Current Setting Value for Ground Fault Alarm Function

For the version with the ground fault alarm, the test for the current setting value may be performed as described in “7. Testing Procedure for Trip Current Setting Value for “GF” (P. 24), but the breaker must be turned OFF prior to the test. Since this version does not trips, the breaker operation cannot be tested.

#### 16. Testing Procedure for Alarm Time Setting Value for Ground Fault Alarm Function

The test for the time setting value may be performed as described in “8. Testing Procedure for Trip Time Setting Value for “GF” (P. 26). However, the OCR does not output the trip signal, preventing you from measure the time setting ( $t_g$ ) with the OCR checker. Using a stopwatch or the like, manually measure the time period from the point when (6) the output is turned ON to the point when (7) the “GF” LED indicator turns ON. Prior the test, turn OFF the breaker.

- Because of the manual measurement, the measured value includes a minor error.
- The OCR checker does not automatically turns OFF the output signal. After the test, therefore, press the OUTPUT switch (Ⓒ in Fig. 9) to turn OFF the output.

Table 6 Evaluation Standard and Test Result Entry Sheet

(the fields enclosed by thick lines are provided for your entries)

| ACB type  | AR                       | OCR type           | AGR-2                    |                |                             |
|---|--------------------------|--------------------|--------------------------|----------------|-----------------------------|
| Serial No   |                          | Customer ID symbol |                          |                |                             |
| OCR functions   |                          | Phase              | Evaluation standard      | Measured value | Converted current value [A] |
| Long time delay trip (LT)   | Pickup current value     | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Trip time value          | R                  | $\leq t_R \leq [sec]$    | [sec]          |                             |
|   |                          | S                  | $\leq t_R \leq [sec]$    | [sec]          |                             |
|   |                          | T                  | $\leq t_R \leq [sec]$    | [sec]          |                             |
| Short time delay trip (LT)  | Trip current value       | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Trip time value          | R                  | $\leq t_{sd} \leq [sec]$ | [sec]          |                             |
|   |                          | S                  | $\leq t_{sd} \leq [sec]$ | [sec]          |                             |
|   |                          | T                  | $\leq t_{sd} \leq [sec]$ | [sec]          |                             |
| Trip current value for instantaneous/making current release trip (INST/MCR) |                          | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
| Ground fault trip/alarm (GF)  | Trip/alarm current value | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Trip/alarm time value    | R                  | $\leq t_g \leq [sec]$    | [sec]          |                             |
|   |                          | S                  | $\leq t_g \leq [sec]$    | [sec]          |                             |
|   |                          | T                  | $\leq t_g \leq [sec]$    | [sec]          |                             |
|   |                          | N                  | $\leq t_g \leq [sec]$    | [sec]          |                             |
| N-phase protection (NP)   | Pickup current value     | N                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Trip time value          | N                  | $\leq t_n \leq [sec]$    | [sec]          |                             |
| Pretrip alarm (PTA)   | Pickup current value     | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Alarm time value         | R                  | $\leq t_p \leq [sec]$    | [sec]          |                             |
|   |                          | S                  | $\leq t_p \leq [sec]$    | [sec]          |                             |
|   |                          | T                  | $\leq t_p \leq [sec]$    | [sec]          |                             |
| Pretrip alarm (PTA2)  | Pickup current value     | R                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | S                  | $< V_T \leq [V]$         | [V]            |                             |
|   |                          | T                  | $< V_T \leq [V]$         | [V]            |                             |
|   | Alarm time value         | R                  | $\leq t_{p2} \leq [sec]$ | [sec]          |                             |
|   |                          | S                  | $\leq t_{p2} \leq [sec]$ | [sec]          |                             |
|   |                          | T                  | $\leq t_{p2} \leq [sec]$ | [sec]          |                             |

\*(Converted current value)[A] =  $I_{CT} \times (\text{Measured value})/0.15$

( $I_{CT}$  = Primary CT rated current value [A])

## VI. Procedure for Checking the Output

This chapter describes the procedure for checking the output signal value from the OCR checker. The OCR checker provides a terminal to output the output signal value to a general instrument (multi-meter or the like). Using this terminal allows you to check to see whether the actually output signal value correctly corresponds to the value displayed on the OCR. It is recommended that this check be performed approximately once every year by the following procedure:

- (1) Remove the lid for the output signal check terminal. Insert the pins from a general instrument (e.g., a multi-meter) that allows you to measure AC voltage, into the output signal check terminal located behind the lid and then hold the pins.


|   |  |
|---|--|
| <br><b>CAUTION</b> | <ul style="list-style-type: none"> <li>● Do not apply voltage to the output signal check terminal. This may cause a failure in the OCR checker.</li> </ul> |
|---|--|



Fig. 32 Inserting the pins from the instrument

- (2) Set the evaluation item and output signal value for the OCR checker as shown in Table 8. Let the OCR checker output the voltage value and read it from the instrument. Check that the value falls within the evaluation standard range. If the value deviates from this range, contact us.
- (3) After this check, fit the lid for the output signal check terminal back in place.

Table 8 Setting for check and evaluation standard

| Setting for check         |  | Evaluation standard [V]<br>The value read from the general instrument shall fall within the following range: |
|---------------------------|--|--|
| Measurement item selected | Output signal value [V] displayed on the OCR checker |  |
| LT P.U                    | 0.3000   | 0.2940 – 0.3060  |

