5. OVERCURRENT RELEASE (OCR)

Options available for the type AR ACBs include a highly reliable, multi-functional overcurrent release (OCR) with a built-in 8-bit microprocessor.

This OCR is supplied with power through a CT and main circuit current signals from current sensors. When the OCR detects a fault, it sends a trip signal to the magnet hold trigger (MHT) or provides a trip indication or an alarm depending on the type of the fault.

The OCR uses the root mean square sensing for the long time delay (LTD), N-phase protection (NP), and pretrip alarm (PTA) functions. (When six times the CT rated primary current is exceeded, the peak value sensing is used instead.) If a harmonic current flows through the ACB continuously, the root mean square sensing allows the ACB to operate normally.

The OCR is available in the three types that follows:

- AGR-11L L characteristic for general feeder (for works and transformer protection)
- AGR-11R R characteristic for general feeder (3 characteristics conforming to IEC60255)
- AGR-11S S characteristic for generator protection

5-1. Specifications

Specifications of the OCR are shown in Table 18 and Fig. 27.

Table 18 Specifications of type AGR-11 OCR (●: Standard, ○: Optional, –: Not applicable)

Application		For general feeder								For generator protection		Reference section
Characteristic		L				R				S		
Type designation		AGR-11L-XX				AGR-11R-XXX				AGR-11S-XX		
Suffix (XX or XXX) of type designation *1		AL	GL	PS	PG	AL_	GL_	PS_	PG_	AL	PS	
Protective function	Long time delay trip (LT) Short time delay trip (ST) Instantaneous trip (INST/MCR)	●	●	●	●	●	●	●	●	●	●	5-3.
	Ground fault trip (GF) *2	–	●	–	●	–	●	–	●	–	–	
	N-phase protection *3	○	○	○	○	○	○	○	○	–	–	
	Pretrip alarm (PTA) *3	–	–	●	●	–	–	●	●	–	●	
Protection characteristic	COLD/HOT (LT) *4	●	●	●	●	–	–	–	–	–	–	5-1.
	I^2t ON/OFF (ST)	●	●	●	●	●	●	●	●	●	●	5-3.
	INST/MCR (INST) *5	●	●	●	●	●	●	●	●	●	●	5-1.
	I^2t ON/OFF (GF)	–	●	–	●	–	●	–	●	–	–	5-3.
Trip indication	Group indication LED and contact output	●	●	–	–	●	●	–	–	●	–	5-4.
	Individual indication LEDs and contact output	–	–	●	●	–	–	●	●	–	●	
	"Tripped" indication	○	○	○	○	○	○	○	○	○	○	
	"Spring charged" indication	○	○	○	○	○	○	○	○	○	○	
Test function		–	–	●	●	–	–	●	●	–	●	5-5.
Control power supply		Not required	Not required	Required	Required	Not required	Not required	Required	Required	Not required	Required	3-3.

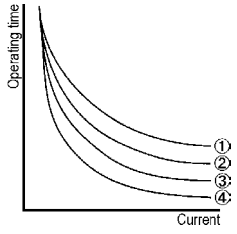
*1: An under bar in the type designatios means a number from 1 to 5 representing a type of the long time delay trip (LT) characteristic as follows: "1": $I^{0.02}t$, "2": It, "3": I^2t, "4": I^3t, "5": I^4t.
The type of LT characteristics is factory set according to your order specification. Refer to section 5-3-2.

*2: The OCR is factory equipped with the ground fault indication function only or with both the ground fault trip function and ground fault indication function according to your order specification. Control power supply is required when the CT rated primary current [I_{CT}] is not more than 800A and the ground fault trip pickup current setting [I_G] is 10% of I_{CT}.

*3: Disabled when control power is lost.

*4: The long time delay trip and N-phase protection functions can be set to COLD or HOT mode by using a switch. In HOT mode, the OCR trips open the ACB in shorter time than in COLD mode when an overload occurs. The HOT mode will be suitable for protection of heat sensitive loads. The OCR is factory se to COLD mode. A COLD/HOT selector switch can be used to select HOT. If the control power is lost, load data stored in HOT mode is cleared. Fig. 27 shows the operating time in COLD and HOT modes.

*5: When INST is enabled, the OCR trips open the ACB when the trip pickup current is reached or exceeded, irrespective of the ACB status. When MCR is enabled, the OCR trips open the ACB when the ACB making current setting is reached or exceeded, and after tripping operation, it locks the ACB in the open state. When using the MCR function, control power supply is required. MCR provides the INST function if the control power is lost.



① COLD mode
② HOT mode: When an overload occurs in a 50%-load state, the operating time is approx. 80% of the time required in COLD mode.
③ HOT mode: When an overload occurs in a 75%-load state, the operating time is approx. 60% of the time required in COLD mode.
④ HOT mode: When an overload occurs in a 100%-load state, the operating time is approx. 20% of the time required in COLD mode.

Fig. 27 COLD and HOT mode

5-2. OCR Setting Procedure

⚠ CAUTION

- OCR setting changes must be performed by competent persons.
- Use a small flatblade screwdriver with a torque of not more than 0.1 N·m or a force of not more than 0.1 N when adjusting the setting switches (rotary step switches or slide switches). An excessive torque or force may cause a malfunction.

The following describes how to set the OCR.

1) Open the ACB.
2) If the OCR is fed by the control power supply, isolate the OCR from the power supply by e.g., moving the breaker body to the ISOLATED position.
3) 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. See Fig. 28. If the OCR cover is padlocked, first remove the padlock.

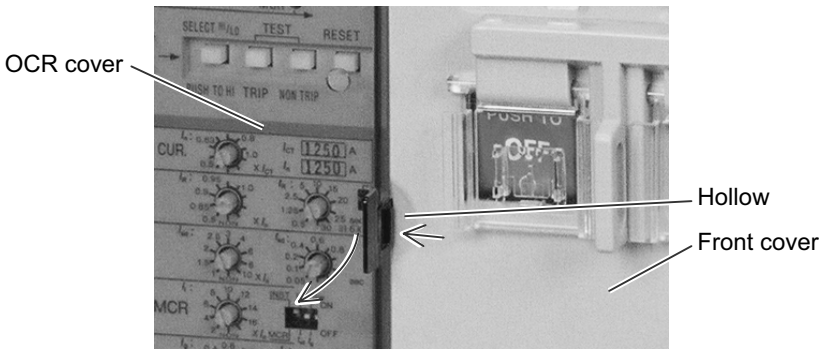


Fig. 28 OCR cover

4) Use rotary step switches and slide switches to set the OCR. See Fig. 29.
   - Rotary step switches must be adjusted with a small flatblade screwdriver. Turn switch knobs stepwise and do not stop the knobs halfway between calibration markings. A bold line on a switch dial means the same settings.
   - Slide switches must also be adjusted with a small flatblade screwdriver. Do not stop switch knobs halfway.

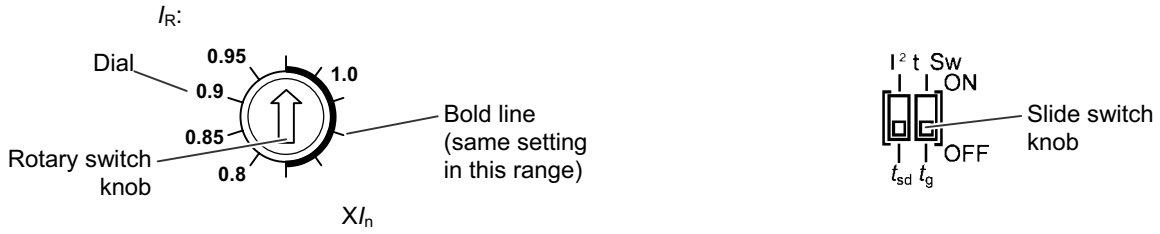


Fig. 29 OCR characteristic setting switches

5) Close the OCR cover. If the OCR requires the control power supply, connect the OCR to the control power supply by e.g., moving the breaker body to the TEST or CONN. position.
6) After setting changes are made, it is recommended that the settings be checked with e.g., a type ANU-1 OCR checker (optional).

5-3. Characteristic Setting

5-3-1. L characteristic for general feeder

A general view, characteristic settings, and characteristic curves of the type AGR-11L OCR (with L characteristic) are shown in Fig. 30, Table 19, and Fig. 31 respectively.

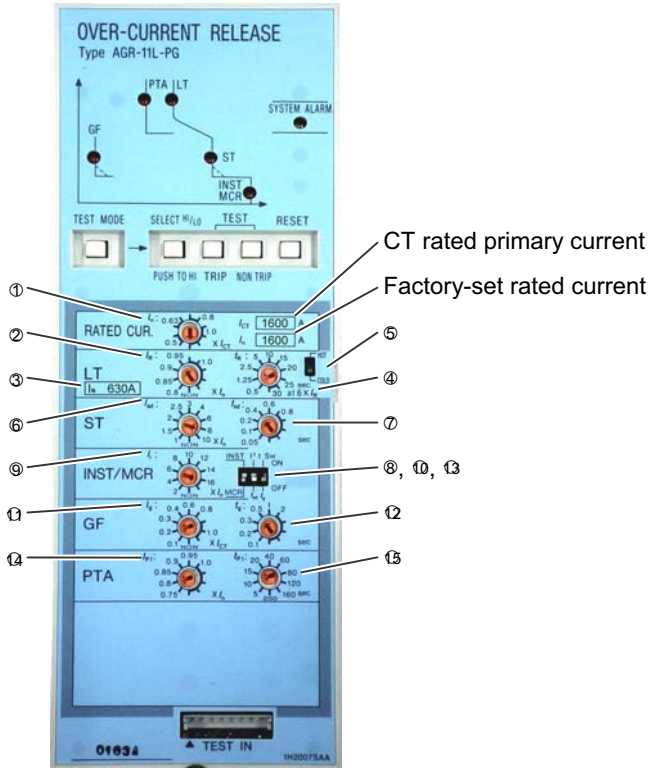


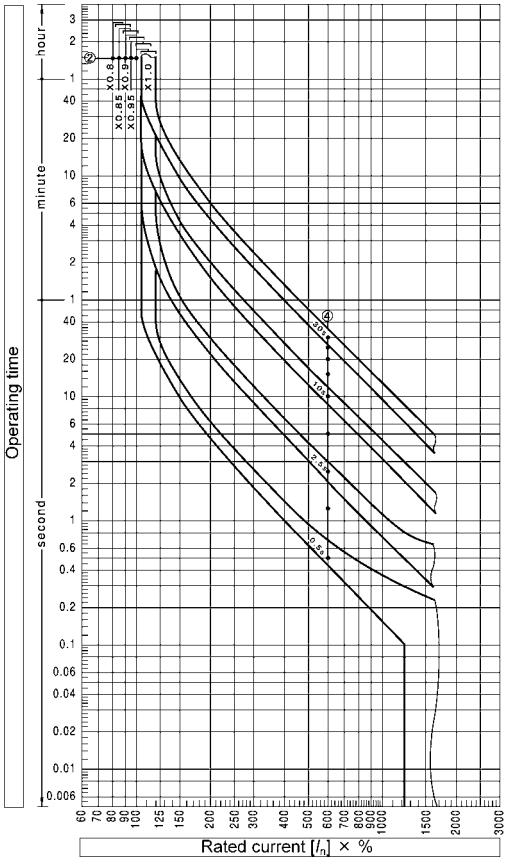
Fig. 30 General view of type AGR-11L OCR (with L characteristic)

Table 19 Settings of type AGR-11L OCR (with L characteristic)

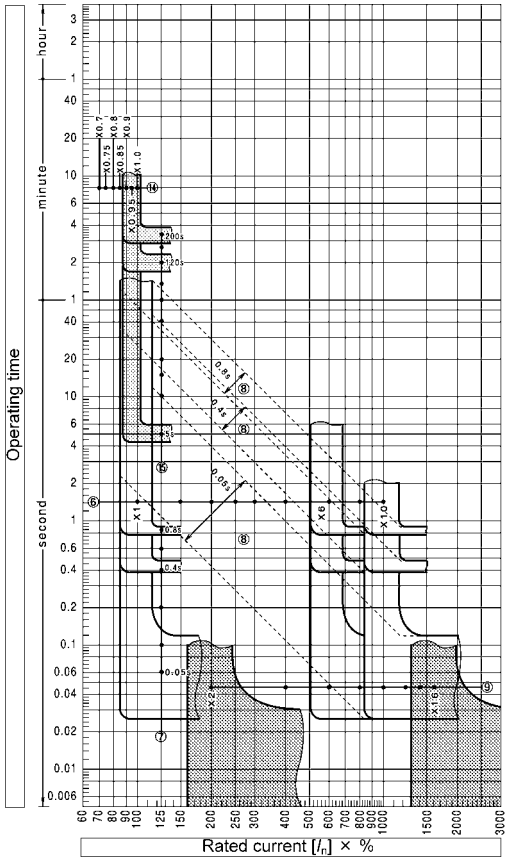
No.	Setting item	Symbol	Setting range								
①	Rated current*1	I_n	CT rated primary current [I_{CT}] × (0.5-0.63-0.8-<u>1.0</u>) (A)								
			Applied [I_{CT}] (A)		200	400	800	1250	1600	2000	2500	3200	4000
			Rated current [I_n] (A)	[I_{CT}] × 0.5	100	200	400	630	800	1000	1250	1600	2000
				[I_{CT}] × 0.63	125	250	500	800	1000	1250	1600	2000	2500
				[I_{CT}] × 0.8	160	320	630	1000	1250	1600	2000	2500	3200
				[I_{CT}] × 1.0	200	400	800	1250	1600	2000	2500	3200	4000
②	Long time delay trip pickup current (continuous)	I_R	[I_n] × (0.8-0.85-0.9-0.95-<u>1.0</u>-NON) (A) • Non tripping at not more than [I_R] x 1.05, Tripping at more than [I_R × 1.05 and not more than [I_R] × 1.2								
③	N-phase protection trip pickup current (continuous)	I_N	[I_{CT}] × (<u>0.4</u>-0.5-0.63-0.8-1.0): Fixed to a single point • Non tripping at not more than [I_N] × 1.05, Tripping at more than [I_N] x 1.05 and not more than [I_R] × 1.2								
④	Long time delay/N-phase protection trip timing	t_R	Long time delay: (0.5-1.25-2.5-5-<u>10</u>-15-20-25-30) (sec) at 600% of [I_R], Tolerance: ±15%, +0.15s –0s N-phase protection: (0.5-1.25-2.5-5-<u>10</u>-15-20-25-30) (sec) at 600% of [I_N], Tolerance: ±15%, +0.15s –0s								
⑤	Long time delay/N-phase protection trip mode	-	HOT/COLD, selectable								
⑥	Short time delay trip pickup current	I_{sd}	[I_n] × (1-1.5-2-2.5-3-4-<u>6</u>-8-10-NON) (A), Tolerance: ±15%								
⑦	Short time delay trip timing	t_{sd}	Relaying time (ms.)		50	100	200	<u>400</u>	600	800	
			Resettable time (ms.)		25	75	175	375	575	775	
			Max. total clearing time (ms.)		120	170	270	470	670	870	
⑧	Short time delay trip I^2t mode	$I^2t\ t_{sd}$	ON/OFF								
⑨	Instantaneous trip pickup current	I_i	[I_n] × (2-4-6-8-10-12-14-<u>16</u>-NON) (A), Tolerance: ±20%								
⑩	INST/MCR	-	Selectable								
⑪	Ground fault trip pickup current *2	I_g	[I_{CT}] × (0.1-<u>0.2</u>-0.3-0.4-0.6-0.8-1.0-NON) (A), Tolerance: ±20%								
⑫	Ground fault trip timing	t_g	Relaying time (ms.)		100	200	<u>300</u>	500	1000	2000	
			Resettable time (ms.)		75	175	275	475	975	1975	
			Max. total clearing time (ms.)		170	270	370	570	1070	2070	
⑬	Ground fault trip I^2t mode	$I^2t\ t_g$	ON/OFF								
⑭	Pretrip alarm pickup current	I_{P1}	[I_n] × (0.75-0.8-0.85-0.9-<u>0.95</u>-1.0) (A), Tolerance: ±7.5%								
⑮	Pretrip alarm timing	t_{P1}	(5-10-15-20-40-60-80-<u>120</u>-160-200) (sec) at not less than [I_{P1}], Tolerance: ±15%, +0.1s –0								

- Underlined values are default settings.
- NON setting disables protective functions. If the short time delay trip function and the instantaneous trip (or MCR) function are set to NON, however, the fail-safe operates so that:
  - The instantaneous trip function is activated at [I_n] × 16 or more if the short time delay trip function and the instantaneous trip function are set to NON.
  - The short time delay trip function is activated at [I_n] × 10 or more if the short time delay trip function and the MCR function are set to NON.
- A pickup current means the threshold by which the OCR determines whether or not an overcurrent occurs. When the current flowing through the OCR exceeds the pickup current setting provided that [I_R] x 1.05 < pickup current setting ≤ [I_R × 1.2, the OCR starts counting the time for tripping. Once the current flowing through the OCR reduces to less than the pickup current setting, time count is reset.

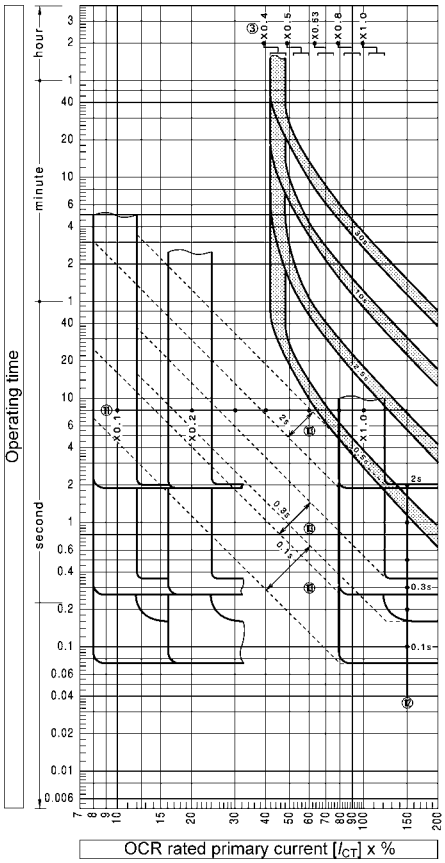
*1: A change in rated current setting results in changes in long time delay, short time delay, instantaneous, and pretrip alarm pickup current settings accordingly.
*2: The ground fault trip pickup current setting should not exceed 1200A.



Long time delay trip



Short time delay trip, instantaneous trip and pretrip alarm



N-phase protection trip and ground fault trip

Note 1: The operating time (t) at a long time delay (or N-phase protection) trip pickup current setting is given by

$$t = -27.94\, t_R \ln \left\{1 - \frac{(1.125\, I_R)^2}{i^2}\right\} \pm 15\%^{+0.15}_{-0}\ [\text{sec}]$$

I_R = Long time delay (or N-phase protection) trip pickup current setting
i = Overcurrent t_R = Time setting

Note 2: The short time delay trip function has precedence over the long time delay trip function. The OCR operates at the short time delay trip timing even in those current ranges in which the long time delay trip time setting is shorter than the short time delay time setting.

Fig. 31 Characteristic curves of type AGR-11L OCR (with L characteristic)

5-3-2. R characteristic for general feeder

A general view, characteristic settings, and characteristic curves of the type AGR-11R OCR (with R characteristic) are shown in Fig. 32, Table 20, and Figs. 33 - 35 respectively.

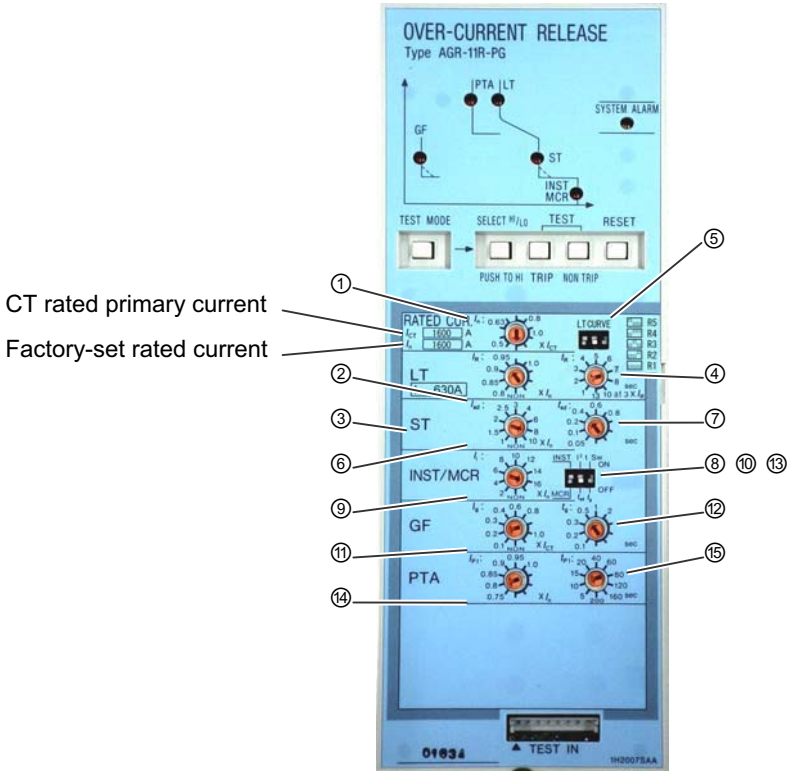


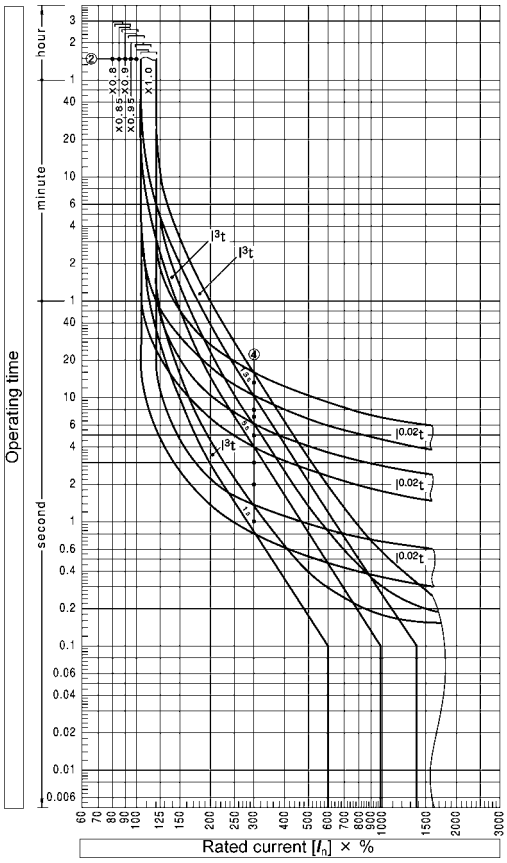
Fig. 32 General view of type AGR-11R OCR (with R characteristic)

Table 20 Settings of type AGR-11R OCR (with R characteristic)

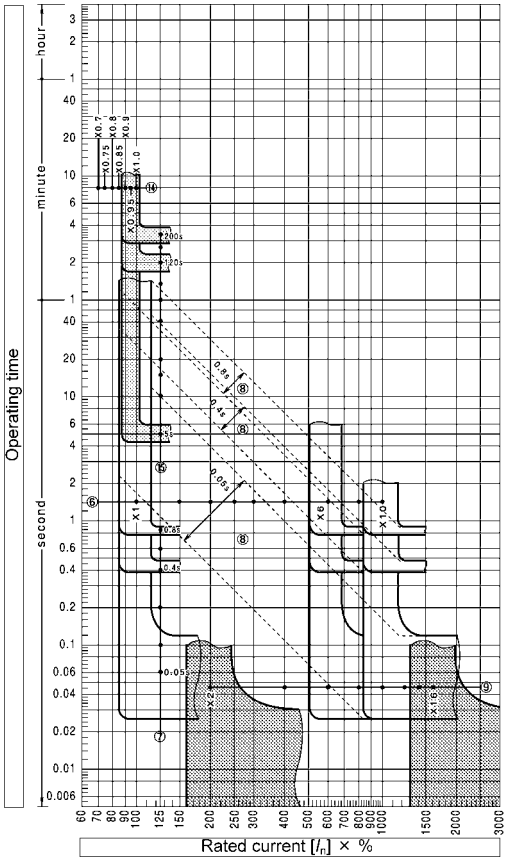
No.	Setting item	Symbol	Setting range								
①	Rated curent *1	I_n	CT rated primary current [I_{CT}] × (0.5-0.63-0.8-1.0) (A)								
			Applied [I_{CT}] (A)		200	400	800	1250	1600	2000	2500	3200	4000
			Rated current [I_n] (A)	[I_{CT}] × 0.5	100	200	400	630	800	1000	1250	1600	2000
				[I_{CT}] × 0.63	125	250	500	800	1000	1250	1600	2000	2500
				[I_{CT}] × 0.8	160	320	630	1000	1250	1600	2000	2500	3200
				[I_{CT}] × 1.0	200	400	800	1250	1600	2000	2500	3200	4000
②	Long time delay trip pickup current (continuous)	I_R	[I_n] x (0.8-0.85-0.9-0.95-1.0-NON) (A) • Non tripping at not more than [I_R] × 1.05, Tripping at more than [I_R] × 1.05 and not more than [I_R] × 1.2										
③	N-phase protection trip pickup current (continuous)	I_N	[I_{CT}] x (0.4-0.5-0.63-0.8-1.0): Fixed to a single point • Non tripping at not more than [I_N] × 1.05, Tripping at more than [I_N] × 1.05 and not more than [I_R] × 1.2										
④	Long time delay/N-phase protection trip timing	t_R	Long time delay: (1-2-3-4-5-6-7-8-10-13) (sec) at 300% of [I_R], Tolerance: ±20%, +0.15s –0s N-phase protection: (1-2-3-4-5-6-7-8-10-13) (sec)) at 300% of [I_N], Tolerance: ±20%, +0.15s –0s										
⑤	Long time delay trip characteristic	-	"R1": $I^{0.02}t$, "R2": It, "R3": I^2t, "R4": I^3t, "R5": I^4t										
⑥	Short time delay trip pickup current	I_{sd}	[I_n] × (1-1.5-2-2.5-3-4-6-8-10-NON) (A), Tolerance: ±15%										
⑦	Short time delay trip timing	t_{sd}	Relaying time (ms.)		50	100	200	400	600	800			
			Resettable time (ms.)		25	75	175	375	575	775			
			Max. total clearing time (ms.)		120	170	270	470	670	870			
⑧	Short time delay trip I^2t mode	I^2t t_{sd}	ON/OFF										
⑨	Instantaneous trip pickup current	I_i	[I_n] × (2-4-6-8-10-12-14-16-NON) (A), Tolerance: ±20%										
⑩	INST/MCR	-	Selectable										
⑪	Ground fault trip pickup current *2	I_g	[I_{CT}] × (0.1-0.2-0.3-0.4-0.6-0.8-1.0-NON) (A), Tolerance: ±20%										
⑫	Ground fault trip timing	t_g	Relaying time (ms.)		100	200	300	500	1000	2000			
			Resettable time (ms.)		75	175	275	475	975	1975			
			Max. total clearing time (ms.)		170	270	370	570	1070	2070			
⑬	Ground fault trip I^2t mode	I^2t t_g	ON/OFF										
⑭	Pretrip alarm pickup current	I_{P1}	[I_n] x (0.75-0.8-0.85-0.9-0.95-1.0) (A), Tolerance: ±7.5%										
⑮	Pretrip alarm timing	t_{P1}	(5-10-15-20-40-60-80-120-160-200) (sec) at not less than [I_{P1}], Tolerance: ±15%, +0.1s –0										

- Underlined values are default settings.
- NON setting disables protective functions. If the short time delay trip function and the instantaneous trip (or MCR) function are set to NON, however, the fail-safe operates so that:
  - The instantaneous trip function is activated at [I_n] × 16 or more if the short time delay trip function and the instantaneous trip function are set to NON.
  - The short time delay trip function is activated at [I_n] × 10 or more if the short time delay trip function and the MCR function are set to NON.
- A pickup current means the threshold by which the OCR determines whether or not an overcurrent occurs. When the current flowing through the OCR exceeds the pickup current setting provided that [I_R] x 1.05 < pickup current setting ≤ [I_R × 1.2, the OCR starts counting the time for tripping. Once the current flowing through the OCR reduces to less than the pickup current setting, time count is reset.

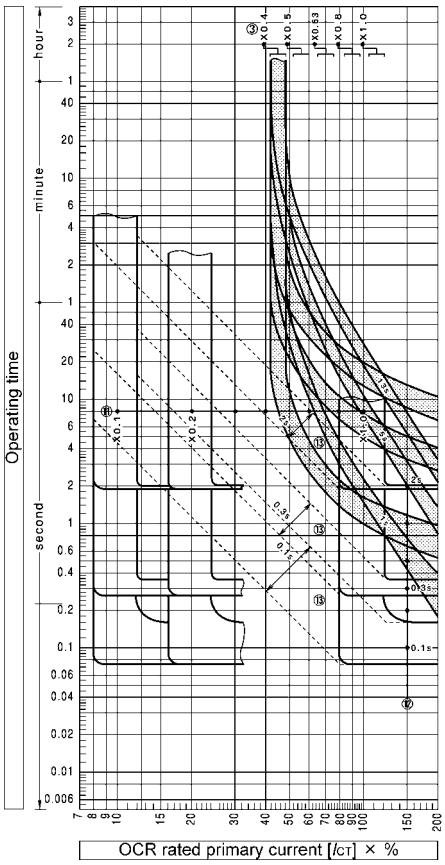
*1: A change in rated current setting results in changes in long time delay, short time delay, instantaneous, and pretrip alarm pickup current settings accordingly.
*2: The ground fault trip pickup current setting should not exceed 1200A.



Long time delay trip



Short time delay trip, instantaneous trip and pretrip alarm



N-phase protection trip and ground fault trip

Note 1: The operating time (t) at a long time delay (or N-phase protection) trip pickup current setting is given by

Type of protection characteristic: $I^{0.02}t$

$$t \fallingdotseq 1.981 \times 10^{-2} \cdot t_R \Big/ \left[\left\{ \frac{i}{1.125 I_R} \right\}^{0.02} - 1 \right] \pm 20\%^{+0.15}_{-0} \text{ [sec]}$$

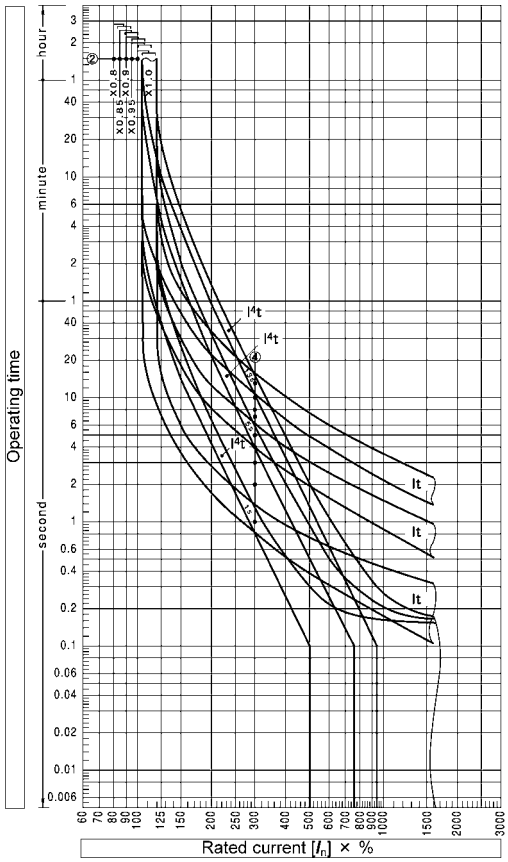
Type of protection characteristic: I^3t

$$t \fallingdotseq 17.96 \cdot t_R \Big/ \left[\left\{ \frac{1.125 I_R}{i} \right\}^{3} - 1 \right] \pm 20\%^{+0.15}_{-0} \text{ [sec]}$$

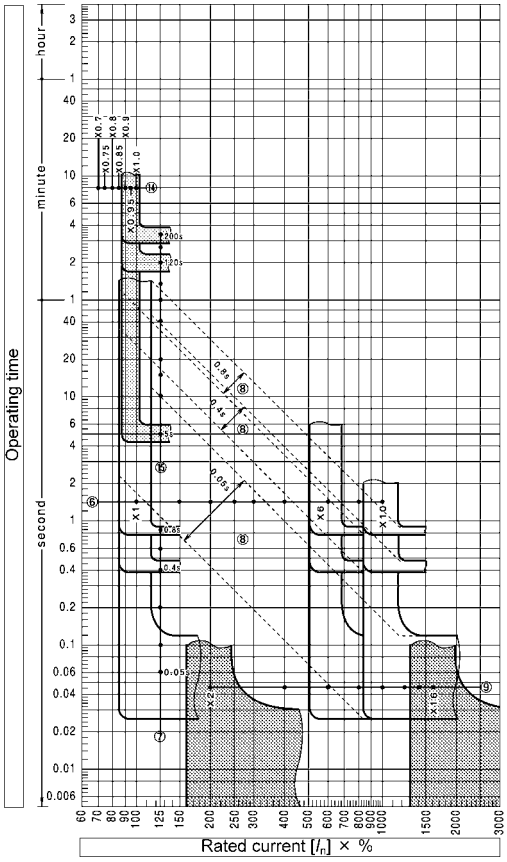
I_R = Long time delay (or N-phase protection) trip pickup current setting
i = Overcurrent t_R = Time setting

Note 2: The short time delay trip function has precedence over the long time delay trip function. The OCR operates at the short time delay trip timing even in those current ranges in which the long time delay trip time setting is shorter than the short time delay time setting.

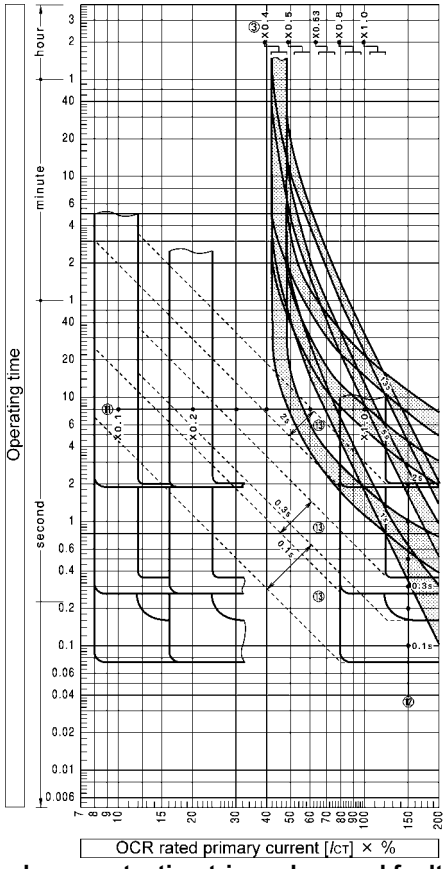
Fig. 33 Characteristic curves of type AGR-11R OCR (with R characteristic of $I^{0.02}t$ and I^3t protection types)



Long time delay trip



Short time delay trip, instantaneous trip and pretrip alarm



N-phase protection trip and ground fault trip

Note 1: The operating time (t) at a long time delay (or N-phase protection) trip pickup current setting is given by

Type of protection characteristic: It

$$t \fallingdotseq 1.667 \cdot t_R \Big/ \left[\left\{ \frac{i}{1.125 I_R} \right\} \quad -1 \right] \pm 20\%^{+0.15}_{-0} \text{ [sec]}$$

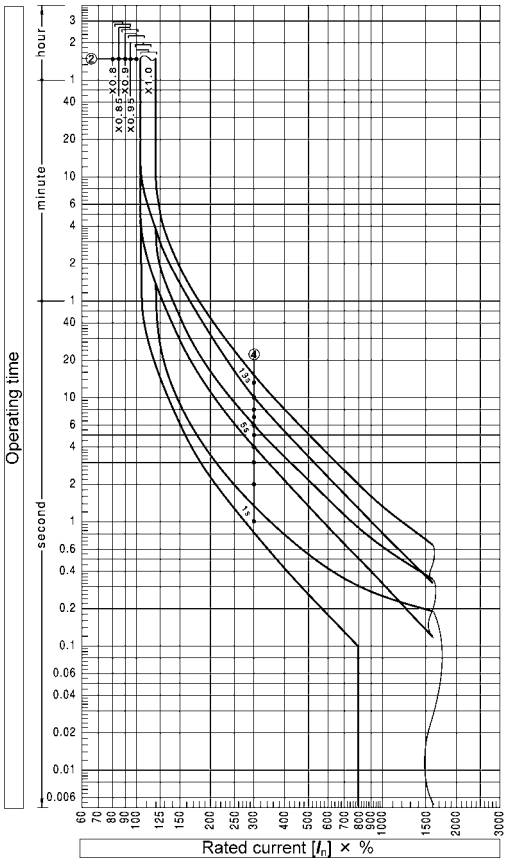
Type of protection characteristic: I^4t

$$t \fallingdotseq 49.56 \cdot t_R \Big/ \left[\left\{ \frac{i}{1.125 I_R} \right\}^4 \quad -1 \right] \pm 20\%^{+0.15}_{-0} \text{ [sec]}$$

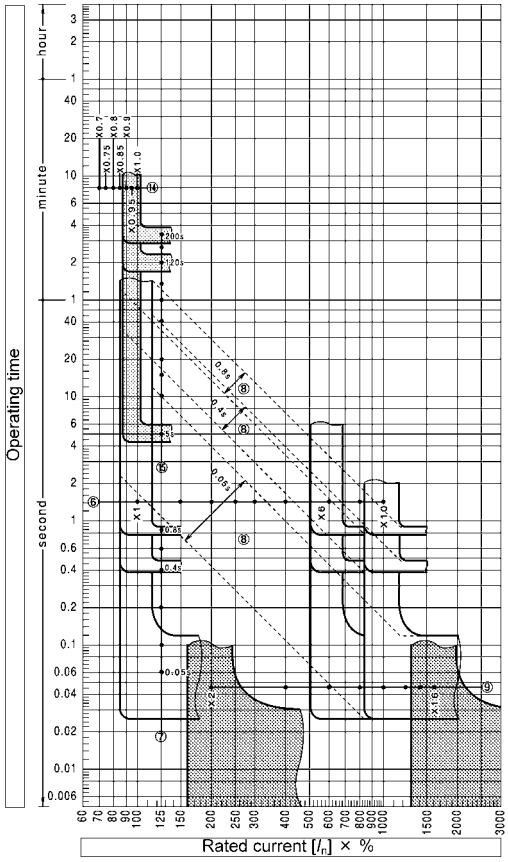
I_R = Long time delay (or N-phase protection) trip pickup current setting
i = Overcurrent t_R = Time setting

Note 2: The short time delay trip function has precedence over the long time delay trip function. The OCR operates at the short time delay trip timing even in those current ranges in which the long time delay trip time setting is shorter than the short time delay time setting.

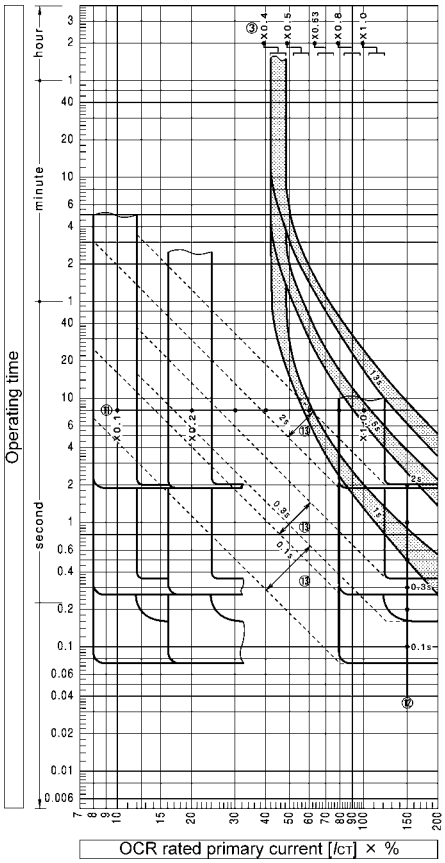
Fig. 34 Characteristic curves of type AGR-11R OCR (with R characteristic of It and I^4t protection types)



Long time delay trip



Short time delay trip, instantaneous trip and pretrip alarm



N-phase protection trip and ground fault trip

Note 1: The operating time (t) at a long time delay (or N-phase protection) trip pickup current setting is given by

$$t \fallingdotseq 6.111 \cdot t_R \Big/ \left[\left\{\frac{i}{1.125 I_R}\right\}^2 - 1\right] \pm 20\%^{+0.15}_{-0} \text{ [sec]}$$

I_R = Long time delay (or N-phase protection) trip pickup current setting
i = Overcurrent t_R = Time setting

Note 2: The short time delay trip function has precedence over the long time delay trip function. The OCR operates at the short time delay trip timing even in those current ranges in which the long time delay trip time setting is shorter than the short time delay time setting.

Fig. 35 Characteristic curves of type AGR-11R OCR (with R characteristic of I^2t protection type)

5-3-3. S characteristic for generator protection

A general view, characteristic settings, and characteristic curves of the type AGR-11S OCR (with S characteristic) are shown in Fig. 36, Table 21, and Fig. 37 respectively.

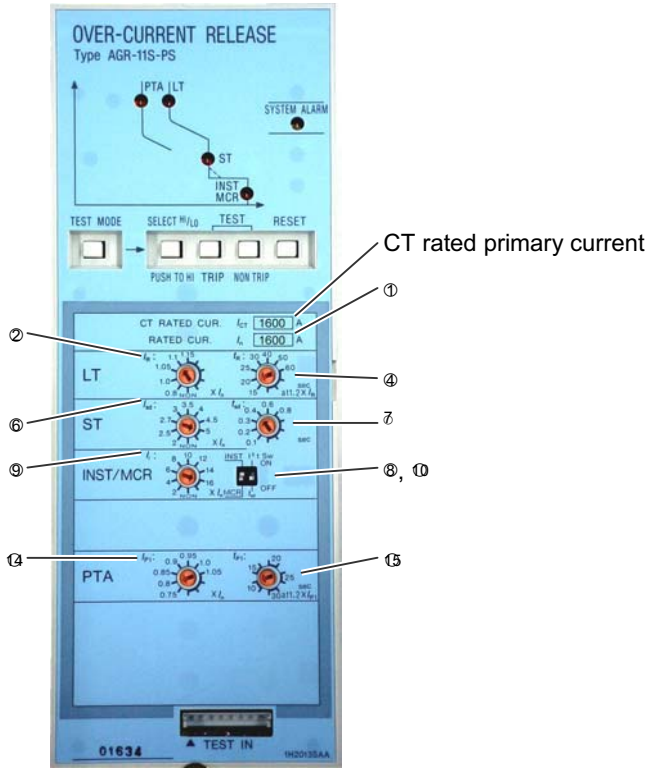


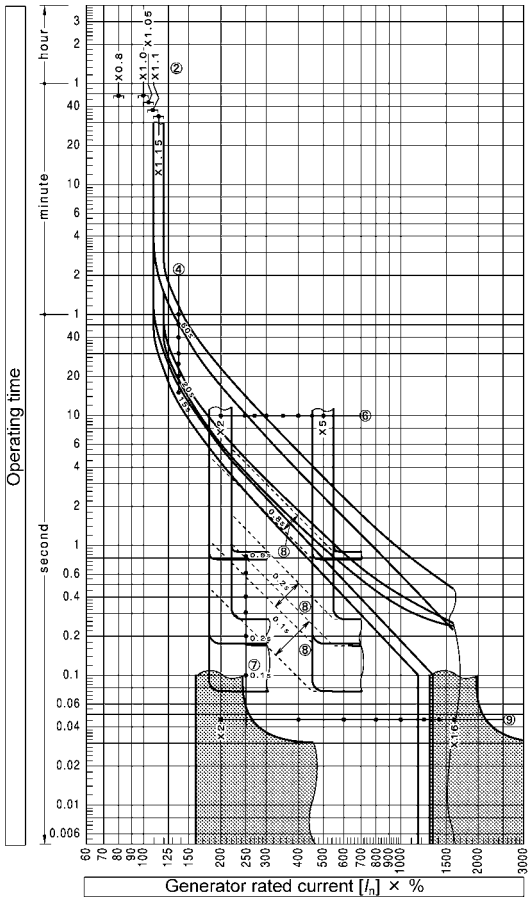
Fig. 36 General view of type AGR-11S OCR (with S characteristic)

Table 21 Settings of type AGR-11S OCR (with S characteristic)

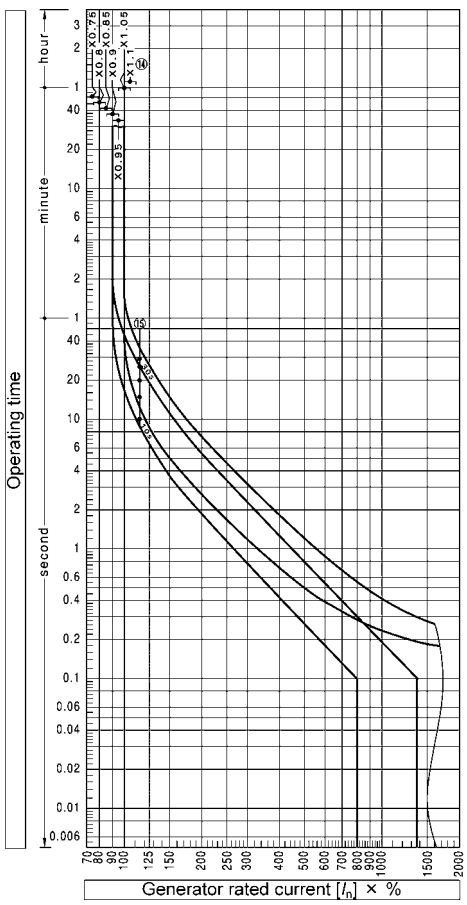
No.	Setting item	Symbol	Setting range						
①	Rated current *1	I_n	CT rated primary current [I_{CT}] × (0.5 - 1.0) (A): Fixed to a single point						
②	Long time delay trip pickup current (continuous)	I_R	[I_n] × (0.8-1.0-1.05-1.1-<u>1.15</u>-NON) (A), Tolerance: ±5%						
④	Long time delay trip timing	t_R	(15-<u>20</u>-25-30-40-50-60) (sec) at 120% of [I_R], Tolerance: ±15%, +0.1s –0						
⑥	Short time delay trip pickup current	I_{sd}	[I_n] × (<u>2</u>-2.5-2.7-3-3.5-4-4.5-5-NON) (A), Tolerance: ±10%						
⑦	Short time delay trip timing	t_{sd}	Relaying time (ms.)	100	<u>200</u>	300	400	600	800
			Resettable time (ms.)	75	175	275	375	575	775
			Max. total clearing time (ms.)	170	270	370	470	670	870
⑧	Short time delay trip I^2t mode	I^2t t_{sd}	ON/OFF						
⑨	Instantaneous trip pickup current	I_i	[I_n] × (2-4-6-8-10-12-14-<u>16</u>-NON) (A), Tolerance: ±20%						
⑩	INST/MCR	-	Selectable						
⑭	Pretrip alarm pickup current	I_{P1}	[I_n] × (0.75-0.8-0.85-0.9-<u>0.95</u>-1.0) (A), Tolerance: ±5%						
⑮	Pretrip alarm timing	t_{P1}	(10-15-20-25-<u>30</u>) (sec) at 120% of [I_{P1}], Tolerance: ±15%, +0.1s –0						

- Underlined values are default settings.
- NON setting disables protective functions. If the short time delay trip function and the instantaneous trip (or MCR) function are set to NON, however, the fail-safe operates so that:
  - The instantaneous trip function is activated at [In] × 16 or more if the short time delay trip function and the instantaneous trip function are set to NON.
  - The short time delay trip function is activated at [In] × 5 or more if the short time delay trip function and the MCR function are set to NON.

*1: Cannot be changed by the user.



Long time delay trip, short time delay trip and instantaneous trip



Pretrip alarm

Note 1: The operating time (t) at a long time delay trip pickup current setting is given by

$$t = -0.843\, t_R \ln \left\{1 - \frac{I_R{}^2}{i^2}\right\} \pm 15\%^{+0.1\text{b}}_{-0} \text{ [sec]}$$

I_R = Long time delay trip pickup current setting
i = Overcurrent t_R = Time setting

Note 2: The short time delay trip function has precedence over the long time delay trip function. The OCR operates at the short time delay trip timing even in those current ranges in which the long time delay trip time setting is shorter than the short time delay time setting.

Fig. 37 Characteristic curves of type AGR-11S OCR (with S characteristic)

5-4. Operation Indication and Indication Resetting Procedure

The OCR has LEDs on the front panel to provide operation indications as shown in Fig. 38 and Tables 22 and 23. It also outputs operation signals to contacts. To reset LEDs or contact output, press the reset button (Fig. 38 ⑦) or isolate the control power (Fig. 10 [11],[12], [21]) for at least 1 second.

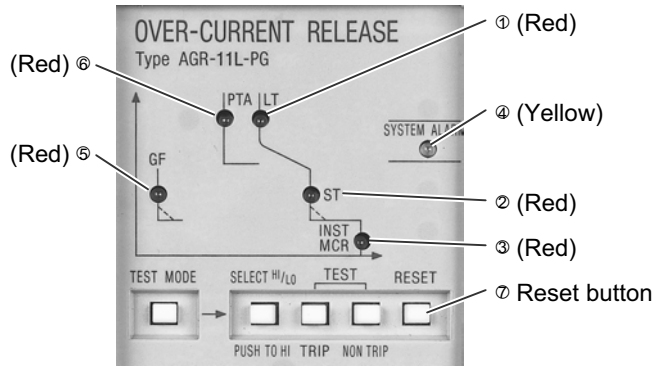


Fig. 38 LEDs and reset button

Table 22 Operation indication 1

Type of OCR	Control power supply	Operation	LED					Contact output			
			Position	State				Terminal No. See Fig. 10	State		
				Normal	pickup	Trip/Alarm	Reset		Normal	Trip/Alarm	Reset
AGR-11L-AL AGR-11L-GL AGR-11R-AL AGR-11R-GL AGR-11S-AL	Not required	Long time delay trip (LT) N-phase protection (NP) *1	①	OFF	Flash	OFF	OFF	[09], [15]	OFF	Turn OFF automatically after ON for 40 ms or more *5	OFF
		Short time delay trip (ST)	②								
		Instantaneous trip (INST/MCR)	③		OFF						
		System alarm	④	OFF	-	ON *2	OFF *3	[09], [26]		ON *2	OFF *3
AGR-11L-GL AGR-11R-GL	Not required	Ground fault trip (GF)	⑤	OFF	Flash	OFF	OFF	[09], [15]	OFF	Turn OFF automatically after ON for 40 ms or more *5	OFF
AGR-11L-PS AGR-11L-PG AGR-11R-PS AGR-11R-PG	Required	Long time delay trip (LT) N-phase protection (NP)	①	OFF	Flash	ON	OFF	[09], [15]	OFF	ON	OFF
		Short time delay trip (ST)	②					[09], [25]			
		Instantaneous trip (INST/MCR)	③		OFF						
		Pretrip alarm (PTA)	⑥		Flash	ON *4		[09], [06]		ON *4	
		System alarm	④	OFF	-	ON	OFF *3	[09], [26]		ON	OFF *3
AGR-11L-PG AGR-11R-PG	Required	Ground fault trip (GF)	⑤	OFF	Flash	ON	OFF	[09], [16]	OFF	ON	OFF
AGR-11S-PS	Required	Long time delay trip (LT)	①	OFF	Flash	ON	OFF	[09], [15]	OFF	Turn OFF automatically after ON for 500 ms or more *5	OFF
		Short time delay trip (ST)	②								
		Instantaneous trip (INST/MCR)	③					[09], [25]			
		Pretrip alarm (PTA)	⑥			ON *4		[09], [06]		ON *4	
		System alarm	④	OFF	-	ON	OFF	[09], [26]		ON	OFF *3

- The ACB can be opened, closed or tripped, irrespective of whether or not the operation indication is reset.
- The operation indication is updated when a protective function is activated.

*1: AGR-11S-AL is not equipped with the N-phase protection function (NP).
*2: When the main circuit is energized and the OCR control power is established.
*3: The OCR has a self-monitoring feature that monitors the OCR internal circuit, the magnet hold tripper (MHT) circuit, and the ACB state. An alarm caused by transient noise can be reset by pressing the reset button. If an alarm cannot be reset, check the ACB. See chapter 7.
*4: Turns OFF automatically when the current decreases below the alarm pickup current setting.
*5: A self-hold circuit is required.

Table 23 Operation indication 2

Type of OCR	Operation	Contact output						
		Terminal No. See Fig. 10	State					
			Closing spring		ACB closed	ACB open		Reset
			Charged	Discharged		Not ready to close *	Ready to close *	
All	Trip	[09], [17]	-	-	OFF	ON	OFF	No change
	Spring charge	[09], [27]	ON	OFF	-	-	-	No change

- The ACB can be opened, closed or tripped, irrespective of whether or not the operation indication is reset.

* "Ready to close" means that all of the following conditions are met:
1. The closing springs are charged.
2. Opening operation is complete (At least 40 ms has elapsed after trip signal was produced).
3. The OFF button is released.
4. The specified voltage is applied to the fixed type undervoltage trip device (if equipped).

5-5. OCR Function Check

⚠ CAUTION

- OCR function check and setting changes must be performed by competent persons.
- Use a small flatblade screwdriver with a torque of not more than 0.1 N·m or a force of not more than 0.1 N when adjusting the setting switches (rotary step switches or slide switches). An excessive torque or force may cause a malfunction.
- After completion of OCR tests, be sure to return the setting switches to the original positions. Failure to do so may cause a fire or burnout.

The following function check is applicable to the OCR types that require control power. To test other types of OCR, use type ANU-1 OCR checker (optional). See Fig. 39 and Tables 24 and 25 for how to test the OCR.

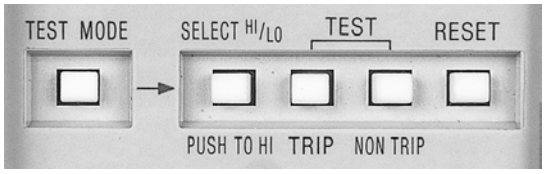


Fig. 39 Test buttons

Table 24 Testing instructions

Step	Test item / Object	Long time delay trip, Pretrip alarm		Short time delay trip, Instantaneous trip		MCR trip
		OCR + ACB	OCR only	OCR + ACB	OCR only	OCR + ACB
1	ACB	Open (Turn OFF)				
2	Breaker body	Move to ISOPLATED position (to isolate control power).				
3	OCR settings	Change as specified in Table 25.				
4	Breaker body	Move to TEST position (to restore control power).				
5	ACB	Close (Turn ON).	Keep open (OFF).	Close (Turn ON).		Keep open (OFF).
6	TEST MODE button	Press once (to enter test mode).				
7	SELEXT HI/LO button	Do not press.		Press once.		
8	TRIP button	Press and hold down until ACB trips open. *1	Do not press.	Press and hold down until ACB trips open. *1	Do not press.	Holding down, check that OCR does not operate and close ACB. *1
	NON TRIP button	Do not press.	Press and hold down until OCR operates. *1	Do not press.	Press and hold down until OCR operates. *1	Do not press.
9	RESET button	Press once.				
10	OCR settings	Restore.				
Make sure that:		ACB opens and OCR provides operation indication. *2	OCR provides operation indication. *2	ACB opens and OCR provides operation indication. *2	OCR provides operation indication. *2	ACB opens and OCR provides operation indication. *2
OCR input signal value		AGR-11L [I_{CT}] × 5, AGR-11R [I_{CT}] × 3, AGR-11S [I_{CT}] × 1.5		[I_{CT}] × 25		

- The ground fault trip and N-phase protection functions cannot be checked.
- Steps 6 - 8 must be completed within 10 seconds. Otherwise, the test mode will be canceled. In such a case, start testing from step 6 again.
- When checking the long time delay trip timing, determine the OCR input signal timing from characteristic curves (Figs. 31, 33 - 37, 39) and compare the results with the values measured by a timer or the like.

*1: If button operation is aborted, the OCR will cancel the test mode automatically. In such a case, start testing from step 6 again.

*2: Use a tester to check for normal contact output.

Table 25 Protective functions that can be checked and OCR setting changes to be done

Protective function that can be checked	Type of OCR	Setting for test
Long time delay trip	AGR-11L	[I_{sd}]: NON, [I_i]: 14 or more, [HOT/COLD]: COLD
	AGR-11R	[I_{sd}], [I_i]: 8 or more
	AGR-11S	—
Short time delay trip	AGR-11L,AGR-11R, AGR-11S	[I_R]: NON, [I_i]: NON, [I^2t t_{sd}]: OFF
Instantaneous trip	AGR-11L,AGR-11R,AGR-11S	[INST/MCR]: INST
MCR trip	AGR-11L,AGR-11R, AGR-11S	[INST/MCR]: MCR
Pretrip alarm	AGR-11L	[I_R]: NON, [I_{sd}]: NON, [I_i]: 14 or more, [HOT/COLD]: COLD
	AGR-11R	[I_R]: NON, [I_{sd}]: 8 or more, [I_i]: 8 or more
	AGR-11S	[I_R]: NON