





Trip relays

Susol

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G / Thermal	• L / S / I / G / Thermal • ZSI(Protective coordination)	• L / S / I / G / Thermal(Continuous) • ZSI(Protective coordination)	• P type
Other protection		• Earth leakage (Option)	• Earth leakage(Option) • Over/Under current • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• P type
Measurement function		• Current (R / S / T / N)	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand • Voltage/Current harmonics (1st-63th) • 3 Phase Waveforms • THD, TDD, K-Factor
Fine adjustment			• Fine adjustment for long/short time delay/instantaneous/ ground	• P type
Pre Trip Alarm			• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)	• P type
Digital Output		• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• P type
IDMTL setting			• Compliance with IEC60255-3 SIT, VIT, EIT, DT	• P type
Communication		• Modbus/RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP
Power supply	• Self Power -Power source works over 20% of load current.	• Self Power - Power source works over 20% of load current. - External power source are required for comm. • AC/DC 110~220V • DC 24/48V	• AC/DC 110~220V • DC 24/48V	• AC/DC 110~220V • DC 24/48V
RTC timer	• Available	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• N type	• N type	• N type
Fault recording		• 10records (Fault/Current/Date and Time)	• 256records (Fault/Current/Date and Time)	• 256records • Last fault wave recording (3 Phase)
Event recording			• 256 records(Content, Status, Date)	• P type
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• A type	• A type

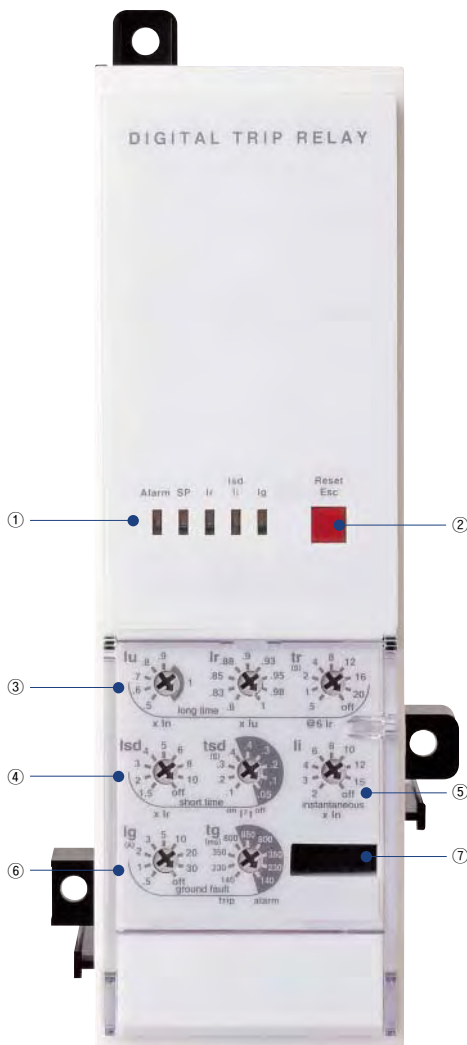
Basic protection function(L / S / I / G) is still under normal operation without control power.

Trip relays

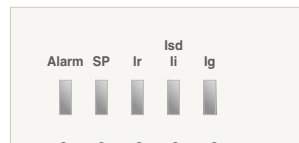
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N type: 'Normal' type

- Optimized protection function
- OCR, OCGR function according IEC60947-2
- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay / Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Self-Power



① LED: Indication of trip info. and overload state



- Ig: LED indicating ground-fault
- I_{sd}/I_i: LED indicating short-time or instantaneous tripping
- I_r: LED indicating long-time delay
- Batt/SP: Self-protection and battery test LED
- Alarm: LED indicating an overload
(Turn on above 90%, Blink above 105%)

② Reset Key: Fault reset or battery check

③ I_u, I_r: Long-time current setting, t_r: Long-time tripping delay setting

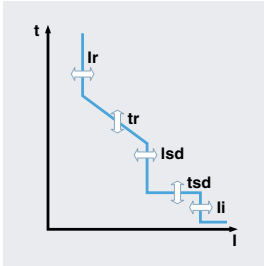
④ I_s: Short-time current setting, t_{sd}: Short-time tripping delay setting

⑤ I_i: Instantaneous current setting

⑥ I_g: Ground fault current setting, t_g: Ground fault tripping delay setting

⑦ Test terminal: OCR test terminal (Connected with OCR tester)

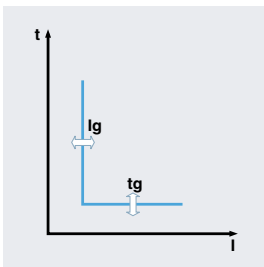
Protection



Long time										
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0			
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off
100ms										
Thermal memory (s)		66	133	268	537	1076	1615	2154	2693	

Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Accuracy: $\pm 10\%$											
Time delay (s)	t_{sd}	$I^{1st} \text{ Off}$	0.05	0.1	0.2	0.3	0.4				
		$I^{1st} \text{ On}$	0.1	0.2	0.3	0.4					
@ $10 \times I_r$	$(I^{1st} \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

Instantaneous										
Current setting (A)	$I_l = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								



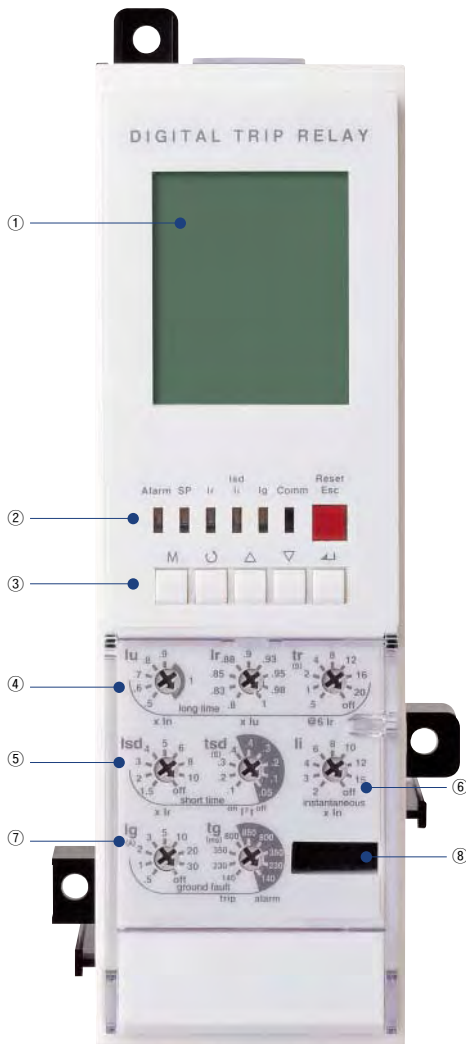
Ground fault											
Pick-up (A)											
Accuracy: $\pm 10\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s)	t_g	$I^{1st} \text{ Off}$	0.05	0.1	0.2	0.3	0.4				
		$I^{1st} \text{ On}$	0.1	0.2	0.3	0.4					
@ $1 \times I_n$	$(I^{1st} \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

Trip relays

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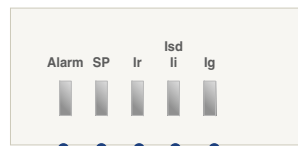
A type: 'Ammeter' type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay / Instantaneous
 - 1st On/Off optional (for short-time delay)
- Ground fault protection
 - 1st On/Off optional
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- High-performance and high-speed MCU built-in
 - Accurate measurement with tolerance of 1.0%
- Fault recording
 - Records Max. up to 10 fault information about fault type, fault phase, fault data, occurrence time of fault
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO(Digital Output)
 - Fixed
- Communication
 - Modbus/RS485
 - Profibus-DP



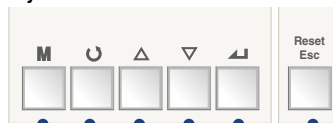
① LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Ig: LED indicating ground-fault
- Isd/li: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- Batt/SP: Self-protection and battery test LED
- Alarm: LED indicating an overload
(Turn on above 90%, Blink above 105%)

③ Key: Move to menu or reset



- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display ↔ Measurement display

④ lu, lr: Long-time current setting, tr: Long-time tripping delay setting

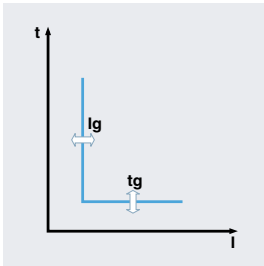
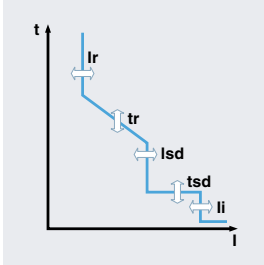
⑤ Is: Short-time current setting, tsd: Short-time tripping delay setting

⑥ li: Instantaneous current setting

⑦ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

Protection



Long time											
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0				
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0	
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off	
Accuracy: $\pm 15\%$ or below	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off	
	100ms	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off
Thermal memory (s)		66	133	268	537	1076	1615	2154	2693		
Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Accuracy: $\pm 10\%$											
Time delay (s)	t_{sd}	$I^{1st} \text{ Off}$	0.05	0.1	0.2	0.3	0.4				
		$I^{1st} \text{ On}$	0.1	0.2	0.3	0.4					
@ $10 \times I_r$	$(I^{1st} \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				
Instantaneous											
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off	
Tripping time		below 50ms									
Ground fault											
Pick-up (A)											
Accuracy: $\pm 10\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s)	t_g	$I^{1st} \text{ Off}$	0.05	0.1	0.2	0.3	0.4				
		$I^{1st} \text{ On}$	0.1	0.2	0.3	0.4					
@ $1 \times I_n$	$(I^{1st} \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				
Earth leakage (Option)											
Current setting (A)	I_g	0.5	1	2	3	5	10	20	30	Off	
Time delay (ms)											
Accuracy: $\pm 15\%$	t_g	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

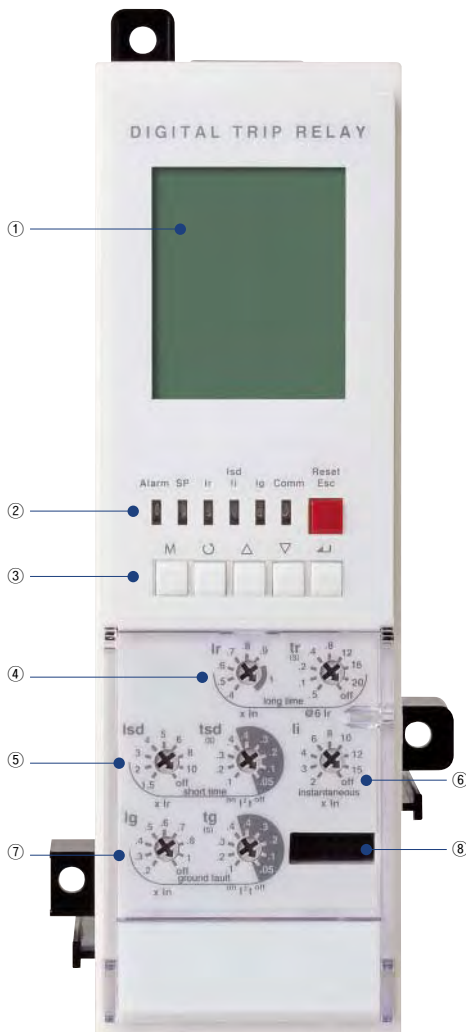
Note) Earth leakage function is available with ZCT or external CT

Trip relays

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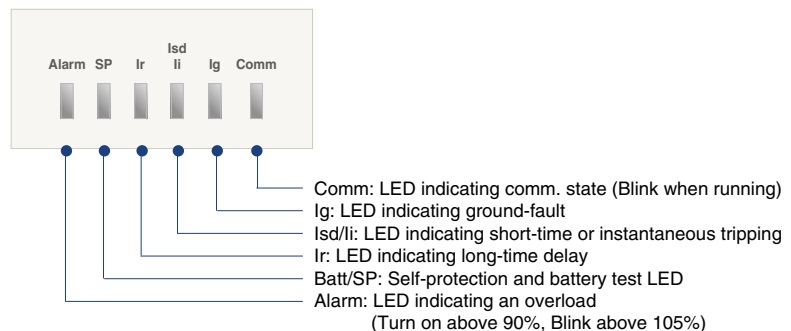
P type: 'Power meter' type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay / Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- The fine-adjustable setting by knob and Key
- IDMLT setting (SIT, VIT, EIT, DT curve)
- Measurement and Display Function
 - High detailed measurement for 3 phase current/Voltage/Power/Energy/Phase angle/Frequency/PF/Demand
 - 128 x 128 Graphic LCD
 - Indicates current/voltage Vector Diagram and Waveform
- Fault recording
 - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
- Event recording
 - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO(Digital output)
 - Programmable for alarm, trip and general DO
- Communication
 - Modbus/RS485
 - Profibus-DP

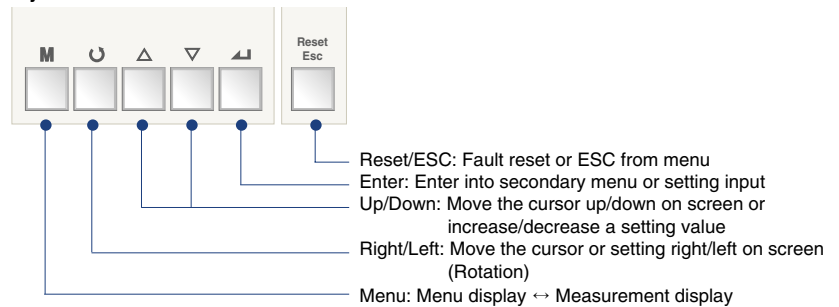


① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



③ Key: Move to menu or reset



④ I_l, I_r: Long-time current setting, t_r: Long-time tripping delay setting

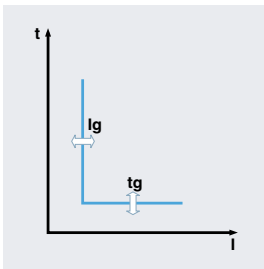
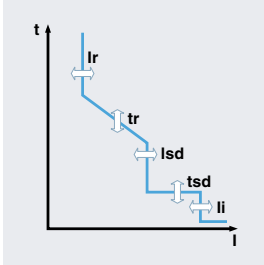
⑤ I_s: Short-time current setting, t_{sd}: Short-time tripping delay setting

⑥ I_i: Instantaneous current setting

⑦ I_g: Ground fault current setting, t_g: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

Protection



Long time										
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off
100ms	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off
Thermal memory (s)		66	133	268	537	1076	1615	2154	2693	

Short time										
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off
Accuracy: $\pm 10\%$										
Time delay (s) @ $10 \times I_r$	tsd	I ^{1st} Off	0.05	0.1	0.2	0.3	0.4			
		I ^{1st} On		0.1	0.2	0.3	0.4			
(I ^{1st} Off)	(I ^{1st} Off)	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								

Ground fault										
Pick-up (A)										
Accuracy: $\pm 10\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) @ $1 \times I_n$	tg	I ^{1st} Off	0.05	0.1	0.2	0.3	0.4			
		I ^{1st} On		0.1	0.2	0.3	0.4			
(I ^{1st} Off)	(I ^{1st} Off)	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

Earth leakage (Option)										
Current setting (A)	I_g	0.5	1	2	3	5	10	20	30	Off
Time delay (ms)										
Accuracy: $\pm 15\%$	tg	Alarm Time(ms)	140	230	350	800	950			
		Trip Time(ms)	140	230	350	800				

Note) Earth leakage function is available with ZCT or external CT

PTA(Pre Trip Alarm)										
Current setting (A)	$I_p = I_r \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
Time delay (s)	$t_p @ (1.2 \times I_p)$	1	5	10	15	20	25	30	35	Off
Accuracy: $\pm 15\%$										

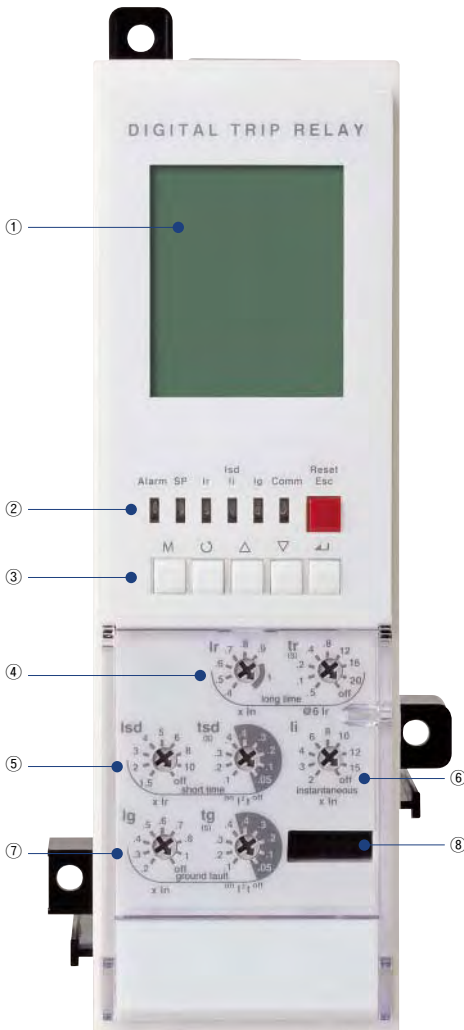
Other protection	Pick-up			Time delay(s)		
	Setting range	Step	Accuracy	Setting range	Step	Accuracy
Under voltage	80V ~ OV_Pick-up	1V	$\pm 5\%$	1.2~40sec	0.1sec	$\pm 0.1sec$
Over voltage	UV_Pick-up ~ 980V	1V	$\pm 5\%$			
Voltage unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or ($* \pm 10\%$)			
Reverse power	10 ~ 500kW	1kW	$\pm 10\%$			
Current unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or ($* \pm 10\%$)			
Over frequency	60Hz UF_Pick-up ~ 65	1Hz	$\pm 0.1Hz$			
Under frequency	50Hz UF_Pick-up ~ 55	1Hz	$\pm 0.1Hz$			
Over frequency	60Hz 55Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			
Under frequency	50Hz 45Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			

Trip relays

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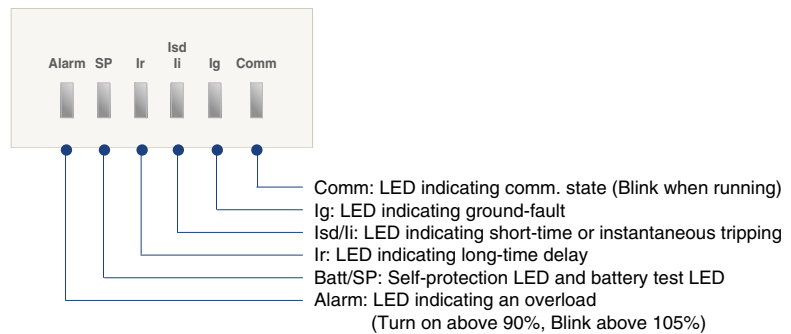
S type: 'Supreme meter' type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay / Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- The fine-adjustable setting by knob and Key
- IDMLT setting (SIT, VIT, EIT, DT curve)
- Measurement and Display Function
 - High detailed measurement for 3 phase current/Voltage/Power/Energy/Phase angle/Frequency/PF/Demand
 - 128 x 128 Graphic LCD
 - Indicates current/voltage Vector Diagram and Waveform
- Fault recording
 - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
 - Fault wave recording: records the latest fault wave
- Event recording
 - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- Power quality analysis
 - Measurement for 1st~63th harmonics
 - THD, TDD, k-Factor
 - Voltage/current waveform capture
- 3 DO(Digital output)
 - Programmable for alarm, trip and general DO
- Communication
 - Modbus/RS485
 - Profibus-DP

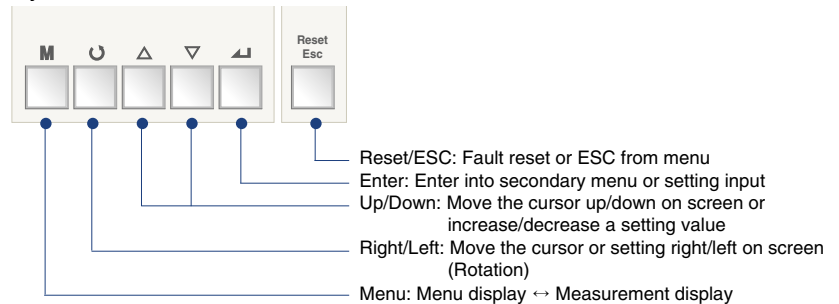


① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



③ Key: Move to menu or reset



④ I_u, I_r: Long-time current setting, t_r: Long-time tripping delay setting

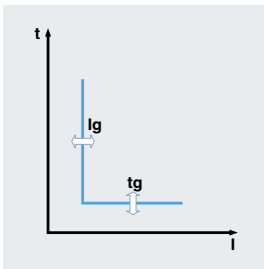
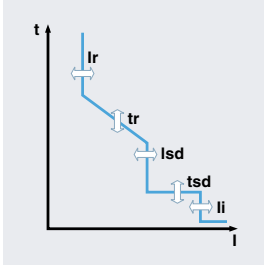
⑤ I_s: Short-time current setting, t_{sd}: Short-time tripping delay setting

⑥ I_i: Instantaneous current setting

⑦ I_g: Ground fault current setting, t_g: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

Protection



Long time										
Current setting (A)	$I_u = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	6	12	16	20	Off
100ms	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off
Thermal memory (s)		66	133	268	537	1076	1615	2154	2693	

Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Accuracy: $\pm 10\%$											
Time delay (s)	t_{sd}	I^2t Off	0.05	0.1	0.2	0.3	0.4				
@ $10 \times I_r$		I^2t On	0.1	0.2	0.3	0.4					
		Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								

Ground fault											
Pick-up (A)											
Accuracy: $\pm 10\%$ ($I_g > 0.4I_n$) $\pm 20\%$ ($I_g \leq 0.4I_n$)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
		I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On	0.1	0.2	0.3	0.4					
Time delay (s)		Min. Trip Time(ms)	20	80	160	260	360				
@ $1 \times I_n$		Max. Trip Time(ms)	80	140	240	340	440				

Earth leakage (Option)											
Current setting (A)	I_g	0.5	1	2	3	5	10	20	30	Off	
Time delay (ms)											
Accuracy: $\pm 15\%$											
	t_g	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

Note) Earth leakage function is available with ZCT or external CT

PTA(Pre Trip Alarm)										
Current setting (A)	$I_p = I_r \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
Time delay (s)	$t_p @ (1.2 \times I_p)$	1	5	10	15	20	25	30	35	Off
Accuracy: $\pm 15\%$										

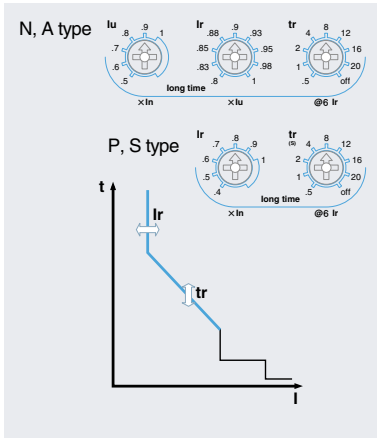
Other protection	Pick-up			Time delay(s)		
	Setting range	Step	Accuracy	Setting range	Step	Accuracy
Under voltage	80V ~ OV_Pick-up	1V	$\pm 5\%$	1.2~40sec	0.1sec	$\pm 0.1sec$
Over voltage	UV_Pick-up ~ 980V	1V	$\pm 5\%$			
Voltage unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or ($* \pm 10\%$)			
Reverse power	10 ~ 500kW	1kW	$\pm 10\%$			
Current unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or ($* \pm 10\%$)			
Over frequency	60Hz UF_Pick-up ~ 65	1Hz	$\pm 0.1Hz$			
Under frequency	50Hz UF_Pick-up ~ 55	1Hz	$\pm 0.1Hz$			
Over frequency	60Hz 55Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			
Under frequency	50Hz 45Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			

Trip relays

Susol

Operation characteristic

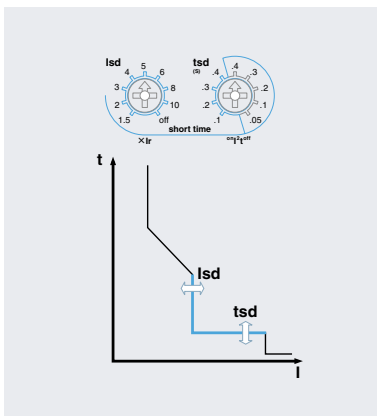
Long-time delay (L)



The function for overload protection which has time delayed characteristic in inverse ratio to fault current.

- Standard current setting knob: Ir
 - Setting range in P type and S type: $(0.4-0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - Setting range in N type and A type: $(0.4 \sim 1.0) \times I_n$
 - lu: $(0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - lr: $(0.8-0.83-0.85-0.88-0.9-0.93-0.95-0.98-1.0) \times I_n$
- Time delay setting knob: tr
 - Standard operating time is based on the time of $6 \times I_r$
 - Setting range: 0.5-1-2-4-8-12-16-20-Off sec (9 modes)
- Relay pick-up current
 - When current over $(1.15) \times I_r$ flows in, relay is picked up.
- Relay operates basing on the largest load current among R/S/T/N phase.

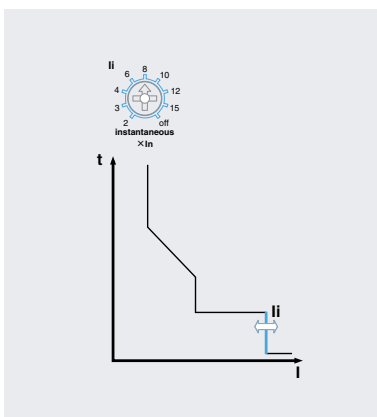
Short-time delay (S)



The function for fault current (over current) protection which has definite time characteristic and time delayed in inverse ratio to fault current.

- Standard current setting knob: Isd
 - Setting range: $(1.5-2-3-4-5-6-8-10-Off) \times I_r$
- Time delay setting knob: tsd
 - Standard operating time is based on the time of $10 \times I_r$.
 - Inverse time (Ist On): 0.1-0.2-0.3-0.4 sec
 - Definite time (Ist Off): 0.05-0.1-0.2-0.3-0.4 sec
- Relay operates basing on the largest load current among R/S/T/N phase.
- Relay can operate at instantaneous current through ZSI.

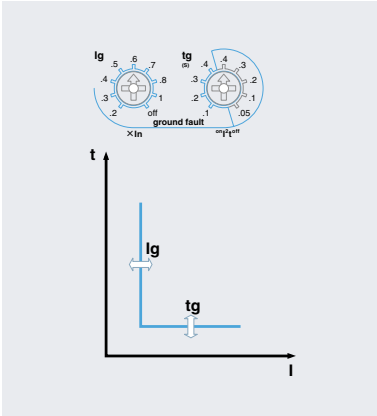
Instantaneous (I)



The function for breaking fault current above the setting value within the shortest time to protect the circuit from short-circuit.

- Standard current setting knob: Ii
 - Setting range: $(2-3-4-6-8-10-12-15-Off) \times I_n$
- Relay operates basing on the largest load current among R/S/T/N phase.
- Total breaking time is below 50ms.

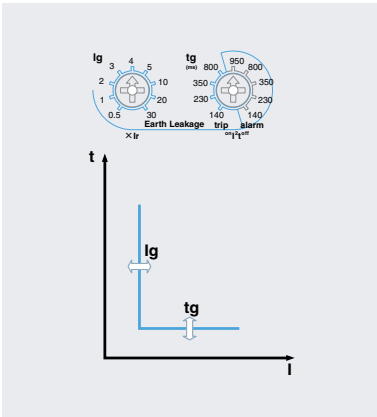
Ground Fault (G)



The function for breaking ground fault current above setting value after time-delay to protect the circuit from ground fault.

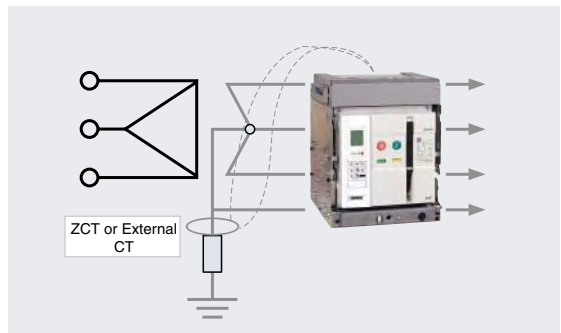
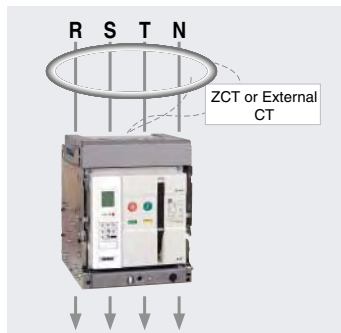
1. Standard setting current knob: I_g
 - Setting range: $(0.2-0.3-0.4-0.5-0.6-0.7-0.8-1.0-Off) \times I_n$
2. Time delay setting knob: t_g
 - Inverse time (I^2t On): 0.1-0.2-0.3-0.4 sec
 - Definite time (I^2t Off): 0.05-0.1-0.2-0.3-0.4 sec
3. Ground fault current = $R+S+T+N$ (Vector Sum)
4. Relay can operate at instantaneous current through ZSI.
5. The protection for ground fault is a basic function of Trip relay (Internal CT type)

Earth Leakage (G) - Option



The function for breaking earth leakage current above setting value after time delay to protect the circuit from earth leakage. (A, P, S type)

1. Standard setting current knob: I_g
 - Setting range: 0.5-1-2-3-4-5-10-20-30-Off (A)
2. Time delay setting knob: t_g
 - Trip time: 140-230-350-800 ms
 - Alarm time: 140-230-350-800-950 ms
3. It is only available with private ZCT or general purpose external CT.



※ The necessity of earth leakage relay with external CT

- Earth leakage relay with Internal CT (standard) operates in the range of 20% ~100% of the rated current.
- If the rated current of ACB increases, the standard operating current of earth leakage relay also increases.
 - ex) 400AF ACB of Min. earth leakage relay current, $400A \times 20\% = 80A$
 - 4000AF ACB of Min. earth leakage relay current, $4000A \times 20\% = 800A$
- Thus, Susol ACB provides a solution with CT which can be installed externally to adjust sensibility of earth leakage current and which can operate relay. (separate purchase)

Trip relays

Susol

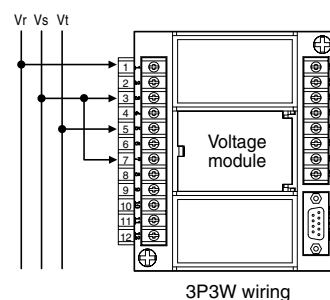
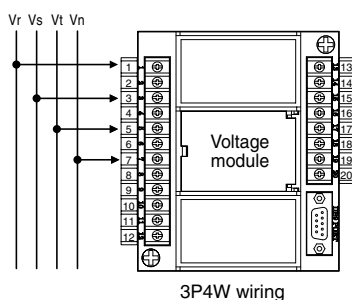
Measurement function

Class.	Measurement element	Detailed element	Unit	Display range	Accuracy
Current	Line current	I_a, I_b, I_c	A	80A~65,535A	±3%
	Normal current	I_1			
	Reverse current	I_2			
Voltage	Line voltage	V_{ab}, V_{bc}, V_{ca}	V	60~690V	±1%
	Phase voltage	V_a, V_b, V_c			±1%
	Normal voltage	V_1			
	Reverse voltage	V_2			
Angle	Line-to-line	$\angle V_{abla}, \angle V_{b\Delta}, \angle V_{c\Delta}$	°	0~360 °	±1 °
	Line-to-current	$\angle V_{ab}V_{bc}, \angle V_{ab}V_{ca}$			±1 °
	Phase-to-phase	$\angle V_aV_b, \angle V_aV_c$			±1 °
	Phase-to-current	$\angle V_aI_a, \angle V_bI_b, \angle V_cI_c$			±1 °
Power	Active power	$P_{a(ab)}, P_{b(bc)}, P_{c(ca)}, P$	kW	1kW~99,999kW	±3%
	Reactive power	$Q_{a(ab)}, Q_{b(bc)}, Q_{c(ca)}, Q$	kVar	1kVar~99,999kVar	±3%
	Apparent power	$S_{a(ab)}, S_{b(bc)}, S_{c(ca)}, S$	kVA	1kVA~99,999kVA	±3%
Energy	Active energy	$W_{Ha(ab)}, W_{Hb(bc)}, W_{Hc(ca)}, WH$	kWh MWh	1kWh~9999.99MWh	±3%
	Reactive energy	$VAR_{Ha(ab)}, VAR_{Hb(bc)}, VAR_{Hc(ca)}, VARH$	kVarh Mvarh	1kVarh~9999.99MVarh	±3%
	Reverse active energy	$rW_{Ha(ab)}, rW_{Hb(bc)}, rW_{Hc(ca)}, rWH$	kWh MWh	1kWh ~9999.99MWh	±3%
Freq.	Frequency	F	Hz	45~65Hz	
Power factor	Power factor(PF)	$PF_{a(ab)}, PF_{b(bc)}, PF_{c(ca)}, PF$		+ : Lead, - : Lag	
Unbalance	Unbalance rate	$I_{unbalance}, V_{unbalance}$	%	0.0~100.0	
Demand	Active power demand	Peak demand	kW	1kW~99999kW	
	Current demand	Peak demand	A	80A~65,535A	
Harmonics	Voltage harmonics	1st~63th harmonics of $V_{a(ab)}, V_{b(bc)}, V_{c(ca)}$	V	60~690V	
	Current harmonics	1st~63th harmonics of I_a, I_b, I_c	A	80A~65,535A	
	THD, TDD		%	0.0~100.0	
	K-Factor		-	0.0~100.0	

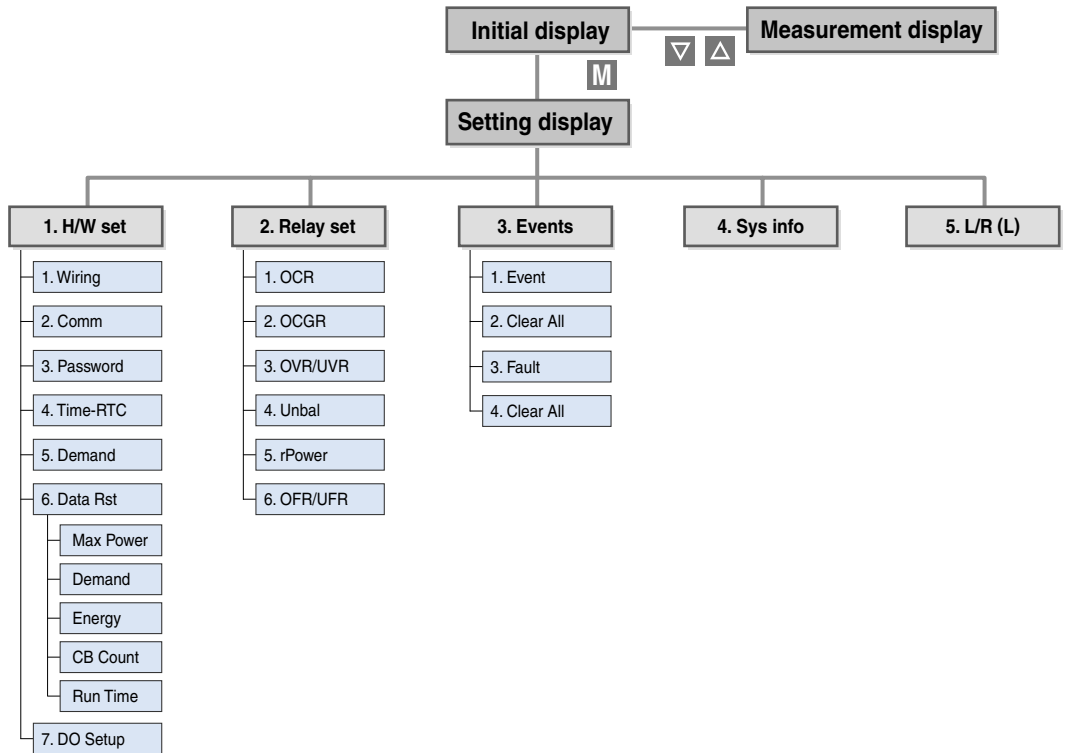
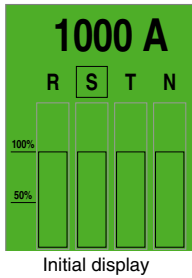
A type
P type
S type

Voltage module

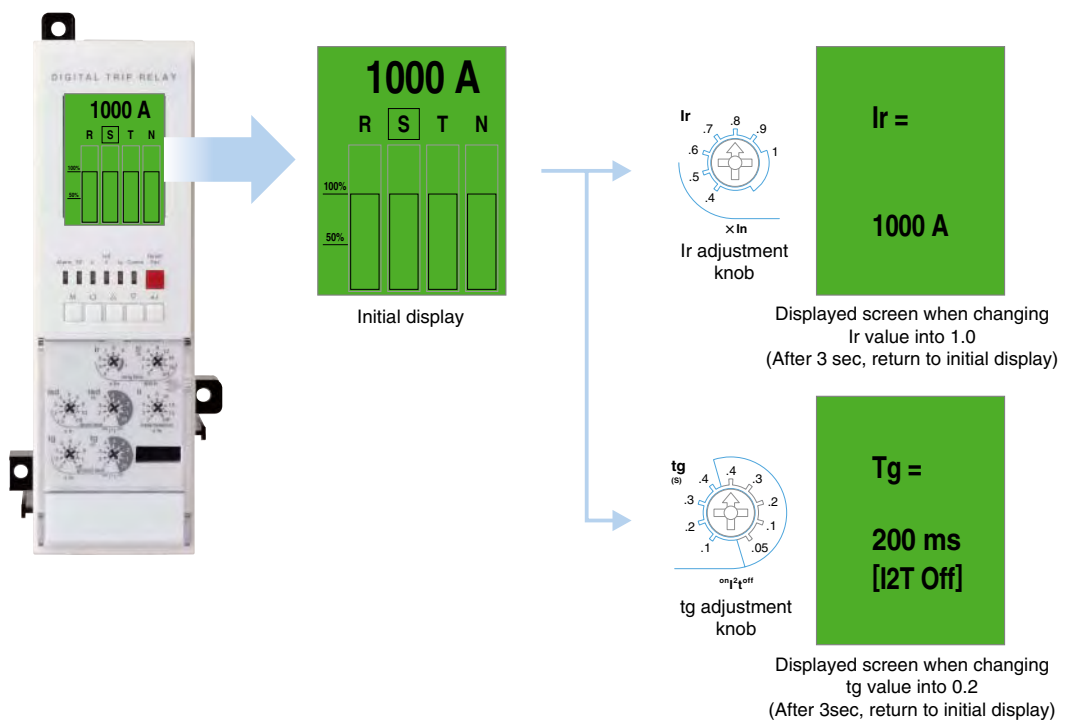
For P and S type Trip relay, separate voltage module is provided to measure other element besides current
- Voltage input range: AC 60~690V



Man machine interface



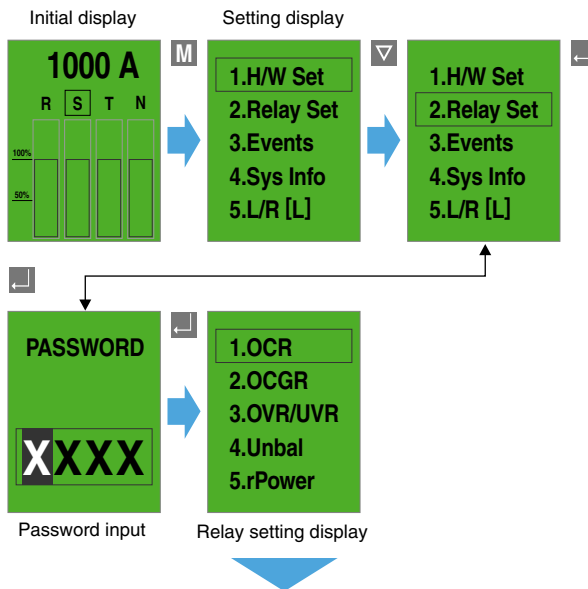
An example of graphic LCD display



Trip relays

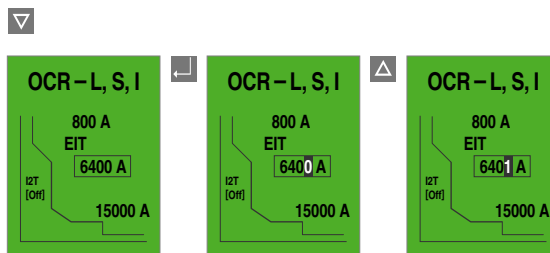
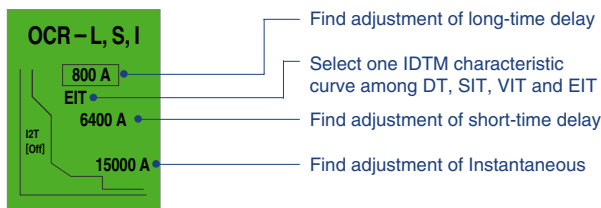
Susol

Protection element setting

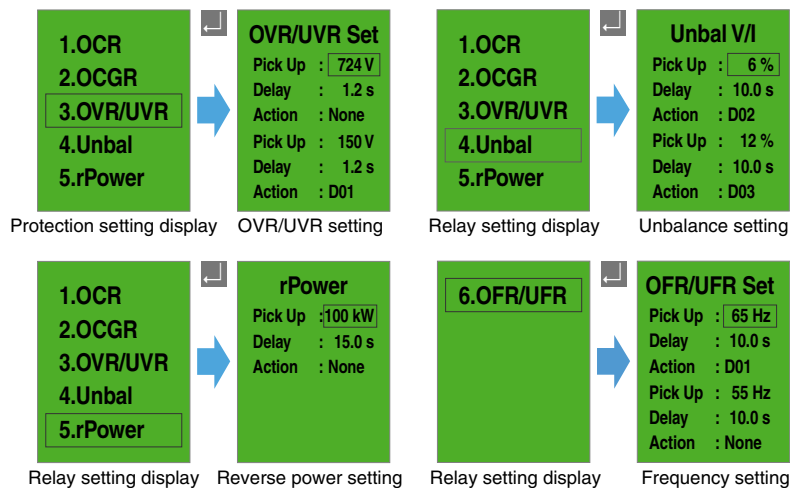


Find adjustment of protection setting current

- OCR and OCGR's current setting is basically controlled by knob's setting values.
- The fine current that cannot be controlled by knob is adjustable by using ∇ , Δ key.
- Fine adjustment is only adjustable in the present knob and next knob's setting range, when moving knob, the adjusted data becomes reset state.



- The setting method of OCGR is same with OCR's, fine adjustment is available.



Measurement element display

