TESTER

USER MANUAL INSTRUCTION

1. Safety Warnings 2
2. Product Feature 3
3. Product Component 4
4. Product Appearance and Control Configuration 5
5. OCR Connection and Battery Exchange Method 7
6. Product Rating9
7. Operating Method 10
8. Relay Element Testing Method 15

4. Product Appearance and Control Configuration

Feature

R-phase waveform output setting

S-phase waveform output setting

T-phase waveform output setting

N-phase waveform output setting

Increases set value

Decreases set value

Saves set value setting

Changes frequency

1. Safety Warnings

Thoroughly read user manual before usage for safe use and to fully understand features of OCR Tester, Please keep user manual near the OCR Tester

Symbols used on product and in user manual represents following warnings:

Warning Appears when instructions are violated, and there is possibility of serious injury or death

Warning

Caution

Please apply correct power which suits rating of power terminal – violation of this caution may cause product damage or fire.

product.

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

Please check the direction before connecting the connector to terminal input/ output.
 violation of this caution may cause product

Check voltage and polarity of control power

> Check cable direction of tester and OCR,

- Do not carry out a test when ACB is powered or rerating. ■ Do not carry out a test if the bus is in live-wire
- Do not carry out a test when OCR control is powered (not applied to marine product)
 it may cause malfunction of OCR.
- Do not disassemble the product even when unpowered,
 -internal charging current of the product may
 cause electric shock.

 Do not install or operate with wet hands, it may
 cause electric shock.

 Charging or line,
 -internal charging current of the product may
 cause electric shock.
- Do not use if the sheath of cable is damaged, -it may cause electric shock.

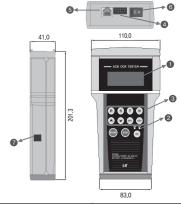
2. Product Feature

- (1) Susol ACB OCR TESTER(shortened as TESTER) performs current relay test of Susol / Metasol ACB OCR(shortened as OCR).
- (2) To perform relay test of OCR/ OCGR / PTA, TESTER can set current amplitude and phase.
- (3) TESTER is equipped with built-in high-performance MCU to perform precise current relay test.
- (4) TESTER displays Fault(accident) that may occur on ACB on LCD screen, as well as trip time/ trip type/ trip phase/ and current value of the trip.
- (5) TESTER is portable-type powered by battery (except formarine-type), which offers convenient and simple testing at any place.

3. Product Components



4. Product Appearance and Control Configuration



NO.	Content	Feature
0	LCD	Displays test current setting and test result
2	LED	Displays set frequency
3	BUTTON	Moving and setting of the menu
4	Signal Output Terminal	OCR connecting terminal
6	Program Download Terminal	Download terminal for program change
6	Power Switch	Power ON/OFF
0	Adapter Terminal	Control power terminal of the tester

| LSIS

NO. Button Type

ENT

ESC

START

STOP

10

1 | **LS** is

2 | **LS**15

5-1. OCR Connecting Method

Connect Signal Cable to Signal Output Terminal on the upper area of the Tester, and connect the other end of the cable to OCR

5. OCR Connection and Battery Exchange Method

-When connecting Signal Cable to OCR, please make sure to plug cable in right direction, (Refer to image below) If inserted in wrong direction, it may cause damage on OCR product



Note1) Standard Type

- 1. Do not carry out a test when OCR control is powered.
- 2. Do not turn on control power of OCR while connected to the Tester.
- 3. After connecting OCR to the Tester, turn Tester on and press any button to
- 4. When the test is complete, press STOP button for 3 seconds to discontinue supplying power to OCR, then turn off the Tester.

Note2) Marine Type

- 1. OCR power control system has to be turned on to carry out a test.
- 2. When OCR is connected to the Tester, do not plug adapter to the Tester.
- When power is supplied to control power system of OCR, it will also supply power to the Tester whilst two devices are connected.
- ACB can perform Trip at the instant when the power is supplied to the Tester.
 (1 beginning Trip is available every time after disconnecting and reconnecting).

5. OCR Connection and Battery Exchange Method

5-2. How to change the Battery

1) When the Battery voltage drops under 6V, the test will stop and a message to turn OFF the control power system of OCR will appear. In order to continue the test. Battery has to be exchanged.



Low Battery Screen

- 2) Disassemble the Case located on the bottom part of the Tester.
- 3) Pull 3 flat batteries out and firmly connect new batteries to the Tester.



- 1. This product is portable type with battery operation only (marine type varies)
- Battery may be discharged if operated for long hours without control power system. It is recommended to carry spare batteries, (when device is turned on with discharged batteries, the screen will display abnormally.)
- When device is discharged, it will not supply power to the OCR so please change the batteries immediately.

6. Product Rating

6-1. Standard Using Environment

This product should be used under standard conditions listed below unless other specific condition is stated

3 | **LS**15

- Standard using temperature: −10°C ~ 55°C Storage temperature: −25°C ~ 70°C
- 2) Humidity condition: below 80%, (area where it is dry.)
- 3) Using environment condition
- Altitude: below 2,000m.
- area where there is no abnormal vibration or shock, - area where air contamination is not severe.

6-2. Product Input Rating

Classification	Applied Limits	Note
Rating Frequency	60Hz or 50Hz	
Rating Input	AC/DC 85~250V(Free Voltage)	
BATTERY	DC9V Alkaline Batteries x3	1 st Battery
Energy Consumption	below 5W when still, below 10W while operating	

7. Operating Method

7-1. Output Signal Amplitude, Phase Setting and Testing Method

7-1-1. Main Screen

| LS is

 Standard setting can be adjusted in multiples based on the size of each phase. Current Base When in "In" mode, maximum rated current becomes standard.

Press Up key once more

: Ir (0.000*In)

When in "Ir" mode current set in Long Time mode becomes standard.

1) Standard Setting

R ●:0.00∠0.0 IE S ●:0.00∠240.0 N O:000∠00 In

Amplitude: 0 times In(Maximum Rating) of each phase Phase: R-Phase ODegrees, S-Phase 240Degrees, T-Phase 120Degrees.

Press Down key once

OCR Type IEC/UL

1) OCR Type setting can be adjusted. 2) "UL" Type

Press Down key once more

OCR Type IFC/UI IEC Type

1) OCR Type setting can be adjusted. 2) "IEC" Type.

7 | **LS**15 | LS is 6 | **LS**15 8 | **LS**15 9 | **LS**15

7. Operating Method

7-2, Marine Type Main Screen

7-2-1, Initial Screen

---Marine ACB--Please Select CT Rate : 200A Use UP/DOWN ENT!

- 1) CT rating is set from marine-type OCR. CT rating can be selected using UP/DOWN

) Like normal-type, R / S / T phase are

) When ENT is pressed. Rated CT / FineSet

Rated Current / Knob / Frequency Location information can be obtained.

40%~100% limit, to set Rated Current (In)

Rated CT in 0.5% interval within

all set to output.

7-2-2. Main Screen

- R :0.00∠0.0 IE S :0.00∠240.0 T :0.00∠120.0 N :0.00∠0.0 In
- Press Ent Key once

Knob: 19192499

Press Ent Key once more

| LS is

Displays Standard Current Setting in Long Time, Short Time, Grounding, Instan-taneous Time and Delay Time setting. Is: 12800A (●0.40) taneous Time and Delay Time setting.
"●" means It is ON and "O" means It 480A (0030) li : 12800A V4.02b

7. Operating Method

7-3. Output Signal Amplitude, Phase Setting and Testing Method

7-3-1, OCR Setting Information Checking Screen

- Press ENT key once (When R / S / T / N is set not to Output)
- R○ : 0.00∠0.0 IE S○ : 0.00∠240.0 T○ : 0.00∠120.0 N○ : 0.00∠0.0 In
- ① Frequency information: 60Hz,50Hz ② Pole: 3P,4P ③ Hot Start: O(Disable), ●(Enable) CT Rate: 200A~10000A
 Func: displays special features - 3P-OCGR - 3P-PTA - EXT-OCGR - 4P-OCGR

1) OCR setting information can be checked

Knob : displays location information of OCR front—side setting knob.

- CT Rate: 1600A Func: 4P-OCGR Knob: 99874526
 - Press ENT key once more
- Ir: 1600A (20.0s) Is: 12800A (●0.40)

LSIS

- Displays Standard Current Setting in Long Time, Short Time, Grounding, Instan— taneous Time and Delay Time Setting. 2) "●" means It is ON and "O" means It

7. Operating Method

2) Press "ENT" Key,

7-3. Output Signal Amplitude, Phase Setting and Testing Method

7-3-2, Amplitude and Phase Setting Screen

- R : 0.00 ∠ 0.0 IE S ○ : 0.00 ∠ 240.0 TO:0.00∠120.0 NO:0.00∠0.0 In
- PHASE R/ SET AMP= 1.50 PHA= 0.0
- RANGE: (0-360 0)
- SO: 0.00∠240.0 TO: 0.00∠120.0 NO:0.00∠0.0 In
- Set amplitude and phase will be displayed on the screen. If you press START KEY, only the chosen phase will send output signal and the screen.

Press relevant Phase Key to output,
 (R ● : R-phase output available
 R O : R-phase cannot output unavailable)

Notes that the cursor is on "AMP=0.00", press Up/Down Key to adjust amplitude, if you press ENT Key once more, the cursor will move to first decimal digit, or press twice to move cursor to second decimal digit.

After setting the amplitude, press ENT Key to set phase.

5) When cursor is on "PHA=0.0", press Up/Down Key to adjust phase and press Ent Key to

7-3-3. Test Screen

WAVE LOADING

-) While OCR test is in progress... Output supplied to OCR.
- 2) Press STOP Key to immediately stop the test

7. Operating Method

7-4, Trip Information Display Screen

7-4-1 Trip Display Screen

TRIPPED L-(R)

- When the test is complete, Trip Display Screen will appear.
 For more information please refer to 7–4–2
- 2) Press STOP Key to return to the main

7-4-2. Trip Display Screen Content Description

-R-phase Long Time Operation

-Fault Current Value Operation Time : 14.117s

TRIPPED : Trip Operation occurred
L : Long Time
S : Short Time Instantaneous Time : Groundina Pre-Trip Alarm Itrip Ttrip Fault Current value

7-5. Other Display Information

7-5-1 OCR Connection Screen

PRESS ANY KEY!

Press any key after checking below conditions:) When OCR is not connected When Signal Cable is disconnected

7-6. Setting the Frequency

- 1) Standard Setting: 60Hz
- 2) To change to 50Hz press Hz Key and relevant frequency LED will light and setting will be changed.
- 3) To change back to 60Hz press Hz Key once more

8. Relay Element Testing Method

8-1. Long Time

- Changing OCR value setting
 refer to Standard Table for Long Time Relay before setting,
 Set other relay elements (lsd / li / lg) to OFF.
- Changing Tester value setting
- : refer to Standard Table for Long Time Relay before setting.

 3) Press START button.
- 4) Time count will begin and be displayed on Tester LCD screen and
- Trip will progress.
- for more Trip information, please refer to Trip Information Display Screen (pg. 14),
- check if Trip progresses within standard time.
 5) Check operation of correct relay element on LCD or LED of OCR.
- for more information please refer to user manual of ACB device
- 6) After the test is complete, press STOP button to return to main screen.

Standard Table for Long Time Relay

		Setting Condition				
_		OCR	Body		TESTER	Standard Normal
0.	N/A	Type	P/S Type		(AMP)	Operation Time
	lu	lr	lr	tr	R/S/T	(Sec)
1	0.5	0.8	0.4	0.5	0.6	9.59 ~12.9
2	0.5	1.0	0.5	0.5	0.8	7.96 ~10.76
3	0.6	1.0	0.6	0.5	0.9	9.59 ~12.9
4	0.7	1.0	0.7	0.5	1.1	8.71~11.78
5	0.8	1.0	0.8	0.5	1.2	9.59 ~12.9
6	0.9	1.0	0.9	0.5	1.4	8.71 ~11.78
7	1.0	1.0	1,0	0.5	6.0	0.43 ~ 0.58
′	1.0	1.0	1.0	4.0	6.0	3.4~4.6
8	1.0	1.0	1.0	0.5	10.0	0.15~0.21
О	1.0	1.0	1.0	4.0	10.0	1.21~1.64

15

8, Relay Element Testing Method

8-2. Short Time

- Changing OCR value setting
 refer to Standard Table for Short Time Relay before setting. Set other relay elements (tr / li / lg) to OFF.
 Changing Tester value setting
- : refer to Standard Table for Short Time Relay before setting
- 3) Press START button.
- 4) Repeat instructions 4–6 listed on 8–1.

Standard Table for Short Time Relay

			Setting	g Conc	lition		
NO.			OCR Bo	dy		TESTER	Standard Normal
INO.	N/A	Туре	P/S Type			(AMP)	Operation Tim (Sec)
	lu	lr	lr	Isd	tsd(I²t)	R/S/T	\/
1	0.5	0.8	0.4	1.5	0.1(on)	0.7	2.70~4.03
2	0.5	1.0	0.5	1.5	0.2(on)	0.8	6.46~9.65
3	0.6	1.0	0.6	1.5	0.3(on)	1.0	9.11~13.6
4	0.7	1.0	0.7	1.5	0.4(on)	1.1	13.8~20.6
5	0.8	1.0	0.8	1.5	0.2(on)	1.3	6.46~9.65
6	0.9	1.0	0.9	1.5	0.3(on)	1.4	10.3~15.4
7	1.0	1.0	1.0	1.5	0.05(off)	1.6	~0.07
8	1.0	1.0	1.0	1.5	0.1(on)	1.6	3.23~4.82
9	1.0	1.0	1.0	1.5	0.4(on)	1.6	12.9~19.3
10	1.0	1.0	1.0	5	0.05(off)	5.5	~0.07
11	1.0	1.0	1.0	5	0.1(on)	5.3	0.29~0.44
12	1.0	1.0	1.0	5	0.4(on)	5.3	1.18~1.76
13	1.0	1.0	1.0	10	0.1(on)	10.5	0.05~0.15
14	1.0	1.0	1.0	10	0.4(on)	10.5	0.33~0.49

8, Relay Element Testing Method

8-3. Instantaneous Time

- 1) Changing OCR value setting
- : refer to Standard Table for Instantaneous Time Relay before setting - Set other relay elements (tr / lsd / lg) to OFF.
- 2) Changing Tester value setting refer to Standard Table for Instantaneous Time Relay before setting.
- 3) Press START button.
- 5) Current can be applied on all R/S/T phase or on single phase for operation.

Standard Table for Instantaneous Time Relay

			Setting	n		
NO.		OCR B			TESTER	Standard Normal
NO.	N/A	Type	P/S Type		(AMP)	Operation Time (Sec)
	lu	lr	lr	li	R/S/T	
1				2	2.1	
2				2	2.1	
3				2	2.1	
4				2	2.1	
5	In St	andard	does	2	2.1	
6	no	t influen	ce	2	2.1	Within
7		ating time		2	2.1	50msec
8	any	value se	etting	4	4.2	
9				6	6.3	
10				8	8.4	
11				10	10.5	
12				15	15.7	1

8, Relay Element Testing Method

8-4. Grounding

LSIS

- Changing OCR value setting
 refer to Standard Table for Grounding Relay before setting.
 Set other relay elements (tr / Isd / Ii) to OFF.
- 2) Changing Tester value setting
- 2) Changing lesser value setting : refer to Standard Table for Grounding Relay before setting.
 3) Press START button.
 4) Repeat instructions 4–6 listed on 8–1.
- Grounding Test only applies current to single phase (one of R/S/T/N phase)

Standard Table for Grounding Relay

			Setting	Cond	lition		
NO.			OCR Bo	dy		TESTER	Standard
INO.	N/A	Туре	P/S Type		(AMP) Normal Operation Time		Operation Time
	lu	lr	lr	lg	tg(I²t)	R/S/T	(Sec)
1					0.05(off)	0.3	~0.1
2				0,2	0.1(on)	0.3	0.77~1.74
3					0.4(on)	0.3	3.09~6.94
4					0.05(off)	0.5	~0.1
5	In St	In Standard does	0.4	0.1(on)	0.5	0.33~0.49	
6	no	t influen	ce		0.4(on)	0.5	1.32~1.98
7		ating time with		0.05(off)	0.8	~0.1	
8	any	value se	tting.	0.7	0.1(on)	0.8	0.11~0.21
9					0.4(on)	0,8	0.52~0.77
10					0.05(off)	1,1	~0.1
11				1.0	0.1(on)	1,1	0.05~0.15
12					0.4(on)	1.1	0.33~0.49

8. Relay Element Testing Method

8-5. PTA(Marine-type)

13

LSIS

- Changing OCR value setting
 refer to Standard Table for PTA Relay before setting.
 Set other relay elements (tr / Isd / Ii) to OFF.
- Set Other relay elements (if / isd / ii / is 0 PF.
 Changing Tester value setting : refer to Standard Table for PTA Relay before setting.
 Press START button.
 Repeat instructions 4–6 listed on 8–1.
 Check PTA Trip on PTA LED of OCR.

Standard Table for PTA Relay

			Setting	Conditi	on		
No.			P/S	ly I		TESTER (AMP)	Standard Normal Operation Time
	N/A	Type	Type			(* /	(Sec)
	lu	lr	lr	lp	tp	R/S/T	
1				0.7	10	3	0.4~0.54
2				8.0	20	3	1.06~1.43
3	In St	andard (does	0.85	20	3	1.19~1.56
4		t influen		0.9	35	5	0.83~1.12
5		ating time value se		0.95	40	5	1.06~1.43
6	carry	value se	turig.	1	40	6	0.81~1.09
7				1.05	45	6	1.01~1.36
8				1.1	45	6	1.1~1.5

When operating both PTA Relay Element Test and Long Time Relay Element Test at once, PTA Trip Information will be displayed before Long Time Trip Information is displayed in accordance to relay setting,

RIPPED	P-(R)	
2a+[D]:	6.350s	
Set[R]: trip:	5.176s	

(Left 6,350s means that Long Time Relay is still in progress after PTA

ISet[R]: 1098 A

LŠis

| LSis

Customer Center - Quick Responsive Service. Excellent technical support TEL. 82-1644-5481 | Home page. http://www.lsis.com

Head Office: 127, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea Telephone: +82)2 2034 - 4870 Fax: +82) 2 2034 - 4713

Purchase Enquiry

Seoul Sales Team Busan Sales Team TEL: (055)282-9812 FAX: (055)282-4352 TEL: (052)261-1585 FAX: (052)261-4205 Daegu Sales Team Pohang Sales Office Gwangiu Sales Jeoniu Sales Office Daeieon Sales

Technology Enquiry

FAX:(041)550-8600 Customer Center TEL:1544-2080

A/S Enquiry

19

Seoul Service TEL:1544-2080 FAX: (02)3660-7021 Busan Service TEL: (051)988-2080~1 FAX: (051)310-6827 TEL: (055)602-2080 FAX: (055)282-4352 Changwon Service Ulsan Service TEL: (052)261-1585 FAX: (052)261-4205 Daegu Service TEL: (053)383-2081~2 FAX: (053)603-7777 Pohang Service TEL: (054)286-4528 FAX: (054)286-2813 Gwangiu Service TEL: (062)527-2080 FAX: (062)528-7684 Jeonju Service TEL: (063)254-2080 FAX: (063)271-2613

| LS is 16 | LS is 17 | **LS**15 18 | **LS**15