

# TESTING CERTIFICATE



**International Institute of  
Reliability Assessment**

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Asan-si, Chungcheongnam-do, Korea Tel : 041-428-9490, Fax 041-428-9493

Report No. :  
170901CJ02  
Page (1) / (Total 20)

1. Customer

- ☐ Company : LSIS Co., Ltd.  
☐ Address : 127, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea

2. Use of the Test report : Product reliability and for accreditation assessment.

3. Sample information

- ☐ Product Name : Susol MCCB  
☐ Model Name :

Sample No.	Model Name	Note	Sample No.	Model Name	Note
#15	TD160N FMU160 160A 3P EXP	Non ETS	#22	TS250N ETS23 250A 3P EXP	ETS
#16	TS160N ATU160 160A 3P EXP		#23	TS400N ETS33 400A 3P EXP	
#17	TS250N ATU250 250A 3P EXP		#24	TS630N ETS33 630A 3P EXP	
#18	TS400N ATU400 400A 3P EXP		#25	TS800N ETS43 800A 3P EXP	
#19	TS630N ATU630 630A 3P EXP		#26	TS400N ETM33 400A 3P EXP	ETM
#20	TS800N ATU800 800A 3P EXP	ETS	#27	TS630N ETM33 630A 3P EXP	
#21	TS160N ETS23 160A 3P EXP		#28	TS800N ETM43 800A 3P EXP	

- ☐ Quantity : 14 EA

4. Test duration : 2017.08.01 ~ 2017.08.23

5. Test method : Suggest by Applicant

6. Test Result : Test result reference

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
This laboratory is not accredited for the test results marked. \*-----

Confirm	Written by	Confirmed by
	Name : Eun-Jung, Cho (Sign)	Technical Manager Name : Hyuck-Ki, Lee (Sign)

IIRA Corporation (Sign)

2017. 09. 01



# Test Result

Report No.

170901CJ02

Page (2) / (Total 20)

## ■ Operation condition test

### 1. Test Information

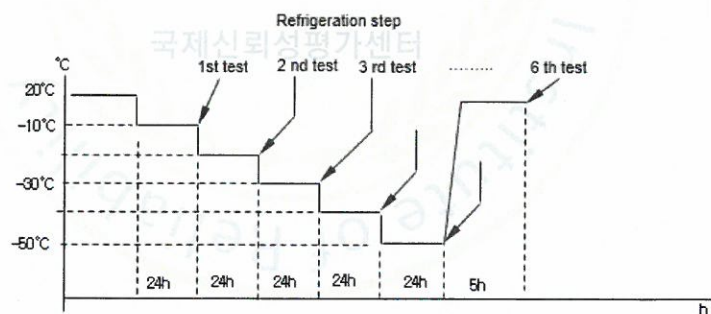
Test Item	Environmental testing procedures test : Cold (Operation condition test)	
Test duration	2017.08.01 ~ 2017.08.23	
Number of sample	Test division (14 EA)	Non ETS(#15~#20), ETS (#21 ~ #25) ETM (#26 ~ #28)
	Chamber division (14 EA)	G1 (#15, #16, #23, #24) G2 (#18, #19, #21, #22) G3 (#17, #20, #25, #25) G4 (#27, #28)

### Test Method

1) The cold test is performed at -10℃ to -50℃, duration within 24h and then the normal operational test and overload release test at the ambient temperature

Test items	Description
Normal operational test	The normal switching sequence six times without current condition under the the rated control supply voltage

2) Recovery condition : ambient temperature at least 5 houres



3) Test

Test item	test
1) Cold test at -10℃	1) Normal operational test
2) Cold test at -20℃	
3) Cold test at -30℃	
4) Cold test at -40℃	
5) Cold test at -50℃	
6) Operational test ambient temperature	

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# Test Result

Report No.

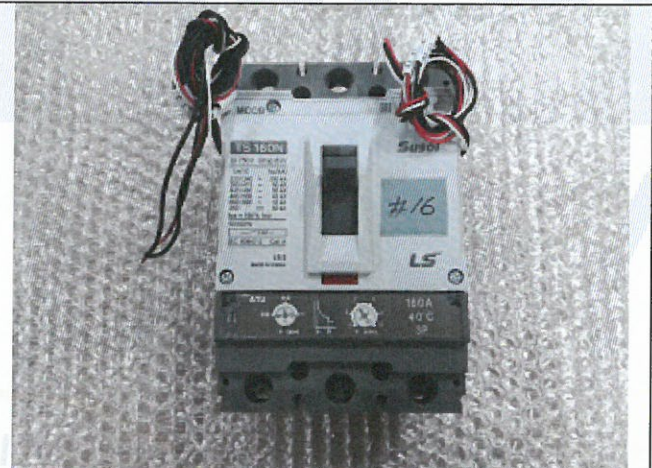
170901CJ02

Page (3) / (Total 20)

## 2. Test Sample



#15 / TS160N FMU160 160A 3P EXP(NON ETS)



#16 / TS160N ATU160 160A 3P EXP(NON ETS)



#17 / TS250N ATU250 250A 3P EXP(NON ETS)



#18 / TS400N ATU400 400A 3P EXP(NON ETS)



#19 / TS630N ATU630 630A 3P EXP(NON ETS)



#20 / TS800N ATU800 800A 3P EXP(NON ETS)

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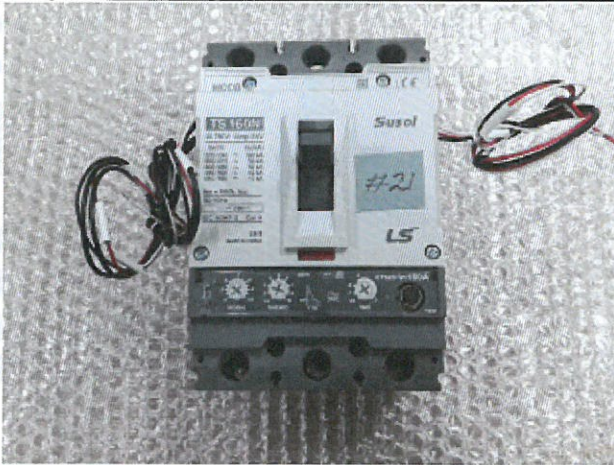


# Test Result

Report No.

170901CJ02

Page (4) / (Total 20)



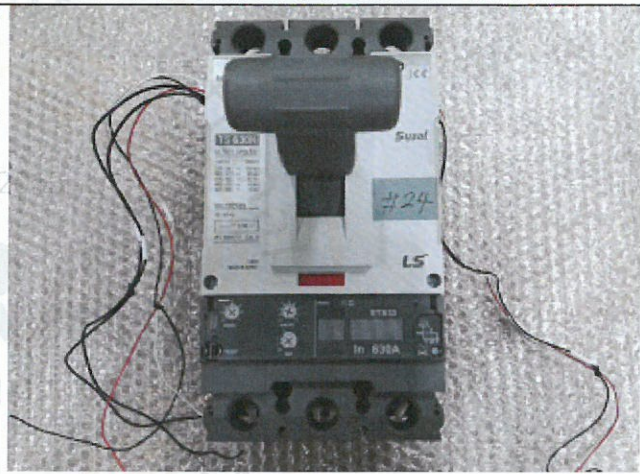
#21 / TS160N ETS23 160A 3P EXP(ETS)



#22 / TS250N ETS23 250A 3P EXP(ETS)



#23 / TS400N ETS33 400A 3P EXP(ETS)



#24 / TS630N ETS33 630A 3P EXP(ETS)



#25 / TS800N ETS43 800A 3P EXP(ETS)



#26 / TS400N ETM33 400A 3P EXP(ETM)

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# Test Result

Report No.

170901CJ02

Page (5) / (Total 20)



#27 / TS630N ETM33 630A 3P EXP(ETM)



#28 / TS800N ETM43 800A 3P EXP(ETM)

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# Test Result

Report No.	170901CJ02	Page (6) / (Total 20)
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## 3. Test Result

Sample	Classification	Performance Check		
Non ETS(#15~#20)	AX, SHT, AL	Normal Operation Status		
	AX, SHT, AL	Normal Operation Status		
ETS (#21 ~ #25) ETM (#26 ~ #28)	MCCB Test	Tripping Curve		Setting Values
				Tripping Time(s)
		①	Long time delay	4xIn (tr 6)
		②	Short time delay	8(8.5)xIn (tsd 0.3)
		③	Instantaneous time delay	11(11.5)xIn

### 3-1) Performance Check : Normal Operating Status

Sample			AX						SHT						AL					
			Off						On						Trip					
			BK-RE(cable collar)						BK-BK(cable collar)						BK-WH(cable collar)					
			-10	-20	-30	-40	-50	20	-10	-20	-30	-40	-50	20	-10	-20	-30	-40	-50	20
G1	Non ETS	# 15	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 16	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	ETS	# 23	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 24	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
G2	Non ETS	# 18	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 19	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	ETS	# 21	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 22	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
G3	Non ETS	# 17	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 20	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	ETS	# 25	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 26	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
G4	ETM	# 27	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
		# 28	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

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# Test Result

Report No.

170901CJ02

Page (7) / (Total 20)

## 3-2) Performance Check : MCCB Test

Sample			MCCB Test							
			On							
			Tripping Curve	Setting Values	Trip/Time(s)					
					-10℃	-20℃	-30℃	-40℃	-50℃	20℃
G1	ETS	# 23	①	4	14.644	14.645	14.645	14.746	14.847	14.442
			②	8(8.5)	0.301	0.300	0.300	0.301	0.300	0.301
			③	11(11.5)	0.028	0.028	0.028	0.028	0.028	0.028
		# 24	①	4	14.746	14.647	14.696	14.947	14.997	14.445
			②	8(8.5)	0.300	0.301	0.300	0.300	0.301	0.300
			③	11(11.5)	0.028	0.028	0.028	0.028	0.028	0.028
G2		# 21	①	4	16.762	16.711	16.610	16.714	16.913	16.509
			②	8(8.5)	0.301	0.300	0.300	0.300	0.300	0.300
			③	11(11.5)	0.028	0.029	0.028	0.031	0.031	0.029
		# 22	①	4	16.610	16.510	16.410	16.561	16.714	16.459
			②	8(8.5)	0.300	0.300	0.299	0.300	0.300	0.300
			③	11(11.5)	0.030	0.028	0.028	0.028	0.028	0.028
G3	# 25	①	4	13.486	13.587	13.637	13.689	13.788	13.486	
		②	8(8.5)	0.301	0.301	0.300	0.300	0.301	0.300	
		③	11(11.5)	0.028	0.028	0.028	0.029	0.028	0.028	
	# 26	①	4	14.095	14.394	14.144	14.198	14.346	13.894	
		②	8(8.5)	0.293	0.293	0.294	0.293	0.294	0.293	
		③	11(11.5)	0.030	0.031	0.033	0.030	0.034	0.031	
G4	ETM	# 27	①	4	14.546	14.647	14.700	14.698	14.701	14.146
			②	8(8.5)	0.293	0.294	0.294	0.293	0.293	0.293
			③	11(11.5)	0.030	0.030	0.031	0.030	0.030	0.030
	# 28	①	4	15.001	15.204	15.205	15.105	15.153	14.703	
		②	8(8.5)	0.293	0.293	0.293	0.293	0.293	0.292	
		③	11(11.5)	0.031	0.030	0.031	0.032	0.032	0.030	

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# Test Result

Report No.

170901CJ02

Page (8) / (Total 20)

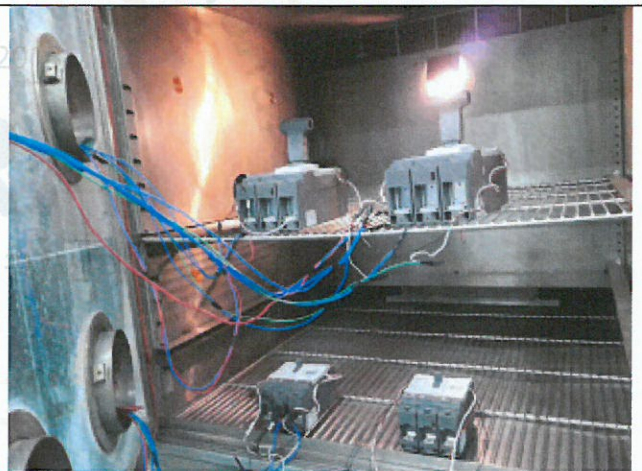
## 4. Test Picture

### 4-1) G1



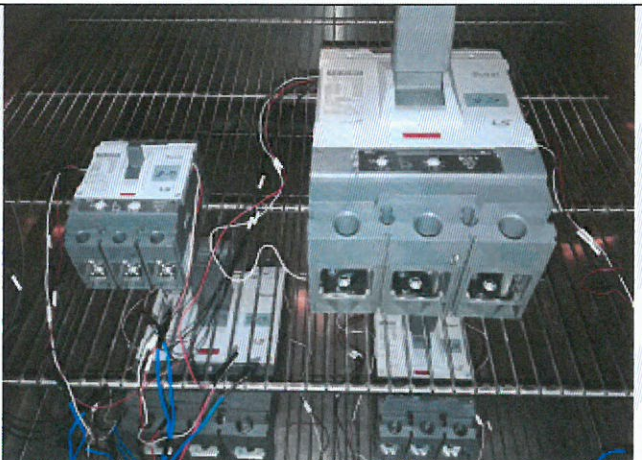
Sample No. : #15, #16, #23, #24

### 4-2) G2



Sample No. : #18, #19, #21, #22

### 4-3) G3



Sample No. : #17, #20, #25, #26

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Report No.

170901CJ02

Page (9) / (Total 20)

## 4. Test Picture

4-4) G4



Sample No. : #27, #28

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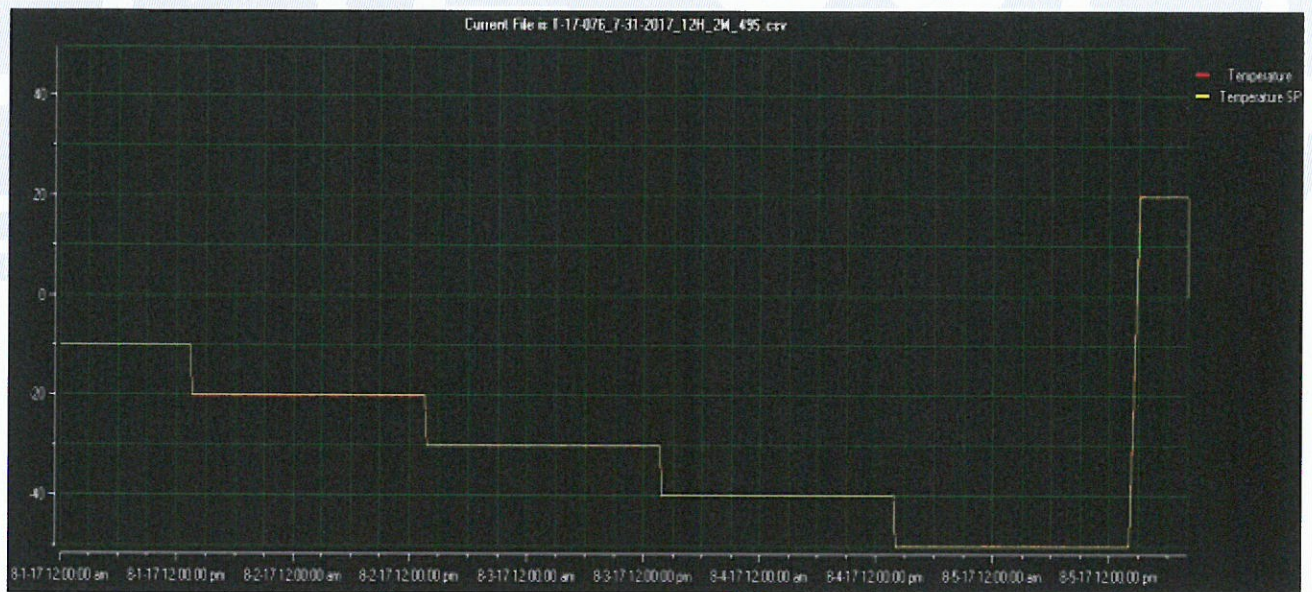
Report No.

170901CJ02

Page (10) / (Total 20)

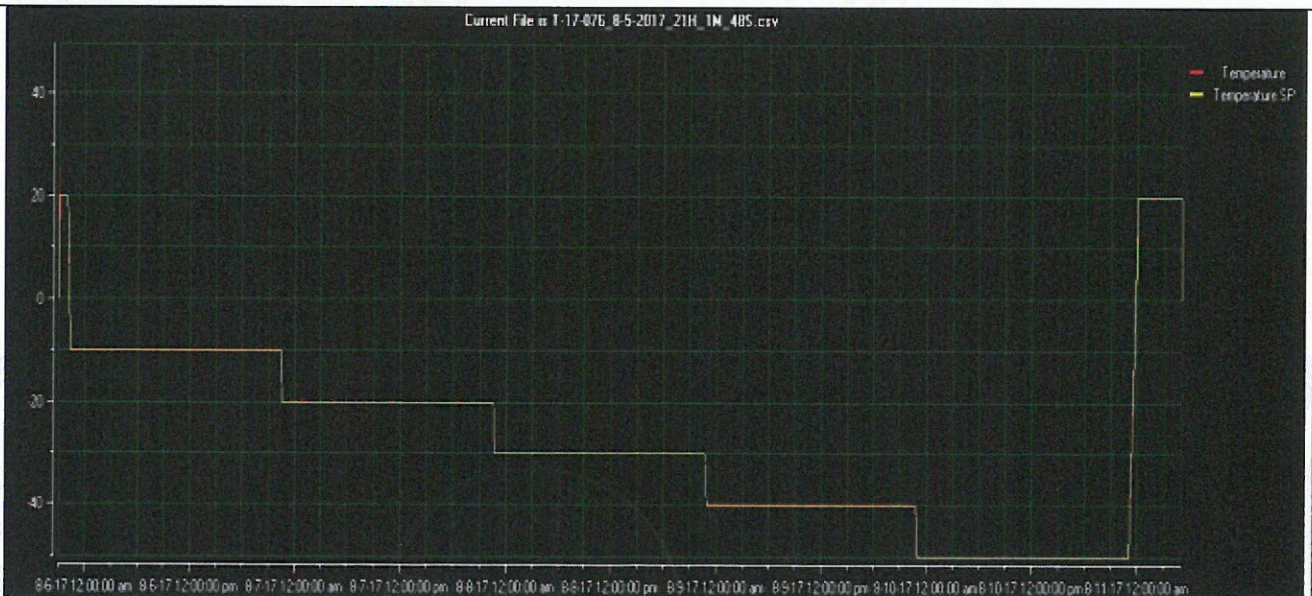
## 5. Test graph

### 5-1) G1



【 Temperature graph 】

### 5-2) G2



【 Temperature graph 】

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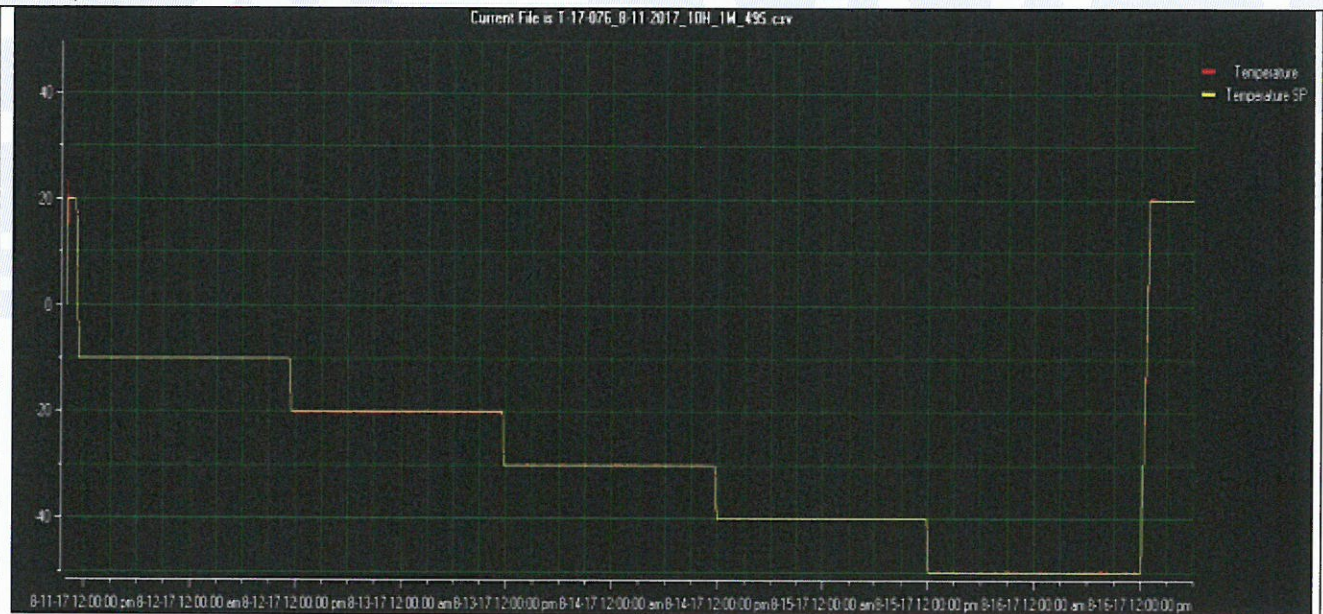
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Report No.

170901CJ02

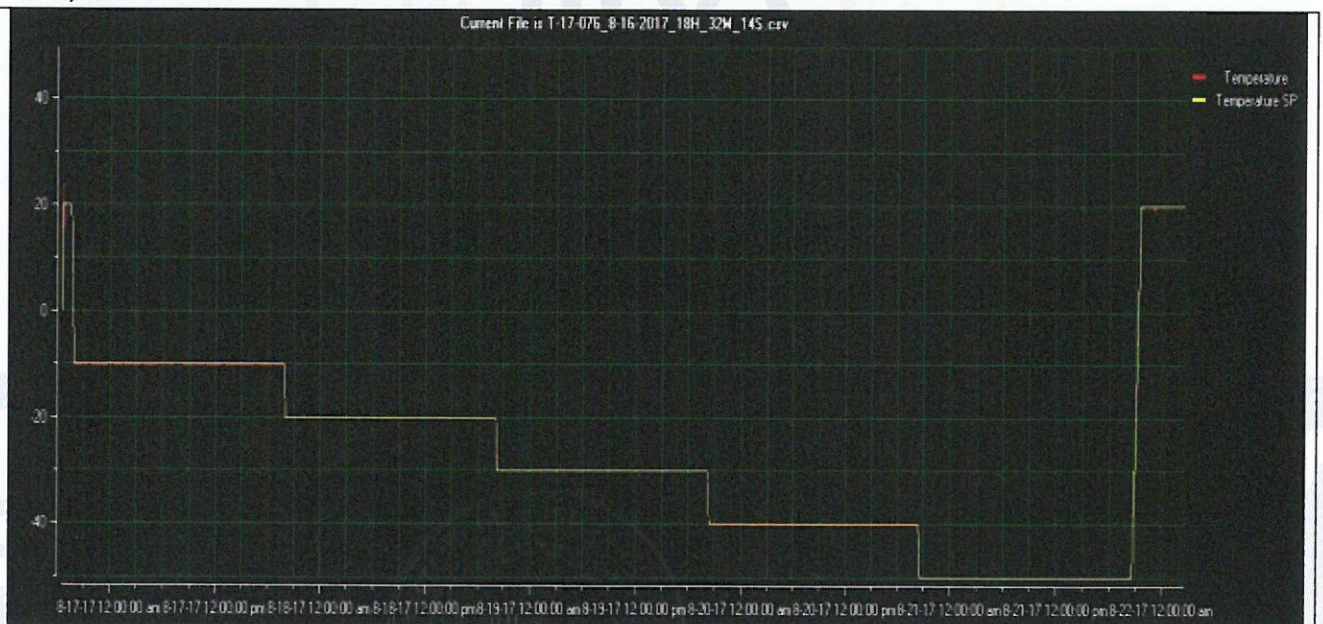
Page (11) / (Total 20)

5-3) G3



【 Temperature graph 】

5-4) G4



【 Temperature graph 】

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# Test Result

Report No.		170901CJ02		Page (12) / (Total 20)	
5. MCCB Test					
#21 / TS160N ETS23 160A 3P EXP(ETS)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
-20℃					

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# Test Result

Report No.		170901CJ02		Page (13) / (Total 20)	
#22 / TS250N ETS23 250A 3P EXP(ETS)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					

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# Test Result

Report No.		170901CJ02		Page (14) / (Total 20)	
#23 / TS400N ETS33 400A 3P EXP(ETS)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					

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# Test Result

Report No.		170901CJ02		Page (15) / (Total 20)	
#24 / TS630N ETS33 630A 3P EXP(ETS)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					

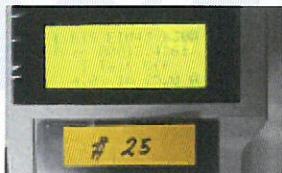
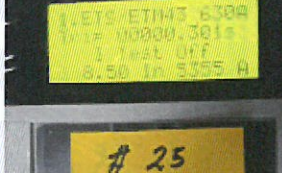
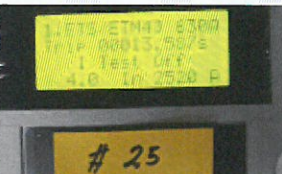
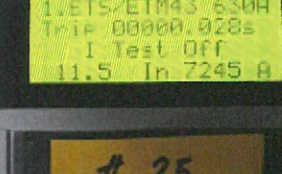

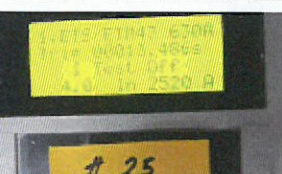
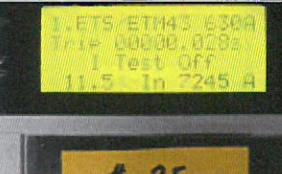
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Report No.		170901CJ02		Page (16) / (Total 20)	
#25 / TS800N ETS43 800A 3P EXP(ETS)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					


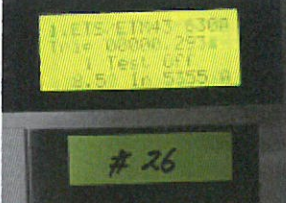
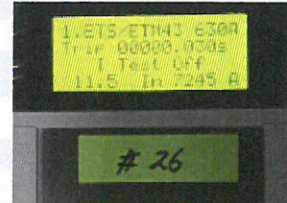

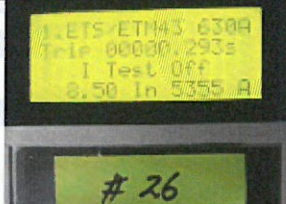
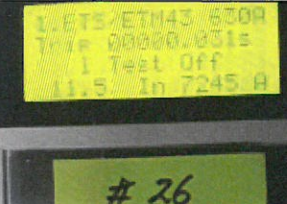
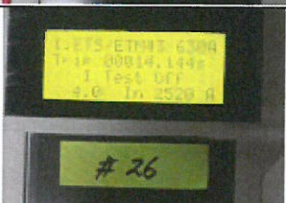
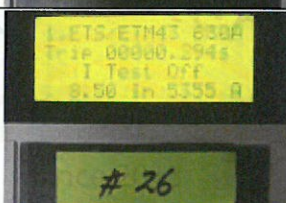
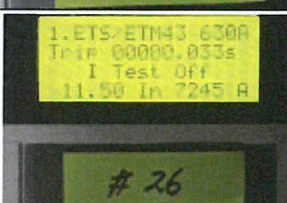
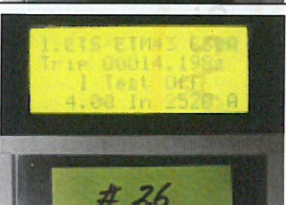
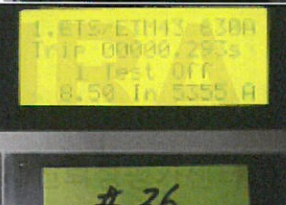
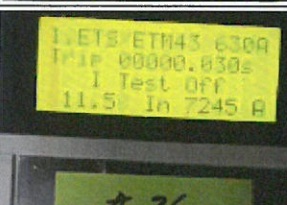
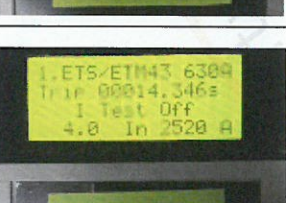
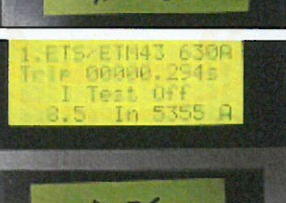
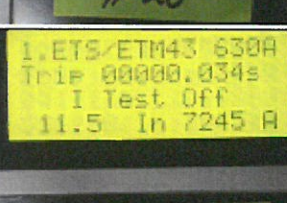
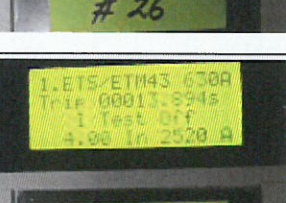
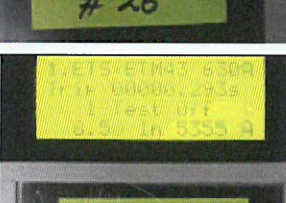
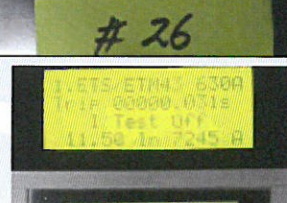
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# Test Result

Report No.		170901CJ02		Page (17) / (Total 20)	
#26 / TS400N ETM33 400A 3P EXP(ETM)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃				# 26	
-20℃				# 26	
-30℃				# 26	
-40℃				# 26	
-50℃				# 26	
20℃				# 26	

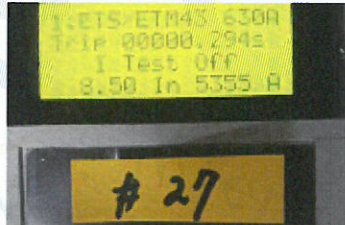
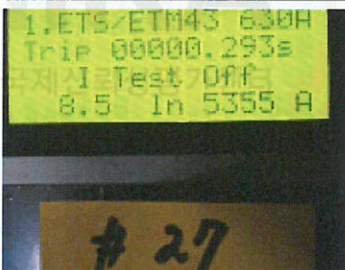
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# Test Result

Report No.		170901CJ02		Page (18) / (Total 20)	
#27 / TS630N ETM33 630A 3P EXP(ETM)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					
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# Test Result

Report No.		170901CJ02		Page (19) / (Total 20)	
#28 / TS800N ETM43 800A 3P EXP(ETM)					
Temp	① Long time delay	② Short time delay	③ Instantaneous time delay		
-10℃					
-20℃					
-30℃					
-40℃					
-50℃					
20℃					

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# Test Equipment

Report No.

170901CJ02

Page (20) / (Total 20)

## 6. Test Equipment



Product	Serial No.	Manufacture	Calibration date
Temp & Hum Chamber	ZP11430007	CSZ	2017.07.28



Product	Serial No.	Manufacture	Calibration date
MCCB TESTER	170724001	LS IS	2017.07.26.
	170724002		2017.07.26

The result of this test report is applied for DUT which is given from applicant.