



PERFORMANCE TEST REPORT

FASTON, .250 STD. REC. TEST REPORT PN2238196/PN2238197

TE Connectivity (Shanghai) Co., Ltd.

1. INTRODUCTION

1.1 Purpose

Testing was performed on product FASTON 250 STD REC STR F-CR 18-14 TPBR and FASTON 250 STD REC RHFLAG TAB 18-12 TPBR to determine its conformance to the requirements of Product Specification 108-143087

1.2 Scope

This report covers the electrical and mechanical performance of FASTON 250 STD REC STR F-CR 18-14 TPBR and FASTON 250 STD REC RHFLAG TAB 18-12 TPBR: 2238196-3 and 2238197-3

1.3 Product Description

The product tested with the below receptacle housings and terminals

PART NO.	Description	Notes
2238196-3	FASTON 250 STD REC STR F-CR 18-14 TPBR	AWG18-14
2238197-3	FASTON 250 STD REC RHFLAG TAB 18-12 TPBR	AWG18-12

1.4 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C
 Relative Humidity 45% to 75%
 Atmospheric Pressure:86.7~106.7kPa

1.5 Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP AND SEQUENCE			
	A	B	C	D
VISUAL EXAMINATION	1,4	1,3	1,3	1,3
Contact Insertion force	2			
Contact Extraction force	3			
Temperature Rise		2		
Temperature Rise Derating Curve			2	
Temperature-Humidity Cycling				2

*** Notes:**

Numbers indicate the sequence in which the tests are performed.

2. Test Requirements and Procedure Summary

2.1 Appearance

There shall be no defects such as scratch, rust, fissure and crack that are detrimental to terminal functions, when the test is made, and the marking shall remain legible clearly.

2.2 Crimp tensile strength

Crimp Tensile strength of crimped receptacle shall be not less than the value specified in table 1.

Wire Size	Tensile Strength(N) Min
0.3mm ² (#22AWG)	36.0
0.5mm ² (#20AWG)	58.0
0.85mm ² (#18AWG)	89.0
1.25mm ² (#16AWG)	133.0
2.0mm ² (#14AWG)	222.0
3.0mm ² (#12AWG)	311.0

Table 1

2.3 Temperature Rising

Measure temperature rise above ambient created by the energizing current. Measurement must be taken in a place where there is no influence from air convection. Temperature rise of any individual termination shall not exceed the value specified in Table2. Temperature rise=Temperature of contact – Ambient temperature.

Wire Size	Test Current(A)	Millvolt Drop(mV/A)	Temperature Rising (°C)
0.3mm ² (#22AWG)	2.0	3.0	5.0
0.5mm ² (#20AWG)	4.0	3.0	10.0
0.85mm ² (#18AWG)	7.0	3.0	20.0
1.25mm ² (#16AWG)	10.0	3.0	30.0
2.0mm ² (#14AWG)	15.0	3.0	30.0
3.0mm ² (#12AWG)	20.0	3.0	30.0

Table 2

2.4 Insertion Force

Fasten a set of receptacle and tab contacts on the tensile testing machine in the manner that they mate as the head is operated. Contact insertion force is measured by operating the head to travel with the speed at a rate of 25.4mm/min approximately a minute. Contact insertion force is determined by measuring the force required to insert tab contact into receptacle to the normal depth.

2.5 Contact Extraction Force

Fasten a receptacle contact mated with a tab contact on tensile testing machine. Apply an axial pull-off load to the crimped wire by operating the head to travel with the speed at a rate of 25.4mm approximately a minute. Contact extraction force is determined by measuring the force required to pull-off the tab contact from the receptacle.

Contact Insertion Force	Contact Extraction Force
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Initial	Initial	6 th . Extraction
36 N max. (individual)	13 N max. (individual)	13 N max. (individual)
27 N max. (average)	22 N max. (average)	18 N max. (average)

Table 3

2.4 Current Cycling

Subject terminals to 500cycles, T1 shall be measured after the 24th cycles and T2 shall be measured after the 500th cycle. Terminals terminated overload test current to be 200% of the nominal test current. One cycle include 45 minutes on and 15minutes off. Temperature rise between T1 and T2 shall not exceed 15°C. Neither T1 nor T2 shall exceed 85°C.

2.5 Temperature-Humidity Cycling

Subject terminal to environmental cycles 500 hours and roughly 42 cycles. And the temperature and humidity cycles information as table 4.

PROFILE1	STEP1	STEP2	STEP3	STEP4	STEP5	STEP6	STEP7
	START	RAMP	RAMP	HOLD	RAMP	RAMP	HOLD
Temp(°C)	30	85	85	85	85	30	30
Humidity(%RH)	50	50	85	85	50	50	50
Step time(hrs)	0	1	0.5	8	0.5	1	1
Cumulative cycle time(hrs)	0	1	1.5	9.5	10	11	12

Table 4

*** Notes**

A) Product must be without rust, corrosion transformation, crack and discoloration.

B) Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification.

3. TEST RESULT

3-1. Test Group A

3-1-1. Examination of product

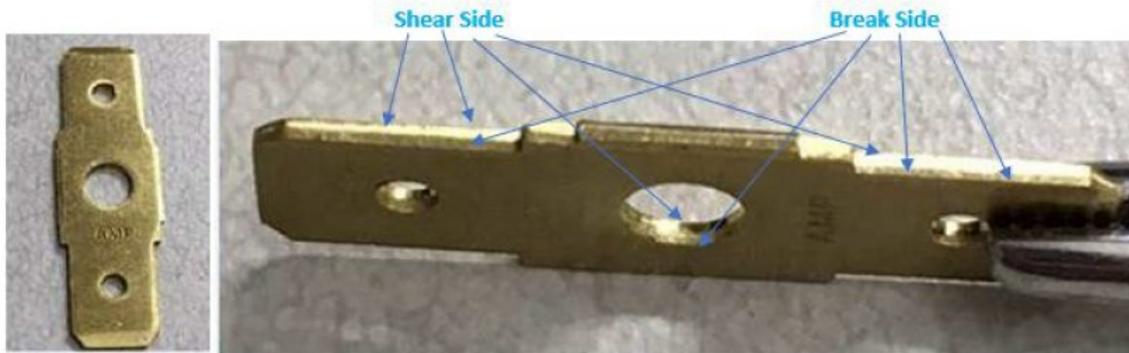
Meets requirements of product drawing. No physical damage. Specimen Information.

PART NO.	Description	Notes
2238196-3	FASTON 250 STD REC STR F-CR 18-14 TPBR	AWG18-14
2238197-3	FASTON 250 STD REC RHFLAG TAB 18-12 TPBR	AWG18-12

3-1-2. Test Flow Description

- Execute visual check before test and take picture.
- Mount test specimen with fixtures in a normal manner and take picture.
- Edit test procedure according to test method then perform test.
 Test Condition: The connectors shall be inserted and withdrawn from test tabs for a total of six times. Test Speed: 25.4 mm/min.

Note: mate with samples to break side and mate with samples to shear side.



Test tab

- Export test data and test curve, execute visual check and take picture after test.

3-1-3. Insertion and Extraction Force Test data shown as below:(Unit:N)

Cycles	2238196-3 Break side insertion and extraction force		
	1 th insertion	1 th retention	6 th retention
Min	14.92	26.60	22.30
Max	24.26	32.15	27.63
Ave	17.67	29.80	25.30
Spec	36 N (MAX)	22N (MIN)	18 (MIN)
Results	OK	OK	OK

Cycles	2238196-3 Shear side insertion and extraction force		
	1 th insertion	1 th retention	6 th retention
Min	14.26	30.52	21.24
Max	18.49	36.99	29.36
Ave	16.34	32.58	24.46
Spec	36 N (MAX)	22N (MIN)	18 (MIN)
Results	OK	OK	OK

Cycles	2238197-3 Break side insertion and extraction force		
	1 th insertion	1 th retention	6 th retention
Min	22.90	26.75	15.94
Max	28.98	32.30	23.61
Ave	26.27	29.23	19.90
Spec	36 N (MAX)	22N (MIN)	18 (MIN)
Results	OK	OK	OK

Cycles	2238197-3 Shear side insertion and extraction force		
	1 th insertion	1 th retention	6 th retention
Min	20.80	32.14	13.27
Max	31.58	38.63	19.86
Ave	26.54	35.02	18.20
Spec	36 N (MAX)	22N (MIN)	18 (MIN)
Results	OK	OK	OK

3-1-4. Insertion and Extraction Force Test Judgement.

According to the 108-143098 spec. The insertion and retention force test meet the spec.

3-2. Test Group B

3-2-1. Examination of product

Meets requirements of product drawing. No physical damage. Specimen Information.

PART NO.	Description	Notes
2238196-3	FASTON 250 STD REC STR F-CR 18-14 TPBR	AWG18-14
2238197-3	FASTON 250 STD REC RHFLAG TAB 18-12 TPBR	AWG18-12

3-2-2. Test Flow Description

- The test specimens were tested in the as-specified state, thermocouple was soldered on the crimp.
- Place the specimen in the chamber, start the test on the following condition:
 Test condition: Subject mated contacts to specified current (Specimens with AWG12 Wire: 20A (01-01~01-12); Specimens with AWG14 Wire: 15A (01-13~01-24)) in the specific temperature and humidity condition

PROFILE1	STEP1	STEP2	STEP3	STEP4	STEP5	STEP6	STEP7
	START	RAMP	RAMP	HOLD	RAMP	RAMP	HOLD
Temp(°C)	30	85	85	85	85	30	30
Humidity(%RH)	50	50	85	85	50	50	50
Step time(hrs)	0	1	0.5	8	0.5	1	1
Cumulative cycle time(hrs)	0	1	1.5	9.5	10	11	12

- The daily check shall be done for the test.

3-2-3. Temperature Rise Test Results.

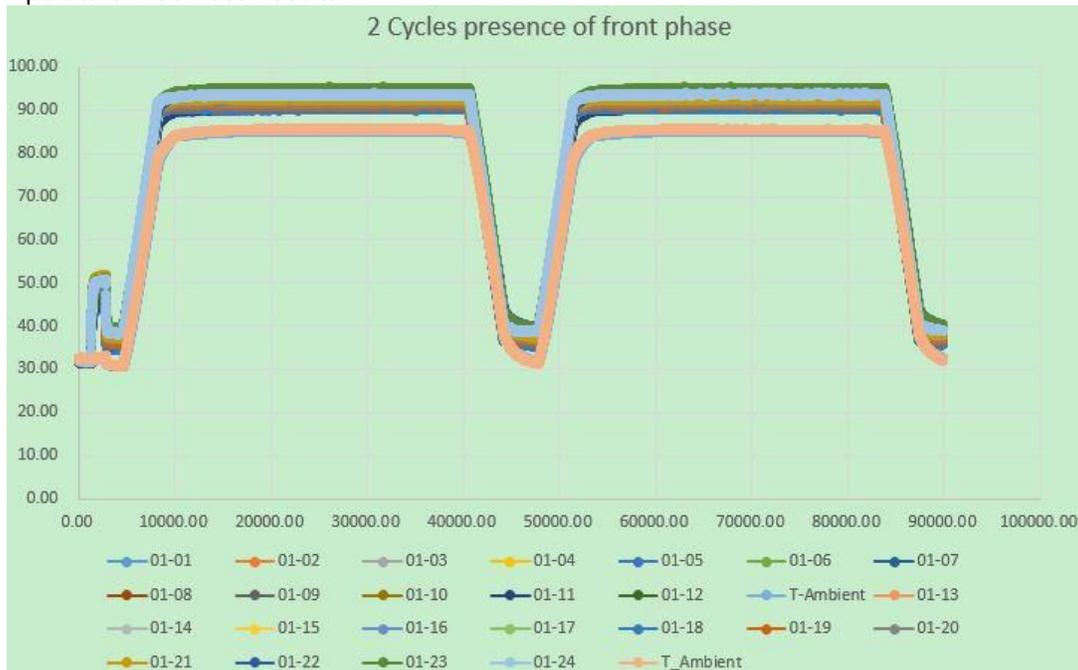


Fig.1: Temperature on specimens data example of 2 cycles when test start

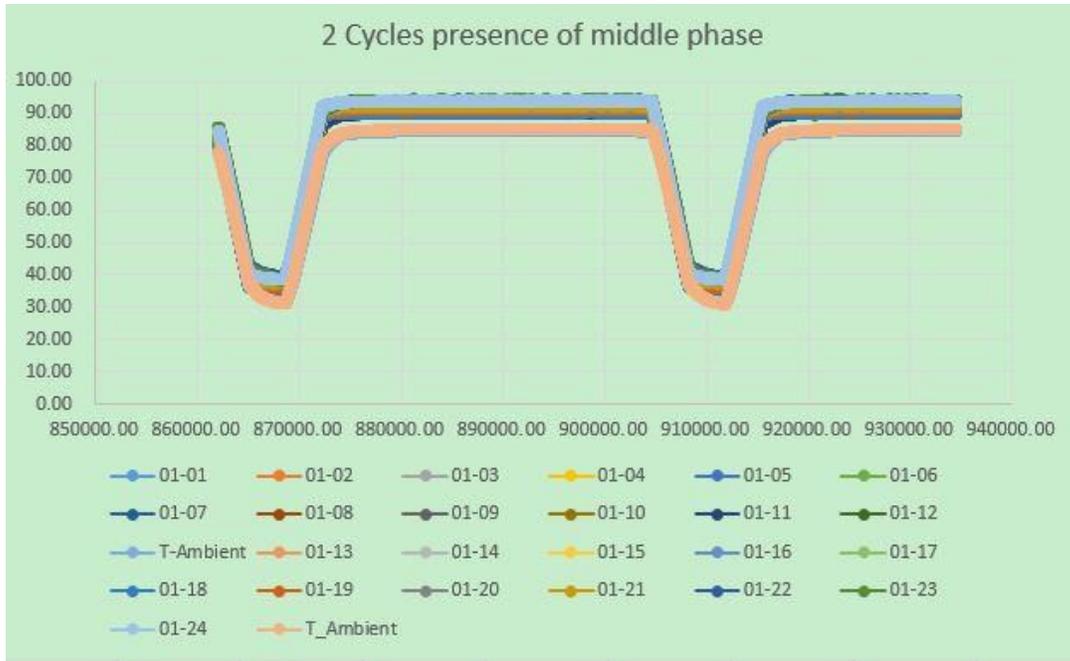


Fig.2: Temperature on specimens data example of 2 cycles when test run half

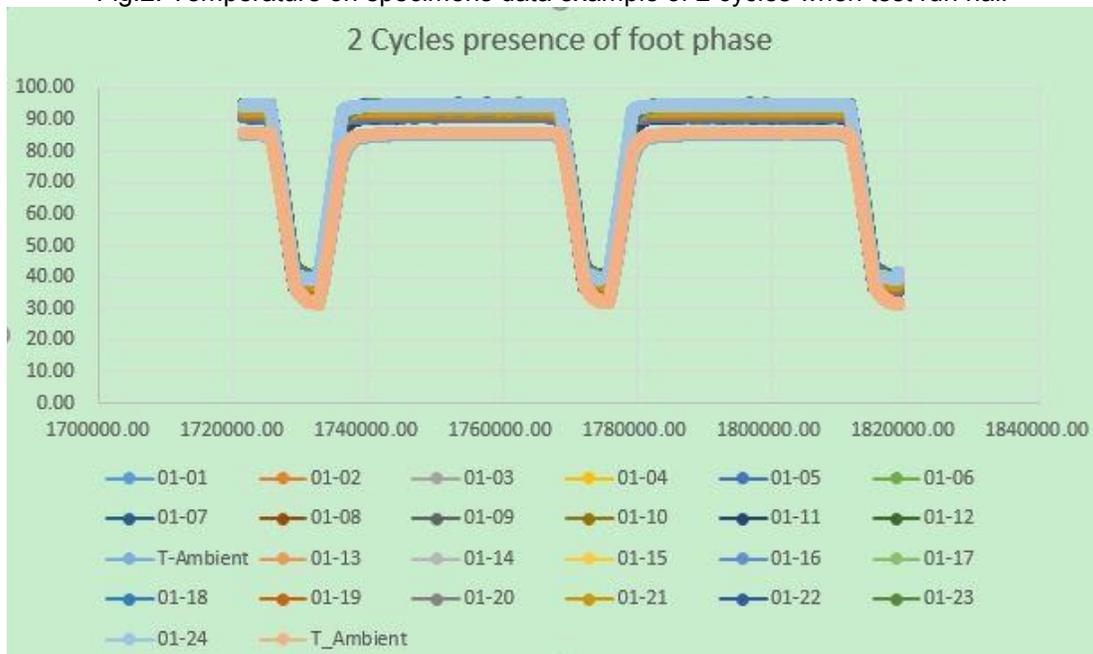


Fig.3: Temperature on specimens data example of 2 cycles when test close to end

3-2-4. Temperature Rise Test Judgement.

According to the 108-143087 spec. The Temperature Rise (Temperature rise=Temperature of contact – Ambient temperature) data meet the spec.

3-3. Test Group C

3-3-1. Examination of product

Meets requirements of product drawing. No physical damage. Specimen Information.

PART NO.	Description	Notes
2238196-3	FASTON 250 STD REC STR F-CR 18-14 TPBR	AWG18-14
2238197-3	FASTON 250 STD REC RHFLAG TAB 18-12 TPBR	AWG18-12

3-3-2. Test Flow Description

- The test specimens were tested in the as-specified state, thermocouple was soldered on the crimp.
- Wire all terminal poles and connect to DC power supply, measure and record the temperature rising when the temperature is steady.
- Thermal stability was achieved when the temperature rise of a minimum of three consecutive reading taken at 5 minutes intervals minimum does not differ by more than $\pm 1^{\circ}\text{C}$ for each thermocouple.
- The current shall be maintained for a period over 1 h during the test.

3-3-3. Derating Curve Test Data

1) PN 2238196-3 crimped with 14AWG wires test group.

Temperature Measurement(T/ Δ T) Unit: $^{\circ}\text{C}$ – Specimens with 14AWG wire				
Current Unit: A	Min	Max	Ave	T-Room
5A, Temp	25.94	27.00	26.4	24.53
5A, Δ Temp	1.41	2.56	1.87	N/A
10A, Temp	30.01	31.20	30.70	25.10
10A, Δ Temp	4.91	6.10	5.6	N/A
15A, Temp	34.48	39.32	37.43	25.23
15A, Δ Temp	9.25	14.09	12.20	N/A
20A, Temp	41.44	49.35	46.09	25.63
20A, Δ Temp	15.81	23.72	20.46	N/A
25A, Temp	49.50	60.77	57.53	25.42
25A, Δ Temp	24.08	35.35	32.12	N/A

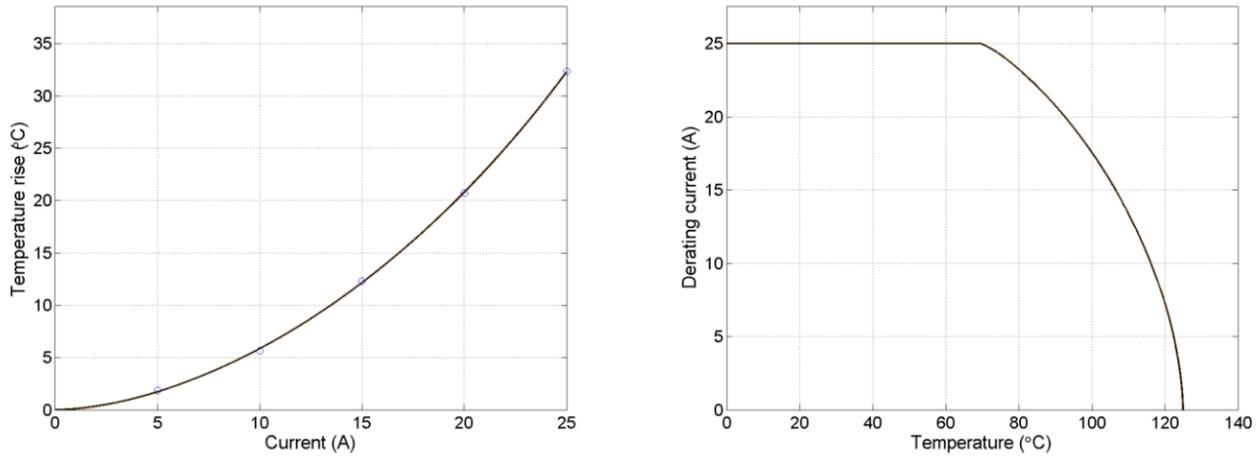


Fig 4: 2238196-3 AWG14# Derating Curve

2) PN 2238197-3 crimped with 12AWG wires test group.

Temperature Measurement(T/ΔT) Unit: °C – Specimens with 12AWG wire				
Current Unit: A	Min	Max	Ave	T-Room
5A, Temp	28.15	29.83	29.03	25.57
5A, ΔTemp	2.58	4.26	3.46	N/A
10A, Temp	33.04	34.70	33.93	25.74
10A, ΔTemp	7.30	8.89	8.19	N/A
15A, Temp	39.28	41.05	40.34	25.99
15A, ΔTemp	13.29	15.06	14.35	N/A
20A, Temp	46.74	50.46	48.51	25.59
20A, ΔTemp	21.15	24.87	22.92	N/A
25A, Temp	56.09	60.68	58.32	26.09
25A, ΔTemp	30.00	34.59	32.23	N/A

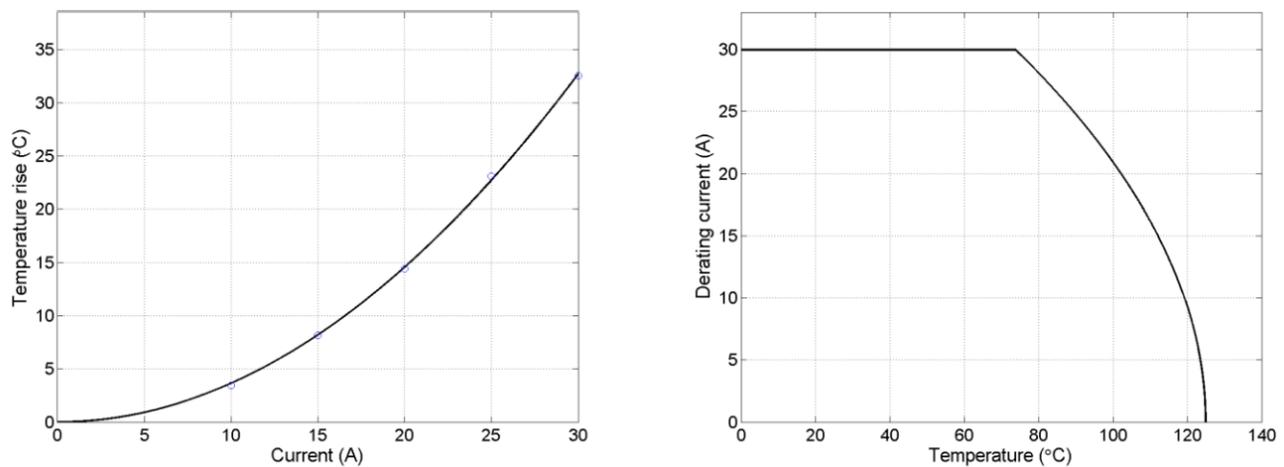


Fig 5: 2238197-3 AWG12# Derating Curve

3-3-4. Derating Curve Test Judgement.

According to the 108-143087 spec. The current cycling test data meet the spec.

3-4. Test Group D

3-4-1. Examination of product

Meets requirements of product drawing. No physical damage. Specimen Information.

PART NO.	Description	Notes
2238196-3	FASTON 250 STD REC STR F-CR 18-14 TPBR	AWG18-14
2238197-3	FASTON 250 STD REC RHFLAG TAB 18-12 TPBR	AWG18-12

3-4-2. Test Flow Description

- Execute visual check before test, and take picture.
- Place test specimens into chamber.
- Edit test procedure according to test method and run Temperature-Humidity chamber.

Test Condition: According to Following Table

Test Step	Start	End	Test Duration
1	30°C/50%RH	30°C/50%RH	30 minutes
2	30°C/50%RH	85°C/50%RH	60 minutes
3	85°C/50%RH	85°C/85%RH	30 minutes
4	85°C/85%RH	85°C/85%RH	480 minutes
5	85°C/85%RH	85°C/50%RH	30 minutes
6	85°C/50%RH	30°C/50%RH	60 minutes
7	30°C/50%RH	30°C/50%RH	60 minutes

Cycles: 42

Note: 15 A was required to be put onto small cross-section wire, and 20 A was required to be put onto big cross-section wire. Temperature was required to be monitored every 30 s.

- Export test data and test curve, execute visual check and take picture after test.

3-4-3. Test Result:

No physical damage was found after test.

