

APPROVAL SHEET

CUSTOMER :

CUSTOMER P/N :

ITEM : Wire to Wire connector.

Specification : 2.5mm Pitch Wire to Wire connector

Maker : CNPLUS

Maker P/N :	Male Housing	1204-21102
	Male Terminal	1204-43331
	Female Housing	1204-11102
	Female Terminal	1204-33331

REMARK :

FACTORY : 2620-9, Jeongwang-dong, Siheung-Si, Gyonggi-do, Republic of Korea

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DATE OF ISSUED : 2019.04.30

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A. 목차

- Customer :
- Description : 2.5mm Pitch Wire to Wire Connector.

- 1 Product Specification (제품명세)
- 2 Drawings (도면)
- 3 Reliability Test Report (신뢰성 실험 보고서)
- 4 QC공정도
- 5 Packing Specification (포장사양서)

B. 개정이력

No.	Data	개정내용	Page	확인
A	2013-09-10	New Released		D.I.Choi
B	2014-02-25	경쟁사 spec 동일화 변경		D.I.Choi
C	2014-05-26	내진동 시험 추가(V-Drop Test)		D.I.Choi
D	2019-04-30	생산지 이전(한국 -> 베트남)		W.S.Choi

This Product Specification covers the **2.5mm pitch Wire to Wire Connector.**
 (이 제품 규격은 2.5mm pitch Wire to Wire 커넥터에 대하여 규정한다)

1. PART NUMBER(제품 번호)

No.	Part No.(제품번호)	Part Name (제품명)
1	1204-21102	2.5mm Pitch W/W Conn. Male Housing
2	1204-11102	2.5mm Pitch W/W Conn. Female Housing
3	1204-43331	2.5mm Pitch W/B Conn. Male Terminal
4	1204-33331	2.5mm Pitch W/B Conn. Female Terminal

2. DIMENSIONS, MATERIAL & PLATING(치수, 재료 & 도금사양)

Construction and dimensions shall be in accordance with the attached drawings.

Material and surface finish shall be as specified below

형상 및 치수는 첨부된 도면에 준하며 주요 제품의 재질 및 표면 처리는 아래와 같다.

No.	Part	Material	Grade / Glass Fiber	Vendor	UL flame class	Finish,Color
1	Male Housing	PA66	KN332G30V0	Kolon	UL94V-0	Natural
2	Female Housing	PA66	KN3322V0L	Kolon	UL94V-0	Natural
3	Male Terminal	Phosphor Bronze	C5210-H	신원금속		Pre-Plating
						Sn 0.9 μ m Min.
4	Female Terminal	Phosphor Bronze	C5210-H	신원금속		Pre-Plating
						Sn 0.9 μ m Min.

3. STANDARD DATA (정격)

3-1. Rated current (전류) : AC/DC 3A

3-2. Rated voltage (전압) : 250V DC/AC(RMS)

3-3. Temperature range(사용온도) : -25°C to +85°C*

* Including Terminal Temperature Rise(통전에 의한 온도상승분 포함)

4. TEST CONDITIONS (시험 조건)

MIL-STD-202 : Test method for Electronic and Electrical Component Parts.

전자, 전기 부품의 시험 법

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C	2014-05-26	2.5mm Pitch Wire to Wire Connector. 1204 Series			1 of 4
	ECN No.				
DOCUMENT No.		CREATED BY	CHECKED BY	CHECKED BY	APPROVED BY
PS-1204-001		D.I.Choi		J.I.Choi	J.H.Kim

5. Specification(제품 규격)

5-1. Electrical Performances(전기적 특성)

Item(항목)	Procedure(시험방법)	Requirement(규격)
Contact Resistance	Mate applicable connector and apply a maximum voltage of 20mV and a current of 10mA .	30mΩ Max.
(접촉저항)	(적용 Connector를 결합한 상태에서 개방전압 20mV이하 단락전류 10mA에서 측정한다.)	(30mΩ 이하)
Insulation Resistance	Mate applicable connector and Apply a voltage of 500V DC for 1min, between adjacent terminals and between terminals to ground	1,000MΩ Min.
(절연저항)	(적용 Connector를 결합한 상태에서 연결하는 단자와 단자, 단자와 접지간에 DC 500V를 1분간 가한다.)	(1,000MΩ 이상)
Dielectric Strength	Mate applicable connector and Apply a voltage of 1000V AC for 1 min. between adjacent terminals and between terminals to ground.	No Breakdown Current leakage < 5mA
(내 전압)	(적용 Connector를 결합한 상태에서 연결하는 단자와 단자, 단자와 접지간에 AC 1000V를 1분간 가한다) * Based upon MIL-STD-202G Method 301	(절연파괴 없을것) (누설전류 < 5mA)
Temperature Rise	Measure the temperature rise at the rated current.	30°C Max.
(온도 상승)	(최대허용 전류를 통전 후 온도 상승분을 측정한다.)	(30°C 이하)

5-2. Mechanical Performances(기계적 특성)

Total Insertion Force (총합삽입력)	Measured forces to insert Male assembly into the Female assembly which has same circuits (Male Ass'y에 Female Ass'y를 삽입할 때 힘을 측정)	Unlocking	0.2kgf Min. 3.0kgf Max.
		Locking	0.2kgf Min. 3.0kgf Max.
Total Withdrawal Force (총합발거력)	Measured forces to Withdrawal Male assembly into the Female assembly which has same circuits (Male Ass'y에 Female Ass'y를 발거할 때 힘을 측정)	Unlocking	0.1kgf Min. 3.0kgf Max.
		Locking	1kgf Min. 7kgf Max.
Terminal Insertion Force (단자 삽입력)	Insert a Terminal into the housing through the speed of 25mm/min and measured the insertion force (단자를 사출물에 삽입할때 힘을 25mm/min 속도로 측정)	0.05kgf Min / 0.5kgf Max	
Terminal retention force (단자 유지력)	Insert a Terminal into the Housing and measure the force to withdraw the terminal from housing Apply axial pull out force at the speed rate of 25 ± 3mm/min (Housing에 Terminal을 조립한 후 Terminal을 25±3mm/min 속도로 인장시켜 이탈될 때의 힘 측정)	0.5kgf Min / 5.0kgf Max	
Single insertion force variation (단일 삽입력 변화량)	Measured terminal single insertion force variation after 30 cycles of terminal insertion and withdrawal operation. (terminal의 삽입/발거 동작을 30회 행한후 삽입력 변화량 측정)	삽입력 : 0.05kgf Min / 0.5kgf Max 변화량 : Below 60% compared with the initial measured value	
Single withdrawal force variation (단일 발거력 변화량)	Measured terminal single withdrawal force variation after 30 cycles of terminal insertion and withdrawal operation. (terminal의 삽입/발거 동작을 30회 행한후 발거력 변화량 측정)	발거력 : 0.01kgf Min / 0.4kgf Max 변화량 : Below 60% compared with the initial measured value	
Crimp Tensile Strength (압착부 인장강도)	Apply axial pull-off load to crimp wire at the speed rate of 25±3mm/min (축 방향으로 25 ± 3mm/min.의 속도로 압착된 Wire를 잡아당겨 측정한다.)	Wire size	Crimp Tensile(Min.)
		AWG #22	2.5kgf
		AWG #24	2.0kgf
		AWG #26	1.5kgf
		AWG #28	1.0kgf
		AWG #30	0.8kgf

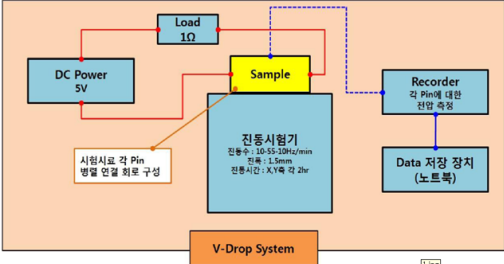
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C	2014-05-26	2.5mm Pitch Wire to Wire Connector. 1204 Series			2 of 4
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PS-1204-001		D.I.Choi		J.I.Choi	J.H.Kim

5-2. Mechanical Performances(기계적 특성)

Item(항목)	Procedure(시험방법)	Requirement(규격)
Terminal Gap Variation (Terminal Gap 변화량)	Measured terminal gap variation after 30cycles of terminal insertion and withdrawal operation. Withdrawal force : 10th/min (terminal의 삽입/발거 동작을 10회/분 속도로 30회 행한 후 Gap 변화량을 측정)	Below 60% compared with the initial terminal gap

5-3. Environmental Performances(환경적 특성)

Item(항목)	Procedure(시험방법)	Requirement(규격)
Durability of contact Resistance variation (내구성시험후 접촉저항 변화량)	Measured contact resistance variation after 30 cycles of total insertion and withdrawal operation. (10th/min.) (결합된 제품 Housing Ass'Y와 Header Ass'Y의 삽입 및 분리 동작을 10th/min 속도로 30회 행한 후 접촉저항 변화량을 측정)	Below 60% compared with the initial measured value

Vibration (내진동성)	Mate Connectors : Amplitude : 1.52mm Sweep time : 10-55-10 Hz in 1 minute Duration : 2 Hours in each X,Y,Z axes 	5V. ±5% Max.
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Heat Resistance (내열성)	Mate Connectors : Temperature : 85±2°C Exposed 2hr after being exposed 96 hours under the chamber temperature electrical characteristics were measured and tested (85±2°C에서 96시간 시험 후 상온에서 2hr 방치 후 측정한다.)	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
Humidity (내습성)	Mate Connectors : Temperature: 40 ± 2°C Relative humidity: 90-95% Duration: Exposed 2hr after being exposed 96 hours. (주위온도 40 ± 2°C, 상대습도 90-95%상에서 96시간 시험 후 상온에서 2hr 방치 후 꺼내어 측정한다.)	Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1.0~6.0kgf

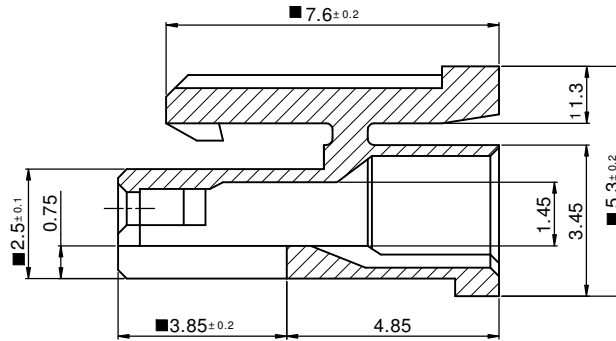
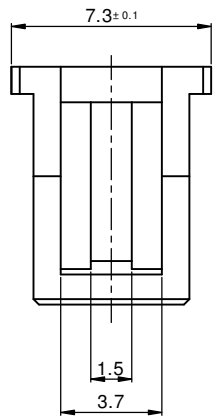
Humidity (내습성)	Mate Connectors : Temperature: 40 ± 2°C Relative humidity: 90-95% Duration: Exposed 2hr after being exposed 96 hours. (주위온도 40 ± 2°C, 상대습도 90-95%상에서 96시간 시험 후 상온에서 2hr 방치 후 꺼내어 측정한다.)	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1.0~6.0kgf

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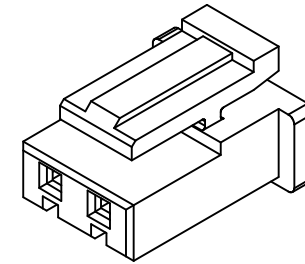
5-3. Environmental Performances(환경적 특성)

Item(항목)	Procedure(시험방법)	Requirement(규격)	
Cold Resistance (내한성)	Mate Connectors : Duration : 96 hours Temperature : -40±2°C (-40 ± 2°C에서 96시간 방치 후 꺼내어 측정한다.)	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1.0~6.0kgf
Shock (내충격성)	Mate Connectors : 50g, 3 strokes in each X,Y,Z axes (50g의 충격을 각 X,Y,Z축에 3회 가한다.)	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1~6kgf
		Discontinuity (순간단락)	1μs Max.
Damage Heat (열충격)	Mate Connectors : Temperature: -55°C (30min) → +85°C(30min) 5Cycle 온도 : -55°C (30min) → +85°C(30min) → 5회	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1~6kgf
Ammonia Gas (NH ₃) (암모니아 가스)	Duration: 40 minutes exposure Atmosphere: NH ₃ gas evaporating from a 28% Ammonia solution. Temperature: 25 ± 2°C 주위온도 : 25 ± 2°C 환경 : 28% NH ₃ gas 시간 : 40분 방치	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1~6kgf
Salt Spray (염수분무)	Measure after test wash and leave to dry. Temperature: 35 ± 2°C Solution : 5%±1% Duration : 48HR ± 4HR (Material : 2HR Application) - Spray 8hr and Pause 16Hr. 2Cycles (시험 후 흐르는 물에 세척 후 상온에서 2Hr 방치 후에 특성을 측정한다.) 단, 원자재 : 2HR 적용함. - 8시간 분무 16시간 휴지. 2Cycles	appearance(외관)	No Damage
		Contact Resistance (접촉저항)	30mΩ Max.
		Insulation Resistance (절연저항)	1,000MΩ Min.
		Dielectric Strength (내전압)	No Breakdown
		Total insertion force (총합삽입력)	Unlock : 0.1~2.0kgf Lock : 0.2~2.5kgf
		Total withdrawal force (총합발거력)	Unlock : 0.1~2.5kgf Lock : 1~6kgf

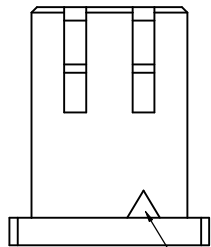
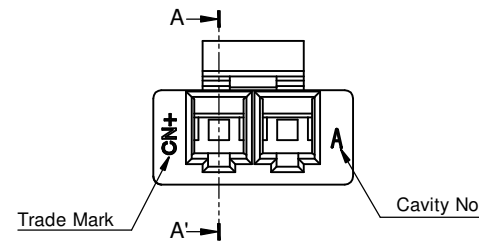
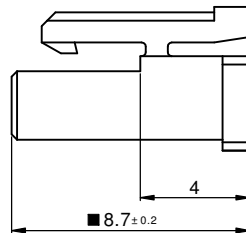
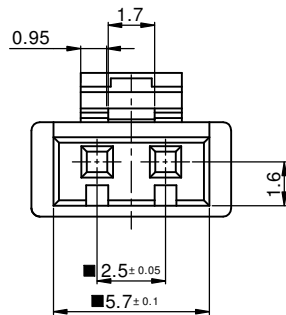
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SECTION A - A'
SCALE(8:1)



ISO VIEW



Circuit No.1.

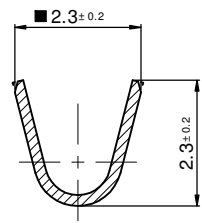
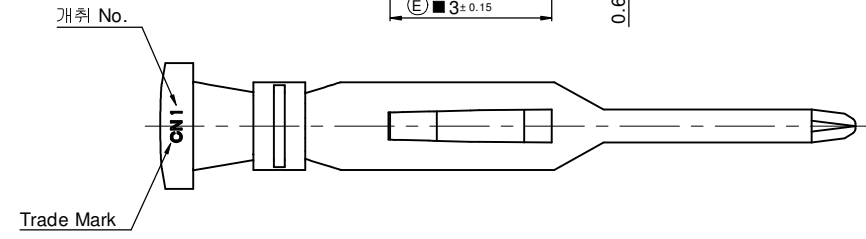
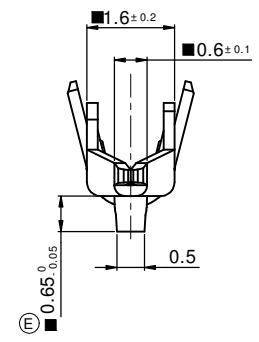
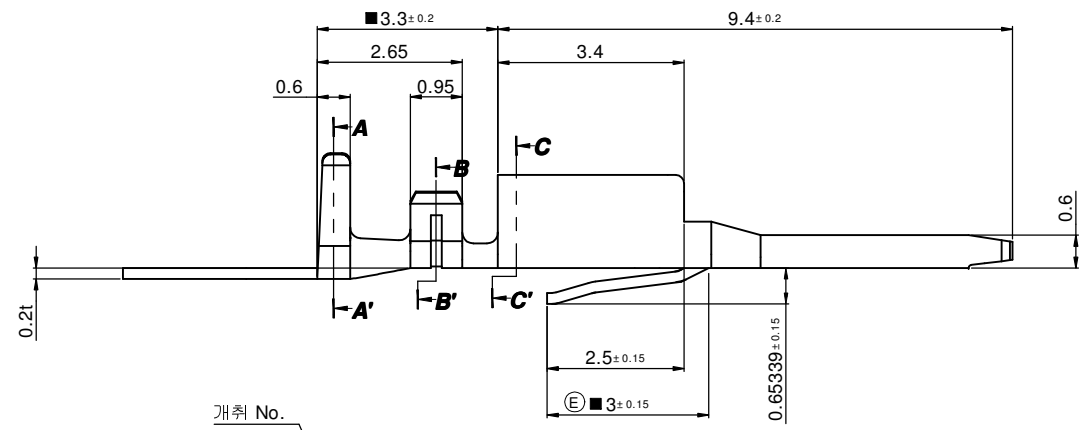
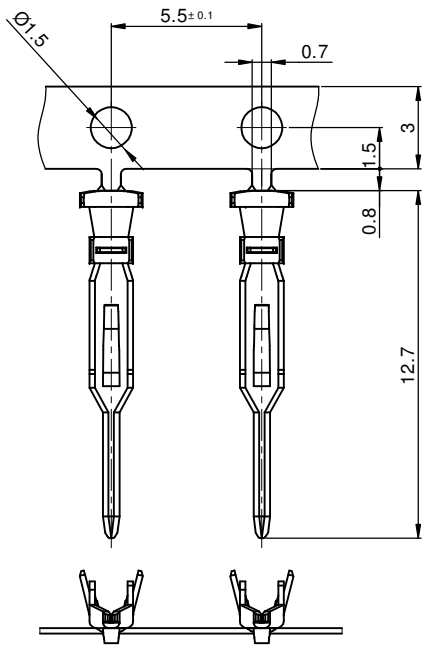
- Note
1. Material : PA66(UL94V- 0, Natural Color)
 2. Application
- Female Terminal : 1204- 33331

A	2014.02.14	2014- 007	NEW RELEASE	DlChoi	JlChoi	HSShin
판수 (REV.)	개정일자 (REV.DATE)	ECN No.	변경내용 (DESCRIPTION)	담당 (DES'D)	검토 (CHK'D)	승인 (APP'D)

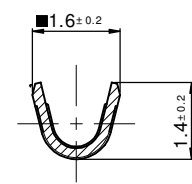
재료 (Material)	SEE TABLE			제품군 (Series)	1204		품명 (Part Name)	2.5mm Pitch W/W Conn. Female Housing	
일반공차 (General Tolerance)	제도 (Drawn)	DlChoi	척도 (Scale)	5 / 1	단위 (Unit)		mm	품번 (Part No.)	1204- 11102
치수 (Dimension)	각도 (Angle)	검토 (Checked)	JlChoi	크기 (Size)	A3	도면번호 (Drawing No.)	S- 1204- 11102	판수 (REV.)	A
Quality Symbols	승인 (Approved)	HSShin	Critical Major				(주) 씨엔플러스 CNPLUS Co., Ltd.		

본 도면의 내용은 (주)씨엔플러스의 자산이므로 허가없이 복제를 금합니다.
The contents of this drawing are proprietaries of CNPLUS Co., Ltd. It is prohibited to copy and reproduce without permission of CNPLUS.

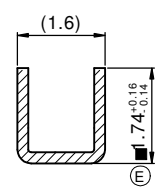
Die Feed Direction →



Section A-A
(Scale 10/1)



Section B-B
(Scale 10/1)

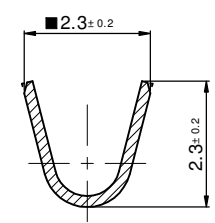
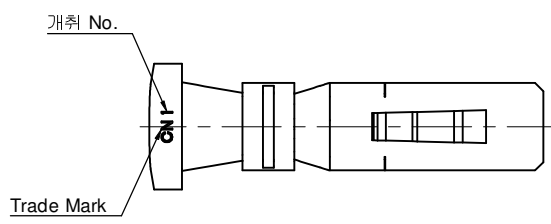
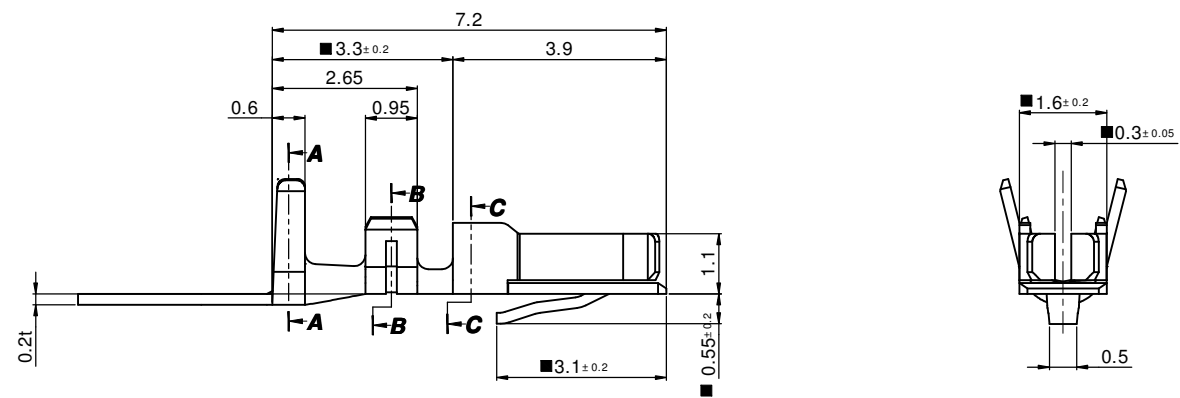
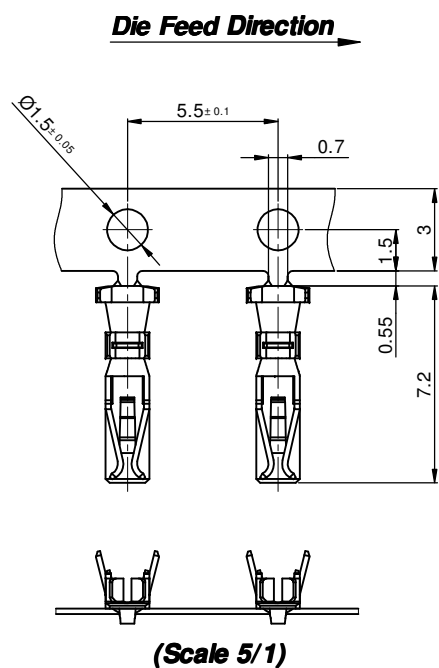


Section C-C
(Scale 10/1)

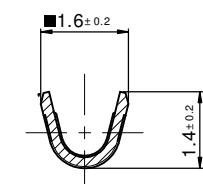
- Note**
1. Material : Phosphor Bronze
 2. Plating : Pre Tin Plating(Sn 0.9 μ m Min.)
 3. Wire Range : AWG # 24~ # 28
 4. Application
- Male Housing : 1204- 21102

E				2015.11.02				2015- 070				고객요청 SPEC 변경				SSKim	SKHan	JiChoi	HSShin	SEE TABLE				재품군(Series) 1204		품명 (Part Name) 2.5mm W/W Conn. Male Terminal				
D				2015.09.22				2015- 053				Revised				SSKim	SKHan	JiChoi	HSShin	일반공차 (General Tolerance)				담당 (Designed)	S.S.Kim	척도 (Scale)	10/1	폼번 (Part No.)(WW25A- 56209)		Sheet No.
C				2015.02.24				2015- 013				고객사 요청 SPEC 변경				SSKim	SKHan	JiChoi	HSShin	치수(Dimension)				검토 (Checked)	S.K.Han	단위 (Unit)	mm	도면번호 (Drawing No.)		판수(REV.)
B				2015.02.02				2015- 011				Terminal 유지력 개선 (란스 형상 변경)				SSKim	SKHan	JiChoi	HSShin	각도(Angle)								검토 (Checked)	J.I.Choi	
A				2014.02.14				2014- 007				NEW RELEASE				DIChoi	SKHan	JiChoi	HSShin	Quality Symbols				승인 (Approved)	H.S.Shin	Symbol		(주) 씨엔플러스 CNPLUS Co., Ltd.		
판수 (REV.)	개정일자 (REV.DATE)	ECN No.	변경내용 (DESCRIPTION)				담당 (DES'D)	검토 (CHK'D)	검토 (CHK'D)	승인 (APP'D)	Critical				Major				Symbol											

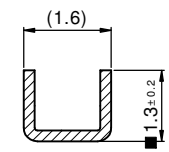
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Section A-A
(Scale 10/1)



Section B-B
(Scale 10/1)



Section C-C
(Scale 10/1)

- Note
1. Material : Phosphor Bronze
 2. Plating : Pre Tin Plating(Sn 0.9 μ m Min.)
 3. Wire Range : AWG # 24~ # 28
 4. Application
- Female Housing : 1204- 11102

A	2014.02.14	2014- 007	NEW RELEASE	DIChoi	JIChoi	HSShin
판수 (REV.)	개정일자 (REV.DATE)	ECN No.	변경내용 (DESCRIPTION)	담당 (DES'D)	검토 (CHK'D)	승인 (APP'D)

재료 (Material)	SEE TABLE			제품군 (Series)	1204	품명 (Part Name)	2.5mm W/W Conn. Female Terminal	
일반공차 (General Tolerance)	담당 (Designed)	D.I.Choi	척도 (Scale)	10/1	품번 (Part No.)	1204- 33331	시트번호 (Sheet No.)	1/1
치수 (Dimension)	검토 (Checked)	D.I.Choi	단위 (Unit)	mm	도면번호 (Drawing No.)	S-1204-33331	판수 (REV.)	A
각도 (Angle)	검토 (Checked)		크기 (Size)	A3	승인 (Approved)	H.S.Shin	(주) 씨엔플러스 CNPLUS Co., Ltd.	
Quality Symbols		Critical		Major				

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SALES COMPONENT

Part Name(품명)	2.5mm Pitch Wire to Wire Connector.	TEST Term(시험 기간)	2019. 04. 22 ~ 2019. 04. 30
Part No.(품번)	1204-Series(2p)	Test Spec.(시험 규격)	PS-1204-001
Test Purpose(시험 목적)	■ 생산지 이관으로 인한 종합신뢰성 시험		

Test Conditions(시험 조건)

1. DIMENSIONS, MATERIAL & PLATING(치수, 재료 & 도금사양)

NO	Part	Material	Finish, Color
1	Male Housing	PA66	Natural
2	Female Housing	PA66	Natural
3	Male Terminal	Phosphor Bronze	Pre-Plating Sn 0.9 μ m Min.
4	Female Terminal	Phosphor Bronze	Pre-Plating Sn 0.9 μ m Min.

2. STANDARD DATA (정격)

2-1. Rated Current (전류) : AC/DC 3A

2-2. Rated voltage (전압) : 250V DC/AC(RMS)

2-3. Temperature range(사용온도) : -25°C to +85°C*

* Including Terminal Temperature Rise(통전에 의한 온도상승분 포함)

3. TEST CONDITIONS (시험 조건) : See Attachment

Test Items(시험 항목)

1. 전기적 특성(Electrical Performances)

: 접촉저항(Contact Resistance), 절연저항(Insulation Resistance), 내전압(Dielectric Strength), 온도상승(Temperature Rise)

2. 기계적 특성(Mechanical Performances)

: Terminal Gap 변화량(Terminal Gap Variation), 총합삽입력(Total Insertion Force), 총합발거력(Total Withdrawal Force), 단자 삽입력(Terminal Insertion Force), 단자 유지력(Terminal Retention Force), 단일 삽입력(Single Insertion Force), 단일 발거력(Single Withdrawal Force), 압착부 인장강도(Crimp Tensile Strength)

3. 환경적 특성(Enviromental Performances)

: 반복삽발거(Repeated Insertion/Withdrawal), 내진동(Vibration), 내열성(Heat Resistance), 내습성(Humidity), 내한성(Cold Resistance), 내충격(Shock), 열충격(Damage Heat), 암모니아 가스(NH3), 염수분무(Salt Spray)

Test Results(시험 결과) ※ Attachments (YES / NO)

Test results see page 2/14

Tester	Checker	Approved
장 정 도	장 정 현	황 인 응

※ Part of this report the reliability of the test results without prior approval of all or part of this report is not available to copy.

Part Name(품명)	2.5mm Pitch Wire to Wire Connector.	TEST Term(시험 기간)	2019. 04. 22 ~ 2019. 04. 30
Part No.(품번)	1204-Series(2p)	Test Spec.(시험 규격)	PS-1204-001

Test Purpose (시험 목적) ■ Total reliability testing early in development(개발초종중합신뢰성시험)

Test Results(시험 결과) ※ Attachments (■ YES / □ NO)

No.	Step	ITEM	Spec	Result	Decision	No.	Step	ITEM	Spec	Result	Decision						
1	이관 전	Contact Resistance	30mΩ Max.	8.23	OK	15	이관 전	Humidity	Contact Resistance	30mΩ Max.	7.81	OK					
	이관 후			8.24	OK				Insulation Resistance	1,000MΩ Min.	1000 ↑	OK					
2	이관 전	Insulation Resistance	1,000MΩ Min.	1000 ↑	OK				이관 후	이관 후	Humidity	Dielectric Strength	No Breakdown	Pass	OK		
	이관 후			1000 ↑	OK							Total	Lock-0.2~2.5kgf	0.43	OK		
3	이관 전	Dielectric Strength	No Breakdown	Pass	OK				이관 후	이관 후	Humidity	Insertion force	Unlock-1.0~6.0kgf	0.37	OK		
	이관 후			Pass	OK							Total	Lock-2.5~7.0kgf	2.87	OK		
4	이관 전	Temperature Rise	30°C Max.	23.93	OK				이관 후	이관 후	Humidity	Withdrawal force	Unlock - 0.1~2.5kgf	0.23	OK		
	이관 후			23.90	OK							Contact Resistance	30mΩ Max.	6.02	OK		
5	이관 전	Terminal Gap Variation	Variation(60% Max.)	Initial	0.300				OK	이관 후	이관 후	Humidity	Insulation Resistance	1,000MΩ Min.	1000 ↑	OK	
				After	0.354				OK				Dielectric Strength	No Breakdown	Pass	OK	
	이관 후			Initial	0.300				OK				Total	Lock-0.2~2.5kgf	0.57	OK	
				After	0.358				OK				Insertion force	Unlock-1.0~6.0kgf	0.41	OK	
5	이관 전	Total Insertion Force	Lock - 0.2~3.0kgf	0.58	OK				16	이관 전	Cold Resistance	Total	Lock-2.5~7.0kgf	3.36	OK		
				0.41	OK							Withdrawal force	Unlock - 0.1~2.5kgf	0.26	OK		
이관 후	0.58			OK	Contact Resistance	30mΩ Max.	7.62	OK									
이관 후	0.41			OK	Insulation Resistance	1,000MΩ Min.	1000 ↑	OK									
6	이관 전	Total Withdrawal Force	Lock-1~7kgf	3.54	OK	이관 후	이관 후	Cold Resistance				Dielectric Strength	No Breakdown	Pass	OK		
				0.22	OK							Total	Lock-0.2~2.5kgf	0.57	OK		
6	이관 후			Cold Resistance	Lock-1~7kgf	3.52	OK	이관 후				이관 후	Cold Resistance	Insertion force	Unlock - 0.1~2.0kgf	0.43	OK
						0.22	OK							Total	Lock-1.0~6.0kgf	3.56	OK
7	이관 전	Terminal Insertion Force-Male	0.05~0.5kgf			0.41	OK	이관 후				이관 후	Cold Resistance	Withdrawal force	Unlock - 0.1~2.5kgf	0.21	OK
						0.48	OK							Contact Resistance	30mΩ Max.	6.08	OK
7	이관 후			Terminal Insertion Force-Female	0.05~0.5kgf	0.47	OK	이관 후				이관 후	Cold Resistance	Insulation Resistance	1,000MΩ Min.	1000 ↑	OK
						0.48	OK							Dielectric Strength	No Breakdown	Pass	OK
8	이관 전	Terminal retention Force-Male	0.5~5.0kgf			3.90	OK	이관 후				이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.58	OK
						2.57	OK							Insertion force	Unlock - 0.1~2.0kgf	0.41	OK
8	이관 후			Terminal retention Force-Female	0.5~5.0kgf	3.78	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	3.55	OK			
						2.56	OK				Withdrawal force	Unlock - 0.1~2.5kgf	0.25	OK			
9	이관 전	Single insertion Force - 1st	0.05~0.5kgf			0.16	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	6.35	OK			
						0.09	OK				Insulation Resistance	1,000MΩ Min.	1000 ↑	OK			
9	이관 후			Single insertion Force - Variation	60% Max.	45%	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK			
						0.17	OK				Discontinuity	1μs Max.	ok	OK			
10	이관 전	Single insertion Force - 10th	60% Max.			47%	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.57	OK			
						0.09	OK				Insertion force	Unlock - 0.1~2.0kgf	0.41	OK			
10	이관 후			Single withdrawal Force - 1st	0.01~0.4kgf	0.12	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	3.11	OK			
						0.06	OK				Withdrawal force	Unlock - 0.1~2.5kgf	0.23	OK			
11	이관 전	Crimp Tensile Strength-Male	20kgf Min.			6.57	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	5.83	OK			
						6.37	OK				Insulation Resistance	1,000MΩ Min.	1000 ↑	OK			
11	이관 후			Crimp Tensile Strength-Female	20kgf Min.	6.66	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK			
						6.23	OK				Discontinuity	1μs Max.	ok	OK			
12	이관 전	Repeated Insetion /Withdrawal	Contact Resistance			30mΩ Max.	6.29	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.40	OK		
						60% Max.	7%	OK				Insertion force	Unlock - 0.1~2.0kgf	0.29	OK		
12	이관 후			Repeated Insetion /Withdrawal	Insulation Resistance	1,000MΩ Min.	1000 ↑	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	4.60	OK		
						No Breakdown	Pass	OK				Withdrawal force	Unlock - 0.1~2.5kgf	0.21	OK		
13	이관 전	V-Drop	See Attachment			OK	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	8.00	OK			
						OK	OK				Insulation Resistance	1,000MΩ Min.	1000 ↑	OK			
14	이관 후			Heat Resistance	Total	Lock-0.2~2.5kgf	0.39	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK		
						0.29	OK	Discontinuity				1μs Max.	ok	OK			
14	이관 후	Heat Resistance	Total			Lock-1.0~6.0kgf	3.11	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.71	OK		
						0.21	OK	Insertion force				Unlock - 0.1~2.0kgf	0.59	OK			
14	이관 후			Heat Resistance	Total	Lock-0.1~2.5kgf	0.40	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	3.59	OK		
						0.29	OK	Withdrawal force				Unlock - 0.1~2.5kgf	0.27	OK			
14	이관 후	Heat Resistance	Total			Lock-0.2~2.5kgf	0.40	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	7.86	OK		
						0.29	OK	Insulation Resistance				1,000MΩ Min.	1000 ↑	OK			
14	이관 후			Heat Resistance	Total	Lock-1.0~6.0kgf	3.11	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK		
						0.22	OK	Insertion force				Unlock - 0.1~2.0kgf	0.41	OK			
14	이관 후	Heat Resistance	Total			Lock-0.1~2.5kgf	0.40	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.44	OK		
						0.22	OK	Withdrawal force				Unlock - 0.1~2.5kgf	0.25	OK			
14	이관 후			Heat Resistance	Total	Lock-1.0~6.0kgf	3.11	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	7.18	OK		
						0.22	OK	Insulation Resistance				1,000MΩ Min.	1000 ↑	OK			
14	이관 후	Heat Resistance	Total			Lock-0.2~2.5kgf	0.58	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK		
						0.41	OK	Discontinuity				1μs Max.	ok	OK			
14	이관 후			Heat Resistance	Total	Lock-1.0~6.0kgf	3.98	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.50	OK		
						0.35	OK	Insertion force				Unlock - 0.1~2.0kgf	0.47	OK			
14	이관 후	Heat Resistance	Total			Lock-0.1~2.5kgf	0.35	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	1.75	OK		
						0.35	OK	Withdrawal force				Unlock - 0.1~2.5kgf	0.41	OK			
14	이관 후			Heat Resistance	Total	Lock-1.0~6.0kgf	3.98	OK	이관 후	이관 후	Cold Resistance	Contact Resistance	30mΩ Max.	5.91	OK		
						0.35	OK	Insulation Resistance				1,000MΩ Min.	1000 ↑	OK			
14	이관 후	Heat Resistance	Total			Lock-0.1~2.5kgf	0.35	OK	이관 후	이관 후	Cold Resistance	Dielectric Strength	No Breakdown	Pass	OK		
						0.35	OK	Discontinuity				1μs Max.	ok	OK			
14	이관 후			Heat Resistance	Total	Lock-1.0~6.0kgf	3.98	OK	이관 후	이관 후	Cold Resistance	Total	Lock-0.2~2.5kgf	0.58	OK		
						0.35	OK	Insertion force				Unlock - 0.1~2.0kgf	0.41	OK			
14	이관 후	Heat Resistance	Total			Lock-0.1~2.5kgf	0.35	OK	이관 후	이관 후	Cold Resistance	Total	Lock-1.0~6.0kgf	1.52	OK		
						0.35	OK	Withdrawal force				Unlock - 0.1~2.5kgf	0.22	OK			

종합판정 : OK

1. 접촉저항 (Contact Resistance)	<p>■ Test Item : 접촉저항(Contact Resistance)</p> <p>1. Equipments : Contact Resistance Tester</p> <p>2. Manufacturers / Models : National Instruments</p> <p>3. Test Environment :</p> <p>4. 시험항목(Review item) : 접촉저항(Contact Resistance)</p> <p>1) Procedure : Mate applicable connector and apply a maximum voltage of 20mV and a current of 10mA.</p> <p>2) Spec : 30mΩ Max.</p>															
DATA SHEET	<p># Contact Resistance(Sample 10EA) <Unit:mΩ></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Min.</th> <th>Max.</th> <th>Avg.</th> <th>Decision</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>7.98</td> <td>8.42</td> <td>8.18</td> <td>OK</td> </tr> <tr> <td>After</td> <td>8.10</td> <td>8.44</td> <td>8.28</td> <td>OK</td> </tr> </tbody> </table>	Step	Min.	Max.	Avg.	Decision	Before	7.98	8.42	8.18	OK	After	8.10	8.44	8.28	OK
Step	Min.	Max.	Avg.	Decision												
Before	7.98	8.42	8.18	OK												
After	8.10	8.44	8.28	OK												

2. 절연저항 (Insulation Resistance)	<p>■ Test Item : 절연저항 (Insulation Resistance)</p> <p>1. Equipments : Insulation Resistance Tester</p> <p>2. Manufacturers / Models : CHROMA</p> <p>3. Test Environment :</p> <p>4. 시험항목(Review item) : 절연저항 (Insulation Resistance)</p> <p>1) Procedure : Mate applicable connector and Apply a voltage of 500V DC for 1min, between adjacent terminals and between terminals to ground</p> <p>2) Spec : 1,000MΩ Min.</p>															
DATA SHEET	<p># Insulation Resistance(Sample 10EA) <Unit:MΩ></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Min.</th> <th>Max.</th> <th>Avg.</th> <th>Decision</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>1000 ↑</td> <td>1000 ↑</td> <td>1000 ↑</td> <td>OK</td> </tr> <tr> <td>After</td> <td>1000 ↑</td> <td>1000 ↑</td> <td>1000 ↑</td> <td>OK</td> </tr> </tbody> </table>	Step	Min.	Max.	Avg.	Decision	Before	1000 ↑	1000 ↑	1000 ↑	OK	After	1000 ↑	1000 ↑	1000 ↑	OK
Step	Min.	Max.	Avg.	Decision												
Before	1000 ↑	1000 ↑	1000 ↑	OK												
After	1000 ↑	1000 ↑	1000 ↑	OK												

3. 내전압 (Dielectric Strength)	<p>■ Test Item : 내전압(Dielectric Strength)</p> <p>1. Equipments : Dielectric Strength Tester</p> <p>2. Manufacturers / Models : CHROMA</p> <p>3. Test Environment : -</p> <p>4. 시험항목(Review item) : 내전압(Dielectric Strength)</p> <p>1) Procedure : Mate applicable connector and Apply a voltage of 1000V AC for 1 min. between adjacent terminals and between terminals to ground.</p> <p>2) Spec : No Breakdown</p>															
DATA SHEET	<p># Dielectric Strength(Sample 10EA)</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Sample1</th> <th>Sample2</th> <th>Sample3</th> <th>Decision</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>Pass</td> <td>Pass</td> <td>Pass</td> <td>OK</td> </tr> <tr> <td>After</td> <td>Pass</td> <td>Pass</td> <td>Pass</td> <td>OK</td> </tr> </tbody> </table>	Step	Sample1	Sample2	Sample3	Decision	Before	Pass	Pass	Pass	OK	After	Pass	Pass	Pass	OK
Step	Sample1	Sample2	Sample3	Decision												
Before	Pass	Pass	Pass	OK												
After	Pass	Pass	Pass	OK												

4. 온도상승 (Temperature Rise)	<p>■ Test Item : 온도 상승(Temperature Rise)</p> <p>1. Equipments : Power Supply / Recorder</p> <p>2. Manufacturers / Models : HAN YOUNG / YOKOGAWA</p> <p>3. Test Environment : -</p> <p>4. 시험항목(Review item) : 온도 상승(Temperature Rise)</p> <p>1) Procedure : Measure the temperature rise at the rated current.</p> <p>2) Spec : 30°C Max.</p>															
DATA SHEET	<p># Temperature Rise(Sample 6EA) <Unit:°C></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Min.</th> <th>Max.</th> <th>Avg.</th> <th>Decision</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>19.15</td> <td>26.01</td> <td>22.49</td> <td>OK</td> </tr> <tr> <td>After</td> <td>21.19</td> <td>26.37</td> <td>24.33</td> <td>OK</td> </tr> </tbody> </table>	Step	Min.	Max.	Avg.	Decision	Before	19.15	26.01	22.49	OK	After	21.19	26.37	24.33	OK
Step	Min.	Max.	Avg.	Decision												
Before	19.15	26.01	22.49	OK												
After	21.19	26.37	24.33	OK												

5. Terminal Gap 변화량 (Terminal Gap Variation)

■ Test Item : Terminal Gap 변화량(Terminal Gap Variation)

- Equipments : Micro Scope
- Manufacturers / Models : NIKON
- Test Environment : -
- 시험항목(Review item) : Terminal Gap 변화량(Terminal Gap Variation)
 - Procedure : Measured terminal gap variation after 30 cycles of terminal insertion and withdrawal operation. (10th/min.)
 - Spec : Below 60% compared with the initial terminal gap

DATA SHEET

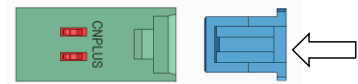
Terminal Gap Variation(Sample 30EA) <Unit:mm>

Step	Min.	Max.	Avg.	Decision	
이관전	Initial	0.288	0.312	0.299	OK
	After	0.341	0.370	0.355	OK
	Variation	12%	27%	19%	OK
이관후	Initial	0.287	0.312	0.300	OK
	After	0.341	0.371	0.358	OK
	Variation	10.1%	28.1%	19.5%	OK

6. 총합삽입력 (Total Insertion Force)

■ Test Item : 총합삽입력(Total Insertion Force)

- Equipments : Push-Pull Gauge
- Manufacturers / Models : AIKOH
- Test Environment : -
- 시험항목(Review item) : 총합삽입력(Total Insertion Force)
 - Procedure : Measured forces to insert Male assembly into the Female assembly which has same circuits
 - Spec : Locking - 0.2kgf Min.~3.0kgf Max. / Unlocking - 0.2kgf Min.~3.0kgf Max.



DATA SHEET

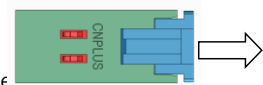
Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.56	0.60	0.58	OK
	Unlocking	0.40	0.42	0.41	OK
이관후	Locking	0.56	0.59	0.57	OK
	Unlocking	0.40	0.42	0.41	OK

7. 총합발거력 (Total Withdrawal Force)

■ Test Item : 총합발거력(Total Withdrawal Force)

- Equipments : Push-Pull Gauge
- Manufacturers / Models : AIKOH
- Test Environment : -
- 시험항목(Review item) : 총합발거력(Total Withdrawal Force)
 - Procedure : Measured forces to Withdrawal Male assembly into the Female assembly which has same circuits
 - Spec : Locking - 1kgf Min.~7kgf Max. / Unlocking - 0.1kgf Min.~3.0kgf Max.



DATA SHEET

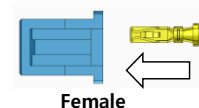
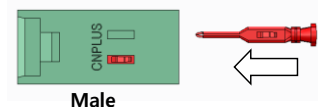
Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	3.46	3.61	3.55	OK
	Unlocking	0.20	0.24	0.22	OK
이관후	Locking	3.46	3.58	3.53	OK
	Unlocking	0.20	0.24	0.22	OK

8. 단자 삽입력 (Terminal Insertion Force)

■ Test Item : 단자 삽입력(Terminal Insertion Force)

- Equipments : Push-Pull Gauge
- Manufacturers / Models : AIKOH
- Test Environment : -
- 시험항목(Review item) : 단자 삽입력(Terminal Insertion Force)
 - Procedure : Insert a Terminal into the housing through the speed of 25mm/min and measured the insertion force
 - Spec : 0.05kgf Min.~0.5kgf Max.



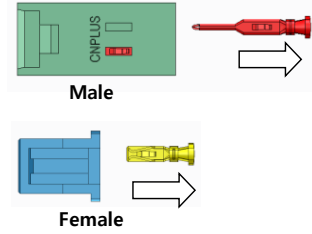
DATA SHEET

Terminal Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Male	0.39	0.43	0.41	OK
	Female	0.47	0.48	0.47	OK
이관후	Male	0.41	0.54	0.47	OK
	Female	0.40	0.53	0.46	OK

9. 단자 유지력 (Terminal Retention force)

- Test Item : 단자 유지력(Terminal Retention force)
- 1. Equipments : Push-Pull Gauge
- 2. Manufacturers / Models : AIKOH
- 3. Test Environment : -
- 4. 시험항목(Review item) : 단자 유지력(Terminal Retention force)
 - 1) Procedure : Insert a Terminal into the Housing and measure the force to withdraw the terminal from housing
 - 2) Spec : 0.5kgf Min.~5.0kgf Max.



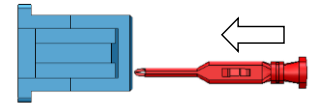
DATA SHEET

Terminal Retention force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Male	3.43	4.35	3.83	OK
	Female	2.32	2.72	2.54	OK
이관후	Male	3.50	4.86	4.18	OK
	Female	2.11	3.25	2.83	OK

10. 단일삽입력 변화량(Single Insertion Force variation)

- Test Item : 단일삽입력 변화량(Single Insertion Force)
- 1. Equipments : Push-Pull Gauge
- 2. Manufacturers / Models : AIKOH
- 3. Test Environment : 30cycle insertion operation. (10th/min.)
- 4. 시험항목(Review item) : 단일삽입력 변화량(Single Insertion Force variation)
 - 1) Procedure : Measured force to insert single pin into single terminal
 - 2) Spec : 0.05kgf Min.~0.5kgf Max. / Below 60% compared with the initial measured value



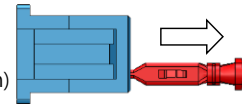
DATA SHEET

Single Insertion Force variation(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	initial	0.15	0.17	0.16	OK
	After	0.08	0.09	0.09	OK
	Variation	41%	51%	46%	OK
이관후	initial	0.15	0.18	0.17	OK
	After	0.08	0.09	0.09	OK
	Variation	39%	52%	47%	OK

11. 단일발거력 변화량(Single withdrawal Force variation)

- Test Item : 단일발거력 변화량(Single withdrawal Force)
- 1. Equipments : Push-Pull Gauge
- 2. Manufacturers / Models : AIKOH
- 3. Test Environment : 30cycle withdrawal operation. (10th/min.)
- 4. 시험항목(Review item) : 단일발거력 변화량(Single withdrawal Force variation)
 - 1) Procedure : Measured force to withdraw single pin into single terminal
 - 2) Spec : 0.01kgf Min.~0.4kgf Max. / Below 60% compared with the initial measured value



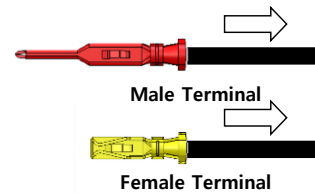
DATA SHEET

Single withdrawal Force variation(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	initial	0.11	0.12	0.12	OK
	After	0.06	0.07	0.06	OK
	Variation	42%	52%	47%	OK
이관후	initial	0.11	0.13	0.12	OK
	After	0.06	0.07	0.06	OK
	Variation	40%	52%	46%	OK

12. 압착부 인장강도 (Crimp Tensile Strength)

- Test Item : 압착부 인장강도(Crimp Tensile Strength)
- 1. Equipments : Push-Pull Gauge
- 2. Manufacturers / Models : AIKOH
- 3. Test Environment : -
- 4. 시험항목(Review item) : 압착부 인장강도(Crimp Tensile Strength)
 - 1) Procedure : Apply axial pull-off load to crimp wire at the speed rate of 25±3mm/min
 - 2) Spec : 2.0kgf Min.(AWG #24)



DATA SHEET

Crimp Tensile Strength(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Male	6.39	6.79	6.62	OK
	Female	6.11	6.58	6.32	OK
이관후	Male	6.43	6.91	6.67	OK
	Female	6.04	6.53	6.25	OK

**13. 반복삽발거
(Repeated
Insertion
/Withdrawal**

- Test Item : 반복삽발거(Repeated Insertion/Withdrawal)
- 1. Equipments : Contact Resistance Tester
- 2. Manufacturers / Models : CR-System
- 3. Test Environment : Measured contact resistance variation after 30 cycles of total insertion and withdrawal operation. (10th/min.)
- 4. 시험항목(Review item) :
 - 1) Procedure : Electrical Performances
Total insertion withdrawal force are measured
 - 2) Spec : Contact Resistance - 30mΩ Max.
Insulation Resistance - 1000MΩ Min.
Dielectric Strength - No Breakdown
Total Insertion Force - Locking 0.2~2.5kgf
Unlocking 0.1~2.0kgf
Total Withdrawal Force - Locking 1.0~6.0kgf
Unlockong 0.1~2.5kgf
Appearance - No Damage
Below 60% campared with the initial measured value

**DATA
SHEET**

Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	initial	5.56	6.30	6.03	OK
	After	5.97	6.79	6.41	OK
	Variation	2%	15%	6%	OK
이관후	initial	5.88	6.31	6.06	OK
	After	6.20	6.69	6.48	OK
	Variation	1%	13%	7%	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.36	0.44	0.39	OK
	Unlocking	0.29	0.29	0.29	OK
이관후	Locking	0.35	0.44	0.40	OK
	Unlocking	0.29	0.29	0.29	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	3.06	3.13	3.10	OK
	Unlocking	0.21	0.22	0.22	OK
이관후	Locking	3.07	3.15	3.10	OK
	Unlocking	0.21	0.22	0.22	OK

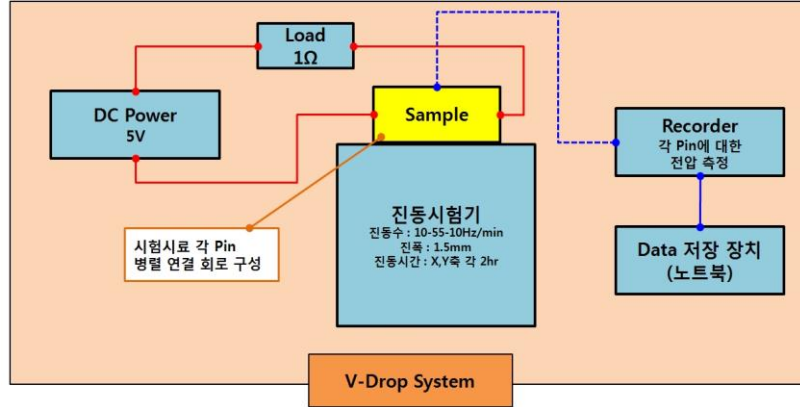
Appearance(Sample 15EA) <Unit:kgf>

Step	Sample1	Sample2	Sample3	Decision	
이관전	Before	OK	OK	OK	OK
	After	OK	OK	OK	OK
이관후	Before	OK	OK	OK	OK
	After	OK	OK	OK	OK

14. 내진동성 (Vibration)

■ Test Item : 내진동성(Vibration)

- 1. Equipments : Vibration Tester
- 2. Manufacturers / Models : -
- 3. Test Environment : 1.52mm P-P, 10-55-10 Hz in 1 minute, 2 Hours in each X,Y,Z axes

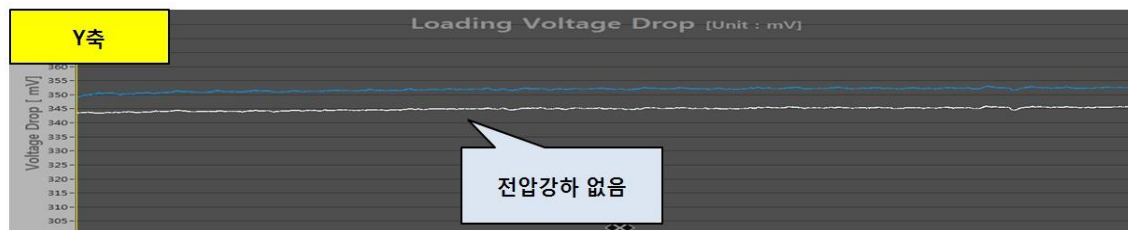


4. 시험항목(Review item) : V-drop

- 1) Procedure :
- 2) Spec : -

DATA SHEET

Step	X축	SPL 1	SPL 2	SPL 3	SPL 4	SPL 5	SPL 6	SPL 7	SPL 8	SPL 9	SPL 10
이관 전	Min	355.831	341.062	354.639	346.42	355.981	344.518	356.395	344.41	356.065	344.096
	Max	358.92	346.837	356.452	347.82	359.537	347.124	358.437	345.977	357.714	345.702
	Δ V	3.089	5.775	1.813	1.4	3.557	2.606	2.042	1.567	1.649	1.607
	변화율	0.9%	1.7%	0.5%	0.4%	1.0%	0.8%	0.6%	0.5%	0.5%	0.5%
Step	Y축	SPL 11	SPL 12	SPL 13	SPL 14	SPL 15	SPL 16	SPL 17	SPL 18	SPL 19	SPL 20
이관 전	Min	349.151	343.32	351.99	344.936	352.601	345.083	351.357	341.062	354.947	341.266
	Max	353.204	346.078	354.233	346.524	353.922	346.171	356.163	344.555	355.727	342.74
	Δ V	4.054	2.758	2.243	1.588	1.321	1.088	4.806	3.493	0.78	1.474
	변화율	1.2%	0.8%	0.6%	0.5%	0.4%	0.3%	1.4%	1.0%	0.2%	0.4%
Step	X축	SPL 1	SPL 2	SPL 3	SPL 4	SPL 5	SPL 6	SPL 7	SPL 8	SPL 9	SPL 10
이관 후	Min	352.596	352.242	352.741	352.432	352.191	352.213	352.388	352.58	352.598	352.174
	Max	355.369	355.772	354.445	357.344	356.801	356.757	354.141	357.022	355.78	354.973
	Δ V	2.773	3.53	1.704	4.912	4.61	4.544	1.753	4.442	3.182	2.799
	변화율	0.8%	1.0%	0.5%	1.4%	1.3%	1.3%	0.5%	1.2%	0.9%	0.8%
Step	Y축	SPL 11	SPL 12	SPL 13	SPL 14	SPL 15	SPL 16	SPL 17	SPL 18	SPL 19	SPL 20
이관 후	Min	352.469	352.703	352.765	352.353	352.675	352.387	352.616	352.763	352.44	352.565
	Max	354.888	352.862	357.256	357.284	357.422	354.578	354.208	353.055	355.123	355.867
	Δ V	2.419	0.159	4.491	4.931	4.747	2.191	1.592	0.292	2.683	3.302
	변화율	0.7%	0.0%	1.3%	1.4%	1.3%	0.6%	0.4%	0.1%	0.8%	0.9%



**15. 내열성
(Heat Resistance)**

- Test Item : 내열성(Heat Resistance)
- 1. Equipments : Heat Resistance Tester
- 2. Manufacturers / Models : HANYOUNG
- 3. Test Environment : Temperature - 85±2°C
Duration - Exposed 2hr after being exposed 96 hours.
- 4. 시험항목(Review item) :
 - 1) Procedure : Electrical Performances
Total insertion withdrawal force are measured
 - 2) Spec : Contact Resistance - 30mΩ Max.
Insulation Resistance - 1000MΩ Min.
Dielectric Strength - No Breakdown
Total Insertion Force - Locking 0.2~2.5kgf
Unlocking 0.1~2.0kgf
Total Withdrawal Force - Locking 1.0~6.0kgf
Unlockong 0.1~2.5kgf
Appearance - No Damage

DATA SHEET

Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.79	7.86	6.66	OK
	After	6.49	8.77	7.59	OK
이관후	Before	5.53	6.34	6.00	OK
	After	5.51	6.46	6.04	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.62	0.72	0.67	OK
	Unlocking	0.47	0.53	0.50	OK
이관후	Locking	0.56	0.60	0.58	OK
	Unlocking	0.40	0.42	0.41	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	4.25	4.29	4.27	OK
	Unlocking	0.31	0.36	0.34	OK
이관후	Locking	3.34	4.63	3.98	OK
	Unlocking	0.30	0.40	0.35	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision	
이관전	Before	OK	OK	OK	OK
	After	OK	OK	OK	OK
이관후	Before	OK	OK	OK	OK
	After	OK	OK	OK	OK

**16. 내습성
(Humidity)**

- Test Item : 내습성(Humidity)
 1. Equipments : Humidity Tester
 2. Manufacturers / Models : HONEYWELL
 3. Test Environment : Temperature 40±2°C, Humidity 90~95%
 Duration - Exposed 2hr after being exposed 96 hours.
 4. 시험항목(Review item) :
 1) Procedure : Electrical Performances
 Total insertion withdrawal force are measured
 2) Spec : Contact Resistance - 30mΩ Max.
 Insulation Resistance - 1000MΩ Min.
 Dielectric Strength - No Breakdown
 Total Insertion Force - Locking 0.2~2.5kgf
 Unlocking 0.1~2.0kgf
 Total Withdrawal Force - Locking 1.0~6.0kgf
 Unlockong 0.1~2.5kgf
 Appearance - No Damage

**DATA
SHEET**
Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.53	7.89	6.54	OK
	After	6.85	8.51	7.81	OK
이관후	Before	5.61	6.46	6.02	OK
	After	5.61	6.46	6.02	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.42	0.45	0.43	OK
	Unlocking	0.36	0.38	0.37	OK
이관후	Locking	0.56	0.60	0.57	OK
	Unlocking	0.40	0.42	0.41	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	2.58	3.07	2.87	OK
	Unlocking	0.21	0.25	0.23	OK
이관후	Locking	3.02	3.91	3.36	OK
	Unlocking	0.20	0.30	0.26	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision
이관전	Before	OK	OK	OK
	After	OK	OK	OK
이관후	Before	OK	OK	OK
	After	OK	OK	OK

**17. 내한성
(Cold Resistance)**

- Test Item : 내한성(Cold Resistance)
- 1. Equipments : Cold Resistance Tester
- 2. Manufacturers / Models : HONEYWELL
- 3. Test Environment : Duration - 96 hours
Temperature - $-40\pm 2^{\circ}\text{C}$
- 4. 시험항목(Review item) :
 - 1) Procedure : Electrical Performances
Total insertion withdrawal force are measured
 - 2) Spec : Contact Resistance - 30mΩ Max.
Insulation Resistance - 1000MΩ Min.
Dielectric Strength - No Breakdown
Total Insertion Force - Locking 0.2~2.5kgf
Unlocking 0.1~2.0kgf
Total Withdrawal Force - Locking 1.0~6.0kgf
Unlockong 0.1~2.5kgf
Appearance - No Damage

DATA SHEET

Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.54	6.93	6.10	OK
	After	6.93	8.41	7.62	OK
이관후	Before	5.62	6.50	6.08	OK
	After	5.62	6.50	6.08	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.56	0.59	0.57	OK
	Unlocking	0.42	0.45	0.43	OK
이관후	Locking	0.56	0.60	0.58	OK
	Unlocking	0.40	0.42	0.41	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	3.54	3.60	3.56	OK
	Unlocking	0.20	0.23	0.21	OK
이관후	Locking	3.06	3.89	3.55	OK
	Unlocking	0.20	0.30	0.25	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision
이관전	Before	OK	OK	OK
	After	OK	OK	OK
이관후	Before	OK	OK	OK
	After	OK	OK	OK

**19. 열충격
(Damage Heat)**

- Test Item : 열충격(Damage Heat)
- 1. Equipments : Thermal Shock Tester
- 2. Manufacturers / Models : HONEYWELL
- 3. Test Environment : a) 55°C(30minutes) →
b)+85°C(30minutes) 5Cycle
- 4. 시험항목(Review item) :
 - 1) Procedure : Electrical Performances
Total insertion withdrawal force are measured
 - 2) Spec : Contact Resistance - 30mΩ Max.
Insulation Resistance - 1000MΩ Min.
Dielectric Strength - No Breakdown
Total Insertion Force - Locking 0.2~2.5kgf
Unlocking 0.1~2.0kgf
Total Withdrawal Force - Locking 1.0~6.0kgf
Unlockong 0.1~2.5kgf
Appearance - No Damage

**DATA
SHEET**

Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.83	7.80	6.57	OK
	After	6.58	9.94	8.00	OK
이관후	Before	5.63	7.99	6.61	OK
	After	5.56	8.42	6.95	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.67	0.74	0.71	OK
	Unlocking	0.57	0.61	0.59	OK
이관후	Locking	0.67	0.74	0.71	OK
	Unlocking	0.57	0.61	0.59	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	4.42	4.77	4.60	OK
	Unlocking	0.31	0.35	0.33	OK
이관후	Locking	3.14	3.98	3.59	OK
	Unlocking	0.20	0.30	0.27	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision
이관전	Before	OK	OK	OK
	After	OK	OK	OK
이관후	Before	OK	OK	OK
	After	OK	OK	OK

20. 암모니아 (NH3)

- Test Item : 암모니아(NH3)
 1. Equipments : -
 2. Manufacturers / Models : -
 3. Test Environment : Duration - 40minute, Temperature - 25±2°C,
 Atmosphere - NH3 gas evaporating from a 28% Ammonia solution.
 4. 시험항목(Review item) :
 1) Procedure : Electrical Performances
 Total insertion withdrawal force are measured
 2) Spec : Contact Resistance - 30mΩ Max.
 Insulation Resistance - 1000MΩ Min.
 Dielectric Strength - No Breakdown
 Total Insertion Force - Locking 0.2~2.5kgf
 Unlocking 0.1~2.0kgf
 Total Withdrawal Force - Locking 1.0~6.0kgf
 Unlockong 0.1~2.5kgf
 Appearance - No Damage

DATA SHEET

Contact Resistance(Sample 10EA) <Unit:mΩ>

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.53	7.11	6.19	OK
	After	6.14	10.86	7.86	OK
이관후	Before	5.92	7.11	6.33	OK
	After	7.06	9.72	8.51	OK

Insulation Resistance(Sample 10EA) <Unit:MΩ>

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 ↑	1000 ↑	1000 ↑	OK
이관 후	1000 ↑	1000 ↑	1000 ↑	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.40	0.49	0.44	OK
	Unlocking	0.31	0.36	0.33	OK
이관후	Locking	0.57	0.60	0.58	OK
	Unlocking	0.40	0.42	0.41	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	2.53	2.91	2.73	OK
	Unlocking	0.22	0.26	0.24	OK
이관후	Locking	3.00	3.98	3.53	OK
	Unlocking	0.22	0.29	0.25	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision
이관전	Before	OK	OK	OK
	After	OK	OK	OK
이관후	Before	OK	OK	OK
	After	OK	OK	OK

**21. 염수분무
(Salt Spray)**

- Test Item : 염수분무(Salt Spray)
 1. Equipments : Salt Spray Tester
 2. Manufacturers / Models : SAMWON
 3. Test Environment : Temperature - $35\pm 2^{\circ}\text{C}$, Solution - $5\pm 1\%$
 Duration - 48HR \pm 4HR(Spray 8hr and Pause 16Hr. 2Cycles)
 4. 시험항목(Review item) :
 1) Procedure : Electrical Performances
 Total insertion withdrawal force are measured
 2) Spec : Contact Resistance - 30m Ω Max.
 Insulation Resistance - 1000M Ω Min.
 Dielectric Strength - No Breakdown
 Total Insertion Force - Locking 0.2~2.5kgf
 Unlocking 0.1~2.0kgf
 Total Withdrawal Force - Locking 1.0~6.0kgf
 Unlockong 0.1~2.5kgf
 Appearance - No Damage

**DATA
SHEET**
Contact Resistance(Sample 10EA) <Unit:m Ω >

Step	Min.	Max.	Avg.	Decision	
이관전	Before	5.57	7.68	6.36	OK
	After	5.71	8.45	7.18	OK
이관후	Before	5.52	6.41	5.91	OK
	After	5.52	6.41	5.91	OK

Insulation Resistance(Sample 10EA) <Unit:M Ω >

Step	Sample1	Sample2	Sample3	Decision
이관 전	1000 \uparrow	1000 \uparrow	1000 \uparrow	OK
이관 후	1000 \uparrow	1000 \uparrow	1000 \uparrow	OK

Dielectric Strength(Sample 10EA)

Step	Sample1	Sample2	Sample3	Decision
이관 전	Pass	Pass	Pass	OK
이관 후	Pass	Pass	Pass	OK

Total Insertion Force(Sample 15EA) <Unit:kgf>



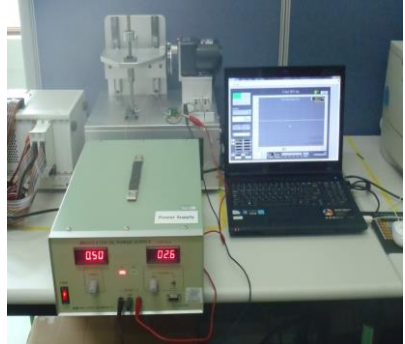






Step	Min.	Max.	Avg.	Decision	
이관전	Locking	0.43	0.61	0.50	OK
	Unlocking	0.44	0.51	0.47	OK
이관후	Locking	0.57	0.60	0.58	OK
	Unlocking	0.40	0.42	0.41	OK

Total Withdrawal Force(Sample 15EA) <Unit:kgf>

Step	Min.	Max.	Avg.	Decision	
이관전	Locking	1.71	1.80	1.75	OK
	Unlocking	0.38	0.45	0.41	OK
이관후	Locking	1.48	1.61	1.52	OK
	Unlocking	0.20	0.24	0.22	OK

Appearance

Step	Sample1	Sample2	Sample3	Decision
이관전	Before	OK	OK	OK
	After	OK	OK	OK
이관후	Before	OK	OK	OK
	After	OK	OK	OK

<p>KEITHLEY</p>	<p>CHROMA</p>	<p>AIKOH</p>
<p>Contact Resistance Tester</p>	<p>Insulation Resistance/Dielectric Strength</p>	<p>Push-Pull Gauge</p>
		
<p>-</p>	<p>HONEYWELL</p>	<p>HONEYWELL</p>
<p>Shock Tester</p>	<p>Humidity / Cold Tester</p>	<p>Damage Heat Tester</p>
		
<p>HANYOUNG</p>	<p>SAMWON</p>	<p>-</p>
<p>Heat Resistance Tester</p>	<p>Salt Spray Tester</p>	<p>Vibration Tester</p>
		
<p>-</p>	<p>YOKOGAWA</p>	<p>HANYOUNG</p>
<p>Ammonia Gas Tester</p>	<p>Recorder</p>	<p>Power Supply</p>
		

1. 접촉저항 <단위:mΩ>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	Min.	Max.	Avg.
이관 전	8.17	8.42	7.98	8.16	8.00	8.32	8.02	8.34	8.27	8.12	7.98	8.42	8.18
이관 후	8.30	8.11	8.31	8.37	8.16	8.10	8.36	8.44	8.43	8.24	8.10	8.44	8.28

2. 절연저항 <단위:mΩ>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	Min.	Max.	Avg.
이관 전	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑			
이관 후	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑	1000 ↑			

3. 내전압 <단위:mΩ>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	Min.	Max.	Avg.
이관 전	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass			
이관 후	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass			

4. 온도상승 <단위:mΩ>

Step	n1	n2	n3	n4	n5	n6	Min.	Max.	Avg.
이관 전	24.49	26.01	21.88	22.6	19.15	20.8	19.15	26.01	22.49
이관 후	21.6	26.37	26.24	24.78	21.19	25.8	21.19	26.37	24.33

7. Terminal Gap 변화량 <단위:mm>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	n16	n17	n18	
이관 전	initial	0.298	0.288	0.293	0.294	0.301	0.296	0.306	0.291	0.311	0.312	0.307	0.311	0.292	0.300	0.298	0.291	0.307	0.292
	After	0.364	0.367	0.353	0.365	0.345	0.347	0.354	0.344	0.369	0.354	0.366	0.347	0.348	0.346	0.370	0.359	0.349	0.341
	Variation	22%	27%	20%	24%	15%	17%	16%	18%	19%	13%	19%	12%	19%	15%	24%	13%	16%	18%
	Step	n19	n20	n21	n22	n23	n24	n25	n26	n27	n28	n29	n30	Min.	Max.	Avg.			
	initial	0.305	0.289	0.297	0.299	0.304	0.293	0.292	0.291	0.299	0.304	0.309	0.302	0.29	0.31	0.30			
	After	0.354	0.363	0.367	0.341	0.357	0.356	0.354	0.341	0.353	0.365	0.361	0.359	0.34	0.37	0.36			
Variation	16%	26%	24%	14%	17%	22%	21%	17%	18%	20%	17%	19%	11.6%	27.4%	18.6%				
이관 후	initial	0.298	0.311	0.300	0.301	0.302	0.295	0.302	0.288	0.288	0.311	0.307	0.292	0.304	0.309	0.289	0.292	0.292	0.294
	After	0.362	0.358	0.361	0.346	0.355	0.343	0.341	0.354	0.355	0.366	0.344	0.348	0.367	0.346	0.365	0.359	0.348	0.356
	Variation	21%	15%	20%	15%	18%	16%	13%	23%	23%	18%	12%	19%	21%	12%	26%	19%	22%	16%
	Step	n19	n20	n21	n22	n23	n24	n25	n26	n27	n28	n29	n30	Min.	Max.	Avg.			
	initial	0.290	0.301	0.288	0.300	0.293	0.287	0.308	0.294	0.307	0.295	0.311	0.303	0.29	0.31	0.30			
	After	0.349	0.361	0.342	0.369	0.360	0.350	0.344	0.363	0.358	0.359	0.351	0.349	0.34	0.37	0.35			
Variation	21%	20%	19%	23%	23%	22%	12%	23%	17%	22%	13%	15%	11.7%	26.3%	18.6%				

5. 총합 삽입력 <단위:kgf>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.	
이관 전	Locking	0.58	0.58	0.56	0.57	0.59	0.58	0.58	0.57	0.58	0.57	0.57	0.59	0.6	0.58	0.58	0.56	0.60	0.58
	Unlocking	0.4	0.42	0.42	0.41	0.42	0.4	0.4	0.41	0.41	0.42	0.4	0.42	0.41	0.42	0.40	0.40	0.42	0.41
이관 후	Locking	0.58	0.57	0.56	0.56	0.56	0.56	0.57	0.56	0.58	0.58	0.56	0.57	0.57	0.59	0.56	0.59	0.57	
	Unlocking	0.41	0.41	0.4	0.41	0.4	0.4	0.41	0.41	0.41	0.4	0.41	0.41	0.42	0.41	0.40	0.40	0.42	0.41

6. 총합 발거력 <단위:kgf>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.	
이관 전	Before	3.5	3.59	3.61	3.5	3.49	3.56	3.56	3.60	3.61	3.55	3.55	3.61	3.54	3.59	3.46	3.46	3.61	3.55
	After	0.23	0.22	0.20	0.22	0.21	0.22	0.21	0.21	0.23	0.24	0.2	0.20	0.22	0.21	0.21	0.20	0.24	0.22
이관 후	Before	3.53	3.54	3.54	3.51	3.51	3.57	3.52	3.51	3.53	3.51	3.58	3.46	3.52	3.55	3.51	3.46	3.58	3.53
	After	0.24	0.22	0.21	0.2	0.22	0.22	0.22	0.23	0.2	0.21	0.2	0.23	0.22	0.21	0.20	0.20	0.24	0.22

7. 단자 삽입력 <단위:kgf>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.	
이관 전	Male	0.43	0.39	0.41	0.42	0.42	0.41	0.40	0.4	0.42	0.4	0.43	0.41	0.4	0.41	0.40	0.39	0.43	0.41
	Female	0.48	0.47	0.47	0.48	0.48	0.48	0.48	0.47	0.47	0.48	0.47	0.47	0.47	0.48	0.48	0.47	0.48	0.47
이관 후	Male	0.48	0.45	0.41	0.47	0.47	0.5	0.45	0.51	0.44	0.42	0.47	0.44	0.46	0.51	0.54	0.41	0.54	0.47
	Female	0.42	0.44	0.5	0.47	0.47	0.45	0.53	0.44	0.49	0.48	0.43	0.4	0.43	0.40	0.50	0.40	0.53	0.46

8. 단자 유지력 <단위:kgf>

Step	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.	
이관 전	Male	3.43	3.82	3.88	4.09	3.63	3.43	3.98	3.62	4.26	3.77	3.88	3.51	3.79	4.35	4	3.43	4.35	3.83
	Female	2.45	2.69	2.60	2.57	2.32	2.41	2.33	2.59	2.47	2.68	2.70	2.72	2.47	2.43	2.64	2.32	2.72	2.54
이관 후	Male	4.46	4.03	3.71	3.5	4.86	3.88	4.52	3.72	4.71	4.25	3.58	4.84	4.59	4.23	3.81	3.50	4.86	4.18
	Female	2.11	2.96	2.46	3.22	2.57	3.09	3.24	2.38	2.96	3.16	3.25	2.98	2.48	2.64	3.02	2.11	3.25	2.83

9. 단일 삽입력 <단위:kgf>

Step		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.
이관 전	initial	0.157	0.154	0.164	0.154	0.152	0.155	0.152	0.168	0.159	0.154	0.157	0.156	0.164	0.165	0.167	0.152	0.168	0.159
	After	0.086	0.083	0.088	0.082	0.089	0.088	0.088	0.085	0.09	0.085	0.082	0.087	0.081	0.082	0.084	0.081	0.090	0.085
	Variation	45%	46%	46%	47%	41%	43%	42%	49%	43%	45%	48%	44%	51%	50%	50%	40%	51%	46%
이관 후	initial	0.164	0.163	0.176	0.155	0.165	0.170	0.171	0.165	0.167	0.155	0.174	0.176	0.174	0.158	0.152	0.152	0.176	0.166
	After	0.092	0.089	0.084	0.084	0.089	0.090	0.092	0.090	0.088	0.087	0.090	0.087	0.086	0.085	0.093	0.084	0.093	0.088
	Variation	44%	45%	52%	46%	46%	47%	46%	45%	47%	44%	48%	51%	51%	46%	39%	39%	52%	47%

10. 단일 발거력 <단위:kgf>

Step		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.
이관 전	initial	0.120	0.124	0.116	0.122	0.117	0.124	0.117	0.116	0.123	0.113	0.117	0.118	0.114	0.122	0.120	0.113	0.124	0.119
	After	0.058	0.061	0.058	0.067	0.060	0.059	0.067	0.060	0.065	0.066	0.062	0.065	0.061	0.067	0.063	0.058	0.067	0.063
	Variation	52%	51%	50%	45%	49%	52%	43%	48%	47%	42%	47%	45%	46%	45%	48%	42%	52%	47%
이관 후	initial	0.124	0.117	0.111	0.124	0.126	0.121	0.122	0.126	0.112	0.114	0.113	0.117	0.120	0.114	0.125	0.111	0.126	0.119
	After	0.068	0.068	0.059	0.061	0.068	0.058	0.066	0.062	0.065	0.068	0.058	0.064	0.067	0.065	0.066	0.058	0.068	0.064
	Variation	45%	42%	47%	51%	46%	52%	46%	51%	42%	40%	49%	45%	44%	43%	47%	40%	52%	46%

11. 압착부 인장강도 <단위:kgf>

Step		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	Min.	Max.	Avg.
이관 전	Male Terminal	6.72	6.47	6.63	6.79	6.70	6.39	6.51	6.70	6.69	6.56	6.65	6.70	6.44	6.73	6.58	6.39	6.79	6.62
	Female Terminal	6.43	6.11	6.58	6.44	6.26	6.13	6.34	6.13	6.14	6.54	6.27	6.45	6.19	6.32	6.42	6.11	6.58	6.32
이관 후	Male Terminal	6.66	6.70	6.43	6.58	6.88	6.45	6.48	6.91	6.84	6.84	6.64	6.59	6.81	6.63	6.58	6.43	6.91	6.67
	Female Terminal	6.25	6.16	6.04	6.53	6.33	6.47	6.22	6.18	6.17	6.06	6.09	6.15	6.50	6.04	6.51	6.04	6.53	6.25

12. 반복삽발거 <단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10								
이관 전	initial	5.65	6.24	5.68	6.14	5.56	6.11	6.30	6.24	6.19	6.20						5.56	6.30	6.03
	After	5.97	6.53	6.06	6.43	6.41	6.63	6.51	6.35	6.79	6.37						5.97	6.79	6.41
	Variation	6%	5%	7%	5%	15%	9%	3%	2%	10%	3%						1.8%	15.3%	6.3%
이관 후	initial	6.09	6.06	6.31	5.88	6.02	6.20	5.93	5.88	6.18	6.01						5.88	6.31	6.06
	After	6.47	6.20	6.37	6.66	6.45	6.69	6.58	6.33	6.33	6.69						6.20	6.69	6.48
	Variation	6%	2%	1%	13%	7%	8%	11%	8%	2%	11%						1.0%	13.3%	7.0%

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Locking	0.40	0.36	0.36	0.36	0.38	0.44	0.41	0.36	0.42	0.37	0.38	0.43	0.41	0.41	0.40	0.36	0.44	0.39
	Unlocking	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
이관 후	Locking	0.43	0.44	0.44	0.35	0.39	0.42	0.38	0.39	0.35	0.40	0.38	0.42	0.39	0.40	0.43	0.35	0.44	0.40
	Unlocking	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Locking	3.1	3.06	3.13	3.11	3.10	3.08	3.1	3.08	3.13	3.08	3.08	3.07	3.13	3.13	3.12	3.06	3.13	3.10
	Unlocking	0.21	0.21	0.21	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.21	0.22	0.22	0.22	0.22	0.21	0.22	0.22
이관 후	Locking	3.07	3.09	3.09	3.11	3.11	3.15	3.07	3.14	3.08	3.08	3.08	3.11	3.1	3.14	3.12	3.07	3.15	3.10
	Unlocking	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.21	0.21	0.22	0.22	0.21	0.22	0.22

13. 내진동성 <단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10								
이관 전	Before	5.48	5.81	5.80	5.90	5.84	5.72	5.87	5.58	5.88	5.77						5.48	5.90	5.77
	After	6.71	6.31	6.18	6.26	6.55	6.34	6.59	6.56	6.28	6.48						6.18	6.71	6.43
이관 후	Before	5.56	5.82	5.62	5.71	5.84	5.86	5.58	5.69	5.61	5.70						5.56	5.86	5.70
	After	6.60	6.11	6.30	6.60	6.25	6.57	6.12	6.59	6.51	6.43						6.11	6.60	6.41

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Before	0.59	0.59	0.58	0.58	0.58	0.59	0.57	0.59	0.58	0.58	0.57	0.58	0.57	0.58	0.58	0.57	0.59	0.58
	After	0.42	0.42	0.40	0.41	0.41	0.42	0.42	0.41	0.41	0.41	0.41	0.41	0.40	0.40	0.41	0.40	0.42	0.41
이관 후	Before	0.50	0.58	0.54	0.48	0.57	0.60	0.44	0.54	0.62	0.48	0.64	0.47	0.46	0.57	0.48	0.44	0.64	0.53
	After	0.59	0.63	0.52	0.41	0.55	0.50	0.63	0.48	0.45	0.60	0.41	0.49	0.44	0.62	0.57	0.41	0.63	0.53

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Before	3.12	3.11	3.13	3.10	3.10	3.12	3.14	3.13	3.11	3.12	3.14	3.13	3.13	3.11	3.12	3.10	3.14	3.12
	After	0.23	0.23	0.23	0.23	0.23	0.22	0.23	0.22	0.23	0.22	0.23	0.24	0.23	0.22	0.23	0.22	0.24	0.23
이관 후	Before	3.34	3.56	3.77	3.86	3.44	3.38	3.23	3.84	3.15	3.20	3.16	3.25	3.48	3.25	3.37	3.15	3.86	3.42
	After	0.20	0.22	0.24	0.26	0.21	0.24	0.24	0.20	0.23	0.25	0.22	0.26	0.21	0.25	0.22	0.20	0.26	0.23

14. 내열성

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	5.79	6.17	7.22	7.86	6.04	6.07	7.21	5.88	7.45	6.92							5.79	7.86	6.66
	After	6.49	6.71	8.67	8.77	7.24	6.72	8.06	6.84	8.48	7.89							6.49	8.77	7.59
이관 후	Before	5.68	6.29	5.88	5.74	5.53	6.23	6.34	5.92	6.07	6.34							5.53	6.34	6.00
	After	6.34	5.51	6.12	6.46	6.29	5.81	6.16	5.51	6.45	5.76							5.51	6.46	6.04

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.72	0.62	0.63	0.67	0.66	0.67	0.68	0.72	0.64	0.69	0.64	0.67	0.71	0.64	0.64		0.62	0.72	0.67
	Unlocking	0.47	0.53	0.49	0.52	0.50	0.48	0.52	0.48	0.50	0.51	0.52	0.47	0.52	0.52	0.48		0.47	0.53	0.50
이관 후	Locking	0.57	0.60	0.56	0.57	0.60	0.59	0.59	0.58	0.60	0.57	0.58	0.58	0.57	0.60	0.56		0.56	0.60	0.58
	Unlocking	0.42	0.42	0.40	0.42	0.42	0.42	0.42	0.42	0.42	0.41	0.41	0.40	0.41	0.40	0.42		0.40	0.42	0.41

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	4.25	4.29	4.26	4.29	4.26	4.26	4.28	4.28	4.28	4.26	4.28	4.29	4.25	4.27	4.28		4.25	4.29	4.27
	Unlocking	0.31	0.36	0.33	0.32	0.35	0.35	0.31	0.35	0.32	0.35	0.33	0.36	0.31	0.34	0.36		0.31	0.36	0.34
이관 후	Locking	4.63	4.54	3.77	4.35	3.68	4.46	4.31	3.42	3.34	3.39	4.27	4.23	3.93	3.62	3.77		3.34	4.63	3.98
	Unlocking	0.33	0.33	0.32	0.36	0.35	0.40	0.32	0.35	0.30	0.38	0.37	0.33	0.35	0.37	0.35		0.30	0.40	0.35

15. 내습성

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	6.65	6.93	6.19	7.89	6.07	6.41	5.53	7.79	6.22	5.72							5.53	7.89	6.54
	After	8.21	7.88	7.93	8.51	6.85	8.39	7.63	8.01	7.24	7.46							6.85	8.51	7.81
이관 후	Before	6.46	6.07	5.61	5.67	6.09	5.79	6.34	5.72	6.28	6.14							5.61	6.46	6.02
	After	6.46	6.07	5.61	5.67	6.09	5.79	6.34	5.72	6.28	6.14							5.61	6.46	6.02

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.45	0.42	0.44	0.42	0.42	0.45	0.44	0.44	0.45	0.44	0.44	0.43	0.45	0.43	0.42		0.42	0.45	0.43
	Unlocking	0.36	0.38	0.37	0.38	0.36	0.37	0.38	0.38	0.38	0.37	0.38	0.36	0.36	0.37	0.38		0.36	0.38	0.37
이관 후	Locking	0.57	0.56	0.58	0.59	0.59	0.58	0.56	0.56	0.58	0.56	0.60	0.58	0.56	0.58	0.58		0.56	0.60	0.57
	Unlocking	0.40	0.42	0.40	0.41	0.41	0.40	0.42	0.40	0.41	0.41	0.42	0.40	0.42	0.40	0.41		0.40	0.42	0.41

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	3.07	2.58	2.93	2.95	3.00	2.98	2.84	2.99	2.77	2.67	3.03	2.72	2.93	2.74	2.79		2.58	3.07	2.87
	Unlocking	0.21	0.25	0.22	0.24	0.22	0.24	0.24	0.22	0.22	0.23	0.24	0.23	0.23	0.22	0.24		0.21	0.25	0.23
이관 후	Locking	3.06	3.09	3.56	3.56	3.91	3.71	3.65	3.34	3.65	3.26	3.18	3.13	3.02	3.08	3.28		3.02	3.91	3.36
	Unlocking	0.29	0.30	0.20	0.23	0.29	0.28	0.21	0.27	0.22	0.29	0.25	0.29	0.25	0.24	0.30		0.20	0.30	0.26

16. 내한성

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	5.54	6.33	6.93	6.13	6.14	6.23	5.96	5.81	6.21	5.73							5.54	6.93	6.10
	After	6.93	8.41	8.20	8.01	6.94	7.56	7.11	7.03	8.23	7.82							6.93	8.41	7.62
이관 후	Before	6.36	5.74	5.86	6.37	5.62	6.50	5.68	6.23	5.97	6.44							5.62	6.50	6.08
	After	6.36	5.74	5.86	6.37	5.62	6.50	5.68	6.23	5.97	6.44							5.62	6.50	6.08

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.59	0.57	0.56	0.58	0.58	0.59	0.59	0.57	0.56	0.57	0.56	0.57	0.57	0.57	0.58		0.56	0.59	0.57
	Unlocking	0.42	0.43	0.45	0.45	0.42	0.44	0.45	0.44	0.45	0.43	0.42	0.43	0.43	0.42	0.44		0.42	0.45	0.43
이관 후	Locking	0.56	0.57	0.58	0.58	0.57	0.60	0.59	0.56	0.57	0.59	0.57	0.58	0.59	0.58	0.60		0.56	0.60	0.58
	Unlocking	0.42	0.42	0.40	0.41	0.40	0.40	0.41	0.40	0.41	0.40	0.42	0.41	0.42	0.41	0.40		0.40	0.42	0.41

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	3.54	3.60	3.55	3.57	3.55	3.58	3.54	3.56	3.58	3.58	3.56	3.57	3.55	3.56	3.54		3.54	3.60	3.56
	Unlocking	0.23	0.20	0.23	0.22	0.21	0.22	0.21	0.20	0.22	0.22	0.22	0.21	0.20	0.23	0.21		0.20	0.23	0.21
이관 후	Locking	3.83	3.38	3.26	3.41	3.64	3.50	3.64	3.06	3.50	3.56	3.52	3.89	3.85	3.51	3.78		3.06	3.89	3.55
	Unlocking	0.28	0.30	0.24	0.24	0.27	0.25	0.27	0.22	0.24	0.27	0.27	0.20	0.26	0.21	0.22		0.20	0.30	0.25

17. 내충격성

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	5.94	5.70	5.63	5.50	5.53	6.09	5.57	5.78	5.53	5.71							5.50	6.09	5.70
	After	6.02	6.32	6.58	6.50	6.06	6.36	6.16	6.52	6.44	6.57							6.02	6.58	6.35
이관 후	Before	5.84	5.69	5.65	6.06	6.02	6.34	5.80	5.61	5.63	5.69							5.61	6.34	5.83
	After	5.84	5.69	5.65	6.06	6.02	6.34	5.80	5.61	5.63	5.69							5.61	6.34	5.83

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.57	0.57	0.58	0.58	0.57	0.57	0.58	0.58	0.58	0.57	0.57	0.58	0.57	0.58	0.57	0.57	0.57	0.58	0.57
	Unlocking	0.42	0.40	0.42	0.40	0.42	0.42	0.41	0.42	0.41	0.40	0.42	0.41	0.40	0.40	0.41	0.40	0.42	0.42	0.41
이관 후	Locking	0.43	0.37	0.36	0.36	0.43	0.44	0.38	0.42	0.41	0.39	0.36	0.44	0.38	0.43	0.45		0.36	0.45	0.40
	Unlocking	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	3.12	3.10	3.11	3.12	3.12	3.10	3.10	3.11	3.12	3.12	3.11	3.11	3.11	3.12	3.12		3.10	3.12	3.11
	Unlocking	0.23	0.25	0.21	0.22	0.23	0.23	0.24	0.24	0.25	0.22	0.22	0.24	0.24	0.23	0.24		0.21	0.25	0.23
이관 후	Locking	3.59	3.46	3.55	3.52	3.60	3.60	3.49	3.58	3.52	3.58	3.53	3.47	3.47	3.49	3.49		3.46	3.60	3.53
	Unlocking	0.22	0.21	0.20	0.21	0.24	0.21	0.21	0.24	0.23	0.23	0.24	0.24	0.24	0.23	0.23		0.20	0.24	0.22

18. 열충격

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	7.54	7.80	7.37	5.99	6.87	6.27	5.92	6.13	6.03	5.83							5.83	7.80	6.57
	After	8.71	8.28	9.94	6.58	8.51	8.13	6.68	7.21	8.19	7.78							6.58	9.94	8.00
이관 후	Before	5.70	5.63	7.99	7.90	6.20	5.73	7.16	6.78	5.73	7.25							5.63	7.99	6.61
	After	8.42	7.17	6.34	7.94	5.69	7.94	5.56	6.14	6.07	8.28							5.56	8.42	6.95

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.74	0.67	0.69	0.72	0.73	0.69	0.69	0.72	0.68	0.71	0.69	0.73	0.73	0.73	0.69		0.67	0.74	0.71
	Unlocking	0.61	0.57	0.57	0.57	0.60	0.59	0.60	0.61	0.61	0.59	0.58	0.57	0.60	0.58	0.58		0.57	0.61	0.59
이관 후	Locking	0.74	0.67	0.69	0.72	0.73	0.69	0.69	0.72	0.68	0.71	0.69	0.73	0.73	0.73	0.69		0.67	0.74	0.71
	Unlocking	0.61	0.57	0.57	0.57	0.60	0.59	0.60	0.61	0.61	0.59	0.58	0.57	0.60	0.58	0.58		0.57	0.61	0.59

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	4.77	4.42	4.45	4.52	4.56	4.74	4.49	4.67	4.66	4.74	4.74	4.65	4.60	4.65	4.44		4.42	4.77	4.60
	Unlocking	0.31	0.35	0.34	0.32	0.31	0.35	0.35	0.35	0.33	0.34	0.32	0.32	0.35	0.34	0.32		0.31	0.35	0.33
이관 후	Locking	3.65	3.77	3.72	3.72	3.40	3.88	3.17	3.46	3.57	3.98	3.96	3.14	3.25	3.47	3.76		3.14	3.98	3.59
	Unlocking	0.29	0.30	0.25	0.26	0.29	0.26	0.25	0.29	0.29	0.26	0.30	0.30	0.27	0.20	0.26		0.20	0.30	0.27

19. 알모니아

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10									
이관 전	Before	6.61	7.11	5.66	6.30	6.14	6.04	5.53	6.56	6.35	5.63							5.53	7.11	6.19
	After	10.86	9.79	6.14	7.32	7.06	7.48	6.21	8.05	8.78	6.89							6.14	10.86	7.86
이관 후	Before	5.92	6.72	5.99	6.13	5.98	6.22	7.11	5.98	6.35	6.91							5.92	7.11	6.33
	After	8.42	8.31	9.71	7.32	7.06	7.48	8.42	9.08	9.55	9.72							7.06	9.72	8.51

<단위:kgf>

Step		Test Data - 총합삽입력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	0.49	0.40	0.48	0.41	0.44	0.45	0.48	0.44	0.43	0.45	0.42	0.40	0.42	0.48	0.47		0.40	0.49	0.44
	Unlocking	0.31	0.36	0.32	0.35	0.33	0.35	0.32	0.35	0.32	0.34	0.33	0.32	0.32	0.33	0.35		0.31	0.36	0.33
이관 후	Locking	0.59	0.58	0.57	0.59	0.60	0.59	0.58	0.58	0.57	0.60	0.60	0.58	0.57	0.59	0.58		0.57	0.60	0.58
	Unlocking	0.42	0.42	0.41	0.40	0.42	0.40	0.40	0.41	0.40	0.41	0.40	0.41	0.41	0.40	0.42		0.40	0.42	0.41

<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.	
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15				
이관 전	Locking	2.91	2.53	2.80	2.66	2.84	2.73	2.66	2.85	2.61	2.87	2.63	2.54	2.70	2.90	2.72		2.53	2.91	2.73
	Unlocking	0.22	0.26	0.26	0.24	0.22	0.24	0.26	0.23	0.24	0.25	0.25	0.24	0.23	0.25	0.26		0.22	0.26	0.24
이관 후	Locking	3.72	3.98	3.46	3.43	3.00	3.89	3.98	3.13	3.35	3.60	3.81	3.21	3.34	3.10	3.97		3.00	3.98	3.53
	Unlocking	0.26	0.26	0.24	0.22	0.24	0.28	0.29	0.23	0.24	0.27	0.25	0.28	0.23	0.26	0.28		0.22	0.29	0.25

20. 염수분무

<단위:mΩ>

Step		Test Data - 접촉저항															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10								
이관 전	Before	6.03	5.99	6.35	6.46	5.57	7.68	6.77	6.39	5.88	6.45						5.57	7.68	6.36
	After	6.38	6.96	7.62	8.00	5.71	8.45	7.16	8.02	6.20	7.35						5.71	8.45	7.18
이관 후	Before	6.41	5.52	5.99	5.60	6.20	5.79	6.27	5.91	5.70	5.75						5.52	6.41	5.91
	After	6.41	5.52	5.99	5.60	6.20	5.79	6.27	5.91	5.70	5.75						5.52	6.41	5.91




<단위:kgf>

Step		Test Data - 총합삼입력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Locking	0.61	0.43	0.46	0.45	0.59	0.55	0.44	0.56	0.47	0.52	0.44	0.52	0.50	0.46	0.51	0.43	0.61	0.50
	Unlocking	0.44	0.51	0.49	0.46	0.51	0.48	0.50	0.49	0.45	0.50	0.47	0.45	0.45	0.46	0.48	0.44	0.51	0.47
이관 후	Locking	0.57	0.58	0.58	0.60	0.60	0.57	0.58	0.58	0.60	0.60	0.57	0.58	0.58	0.60	0.60	0.57	0.60	0.58
	Unlocking	0.40	0.41	0.41	0.42	0.41	0.40	0.41	0.41	0.42	0.41	0.40	0.41	0.41	0.42	0.41	0.40	0.42	0.41







<단위:kgf>

Step		Test Data - 총합발거력(Locking)															Min.	Max.	Avg.
		n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15			
이관 전	Locking	1.80	1.71	1.73	1.78	1.78	1.77	1.76	1.74	1.73	1.74	1.75	1.76	1.78	1.73	1.72	1.71	1.80	1.75
	Unlocking	0.38	0.45	0.39	0.39	0.42	0.41	0.40	0.42	0.41	0.44	0.41	0.42	0.39	0.42	0.44	0.38	0.45	0.41
이관 후	Locking	1.61	1.48	1.49	1.55	1.48	1.61	1.48	1.49	1.55	1.48	1.61	1.48	1.49	1.55	1.48	1.48	1.61	1.52
	Unlocking	0.20	0.21	0.23	0.21	0.24	0.20	0.21	0.23	0.21	0.24	0.20	0.21	0.23	0.21	0.24	0.20	0.24	0.22

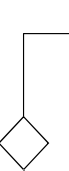


4M QC 공정도

작성	검토	승인
		
장정도	장정현	황인용

관리 No. : CNQ-105	제조사 : 씨엔플러스	작성일 : 2013.09.12
모델명 : 2.5mm Pitch W/W Conn. Male Housing	작성자 : 장정도	Rev.일 : 2019.04.18
Part No. : 1204-21102		

공정번호	공정흐름도		공정명	작업내용	4M				
	CNPLUS	베트남법인			MAN (사람)	Machine (장비)	Material (재료)	Method (방법)	
1			원재료 입고검사	원재료 번호	Giang	-	PA66	Material :PA66 (KN332G30V0, Natural, White, UL94-V0, Kolon)	자체입출고 관리대장
2			사출검사	외 관	Ly	공구현미경	Housing	Flash 0.05mm MAX (단. 성능에 영향을 미치는 Flash 없을 것) 미성형,수축/웰드라인,섬유질(실)이물 없을 것. 특정-1Point, 비전도성/고형성, 크기(0.2mm이하) 사출이물-크기(0.2mm이하) 얼룩이물-1Point, 비전도성/고형성, 크기(0.5mm이하)	공정검사 기준서 공정검사 성적서 도면
				치 수					
3			수입검사	외 관	Giang	공구현미경	Housing	Terminal의 간지이탈 없으며, 권취상태가 양호할 것. 역방향,미도금,이물 없을 것. 물얼룩,백화 등 오염 없을 것 Terminal을 90° 이상 비틀었을시 도금 이탈 및 들뜸현상 없을 것. Reel Camber of Carrier 20/1000 mm max	수입검사 기준서 수입검사 이력표 수입검사 성적서 도면 XRF 유해물질 검사 지침서 XRF 성적서
				치 수					
				환경검사					
4			출하검사	외 관	Giang	공구현미경 (50x)	Housing	기능에 영향을 주는 Flash/Burr 없을 것. 오염, 변색, 미성형, 깨짐, 이물, 등 이상 없을 것. 규정된 수량이 정확할 것.(미만,초과 없을 것.) 현품표 확인 할것.	출하검사기준서 출하성적서 XRF 유해물질 검사 지침서 XRF 성적서
				치 수					
				형합성		상대물			
				환경검사		XRF 측정기			
5			출하포장	Packing	Thu	육안확인	Paper BOX	법인 라벨 출력후 부착	ERP - 출하라벨포장 사양서
6			출하	출고수량 확인	Thu	육안확인	Paper BOX	출하 수량 누락 없을것.	ERP - 출하등록
						육안		기능에 영향을 주는 Flash/Burr 없을 것.	출하검사기준서

씨엔플러스
 1204-21102
 FULLINE

7		출하검사	외 관	유동레 이민속	공구현미경 (50x)	Housing	오염, 변색, 미성형, 깨짐, 이물, 등 이상 없을 것. 규정된 수량이 정확할 것.(미만,초과 없을 것.) 현품표 확인 할것. 7.5 ±0.2 17 ±0.2 2.5 ±0.05 5.8 ±0.1 2.6 ±0.1 2.8 ±0.1 1.8 ±0.1	출하성적서 XRF 유해물질 검사 지침서 XRF 성적서																								
			치 수						XRF 측정기																							
		환경검사					<table border="1"> <tr> <td></td> <td>Cd</td> <td>Pb</td> <td>Hg</td> <td>Cr+6</td> <td>Br</td> <td>Cl</td> <td>Sb</td> </tr> <tr> <td>유기물</td> <td>5</td> <td>100</td> <td>500</td> <td>500</td> <td>500</td> <td>500</td> <td>700</td> </tr> <tr> <td>무기물</td> <td>70</td> <td>500</td> <td>500</td> <td>500</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table>		Cd	Pb	Hg	Cr+6	Br	Cl	Sb	유기물	5	100	500	500	500	500	700	무기물	70	500	500	500	-	-	-	
	Cd	Pb	Hg	Cr+6	Br	Cl	Sb																									
유기물	5	100	500	500	500	500	700																									
무기물	70	500	500	500	-	-	-																									
8		출하포장	Packing	이영숙	육안확인	Paper BOX	표준화 라벨 출력후 부착	ERP - 출하라벨포장 사양서																								
9		출하	출고수량 확인	이영숙	육안확인	Paper BOX	출하 수량 누락 없을것.	ERP - 출하등록																								

* Process Symbols : ▽(Incoming), ○ (Working Flow Chart), ◇ (Inspection), □ (Packing), ▷(Delivery)

제 / 개 정	일자	개정사유	개정 No.
	2013.09.12	New-Released	0
	2015.02.27	고객 기준서 접수에 따른 출하검사 항목 변경	1
	2019.04.18	생산지 이관으로 인한 공정 흐름도 변경 및 검사항목 추가	2

4M QC 공정도

작성	검토	승인
장정도	장정현	황인용

관리 No. : CNQ-106	제조사 : 씨엔플러스	작성일 : 2013.09.12
모델명 : 2.5mm Pitch W/W Conn. Female Housing	작성자 : 장정도	Rev.일 : 2019.04.18
Part No. : 1204-11102		

공정번호	공정흐름도		공정명	작업내용	4M				
	CNPLUS	베트남법인			MAN (사람)	Machine (장비)	Material (재료)	Method (방법)	
1204-11102 F U L L I N - L I N -	1		원재료 입고검사	원재료 번호	Giang	-	PA66	Material :PA66 (KN3322V0L, Natural, White, UL94-V0, Kolon)	자체입출고 관리대장
	2		사출검사	외 관	Ly	공구현미경	Housing	Flash 0.05mm MAX (단. 성능에 영향을 미치는 Flash 없을 것) 미성형,수축/웰드라인,섬유질(실)이물 없을 것. 흑점-1Point, 비전도성/고형성, 크기(0.2mm이하) 사출이물-크기(0.2mm이하) 얼룩이물-1Point, 비전도성/고형성, 크기(0.5mm이하)	공정검사 기준서 공정검사 성적서 도면
				치 수				2.5 ±0.05 5.7 +0.03/-0.01 8.7 ±0.08 7.6 ±0.05 2.5 ±0.03 3.85 ±0.05 5.3 ±0.08 0.5 +0.05/-0 Camber/Bow 0.1mm Max	
	3		수입검사	외 관	Giang	공구현미경	Housing	Terminal의 간지이탈 없으며, 권취상태가 양호할 것. 역방향,미도금,이물 없을 것. 물얼룩,백화 등 오염 없을 것 Terminal을 90° 이상 비틀었을시 도금 이탈 및 들뜸현상 없을 것. Reel Camber of Carrier 20/1000 mm max	수입검사 기준서 수입검사 이력표 수입검사 성적서 도면 XRF 유해물질 검사 지침서 XRF 성적서
				치 수				2.5 ±0.05 5.7 +0.03/-0.01 8.7 ±0.08 7.6 ±0.05 2.5 ±0.03 3.85 ±0.05 5.3 ±0.08 0.5 +0.05/-0 Camber/Bow 0.1mm Max	
환경검사	XRF 측정기								
4		출하검사	출하검사	치 수	Giang	공구현미경 (50x)	Housing	기능에 영향을 주는 Flash/Burr 없을 것. 오염, 변색, 미성형, 깨짐, 이물, 등 이상 없을 것. 규정된 수량이 정확할 것.(미만,초과 없을 것.) 현품표 확인 할것.	출하검사기준서 출하성적서 XRF 유해물질 검사 지침서 XRF 성적서
5		출하포장	Packing	Packing	Thu	육안확인	Paper BOX	법인 라벨 출력후 부착	ERP - 출하라벨포장 사양서

6			출하	출고수량 확인	Thu	육안확인	Paper BOX	출하 수량 누락 없을것.	ERP - 출하등록																							
7			출하검사	외 관	유동레 이민속	육안	Housing	기능에 영향을 주는 Flash/Burr 없을 것. 오염, 변색, 미성형, 깨짐, 이물, 등 이상 없을 것. 규정된 수량이 정확할 것.(미만,초과 없을 것.) 현품표 확인 할것. 7.5 ±0.08 0.85 ±0.05 2.5 ±0.05 5.8 +0.05/-0 0.45 +0.05/-0 2.6 +0.05/-0 2.8 +0.05/-0 1.79 +0/-0.04	출하검사기준서 출하성적서 XRF 유해물질 검사 지침서 XRF 성적서																							
				치 수		공구현미경 (50x)																										
				형합성		상대물																										
				환경검사		XRF 측정기																										
상대물 삼입시 간섭이 없을 것								ERP - 출하라벨포장 사양서																								
<table border="1"> <tr> <td></td> <td>Cd</td> <td>Pb</td> <td>Hg</td> <td>Cr+6</td> <td>Br</td> <td>Cl</td> <td>Sb</td> </tr> <tr> <td>유기물</td> <td>5</td> <td>100</td> <td>500</td> <td>500</td> <td>500</td> <td>500</td> <td>700</td> </tr> <tr> <td>무기물</td> <td>70</td> <td>500</td> <td>500</td> <td>500</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table>										Cd	Pb	Hg	Cr+6	Br	Cl	Sb	유기물	5	100	500	500	500	500	700	무기물	70	500	500	500	-	-	-
	Cd	Pb	Hg	Cr+6	Br	Cl	Sb																									
유기물	5	100	500	500	500	500	700																									
무기물	70	500	500	500	-	-	-																									
8			출하포장	Packing	이영속	육안확인	Paper BOX	표준화 라벨 출력후 부착																								
9			출하	출고수량 확인	이영속	육안확인	Paper BOX	출하 수량 누락 없을것.	ERP - 출하등록																							

* Process Symbols : ▽(Incoming), ○ (Working Flow Chart), ◇ (Inspection), □ (Packing), ▷(Delivery)

제 / 개 정	일자	개정사유	개정 No.
	2013.09.12	New-Released	0
	2019.04.18	생산지 이관으로 인한 공정 흐름도 변경 및 검사항목 추가	1

1. 제품명칭 (PRODUCT NAME)

: 2.5mm Pitch W/W Connector Male Housing

2. 제품번호 (PART NUMBER)

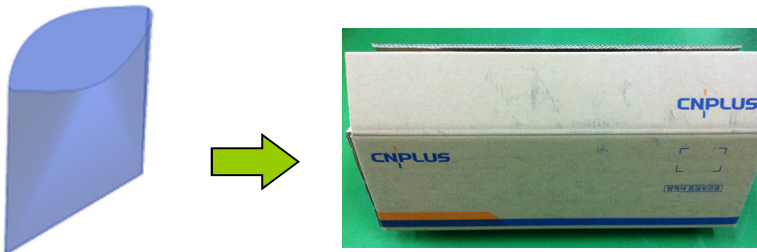
Ckts.	포장후 제품번호
2P	1204-21102

1 2 0 4 -
2 1 1 0 2 → **Circuits**

3. 포장수량 (PACKING QUANTITY)

Ckts.	Poly Pack		Out Box		
	Size	Q'ty	Size	P- Pack Q'ty	Q'ty
2P	200x250	1,500	530x200x180	5	7,500

4. 포장방법



5. NOTE

REVISION	DATE	TITLE			
A	2013-01-09	2.5mm Pitch W/W Conn. Male Housing (1204 SERIES)			
	ECN No.				
	2014-007				
DOCUMENT No.		CREATED BY	CHECKED BY	CHECKED BY	APPROVED BY
PK-1204-001		D.I.Choi	J.I.Choi	J.H.Kim	H.S.Shin

1. 제품명칭 (PRODUCT NAME)

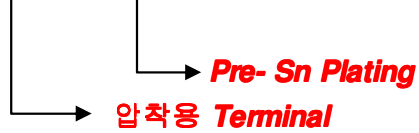
: 2.5mm Pitch W/W Connector. Male Terminal

2. 제품번호 (PART NUMBER)

Ckts.	포장후 제품번호
-	1204- 43331

1 2 0 4 -

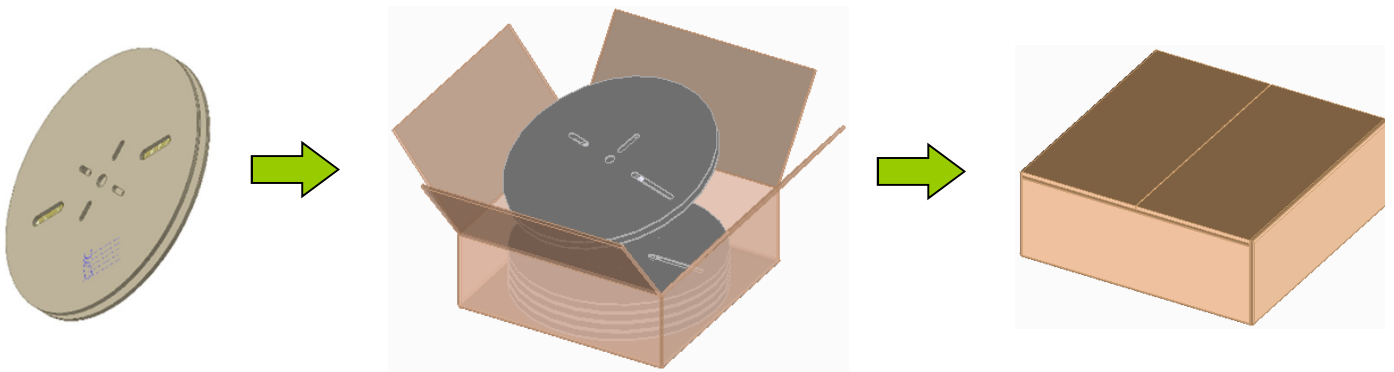
4 3 3 3 1



3. 포장수량 (PACKING QUANTITY)

Ckts.	Reel		Carton Box			
	Size	Q'ty	Size	Reel Q'ty	Q'ty(Total)	Weight(kg)
-	9000- 30120	10,000	9000- 10013	5	50,000	
	Ø550X20	10,000	565X560X165	5	50,000	

4. 포장방법



5. NOTE

REVISION	DATE	TITLE			
A	2013-11-11	2.5mm Pitch W/W Conn. Male Terminal (1204 SERIES)			
	ECN No.				
	2014-007				
DOCUMENT No.		CREATED BY	CHECKED BY	CHECKED BY	APPROVED BY
PK-1204-001		D.I.Choi	J.I.Choi	J.H.Kim	H.S.Shin

1. 제품명칭 (PRODUCT NAME)

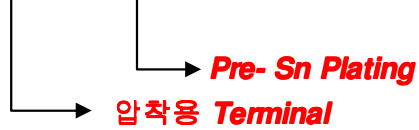
: 2.5mm Pitch W/W Connector. Female Terminal

2. 제품번호 (PART NUMBER)

Ckts.	포장후 제품번호
-	1204-33331

1 2 0 4 -

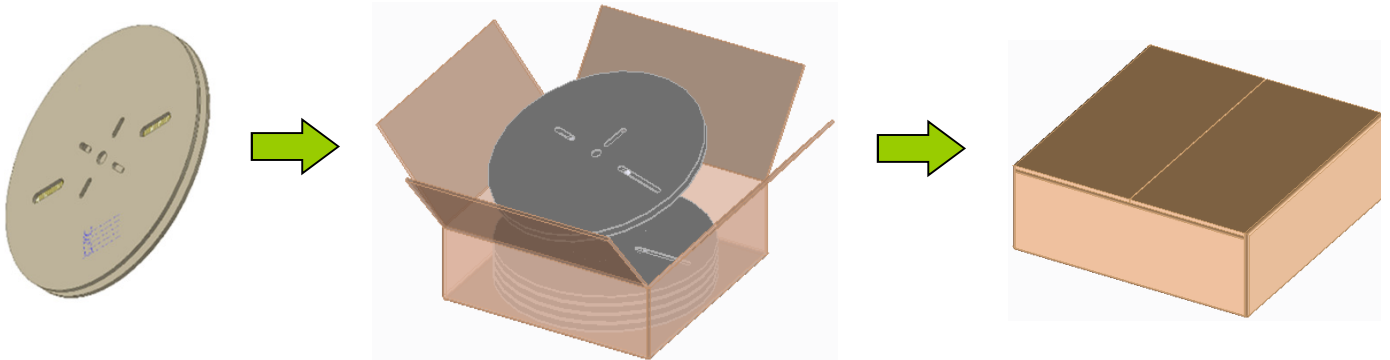
3 3 3 3 1



3. 포장수량 (PACKING QUANTITY)

Ckts.	Reel		Carton Box			
	Size	Q'ty	Size	Reel Q'ty	Q'ty(Total)	Weight(kg)
-	9000-30118	10,000	9000-10012	5	50,000	
	Ø550X18	10,000	565X550X155	5	50,000	

4. 포장방법



5. NOTE

REVISION	DATE	TITLE			
A	2013-09-10	2.5mm Pitch W/W Conn. Female Terminal (1204 SERIES)			
	ECN No.				
	2014-007				
DOCUMENT No.	CREATED BY	CHECKED BY	CHECKED BY	APPROVED BY	
PK-1204-002	D.I.Choi	J.I.Choi	J.H.Kim	H.S.Shin	