1. Scope:

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of 025/090II I/O Connector.

Applicable product description and part numbers are as shown in Appendix 1.

2. Applicable Documents:

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP Specifications:

A.	109-5000	Test Specification, General Requirements for Test Methods
B.	114-5250	Application Specification: Crimping of 025 Receptacle Contact
C.	501-5370	Test Report
D.	114-5291	Application Specification: Crimping of 025 Tab Contact

2.2 Commercial Standards and Specifications:

A.	JASO D605	Multi-pole Connector for Automobiles
B.	JASO D7101	Test Methods for Plastic Molded Parts
C.	JIS C3406	Low Voltage Wires and Cables for Automobiles
D.	JIS D0203	Method of Moisture, Rain and Spray Test for Automobile Parts
E.	JIS D0204	Method of High and Low Temperature Test for Automobile Parts
F.	JIS D1601	Vibration Testing Method for Automobile Parts
G.	JIS R5210	Portland Cement
H.	MIL-STD-202	Testing Method 208: Method of Soldering

2.3 Other Specifications:

See instruction sheet of each contact maker about application specification of 090II receptacle contact and tab contact.

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3. Requirements:

3.1 Design and Construction:

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2 Materials:

A. Contact:

Description	Material	Finish
Tab(Male)	Brass	Selective-Gold plating over Ni under plating or Pre-Tinned or Selective-Tin
Receptacle(Female)	Copper Alloy	Selective-Gold plating over Ni under plating, Pre-Tinned

Fig.1

B. Housing: PBT or SPS

C. Wire

Contact	Wire Size
025	0.22～0.5mm^2
090II	0.3～2.0mm^2

Fig.2

3.3 Ratings:

A. Voltage rating: 12 V DC

B. Temperature rating: −30℃ to 105℃

3.4 Performance Requirements and Test Descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.3 and Fig4. All tests shall be performed in the room temperature, unless otherwise specified.

3.5 Test Requirements and Procedures Summary:

Para.	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Meets requirements of product drawing and AMP Specification 114-5250.	Visually ,dimensionally and functionally inspected per applicable quality inspection plan
		Electrical Requirements	
3.5.2	Termination Resistance (Low Level)	025 8 mΩ Max. (Initial) 16 mΩ Max. (Final) 090II 3 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to 20 mV Max. open circuit at 10 mA. Fig. 5 AMP Spec. 109-5311-1
3.5.3	Termination Resistance (Specified Current)	025 8 mΩ Max. (Initial) 16 mΩ Max. (Final) 090II 3 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to 12 V Max. open circuit at 1A. Fig.5 AMP Spec. 109-5311-2
3.5.4	Dielectric Withstanding Voltage	No creeping discharge or flashover shall occur.	Impressed voltage 1kVAC for 1 min. Mated connector. Fig.6 AMP Spec. 109-5301
3.5.5	Insulation Resistance	100 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500VDC Mated connector. Fig.6 AMP Spec. 109-5302
3.5.6	Current Leakage	3mA Max.	Impressed voltage 14VDC Fig.7 AMP Spec. 109-5312
3.5.7	Temperature Rise	60°C Max.	Measure temperature rising at wire crimped by applied current to all positions. Fig.11 AMP Spec. 109-5310
3.5.8	Over Current Loading	No ignition is allowed during the test.	Apply the current to only one position. Applied Current : Fig. 8
		Physical Requirements	
3.5.9	Vibration (High Frequency)	No electrical discontinuity greater than 1 μ sec. shall occur. Satisfy requirements of test item on the "3.6 sequence".	Vibration Frequency : 20→200→20Hz/3min. Acceleration : 44.1 m / s^2 Vibration Direction : X, Y, Z Duration: 3hours each Mounting: Fig. 9

Fig.3 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.10	Shock	No electrical discontinuity greater than 1 μ sec. shall occur.	Acceleration : 980m/s^2 Waveform : Half sine wave Duration : 6msec.Velocity Number of Drops: 3 drops each directions of X,-X, Y,-Y,Z and -Z axes, totally 18 drops Mounting : Fig. 9 AMP Spec. 109-5208
3.5.11	Connector Mating Force	70N Max. (Contact number for product part no. 1565038 and 1565041 shall be six 025contacts and eight 090 Ⅱ contacts.)	Operation Speed: 100mm/min. Measure the force required to mate connectors. AMP Spec. 109-5206
3.5.12	Connector Unmating Force	70N Max. (Contact number for product part no. 1565038 and 1565041 shall be six 025contacts and eight 090 Ⅱ contacts.)	Operation Speed: 100mm / min. Measure the force required to unmate connectors. (without housing lock) AMP Spec. 109-5206
3.5.13	Connector Locking Strength	100N Min.	Apply an axial pull-off load to one of the mated housing, measure locking strength. Operation Speed: 100mm/min. AMP Spec. 109-5210
3.5.14	Contact Insertion Force	10N Max. per contact	Measure the force required to insert contact into housing. AMP Spec. 109-5211
3.5.15	Contact Retention Force(Secondary Lock)	100N Min.	Measure contact retention force with secondary lock set it effect. Operation Speed: 100mm/min. AMP Spec. 109-5212
3.5.16	Crimp Tensile Strength	Wire Size (mm2) / Tensile Strength (N) Min. 0.5 / 90 2 / Initial: 270, Final: 230	Apply an axial pull-off load to crimped wire of contact secured on the tester. Operation speed: 100mm/min. AMP spec. 109-5205 Condition B
3.5.17	Retention force of Tab	20N Min.(PBT housing) 15N Min.(SPS housing)	Measure the retention force between housing and tab contact. Operation speed: 100mm/min

Fig.3 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.18	Resistance to "Kojiri"	Satisfy requirements of test item on the "3.6 sequence".	Repeated mating-unmating by hand in up-down and right-left directions for 10 cycles. AMP Specification, 109-5215
3.5.19	Fasting Torque for Screw	No crack and compression buckling of housing permissible.	Operation torque value on customer drawing.
3.5.20	Solderability	Wet Solder Coverage : (Plated area only) 95 % Min. (with substrate area) 50 % Min. (without substrate area)	Solder bath : Sn-40Pb Solder Temperature :235±5℃ Immersion Duration :5±0.5sec. Flux : Alpha100 AMP Spec.109-5203 Matte Tin plating only Solder bath : Sn-3Ag-0.5Cu Solder Temperature :250±5℃ Immersion Duration :5±0.5sec. Flux : ULF-300R
3.5.21	Resistance to soldering heat	Application to SPS housing only. No gap with PCB omission of screw. Retension Force of Tab :15N Min.	Test connector solder dipped after mounted on PCB with screw. It should be checked and measured after test connector become room temperature. Solder temperature : 260±5℃ Immersion duration : 10±1sec. AMP Spec.109-5204 Condition B
3.5.22	Handling Ergonomics	No abnormalities allowed in manual mating/unmating handling.	Manually operated.
		Environmental Requirements	
3.5.23	Thermal Shock	Satisfy requirements of test item on the "3.6 sequence".	-40℃/30min., 100℃/30min. Making this a cycle, repeat 1000 cycles. Monitor resistance-variation at closed circuit current of 10mA during the test. AMP Spec. 109-5103
3.5.24	Humidity (Steady State)	Satisfy requirements of test item on the "3.6 sequence". Current Leakage : 3mA Max.	90～95%R. H. , 60℃ , 96hours Monitor current leakage during the test. AMP Spec. 109-5105
3.5.25	Industrial Gas (SO_2)	Satisfy requirements of test item on the "3.6 sequence".	Unmated connector SO_2 Gas: 25ppm, 75% R. H. 25℃, 96 hours AMP Spec. 109-5107

Fig.3 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.26	Temperature Life (Heat Aging)	Satisfy requirements of test item on the "3.6 sequence".	120℃, 120hours AMP Spec. 109-5104
3.5.27	Resistance to Cold	Satisfy requirements of test item on the "3.6 sequence".	-40℃, 120hours AMP Spec. 109-5108
3.5.28	Humidity-Temperature Cycling	Satisfy requirements of test item on the "3.6 sequence".	Condition : Fig. 10 Making this condition a cycle, repeat 10 cycles. Monitor resistance-variation at closed circuit current of 10mA during the test.
3.5.29	Dust Bombardment	Satisfy requirements of test item on the "3.6 sequence".	Subject JIS R 5210 cement blow of 1.5kg per 10 seconds in 15 minutes intervals for 8 cycles, with mating/unmating per 2 cycles. AMP Spec. 109-5110
3.5.30	Compound Environment Resistance	Satisfy requirements of test item on the "3.6 sequence". No electrical discontinuity greater than 1 μ sec. shall occur.	Temperature : 80℃ Vibration Frequency : 20→200→20Hz/3Min. (Log) Acceleration : 44.1m/s^2 Vibration Direction : X, Y, Z Duration : 300hours Test Current : Fig. 12 Mounting : Fig. 9 Monitor resistance-variation, and after this test check if instant cutoff occurs for an hour on "3.5.9 vibration".
3.5.31	Condensation	Satisfy requirements of test item on the "3.6 sequence".	0℃/10min.,80℃/90~95%/30min. Making this a cycle, repeat 48 cycles. Monitor current leakage during the test.

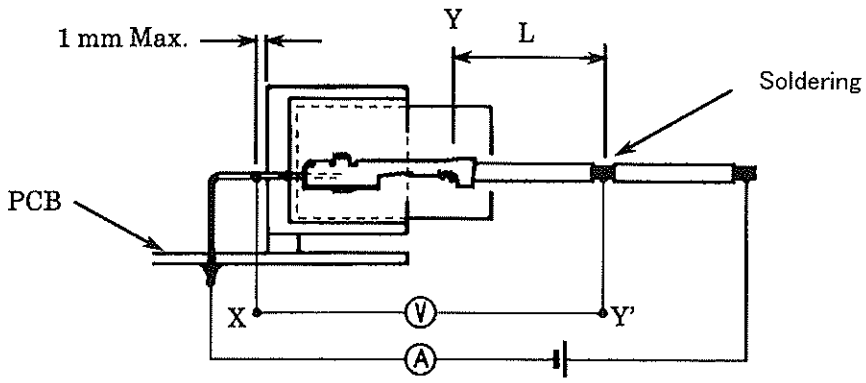
Fig.3 (END)

3.6 Product Qualification Test Sequence

No.	Test Examination	Test Group														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Test Sequence[a]														
3.5.1	Confirmation of Product	1	1,5	1,6	1,6	1,5	1,5	1,5	1,5	1,6	1,3	1,5	1,6	1,6	1,3	1,3
3.5.2	Termination Resistance (Low Level)	4	2,6	2,7	2,7	2,6	2,6	2,6	2,6	2,7		2,6	2,7	2,7		
3.5.3	Termination Resistance (Rated Current)	5	3,7	3,8	3,8	3,7	3,7	3,7	3,7	3,8		3,7	3,8	3,8		
3.5.4	Dielectric withstanding Voltage	7						9				9				
3.5.5	Insulation Resistance	6						8				8			4	
3.5.6	Current Leakage							4							2	
3.5.7	Temperature Rise	8								4,9				4		
3.5.8	Over Current Loading		4													
3.5.9	Vibration (High Frequency)			5										5		
3.5.10	Shock				5											
3.5.11	Connector Mating Force	3														
3.5.12	Connector Unmating Force	9														
3.5.13	Connector Locking Strength	10					9	11		11	5	11				
3.5.14	Contact Insertion Force	2														
3.5.15	Contact Retention Force (Secondary Lock)	11					10	12		12	6	12				
3.5.16	Crimp Tensile Strength	12					11		8	13						
3.5.17	Retention Force of Tab	14														4
3.5.18	Resistance to "Kojiri"					4										
3.5.19	Fasten Torque for Screw	16					12			14		13				
3.5.20	Solderability	13														
3.5.21	Resistance to Soldering Heat															2
3.5.22	Handling Ergonomics	15					8	10		10	4	10				
3.5.23	Thermal Shock						4									
3.5.24	Humidity (Steady State)							4								
3.5.25	Industrial SO_2 Gas								4							
3.5.26	Temperature Life (Heat Aging)			4	4					5			4			
3.5.27	Resistance to Cold										2					
3.5.28	Humidity–Temperature Cycling											4				
3.5.29	Dust Bombardment												5			
3.5.30	Compound Environment Resistance													4		
3.5.31	Condensation														2	

(a) Numbers indicate sequence in which tests are performed.

Fig.4



Deduct resistance of Y–Y' (wire "L") from X–Y'

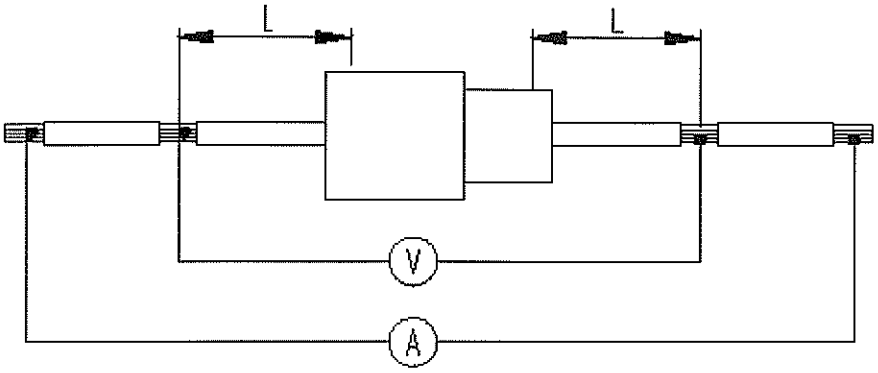


Fig.5

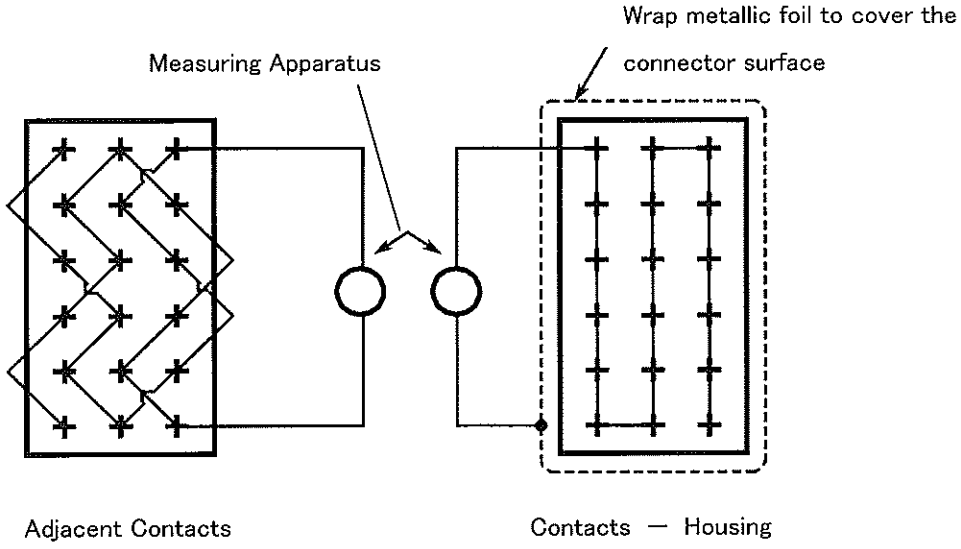


Fig. 6

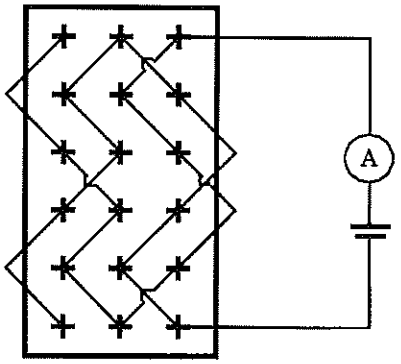
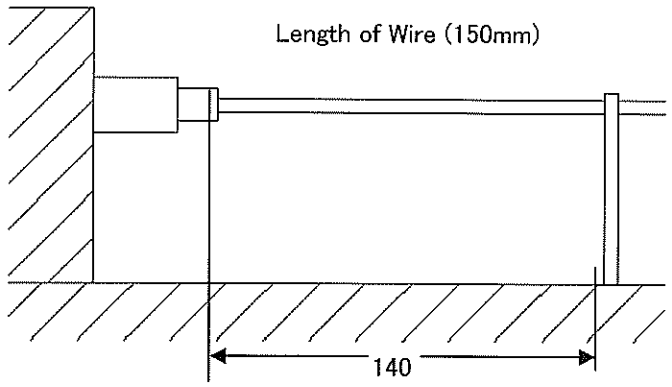


Fig.7

Wire Size (mm^2)	Current Type	Test Current (A)	Duration
0.5	①	16.5	60 min.
	②	20.2	200 sec.
	③	22.5	5 sec.
	④	30.0	1 sec.
1.25	①	33.0	60 min.
	②	40.5	100 sec.
	③	45.0	10 sec.
	④	60.0	2 sec.

Fig.8



Vibration Table

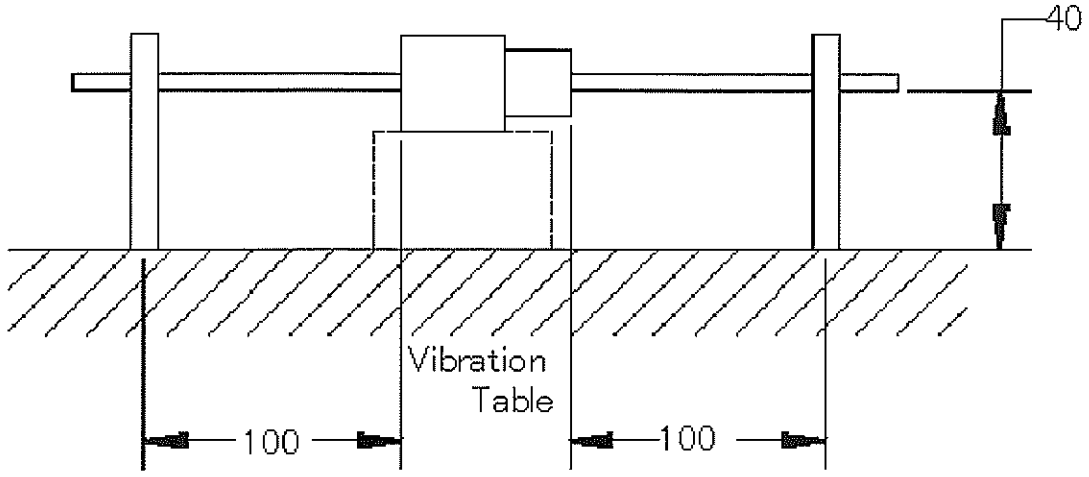


Fig. 9

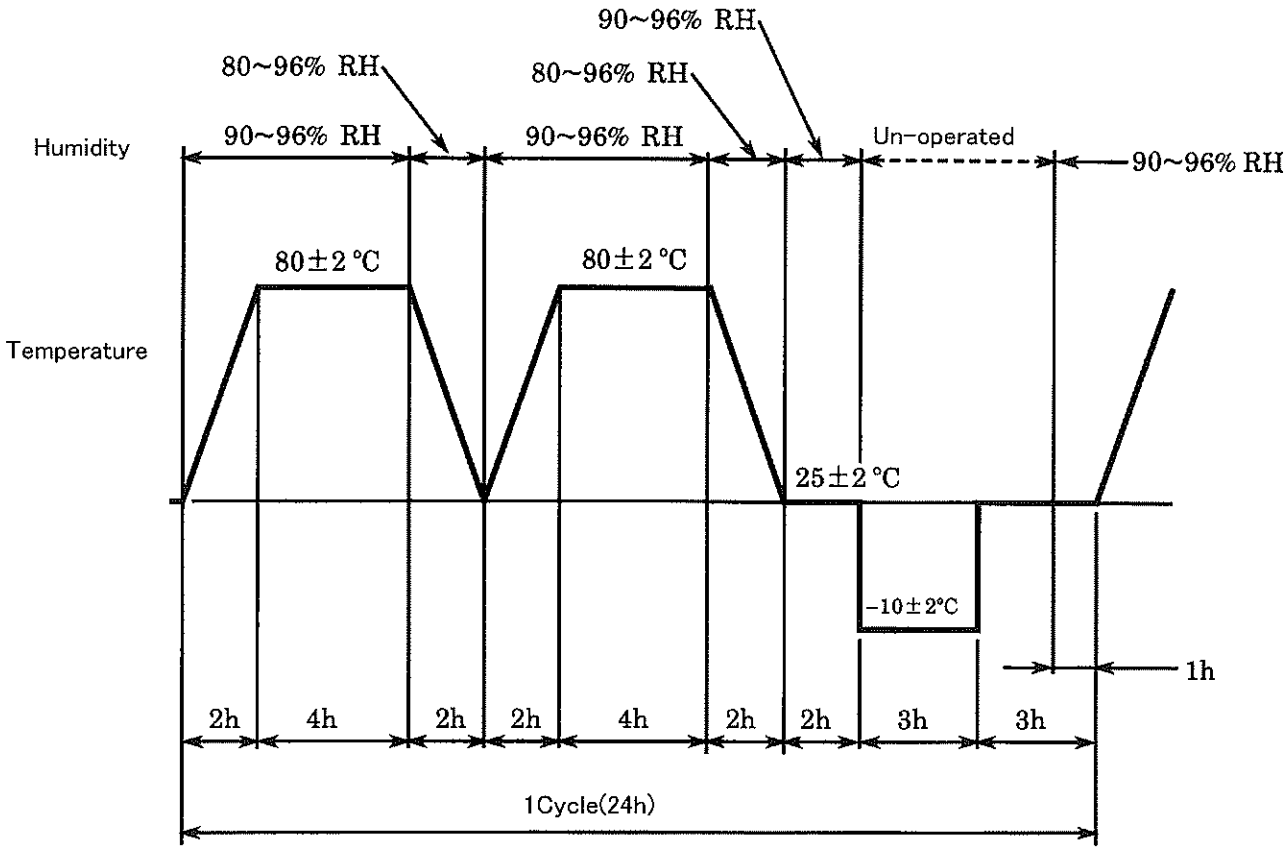


Fig.10

Contact	Wire Size (mm^2)	Test Current	Temperature Rise
025	0.5	3.3A	60°C max.
090II	2.0	7.5A	

Fig.11

Contact	Finish	Wire Size (mm^2)	Test Current	Test Time
025	Tin-Lead	0.5	1.8A	45min.ON、15min.OFF 300cycles
	Selective Gold	0.5	10mA	
090II	Tin-Lead	2.0	4.2 A	

Fig.12

The applicable product descriptions and part numbers are as shown in Appendix. 1

Product Part No.*	Description
1318750	025/090II SER 50POS CAP ASSY(MALE CONNECTOR)
1318751	025/090II SER 80POS CAP ASSY(MALE CONNECTOR)
1612800	025/090II SER 80POS CAP ASSY KEYING (MALE CONNECTOR)
1318756	025/090II SER 24POS PLUG ASSY(FEMALE CONNECTOR)
1612802	025/090II SER 24POS PLUG ASSY KEYING (FEMALE CONNECTOR)
1318757	025/090II SER 26POS PLUG ASSY(FEMALE CONNECTOR)
1612803	025/090II SER 26POS PLUG ASSY KEYING (FEMALE CONNECTOR)
1318758	025/090II SER 30POS PLUG ASSY(FEMALE CONNECTOR)
1376357	025/090II SER 26POS LOW-PROFILE CAP ASSY H-Type(MALE CONNECTOR)
1376360	025/090II SER 26POS LOW-PROFILE PLUG ASSY(FEMALE CONNECTOR)
1376371	025/090II SER 26POS LOW-PROFILE CAP ASSY V-Type(MALE CONNECTOR)
1565038	025/090II SER 20POS WIRE TO WIRE CAP ASSY(MALE CONNECTOR)
1565041	025/090II SER 20POS WIRE TO WIRE PLUG ASSY(FEMALE CONNECTOR)
1565371	025/090 26POS LOW-PROFILE CAP ASSY V-Type(MALE CONNECTOR)
1123343	025 RECEPTACLE CONTACT(Sn)
1123343	025 RECEPTACLE CONTACT(Au)
1376109	025 TAB CONTACT(Sn)
1376109	025 TAB CONTACT(Au)
	090II RECEPTACLE CONTACT (S)
	090II RECEPTACLE CONTACT (M)
	090II RECEPTACLE CONTACT (L)

Appendix.1

*Note: Part number is consisted from listed base number and 1 digit numeric prefix and Suffix with dash. Refer to catalog or customer drawing for specific part numbers for each base number. When prefix is zero, zero and dash are omitted.