

JAPAN AVIATION ELECTRONICS IND., LTD. CONNECTOR DIVISION 日本航空電子工業株式会社 コネクタ事業部			JN2 CONNECTOR SPECIFICATION		Connector Specification No. JACS-5119-E
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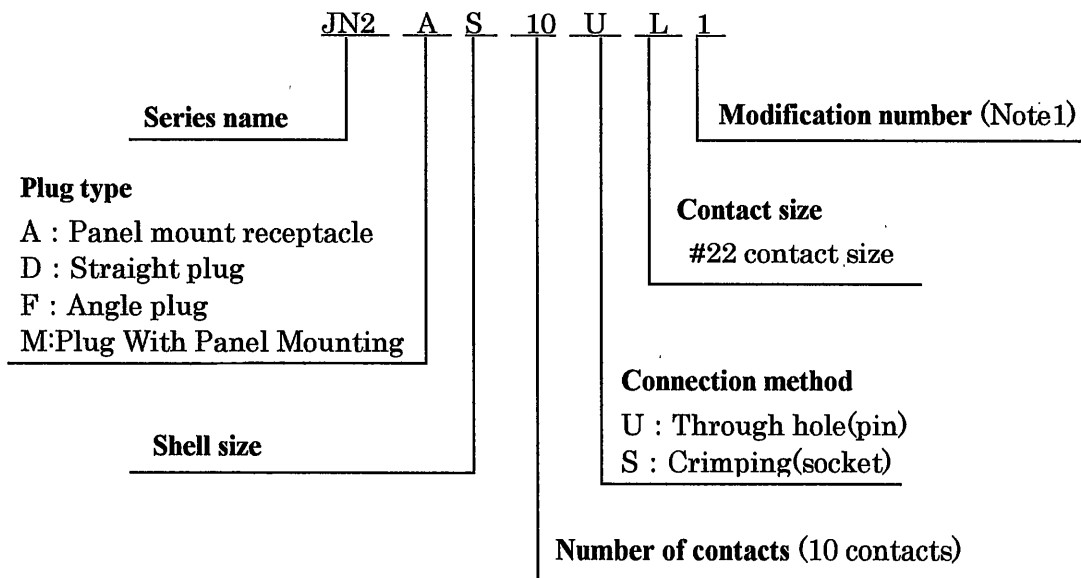
1. Scope

△ 1-1 Scope

This specification shall specify the JN2 series connectors to the extent shown in the following product designations.

[Product designations]

No.	Product name	Product Drawing Number
1	JN2AS10UL1	SJ037092
2	JN2AS10ML1	SJ038605
3	JN2AS10ML2	SJ038606
4	JN2FS10SL1	SJ037095
5	JN2FS10SL2	
6	JN2DS10SL1	SJ037096
7	JN2DS10SL2	
8	JN2FS10SLK	SJ037101
9	JN2DS10SLK	SJ037102
10	JN2MS10SL1	SJ101958
11	JN2MS10SLK	SJ105536



Note 1. Refer to the applicable product drawing for its detailed contents because the description of modification number depends on product.

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1.2 Applicable contacts and wire sizes

The applicable contacts and wire sizes shall be of the following table

Contact type	Classification	Applicable contact name	Type	Applicable wire	
				AWG No.	Sheath OD
# 22 socket contact	Loose piece contacts (100 pcs)	JN1-22-20S-PKG100	Press	#20	$\phi 1.5 \geq$
		JN1-22-22S-PKG100		#21~#25	$\phi 1.5 \sim \phi 0.8$
		JN1-22-26S-PKG100		#26~#28	$\phi 1.0 \sim \phi 0.8$
	Reel-like contact (10,000 pcs)	JN1-22-20S-10000		#20~#23	$\phi 1.5 \sim$
		JN1-22-22S-10000		#21~#25	$\phi 1.5 \sim \phi 0.8$
		JN1-22-26S-10000		#26~#28	$\phi 1.0 \sim \phi 0.8$

※1. The pin contact is a through hole type and is assembled into Receptacle (pin insulator).

※2. Refer to the pertinent catalog for its details of each wire specification.

1-3 Rated current

The rated current of contacts shall be as follows.

Contact size	Rated current
#22	3 A max. (per wire)

1-4 Rated voltage

The rated voltage of contacts shall be less than AC 200V r.m.s.

1-5 Operating temperature range

The operating temperature range of connectors shall be -20°C to $+100^{\circ}\text{C}$.

2. Requirements

In the event of a conflict between this specification and product drawings, a product drawing shall take precedence.

2-1 Construction, style, dimensions, materials, finish

Refer to the applicable product drawings.

2-2 Appearance

There must be no dirt, damage and or crack which may have detrimental effects on the functions of connectors.

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2-3 Specifications

2-3-1 Dielectric withstanding voltage

The connectors shall show no evidence of breakdown or flashover when applied the voltage up to AC 900V r.m.s in accordance with 3-5-1 hereof.

2-3-2 Insulation resistance

The insulation resistance shall be not less than 1,000 M Ω when tested in accordance with 3-5-2 hereof.

2-3-3 Contact retention force

The contact retention force shall meet the value of the following table when tested in accordance with 3-5-3 hereof.

Contact size	Axial load [N]
#22	29.4

2-3-4 Contact resistance (low level)

The contact resistance (low level) shall meet a value of **Table-1** when tested in accordance with 3-5-4 hereof.

2-3-5 Contact resistance (steady-state level)

The contact resistance (steady-state level) shall meet a value of **Table-1** when tested in accordance with 3-5-5 hereof.

Table-1

Contact Size	Applicable wire	Contact resistance (low level)		Contact resistance (steady-state level)		
	Wire size	Initial (m Ω max)	After tests (m Ω max)	Test current (A)	Initial (m Ω max)	After tests (m Ω max)
#22	AWG#20, #21, #22	20	22	3	20	23
	AWG#23, #24	25	28	3	20	23
	AWG#25, #26	31	38	2	26	32
	AWG#28	50	60	1.5	36	43

2-3-6 Contact engagement and separation force

The contact engagement and separation force shall meet the following table when tested in accordance with 3-5-6 hereof. However, the connectors that do not exceed the maximum engagement forces shall be more than 96%. In addition, all contacts shall be more than minimum and separation forces.

Contact size	Test pin	Engagement force	separation force
#22	ϕ 0.782 0 -0.003	2.26 N max.	—
	ϕ 0.742 +0.003 0	—	0.2 N min.

2-3-7 Crimp tensile strength

The crimp tensile strength shall meet the following table when tested in accordance with 3-5-7 hereof.

Applicable wire size	Tensile strength
AWG #20, #21	43.2 N min.
AWG #22, #23	49.0 N min.
AWG#24	34.3 N min.
AWG #25	26.5 N min.
AWG #26	20.5 N min.
AWG #28	13.7 N min.

2-3-8 Temperature cycling

When tested in accordance with 3-5-8 hereof, there shall be no defects such as cracking in insulator. In addition, the connectors shall meet 2-3-1 hereof after the completion of the last cycle.

2-3-9 Humidity

The connector shall meet 2-3-1 hereof when tested in accordance with 3-5-9 hereof.

2-3-10 Vibration

When tested in accordance with 3-5-10 hereof, there shall be no defects such as damage and/or loosening of parts in each component. In addition, there shall be no interruption of electrical continuity longer than 1 μ s.

2-3-11 Vibration durability

When tested in accordance with 3-5-11 hereof, there shall be no defects such as damage and/or loosening of parts in each component.

2-3-12 Shock

When tested in accordance with 3-5-12 hereof, there shall be no defects such as damage and/or loosening of parts in each component. In addition, there shall be no interruption of electrical continuity longer than 1 μ s.

2-3-13 Durability

When tested in accordance with 3-5-13 hereof, there shall be no defects such as damage and/or loosening of parts in each component, and the connectors shall meet 2-3-5 and 2-3-6 hereof after the test.

2-3-14 Cable tensile strength

The cable tensile strength shall meet the following value when tested in accordance with 3-5-14 hereof.

Item	Specified value
Cable tensile strength	20 N min.

2-3-15 Connector destructive strength

The connector destructive strength shall meet the following value when tested in accordance with 3-5-15 hereof.

Item	Specified value
Connector destructive strength	150 N min.

2-3-16 Salt spray(Corrosion)

When tested in accordance with 3-5-16 hereof, there shall be no occurrence of corrosion that will have detrimental effect on engagement and separation of the connectors. In addition, the connectors shall meet 2-3-4 and 2-3-5 hereof after the test.

2-3-17 Waterproof (including dust-proof)

When tested in accordance with 3-5-17 hereof, there shall be no evidence of defects such as damage and/or loosening of parts in each component, and the connectors shall meet 2-3-1 and 2-3-2 hereof after the test.

2-3-18 Soldering heat resistance (Receptacle only)

When tested in accordance with 3-5-18, there shall be no evidence of deformation and damage detrimental to the Specifications of connectors

2-3-19 Fluid immersion

When tested in accordance with 3-5-19 hereof, there shall be no evidence of defects such as expansion, damage, and/or cracking in insulator (rubber), and also of oil leakage into its inside.

2-4 Marking

The marking shall be legibly and permanently made on the positions as specified in the applicable product drawings.

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3. Quality Assurance Requirements

3-1 Quality assurance tests and inspections

All requirements specified in this specification shall be warranted by the following tests and inspections.

- (1) Approval test
- (2) Acceptance inspections

3-2 Testing conditions

Unless otherwise specified herein, all tests and inspections shall be carried out under the following conditions

Temperature	10~35 °C
Relative Humidity	30~80%

3-3 Approval test

The tests shall be carried out according to the sequential order specified in **Table-2** hereof on the first lot and, must pass all of the requirements

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Table -2

<div><div>Conditions</div><div>a)</div><div>b)</div><div>c)</div></div>	Steady-state	Temp. Shock	Humidity	Vibration	Vibration Durability	Shock	Life	Salt Spray	Water-pr oof	Soldering Heat resistance	Fluid immersio n
	3-2	2-3-8	2-3-9	2-3-10	2-3-11	2-3-12	2-3-13	2-3-16	2-3-17	2-3-18	2-3-19
		3-5-8	3-5-9	3-5-10	3-5-11	3-5-12	3-5-13	3-5-16	3-5-17	3-5-18	3-5-19
Appearance 2-1 2-2	(1) [1] <1> 1 (1) 《1》	(9) 3	(11)	(13)	(14)	(15)	(16)	(19) <4>	《4》	(2)	[3]
Dielectric withstanding voltage 2-3-1 3-5-1	(2) [2] 《2》	(10)	(12)					(20)	《5》		[4]
Insulation resistance 2-3-2 3-5-2	(3) 《3》							(21)	《6》		
Contact retention force 2-3-3 3-5-3	(4)									(3)	
Contact resistance (low level) 2-3-4 3-5-4	(5) <2>						(17)	(22) <5>			
Contact resistance (Steady- state) 2-3-5 3-5-5	(6) <3>						(18)	(23) <6>			
Contact engagement and separation force 2-3-6 3-5-6	2	4									
Crimp tensile strength 2-3-7 3-5-7								<7>			
Cable tensile strength 2-3-14 3-5-14	(7)										
Connector destructive strength 2-3-15 3-5-15	(8)										

Group A (*) ... 3 sets per each connector (Sample No. I, II)

Group B [*] ... 3 sets per each connector (Sample No. I, II)

Group C 《 * 》 ... 3 sets per each connector (Sample No. I, II)

Group D < * > ... 5 contacts per each connector

Group E * ... 10 contacts per each connector

Group F (⊗) ... 3 receptacle connectors (Sample No. III)

a) Requirements

b) Test methods

c) Items

3-3-1 Samples

The samples shall consist of each 3 sets of the following items and the number of contacts shall be 15 pieces for every wire size

(1) Connectors

Sample No.	Product Name		Wire to be used (Cable Dia. mm)
	Receptacle	Plug	
I	JN2AS10UL1	JN2DS10SL1	5 × 12/0.18+1P × 7/0.18 (Cable Dia. : φ 6.2)
	JN2AS10UL1	JN2FS10SL1	
II	JN2AS10UL1	JN2DS10SL2	5 × 20/0.18+2P × 7/0.18 (Cable Dia. : φ 7.2)
	JN2AS10UL1	JN2FS10SL2	
III	JN2AS10UL1	—	—

(2) Contacts

Contact size	Contact name		Wire to be used (AWG No.)
	Pin contact	Socket contact	
#22	JN1-22-22P-***	JN1-22-22S-***	AWG#21, 23, 25

Note : The pin contacts shall be used its crimp type as dummy pins.

3-4 Acceptance inspections

The connectors shall be tested every manufacturing lot according to the sequential order specified in the following table and must meet all requirements

Item	Requirements	Test method	Number of samples
Appearance	2-1, 2-2	—	A.Q.L 1%
Dimensions		—	1 piece/lot
Dielectric withstanding voltage	2-3-1	3-5-1	5 pieces/lot
Insulation resistance	2-3-2	3-5-2	5 pieces/lot

3-4-1 Samples

The samples shall be extracted according to ANSI/ASQCZ1.4 (Special Level : S-3), and the number of samples shall be specified in the table shown above. (n pieces of the samples shall be taken out from a lot on A.Q.L 1 % basis and carried out appearance inspection, and then 5 pieces shall be taken out from thereof and be inspected Dielectric withstanding voltage and insulation resistance.)

3-4-2 Non-defective certifications

The non-defective certification shall attach one (1) copy every shipping lot with the product delivery simultaneously.

3-5 Test methods

3-5-1 Dielectric withstanding voltage

The test voltage specified in 2-3-1 hereof shall be applied for 1 minute between the two closest contacts and between the contacts closest to the shell and the shell. In addition, the test voltage shall be steadily increased at a rate not exceeding 500 V/sec up to the specified voltage.

3-5-2 Insulation resistance

The insulation resistance shall be measured on specimens using DC 500V applied between the two closest contacts and between the contacts closest to the shell and the shell.

3-5-3 Contact retention force

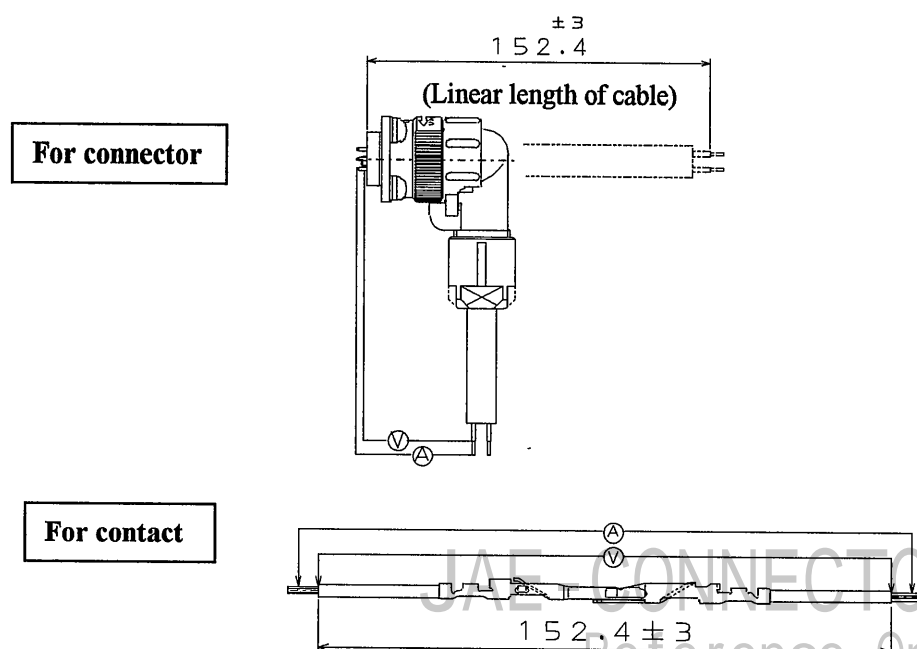
Axial loads specified in 2-3-3 shall be applied from the engagement side of the contact inserted into insulator.

3-5-4 Contact resistance (low level)

The contact resistance shall be derived from the voltage drop measured at the points shown in the following figure after having mated connectors or contacts in a manner the same as actual use condition, and meet the value specified in 2-3-4 hereof. In addition, the open circuit voltage of contact endpoints shall be 20 mV, and the test current shall be DC 100 mA.

3-5-5 Contact resistance (steady-state level)

The contact resistance shall be derived from the voltage drop measured at the points shown in the following figure after having mated connectors or contacts in a manner the same as actual use condition, and meet the value specified in 2-3-5 hereof.



3-5-6 Contact engagement and separation force

The engagement and separation force of socket contact shall be measured with the test pins of 2-3-6 hereof. In addition, the engagement depth shall be 5mm.

3-5-7 Crimp tensile strength

After having crimped the wires of 1-2 hereof to contacts with an appropriate crimping tool, the strength of crimped area of contact shall be measured.

3-5-8 Temperature cycling

The temperature cycling shall use the connectors assembled in a manner same as the actual use condition, and be done 5 cycles as the cycle shown in the following table to be 1 cycle

Test sequence	Temperature (°C)	Duration
1	$-20 \begin{smallmatrix} 0 \\ -3 \end{smallmatrix}$	30 minutes
2	Room temperature	5 minutes max.
3	$+100 \begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$	30 minutes
4	Room temperature	5 minutes max.

3-5-9 Humidity

The connectors assembled in a manner same as the actual use condition shall be exposed to a relative humidity $95 \pm 3\%$, at a temperature of $71 \pm 2^\circ\text{C}$ for 14 days.

3-5-10 Vibration

The connectors assembled in a manner same as the actual use condition shall be vibrated under the following conditions. In addition, all contacts shall be wired in a series circuit and a current of DC 100 mA shall flow through such circuit and the discontinuity of current flow shall be checked during the test.

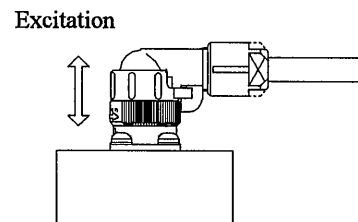
<u>Conditions</u>	Total amplitude : 1.52 mm or 98 m/s ² peak
	Frequency : 10~500 Hz
	Duration : 10~500~10 Hz
	15 minutes per cycle
	3 axes, 3 hours each
	9 hours in total

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3-5-11 Vibration durability

The connectors assembled in a manner same as the actual use condition shall be vibrated under the following conditions.

<u>Conditions</u>	Total amplitude : 1.8 mm or 14.2 m/s ² peak
	Frequency : 20 Hz
	Duration : 1 axis 40 hours



3-5-12 Shock

The connectors assembled in a manner same as the actual use condition shall be dropped from a height being fully obtainable deceleration of 490 m/s² using a drop-down type impact.

All contacts shall be wired in a series circuit and a current of DC 100 mA shall flow through such circuit and the discontinuity of current flow shall be checked during the test.

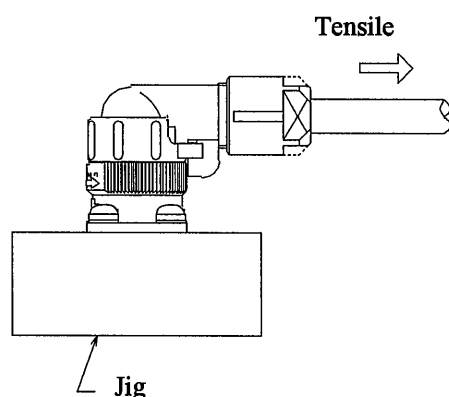
<u>Conditions</u>	Acceleration : 490 m/s ²
	Duration : 11ms
	Waveform : Half-sine
	Number of times : 3 axes, 3 times each (9 times in total)

3-5-13 Durability

The connectors shall be mated and unmated 500 times at a rate that shall not be greater than 600 times per hour.

3-5-14 Cable tensile strength

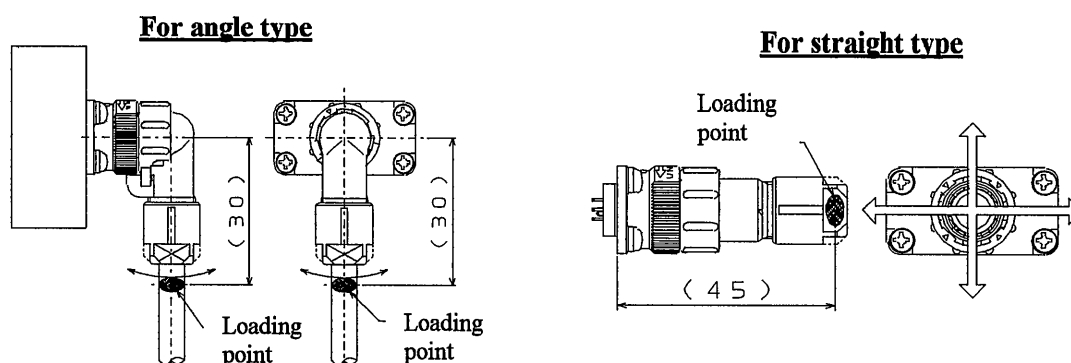
The load of 2-3-14 hereof shall be applied to a cable of the connector assembled in a manner same as the actual use condition in the direction of the following figure.



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3-5-15 Connector destructive strength

The load of 2-3-15 hereof shall be applied to the connector assembled in a manner same as the actual use condition in the four (4) directions of the following figure.

**3-5-16 Salt spray(Corrosion)**

The connectors assembled in a manner same as the actual use condition shall be tested in accordance with MIL-STD-202, Method 101, condition B. After the test, the connectors shall be washed its outside in water immediately, and then shall be exposed in a hot-air circulation drying chamber of $38 \pm 3^{\circ}\text{C}$ for 24 hours.

Conditions

Salt solution concentration : 5%

Test chamber temperature : 35°C

Length of test : 48 hours

3-5-17 Waterproof (including dust-proof)

The connectors assembled in a manner same as the actual use condition shall be carried out according to the tests of IP-67 in IEC 529. However, receptacle and the connection side of plug shall be the suitable waterproof structure.

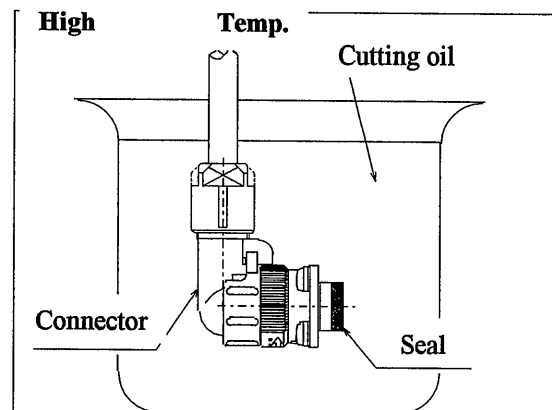
3-5-18 Soldering heat resistance (Receptacle only)

The through-hole terminal area of receptacle shall be dipped into a soldering bath of 260°C for 3 seconds.

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3-5-19 Fluid immersion

The connectors mated in same manner as the actual use condition shall be immersed in cutting oil being heated (setup temperature 85°C) as shown below for 200 hours



4. Packaging and packing

Packaging and packing shall be carried out in a manner that will not adversely affect on the quality of products, and the product name, quantity and so forth shall be marked if deemed necessary.

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