COMMON PARTS/MATERIALS, SPACE USE, APPLICATION DATA SHEET FOR

Part Description	CONNECTORS, COAXIAL, RADIO FREQUENCY, HIGH RELIABILITY, SPACE USE ADAPTER JACK-JACK, STRAIGHT, 4-POINT ATTACHMENT
Part Number and Type	J2060 / HA81-33K0-*
Applicable Specification	JAXA-QTS-2060 JAXA-QTS-2060 Appendix H JAXA-QTS-2060/H403

March 2025

Prepared and Established by Waka Manufacturing Co., Ltd.

Issued by Japan Aerospace Exploration Agency

This document is the English version of JAXA QTS/ADS which was originally written and authorized in Japanese and carefully translated into English for international users. If any question arises as to the context or detailed description, it is strongly recommended to verify against the latest official Japanese version.

The release date of the English version of this data sheet: 24 March 2026

Record of revisions

Rev.	Date	Description
NC	4 Mar. 2013	Original
A	19 Jun. 2014	Reflected the change of document by Waka Manufacturing Co., Ltd. Document No: JX014 (Rev. A)
B	28 Sept. 2016	Reflected the change of document by Waka Manufacturing Co., Ltd. Document No: JX014 (Rev. B)
C	21 Mar. 2025	Reflected the change of document by Waka Manufacturing Co., Ltd. Document No: JX014 (Rev. C)
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Revision history

Rev.	Date	Description
NC	4 Mar. 2013	Original
A	19 Jun. 2014	Paragraph 6. Environmental Limit Added the evaluation result of the environmental limit test. Paragraph 6.2. RF dielectric withstanding voltage Clarified that there was no short-circuit at RF dielectric withstanding voltage, and clearly specified the leak current value. Paragraph 7.2. Failure mode a) Open circuit Deleted the cause of open circuit (solder detachment) because it does not apply to this connector. b) Short circuit Clarified the cause of short circuit
B	28 Sept. 2016	・ Figure 3: Changed the dimension tolerance of the mounting hole (4–ϕ2.60) ・ from to “+0.05/0” to “+0.08/-0.08”. (error correction) ・ Paragraph 4.1 b): Added the unit of insulation resistance (Ω).(omission correction) ・ Paragraph 10.1 Contact Information: Changed the contact address, ・ telephone/Fax numbers due to the head quarter relocation.
C	21 Mar. 2025	・ Revised in accordance with the revised general specification JAXA-QTS-2060F. 1) Changed terminology to align the standardized nomenclature for connectors and contacts. (for Japanese version only.) 2) Items (a), (b), (c) and (d) of paragraph 4.2, and item (e) of paragraph 4.3: Changed wording from "Insertion/removal force" to "connector mating and unmating force." 3) Items (c) and (d) of paragraph 4.2: Changed wording from “coupling characteristics” to “contact insertion and removal characteristics.” 4) Items (a) and (b) of paragraph 4.3: Changed wording from “intermittent contact” to “electrical interruption.” 5) Items (c) of paragraph 4.2: Changed the criteria for contact removal from "0.277N {28.3gf} min." to "0.28N {28.5gf} min." 6) Table 6: Changed the applicable document for dielectric withstanding voltage from MIL-STD-1344 to EIA-364-20F due to the cancellation of MIL-STD-1344 ・ Paragraph 3. USAGE Corrected wording error in item c). ・ Items (c) and (e) of paragraph 4.1 Corrected errors.

JX-014

Rev.	Date	Description
		・ Paragraph 8. STORAGE CONDITIONS Deleted the text of “Suppliers” since "Suppliers" is not defined in this data sheet. (for Japanese version only.) ・ Paragraph 9. NOTES Itemized and corrected editorial error.

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Contents

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COMMON PARTS AND MATERIALS, SPACE USE,
APPLICATION DATA SHEET FOR

1. GENERAL

1.1 Scope

This Application Data Sheet details additional general information necessary for parts selection and/or equipment design that is not contained in JAXA-QML. Users are encouraged to look into other information sources for specific applications, and responsible for their decisions on part selection and usage.

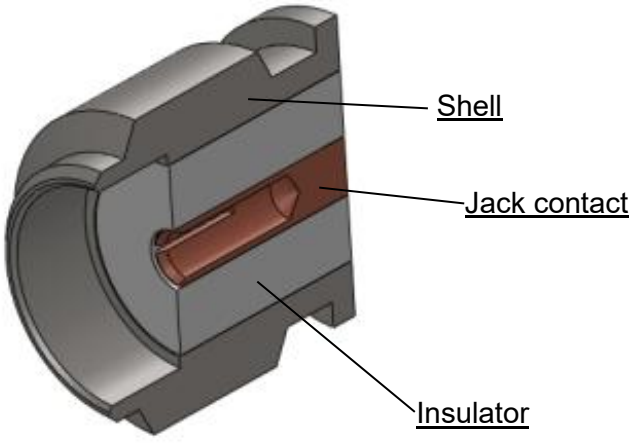
1.2 Applicable Documents

JAXA-QTS-2060	Connectors, High Reliability, Space Use, General Specification for
JAXA-QTS-2060 Appendix H	Connectors, Coaxial, Radio Frequency
JAXA-QTS-2060/H403	Connectors, Coaxial, Radio Frequency, High Reliability, Space Use, Adapter Jack-Jack, Straight, 4-Point Attachment, Detail Specification For

2. SUMMARY OF PRODUCTS

2.1 Outline

Connectors described in this data sheet are high reliability parts for electronic equipment to be installed on satellites and/or launch vehicles. They are coaxial radio frequency connectors which are generally referred to as SMA connectors.
Shells are round in shape and the mating parts contains the male connector with coupling nut and the female connector with an external thread to prevent mis-mating.
The contact of the connectors is a coaxial type only and the insulation is made out of Teflon which makes it a low insertion loss connector.
The connectors are interchangeable with ESA and MIL-certified connectors.
Cross-sectional view of the connector is shown in Figure 1.



Note: The screw section is not Included in this image.

Figure 1. Cross-Sectional View of the Connector

2.2 Structure of Part Number for Connectors

The structure of the part number for the connectors shall be in accordance with Appendix H of JAXA-QTS-2060 and as follows.

2.2.1 Part Number

The part number of the connectors is assigned based on the series, configuration, identification number, contact type, and terminal style and the example is as follows.

Example J2060 / HA (Series (HA:SMA)) 81 (Configuration (See table1)) - 33K0 - 01 (Identification number (See paragraph 2.2.1.1))

Table 1. Configuration

1st digit number	Connector type	2nd digit number	Configuration/attachment
8	Adapter jack-jack	1	Straight 4-point attachment

2.2.1.1 Identification Number

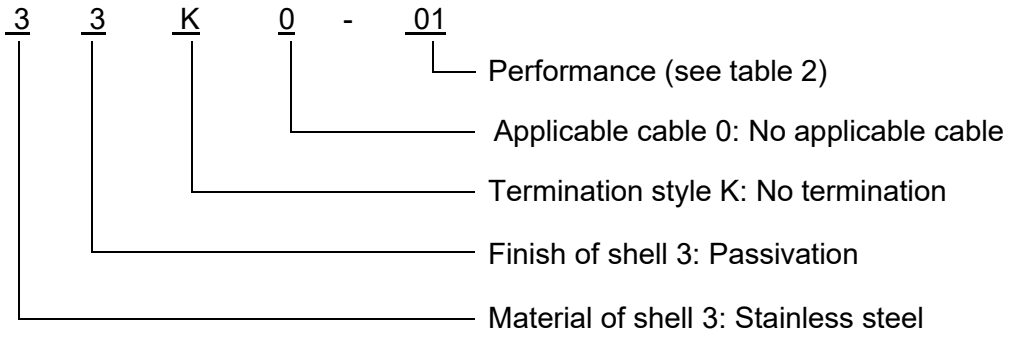


Table 2. Performance

Unit: mm

Number	Dimension A	Performance
01	12.75 to 12.95	See figure 3
02	9.45 to 9.65	See figure 3

2.3 External, Dimensions, Mass, and Marking

The external, dimensions, and marking shall be as specified in Figures 2 through 4.

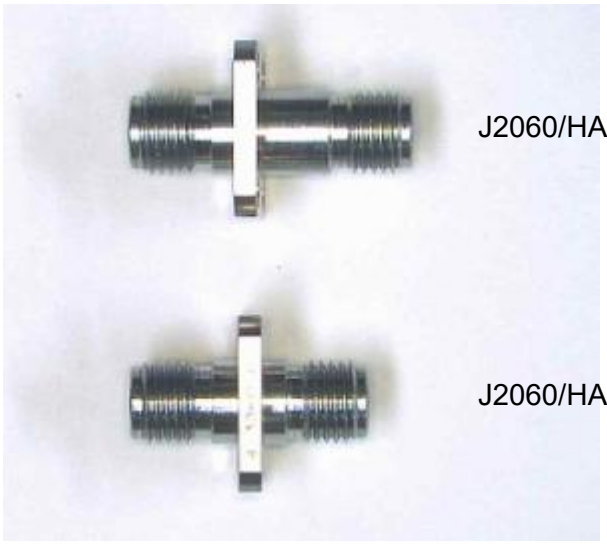


Figure 2. External Views of the Adapter, Straight Type Connectors

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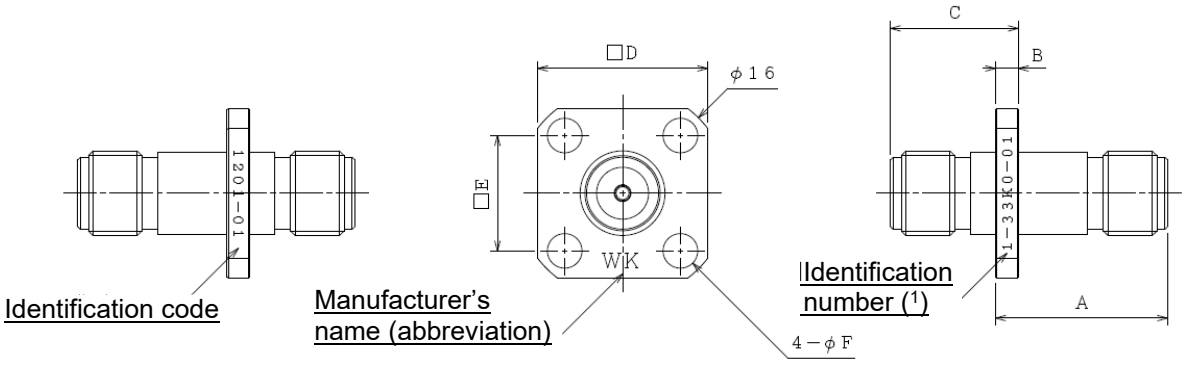
Unit: mm



Identification number	A	B	C	D	E	F	Mass (g)
33K0-01	12.85±0.1	1.70±0.05	9.55±0.3	12.7±0.2	8.64±0.05	2.6±0.08	3.9 to 4.1
33K0-02	9.55±0.1	1.70±0.05	9.55±0.3	12.7±0.2	8.64±0.05	2.6±0.08	3.4 to 3.6

Note: (1) The number identifying the connector configuration, attachment style and identification number shall be marked.

Identification code example :

13	12	-	01
The last two digits of the number of the year	The two digits indicating the calendar week of the year		Production lot number (series)

Figure 3. Externals, Dimensions, and Marking

3. USAGE

3.1 Rating

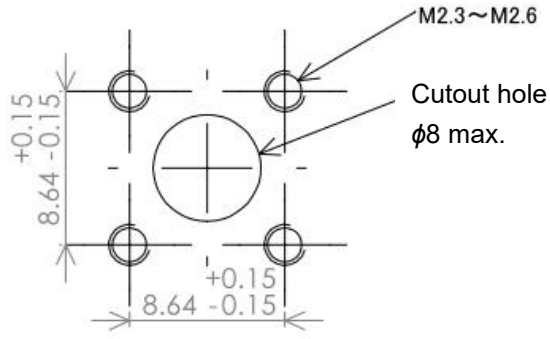
a) Rated voltage 335Vrms (Barometric pressure)
b) Nominal impedance 50Ω
c) Operating Temperature Range -65 to +115°C

3.2 Dimensions for Mounting Hole

The connectors shall be mounted on the place where holes as shown in Figure 4 are drilled to align the drill holes of the connector. If several cutout holes need to be drilled, take a plenty of space between cutout holes considering the widths of the flanges with 4-hole being 12.7mm.

The screws of size M2.3 to M2.6 shall be used for mounting the connectors, and the drill holes need to be drilled. Although the cutout holes of the connectors shall be based on the terminal configuration and mating connectors and decided by the users, the maximum hole size shall be 8mm considering the interference with the drill holes. Alternate the screwing; the screw shall not be tightened all at once but a few turns at a time and move to the other side (diagonal side) of the mount and screw the other and back to the other side to screw all the way alternately little by little.

Unit: mm



4-hole flange type

Figure 4. Mounting Hole Dimensions

3.2.1 Thickness of the Mounting Board

The thickness of the mounting board shall be shown in Table 3.

Table 3. Thickness of the Mounting Board

Unit: mm

Part number	Thickness
J2060/HA-81 33K0-01	5 as a maximum
J2060/HA-81 33K0-02	3 as a maximum

3.3 Precautions for Use

3.3.1 Handling

A clean gloves and/or finger cot shall be used for handling connectors and contacts after the package seal is opened. When a contact is tested individually for conductivity, the contact shall be inserted to the mated contact straight without applying the bending moment or rotation.
Take extra caution for handling these RF connectors because they are extremely delicate and fragile.

3.3.2 Mating and Unmating

Mating or unmating of the connectors shall be performed gently in parallel with the mating axis. Mate or unmate the connectors without applying the bending moment or rotation.
Use the torque wrench for tightening the coupling nut. The recommended size and torque for the wrench shall be 5/16 (8mm), and
78.94 {8.05} to 112.88N· cm {11.5kgf· cm}, respectively.

4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS

The following test items of Qualification test were performed and the results met the requirements specified in the applicable specification.

4.1 Electrical Performance

(a) Dielectric withstanding voltage
Test voltage: AC1000Vrms (Barometric pressure)
Test duration: One minute
Requirement: Connectors shall exhibit no evidence of short circuit.

(b) Insulation resistance
Test voltage: DC500V
Requirement: Insulation resistance shall be 5000MΩ as a minimum.

(c) Contact resistance
Measured section: Center contact
Requirement: Contact resistance shall be 3.0mΩ as a maximum before test and 4.0mΩ as a maximum after test.

(d) VSWR and RF insertion loss (Reference data)
VSWR and RF insertion loss are not required in the qualification test, however, the reference data is shown in Figures 5 and 6.

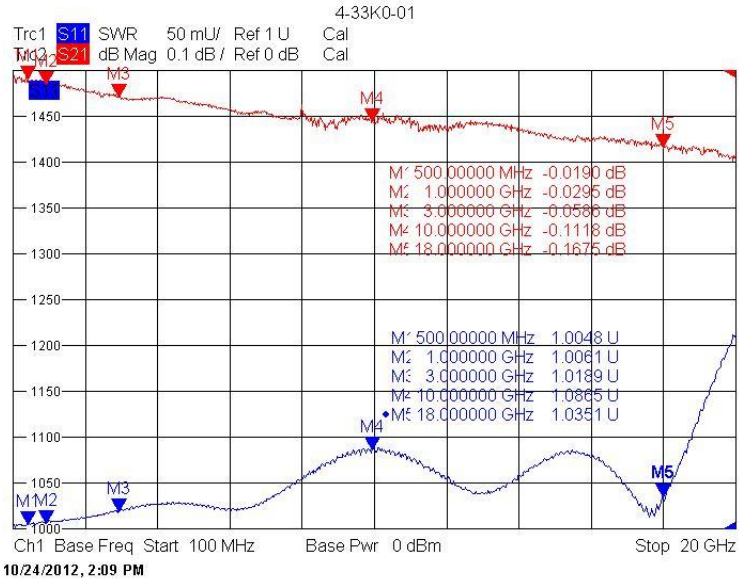


Figure 5. J2060/ HA81-33K0-01 (Reference Data)

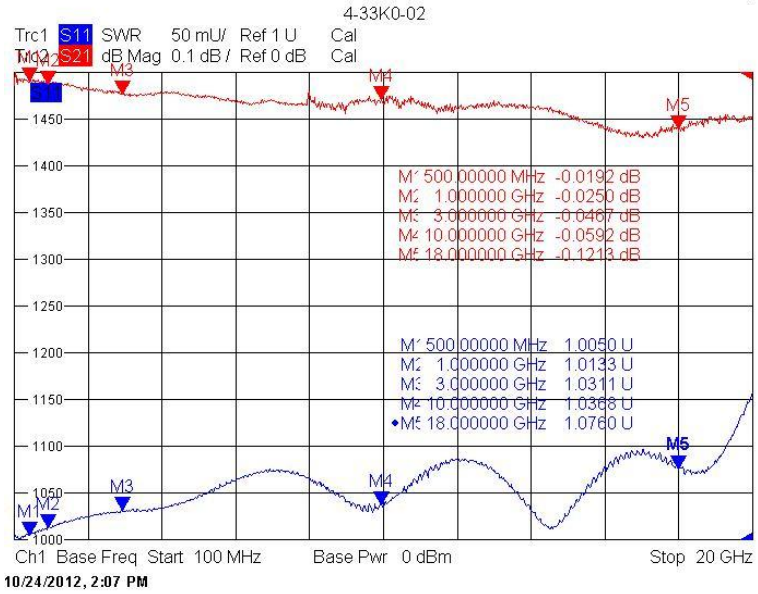


Figure 6. J2060/ HA81-33K0-02 (Reference Data)

4.2 Mechanical Performance

(a) Connector Mating and Unmating Force
Requirement: The torque necessary to fully engage/disengage the connector shall not exceed 22.6N·cm {2.3kgf·cm}.

(b) Coupling Proof Torque
Test condition: Tighten the coupling nut with the torque of 169.7N·cm {17.30kgf·cm} and uncouple a minute later.

Requirement: The connection shall not be dislodged. At the completion of the test, the interface dimensions of the connector shall remain as specified in the detail specification and meet the requriement of connector mating and unmating force.

(c) Contact insertion and removal characteristics
Test condition: After the completion of the engage/disengage three times with specified oversized pin, the connector shall be secured on the jig and tested for engage/disengage with specific test pin.
Requirement: The dimensions of the joint part shall be met as specified in the detail specification. For connector mating and nnmating force, the following conditions shall be met.
Force to engage: 13.3N {1.36kgf} as a maximum
Force to disengage: 0.28N {28.5kgf} as a minimum

(d) Durability
Test condition: 500 repetitions of engage and disengage actions (12 times/min. Max.)
Requirement: There shall not be any mechanical damage in the connector and the mating mechanism shall be able to operate mechanically. After the test, connector mating and unmating force and contact insertion and removal characteristics requirements shall be met.

4.3 Environmental Performance

(a) Vibration
High frequency vibration (294m/s^2 {30G} peak)
Sweep time and test duration: 10 to 2000Hz (20min. back and forth)
Direction and test cycle: 12 times for each direction perpendicular to x, y, and z axes.
Requirement: The connector shows no electrical interruption of 1μs or more, short or open circuit. There shall be no mechanical damage. After the test, contact resistance (center contact) requirement shall be met.

(b) Shock
Pulse waveform: Half sine
Peak acceleration rate: 2,942m/s^2 {300G}
Pulse duration: 3ms
Pulse velosity change: 5.61m/sec
Shock direction and test cycle: ±X, ±Y, and ±Z axes (3 times for each direction, total of 18 times)
Requirement: The connector shows no electrical interruption of 1μs or more, short or open circuit. There shall be no mechanical damage. After the test, contact resistance (center contact) requirement shall be met.

(c) Thermal Shock
Temperature range: -65 to 200°C
Duration: 30min.
Number of cycle: 5 cycles

Requirement: There shall be no mechanical damage. After the test, dielectric withstanding voltage and contact resistance (center contact) requirements shall be met.

(d) Moisture Resistance
Temperature range: -10 to 65°C
Humidity range: 80 to 98%
Time of a cycle: 24hours
Number of cycle: Five cycles for each cycles A and B shown in figure 7, total of 10 cycles.
Requirement: There shall be no mechanical damage. After the test, insulation resistance and dielectric withstanding voltage requirements shall be met.

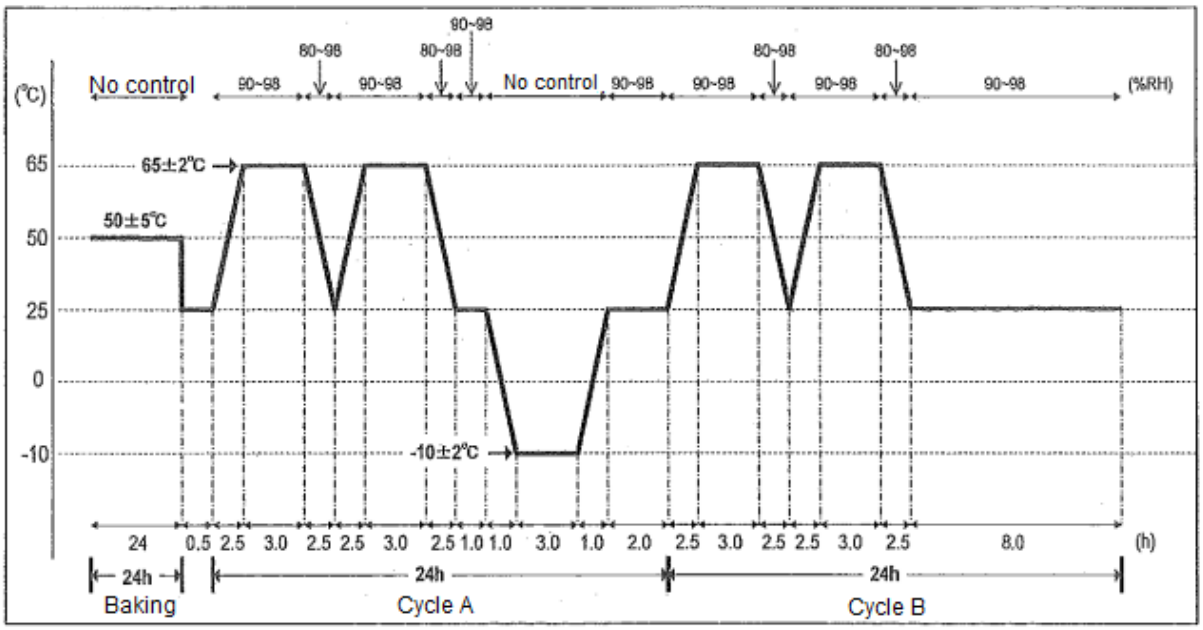


Figure 7. Type II, Moisture Test Cycle

(e) Salt Spray
Concentration: 5±1%
pH: 6.5 to 7.2
Temperature: 35±3°C
Test duration: 48 hours
Requirement: Bare metal shall not be exposed at the joint surface or internal surface. After the test, the requirement of connector mating and unmating force shall be met.

4.4 Outgassing

The outgassing test was conducted in accordance with ASTM E595 for organic materials used for the connectors. The results are shown in Table 4.

Table 4. Outgassing Test Results

Material	TML (%)	CVCM (%)
Insulation (Teflon)	0.004±0.000	0.000±0.000

Note: ([1]) The connectors contain no epoxy.

4.5 Residual Magnetization

The test results of residual magnetization measured with a gaussmeter shall be shown in Table 5.

Table 5. Residual Magnetization Test Results

Connector type	Average (nT)	Maximum (nT)	Minimum (nT)
Adapter jack-jack, Straight 4-point attachment	560	931	107

5. CHARACTERISTICS UNDER VARIOUS OPERATING CONDITIONS

No data.

6. ENVIRONMENTAL LIMIT

The test conditions and test items for environmental limit test are shown in Tables 6 and 7. Each test result is specified in the tables indicated below.

(1) External, dielectric withstanding voltage, instantaneous interruption Tables 8 and 10

(2) Contact resistance Tables 9, Figures 8 and 9

Table 6. Test Condition

Gr.	Order	Test item	Test condition
I	1	Vibration (Random vibration)	MIL-STD-202 Test method 214 Test condition: (I) J rms value of acceleration: 37.80G 3 directions for 15min. each
	2	Shock	MIL-STD-202 Test method 213 Test condition: F (half-wave sinusoidal wave) · Gravitational acceleration: 1500G±20% · Pulse duration: 0.5ms±15% · Pulse speed variation: 4.68m/s±10% Total of 6 times (3 times each for "-" and "+" directions per direction) X 3 directions (Total vibration time: 18)
	3	Thermal shock	MIL-STD-202 Test method 107 Test condition: B-3 (The min. temp: -65°C$_{-5}^{+0}$ to the max. temp.165°C$_{-5}^{+0}$) 1000cycle (Externals, contact resistance, and dielectric withstanding voltage are checked for each 100cycle)
II	1	Dielectric withstanding voltage (reduced pressure)	EIA-364-20F Voltage is applied by 100V increments (Check dielectric withstanding voltage under the reduced pressure of 4.4kPa)

Gr.	Order	Test item	Requirement	Sample size	Sample
I	1	Vibration (Random vibration)	As specified in paragraph H.3.8.2, Appendix H of JAXA-QTS-2060E. There shall be no loosening of parts.	5	J2060/HA81 -33K0-01
	2	Shock			
	3	Thermal shock	As specified in paragraph H.3.8.3, Appendix H of JAXA-QTS-2060E		
II	1	Dielectric withstanding voltage (reduced pressure)	As specified in paragraph H.3.6.1, Appendix H of JAXA-QTS-2060E	5	

Table 7. Measured Item

	External	Contact resistance	Dielectric withstanding voltage	Instantaneous interrupt
Before test	□	□	□	
Vibration	●	●		○
Shock	●	●		○
Thermal shock	●	●	●	

Note: □: Items to be measured before test
○: Items to be measured during test
●: Items to be measured after test

Table 8 Externals, Dielectric Withstanding Voltage, and Instantaneous Interrupt

Part number	Item	Externals	Dielectric withstanding voltage	Instantaneous interrupt
J2060/HA81 -33K0-01	Pre-test	Good	Good	---
	Vibration	Good	---	Good
	Shock	Good	---	Good
	Thermal shock	Good	Good	---

Table 9. Contact Resistance

(mΩ)

Part number	Item	Ave.	Max.	Min.	Std. deviate
J2060/HA81 -33K0-01	Pre-test	1.48	1.52	1.47	0.021
	Vibration	1.44	1.46	1.43	0.013
	Shock	1.46	1.47	1.42	0.021
	Thermal shock	1.35	1.47	1.27	0.048

(n=5)

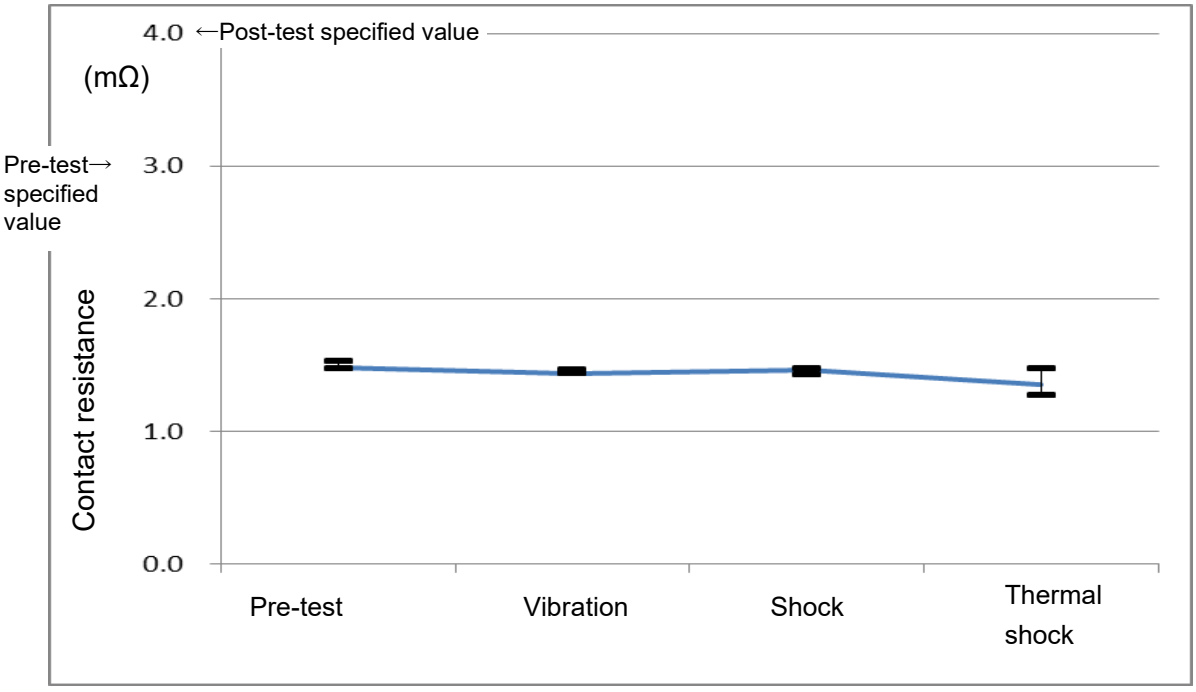


Figure 8. Contact Resistance in Environmental Limit Test

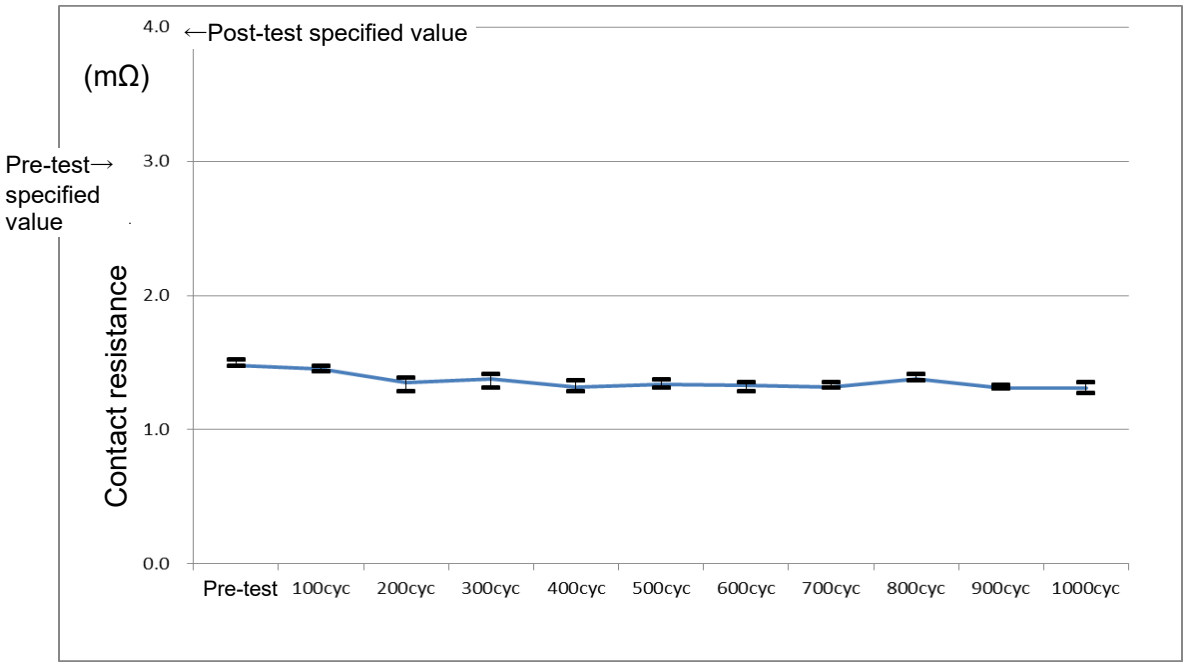


Figure 9. Contact Resistance in Thermal Shock Test

6.1 Dielectric Withstanding Voltage at Reduced Pressure

Table 10. Dielectric Withstanding Voltage (Destructive Voltage) at Reduced Pressure

(Unit: Vrms)

Part number	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
J2060/HA81 -33K0-01	500	600	600	600	600

(n=5)

6.2 RF Dielectric Withstanding Voltage

There was no short circuit observed at the radio frequency of 1200Vrms (5MHz).The leak current was 25mA or less.

7. RELIABILITY

7.1 Failure Rate

The failure rate for the general products (estimate) in the market is shown below as a reference.

7.1.1 Calculation Conditions

a) Reliability level: 60%
b) Number of defects reported by customers (r): 0

c) Operating year: 2 years per each product
T= (8 hours / day) X 300 days X 2 years X Number of products
i) In 2005: 14181 pieces T1 = 68068800
ii) In 2006: 17734 pieces T2 = 85123200
iii) In 2007: 18484 pieces T3 = 88723200
iv) In 2008: 17364 pieces T4 = 83347200
v) In 2009: 13545 pieces T5 = 65016000
vi) In 2010: 20987 pieces T6 = 100737600
The total of operating time T = 491016000

7.1.2 Calculation Results

MTBF = T / 0.917 (when the number of failure r= 0 according to JIS C 5003)
= 491016000 / 0.917
≈ 535459105.8

Predicted failure rate: $\lambda = 1 / MTBF$
$= 1 / 535459105.8$
$\approx 1.87 \times 10^{-9}$
$= 1.87$ (fit)

7.2 Failure Mode

The possible failure mode shall be as follows.

a) Open-circuit
Center contact breakdown
b) Short-circuit
Shavings etc. caused by the failed work on parts.
c) Characteristic degradation
Plating trouble, contaminated insulation, damaged or loosened contact caused by twisting and rotating (improper instruction)

8. STORAGE CONDITIONS

a) The connectors are sealed in a bag to prevent any dust to get in during shipping. Do not open the sealed bag if not necessary. Re-seal the bag before storage if opened for receiving inspection or other needs.
b) Store the connectors at an ambient temperature and humidity if possible.
c) Minimize vibrations and shocks during shipping and storage.

9. NOTES

When connecting or disconnecting, only rotate the coupling.
Be careful not to rotate the shell or cable as this may damage the contacts.

10. OTHERS

10.1 Contact Information

Manufacturer: Waka Manufacturing Co., Ltd. Sales Department
Address: 6F, Nishi-shinjuku Takagi Building, 1-20-3, Nishi-shinjuku, Shinjuku-Ku, Tokyo, 160-0023 Japan
Tel: +81-3-6635-5410
Fax: +81-3-6635-5420