

Registration No. 1292

JAXA-QTS-2180/103B

6 February 2025

Superseding

JAXA-QTS-2180/103A

Cancelled

6 February 2025

TEMPERATURE SENSORS, PLATINUM,
PROBE SHEATH TYPE, RADIATION HARDENED,
LONG-LIFE, HIGH RELIABILITY,
SPACE USE,
DETAIL SPECIFICATION FOR

Prepared and Established by Mitsubishi Heavy Industries, 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 specification: 28 May 2025

JAXA-QTS-2180/103B 6 February 2025		J A X A Parts Specification	Page	– i –
Record of revisions				
Rev.	Date	Description		
NC	11 Aug. 2009	Original		
A	24 Sept. 2015	Reflected the change of document by Mitsubishi Heavy Industries, Ltd. Document No: VET25108 (Rev. A)		
B	6 Feb. 2025	Reflected the change of document by Mitsubishi Heavy Industries, Ltd. Document No: VET25108 (Rev. B)		
		The remainder of this page is intentionally left blank.		

Revision history

Rev.	Date	Description
NC	11 Aug. 2009	Original
A	24 Sept. 2015	(1) Cover page: The name of organization was changed (however no name change in English) (2) Clarified the description Paragraphs 4.2 and 4.3: Added the description of test in Tables 5, 6, and 7 and clarified the test items whose results will be substituted by the inspection data during manufacturing process. (3) Changed the location of Table 4 referred by paragraph 3.1 and Table 3 to immediately after Table 3.
B	6 Feb. 2025	(1) Added calibration temperature - Table 1: Added the measured temperature range of "-196°C to +135°C" in association with the additional calibration temperature. - Table 3: Added the calibration temperature level "J" in "interchangeability." - Table 4: Updated the interchangeability to accommodate the additional measured temperature of "-196°C" with the maximum and minimum values of the resistance. (2) Applied humidity resistance - Table 3: Changed from "Not applicable" to "As specified in JAXA-QTS-2180. For test condition, the level A-2 shall apply." in "humidity resistance." - Table 5: Changed from "not applicable" to "applicable" in "humidity resistance." (3) Changed applicable level of operating life (Temperature cycling) Table 3: Changed the level from "Level B" to "Level F."

JAXA-QTS-2180/103B 6 February 2025	J A X A Parts Specification	Page	– iii –
			VET25108
Contents			
1. GENERAL			1
1.1 Scope.....			1
1.2 Part Number			1
1.3 Rating			1
2. APPLICABLE DOCUMENTS.....			2
2.1 Applicable Documents.....			2
2.2 Reference Documents.....			2
3. REQUIREMENTS			2
3.1 Performance			2
3.2 Externals, Dimensions and Markings			6
3.2.1 Externals, Dimensions, Mass and Interface.....			6
3.2.2 Markings			7
4. QUALITY ASSURANCE PROVISION			7
4.1 In-process Inspection			7
4.2 Qualification Test			7
4.3 Quality Conformance Inspection			9
4.4 Long-term Storage			10
4.4.1 Disposition of Products Stored for a Long Time at Manufacturer's Site			10
4.4.2 Storage by Purchaser.....			10
4.5 Changes of Tests and Inspections			10
5. PREPARATION FOR DELIVERY.....			10
6. NOTE			10

**TEMPERATURE SENSORS, PLATINUM,
PROBE SHEATH TYPE, RADIATION HARDENED,
LONG-LIFE, HIGH RELIABILITY,
SPACE USE,
DETAIL SPECIFICATION FOR**

1. GENERAL

1.1 Scope

This specification establishes the detail requirements and quality assurance provisions for long-life, radiation hardened, probe sheath type, platinum temperature sensors (hereinafter referred to as “temperature sensors”) of the space use, high reliability, platinum temperature sensors (JAXA-QTS-2180).

1.2 Part Number

The part number is as shown in the example below.

(Example) N1043 / 301 - 50 - □□□ - □

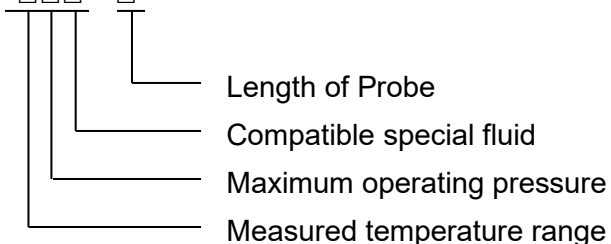


Table 1. Part Number

Item	JAXA-QTS-2180 Paragraph	Requirement
Measured temperature range	3.7 a)	1: -260°C to +135°C Calibration temperature -269, -183, 0, 100°C 2: -196°C to +135°C Calibration temperature -196, 0, 100°C
Maximum operating pressure	3.7 b)	3: 6.865MPa {70kgf/cm ² }G
Compatible special fluid	3.3.2.1	2: Corrosive fluid (see Table 3)
Length of Probe	—	1: 38±1mm (see Figure 1)

1.3 Rating

The ratings shall be in accordance with Table 2.

JAXA-QTS-2180/103B 6 February 2025	J A X A Parts Specification	Page	– 2 –
---------------------------------------	--------------------------------	------	-------

VET25108

Item	Specification
Measured temperature range (Operating temperature range)	–260 to +135°C, -196 to +135°C (–260 to +135°C)
Maximum Operating Pressure	6.865MPa {70kgf/cm ² }G
Supply Current	Max. 5mA
Nominal Resistance	1000±2Ω (at 0°C)

2.

APPLICABLE DOCUMENTS

2.1

Applicable Documents

The applicable documents shall be as specified in paragraph 2.1 of JAXA-QTS-2180.

2.2

Reference Documents

The reference documents shall be as specified in paragraph 2.2 of JAXA-QTS-2180.

3.

REQUIREMENTS

The requirements shall be as specified in paragraph 3 of JAXA-QTS-2180 and as follows.

3.1

Performance

The performance of the temperature sensors shall be as shown in Table 3.

JAXA-QTS-2180/103B 6 February 2025		J A X A Parts Specification	Page	– 3 –
				VET25108
Table 3. Performance (1/2)				
Item	Paragraph in JAXA-QTS-2180	Performance		
Parts and materials				
Machined parts	3.3.1.1	As specified in JAXA-QTS-2180.		
Compatibility with fluids	3.3.2.1	Shall be compatible with the basic fluids and special fluids B and C.		
Outgassing	3.3.2.2	As specified in JAXA-QTS-2180.		
Radiation hardness	3.3.2.3	As specified in JAXA-QTS-2180.		
Design and structure	3.4	As specified in JAXA-QTS-2180.		
Externals, dimensions and markings	3.5	As specified in Figures 1 and 2		
Workmanship				
Structure (DPA)	3.6.1	(1) Internal structure and main dimensions (2) Welding state (3) Soldering state (4) Amount of filled resin		
Cleanliness	3.6.2	As specified in JAXA-QTS-2180. For the particle count, the requirement level B shall apply.		
Basic characteristics				
Proof pressure	3.8.1.1	As specified in JAXA-QTS-2180.		
Leakage	3.8.1.2	As specified in JAXA-QTS-2180. For the testing temperature for pressure cell, level A shall apply.		
Insulation resistance	3.8.1.3	As specified in JAXA-QTS-2180. The measuring method shall be as specified in paragraph 4.6.4.3 a).		
Dielectric withstanding voltage	3.8.1.4	As specified in JAXA-QTS-2180.		
Interchangeability	3.8.1.5	As specified in Table 4. For calibration temperature, the level shall apply as follows; Measured temperature range -260 to +135°C: Level A. Measured temperature range -196 to +135°C: Level J.		
Other characteristics				
Strength of extension wire connection	3.8.2.1	Not applicable.		
Over current	3.8.2.2	As specified in JAXA-QTS-2180.		
Pressure dependence	3.8.2.3	Not applicable.		
Repeatability	3.8.2.4	Within $\pm 0.2^{\circ}\text{C}$ (it is equivalent to $\pm 0.795\Omega$ at 0°C). For temperature cycling, the level A shall apply.		
Response time	3.8.2.5	Maximum of 1.5 seconds.		
Self-heating	3.8.2.6	The temperature rise due to self-heating shall be 1°C max. at an input level of 50mW.		
Thermoelectromotive force	3.8.2.7	As specified in JAXA-QTS-2180.		

JAXA-QTS-2180/103B 6 February 2025		J A X A Parts Specification	Page	– 4 –
				VET25108
Table 3. Performance (2/2)				
Item		Paragraph in JAXA-QTS-2180	Performance	
Environmental characteristics				
	Dynamic pressure	3.8.3.1	As specified in JAXA-QTS-2180. For test condition, the level A shall apply.	
	Sine wave vibration (I)	3.8.3.2	As specified in JAXA-QTS-2180.	
	Sine wave vibration (II)	3.8.3.3	Not applicable.	
	Random vibration	3.8.3.4	As specified in JAXA-QTS-2180. For test condition, the level B shall apply.	
	Shock	3.8.3.5	As specified in JAXA-QTS-2180. For test condition, the level B shall apply.	
	Radiation hardness	3.8.3.6	As specified in JAXA-QTS-2180.	
	Pressure cycle	3.8.3.7	Not applicable.	
	Humidity resistance	3.8.3.8	As specified in JAXA-QTS-2180. For test condition, the level A-2 shall apply.	
Life				
	Storage life	3.8.4.1	As specified in JAXA-QTS-2180. For test condition, the level A shall apply.	
	Operating life (High temperature life)	3.8.4.2.1	The change in temperature/resistance characteristics shall be within $\pm 0.2^{\circ}\text{C}$. For test condition, the level B shall apply.	
	Operating life (Temperature cycling)	3.8.4.2.2	The change in temperature/resistance characteristics shall be within $\pm 0.2^{\circ}\text{C}$. For test condition, the level F shall apply.	
Destructive characteristics				
	Burst pressure	3.8.5.1	As specified in JAXA-QTS-2180.	

Table 4. Interchangeability

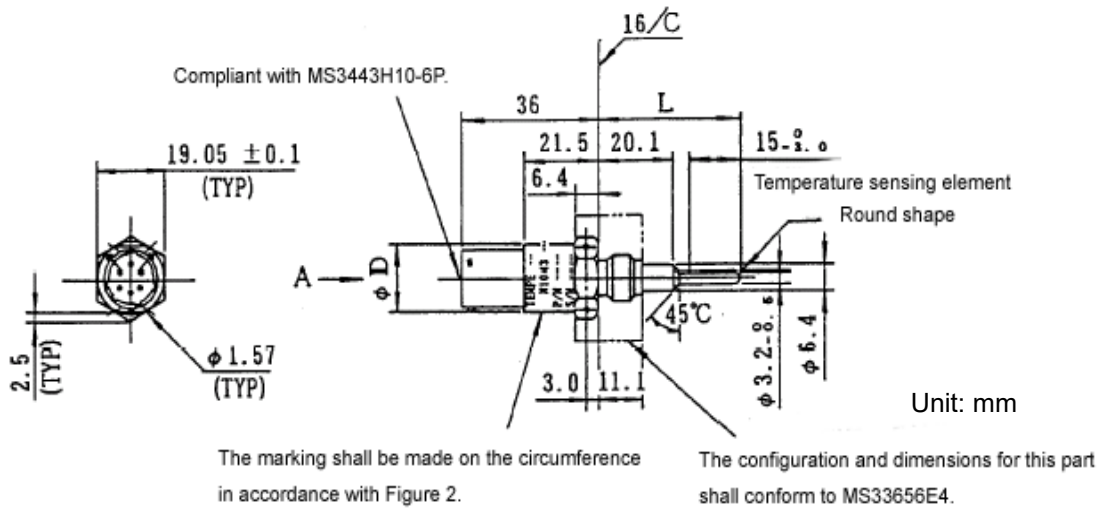
Temperature (°C) ⁽¹⁾	Resistance (Ω)	
	Minimum	Maximum
-260	0.98	3.98
-253	4.60	6.80
-240	24.04	26.24
-220	86.89	90.69
-200	169.36	173.56
-196	186.49	190.89
-183	242.78	247.18
-180	255.77	260.17
-160	341.88	346.08
-140	426.63	430.83
-120	510.24	514.44
-100	592.94	597.14
-80	675.04	679.04
-60	756.45	760.45
-40	837.37	841.37
-20	917.87	921.87
0	998.00	1002.00
20	1076.87	1081.67
40	1155.35	1160.75
60	1232.84	1239.84
80	1310.24	1318.04
100	1387.26	1395.66
120	1463.70	1472.90
135	1520.62	1530.62

Note⁽¹⁾: When measured temperature ranges are from -196 to +135°C, temperatures below -196°C are for reference only.

3.2 Externals, Dimensions and Markings

3.2.1 Externals, Dimensions, Mass and Interface

The externals, dimensions, mass and interface of the temperature sensor shall be as shown in Figure 1.



	φD
Weld reinforcement	φ19 ^{+0.5} ₀
Cylindrical part	φ19 ⁰ _{-0.2}

Part Number	Length	Mass
N1043/301-50-X32-1	38±1 mm	Max. 60g

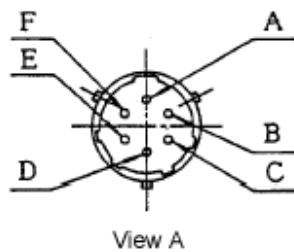
X=1, 2

Note: For dimensions without specified tolerances in the above figure, the tolerance values specified below shall apply.

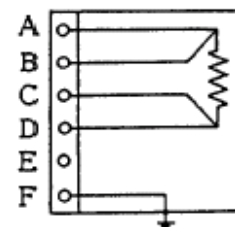
Significant figures shown in the above figure

Tolerance

X	±1
X.X	±0.5
X.XX	±0.25



The phase between the hexagonal connector receptacle portion and each pin may be aligned inaccurately.



Receptacle (Compliant with MS3443H10-6P) and Pin Assignment

Figure 1. Externals, Dimensions, Mass and Interface of Temperature Sensors

3.2.2 Markings

The marking on the temperature sensors shall be as specified in Figure 2. The location of the marking shall be specified in Figure 1.

TEMPERATURE SENSOR Part name
N1043/ [] JAXA part number
P/N [] QML manufacturer's part number
S/N [] [] []
 | | | Supplier's name
 | | Year and month manufactured
 | Example 2009-05
 | Serial number, starting with "0001"

Figure 2. Marking

4. QUALITY ASSURANCE PROVISION

The quality assurance provisions shall be in accordance with paragraph 4 of JAXA-QTS-2180 and as follows.

4.1 In-process Inspection

The in-process inspection shall be in accordance with paragraph 4.3 of JAXA-QTS-2180.

4.2 Qualification Test

The qualification test shall be in accordance with paragraph 4.4 of JAXA-QTS-2180 and Table 5.

JAXA-QTS-2180/103B 6 February 2025			J A X A Parts Specification			Page	– 8 –	
VET25108								
Table 5. Qualification Test								
Group	Sub-group	Order	Test item		Require- ment paragraph	Test method paragraph	Number of samples	Quantity of allowable defects
I Basic characteristics tests	A	1	Externals, dimensions, marking and others		3.5	4.6.2	4	0
		2	Proof pressure ⁽¹⁾		3.8.1.1	4.6.4.1		
		3	Leakage ⁽¹⁾		3.8.1.2	4.6.4.2		
	B	1	Insulation resistance		3.8.1.3	4.6.4.3		
		2	Dielectric withstanding voltage		3.8.1.4	4.6.4.4		
	C	1	Interchangeability ⁽¹⁾		3.8.1.5	4.6.4.5		
	D	1	Humidity resistance		3.8.3.8	4.6.6.8		
	E	1	Cleanliness ⁽¹⁾		3.6.2	4.6.3.2		
II Other characteristics tests	A	1	Strength of extension wire connection		NA	NA	4	0
		2	Over current		3.8.2.2	4.6.5.2		
		3	Pressure dependence		NA	NA		
	B	1	Repeatability		3.8.2.4	4.6.5.4		
		2	Response time		3.8.2.5	4.6.5.5		
		3	Self-heating		3.8.2.6	4.6.5.6		
		4	Thermoelectromotive force		3.8.2.7	4.6.5.7		
		III Environmental tests	A	1	Dynamic pressure			
B	1		Sinusoidal vibration (I)		3.8.3.2	4.6.6.2		
C	1		Random vibration		3.8.3.4	4.6.6.4		
D	1		Shock		3.8.3.5	4.6.6.5		
E	1		Radiation hardness		3.8.3.6	4.6.6.6		
F	1		Sinusoidal vibration (II)		NA	NA		
G	1		Pressure cycle		NA	NA		
H	1		Humidity resistance		3.8.3.8	4.6.6.8		
IV Life tests	A	1	Storage life		3.8.4.1	4.6.7.1	2	0
		2	Operating life	High temperature life	3.8.4.2.1	4.6.7.2.1		
				Temperature cycling	3.8.4.2.2	4.6.7.2.2		
V Destructive test	A	1	Destructive pressure		3.8.5.1	4.6.8.1	2	0
VI Construction	A	1	Construction (DPA)		3.6.1	4.6.3.1	2	0
-	-	1	Parts and materials		3.3	N/A	⁽²⁾	N/A

Notes: ⁽¹⁾ These tests may be performed during the manufacturing process. (Some items are substituted by the inspection data during manufacturing process)
⁽²⁾ Data to certify compliance with design specifications shall be submitted.

JAXA-QTS-2180/103B 6 February 2025			J A X A Parts Specification			Page	– 9 –	
VET25108								
4.3 Quality Conformance Inspection								
The quality conformance inspection shall be in accordance with Paragraph 4.5 of JAXA-QTS-2180 and Tables 6 and 7.								
Table 6. Quality Conformance Inspection (Group A)								
Group	Sub-group	Order	Inspection item		Requirement paragraph	Test method paragraph	Number of samples	Quantity of allowable defects
I (Basic characteristics test)	A	1	Externals, dimensions, marking and others		3.5	4.6.2	All	0
		2	Proof pressure ⁽¹⁾		3.8.1.1	4.6.4.1		
		3	Leakage ⁽¹⁾⁽²⁾		3.8.1.2	4.6.4.2		
	B	1	Insulation resistance		3.8.1.3	4.6.4.3		
		2	Dielectric withstanding voltage		3.8.1.4	4.6.4.4		
	C	1	Interchangeability ⁽¹⁾		3.8.1.5	4.6.4.5		
	D	1	Humidity resistance ⁽¹⁾		NA	NA		
	E	1	Cleanliness ⁽¹⁾		3.6.2	4.6.3.2		
Notes: ⁽¹⁾ These inspections may be performed during the manufacturing process. (Some items are substituted by the inspection data during manufacturing process) ⁽²⁾ The leakage for pressure cell (paragraph 3.8.1.2 a)).shall be applied to the sample in group B inspection.								
Table 7. Quality Conformance Inspection (Group B)								
Group	Sub-group	Order	Inspection item		Requirement paragraph	Test method paragraph	Number of samples	Quantity of allowable defects
II Other characteristics tests	A	1	Strength of extension wire connection		NA	NA	1	0
		2	Over current		3.8.2.2	4.6.5.2		
		3	Pressure dependence		NA	NA		
	B	1	Repeatability		3.8.2.4	4.6.5.4		
		2	Response time		3.8.2.5	4.6.5.5		
		3	Self-heating		3.8.2.6	4.6.5.6		
		4	Thermoelectromotive force		3.8.2.7	4.6.5.7		
III Environmental tests	A	1	Random vibration		3.8.3.4	4.6.6.4	1	0
	B	1	Shock		3.8.3.5	4.6.6.5		
IV Life tests	A	1	Operating life	High temperature life	3.8.4.2.1	4.6.7.2.1	1	0
				Temperature cycling	3.8.4.2.2	4.6.7.2.2		
V Destructive test	A	1	Destructive pressure		3.8.5.1	4.6.8.1	1	0
VI Construction	A	1	Construction (DPA)		3.6.1	4.6.3.1	1	0

JAXA-QTS-2180/103B 6 February 2025	J A X A Parts Specification	Page	– 10 –
VET25108 4.4 Long-term Storage The long-term storage shall be in accordance with paragraph 4.7 of JAXA-QTS-2180 and as follows. 4.4.1 Disposition of Products Stored for a Long Time at Manufacturer's Site The shipment of the temperature sensors stored for 12 months or more after quality conformance inspection (group A) shall be in accordance with paragraph 4.7.1 of JAXA-QTS-2180. 4.4.2 Storage by Purchaser If the package needs to be opened for an incoming inspection, it shall be opened in a clean room or in the area where cleanliness level is well controlled. After the package is opened, the products shall not be touched with bare hands. 4.5 Changes of Tests and Inspections There is no change to the test or inspection from the in-process inspection and quality conformance inspection specified in JAXA-QTS-2180. 5. PREPARATION FOR DELIVERY The preparation for delivery shall be in accordance with paragraph 5 of JAXA-QTS-2180. 6. NOTE Refer to paragraph 6 of JAXA-QTS-2180.			