

MHF[®] 4L Connector with Lock

Part No. Plug: 20632-001R-37 Receptacle: 20579-001E-**

Locking Function: 3615-000*

Test Report

Product Specification no. PRS-2556

| | | | | | |
|------|--------|----------------|-------------|------------|-------------|
| | | | | | |
| | | | | | |
| 0 | T19048 | April 18, 2019 | K.Motomura | K.Yufu | Y.Hashimoto |
| Rev. | ECN | Date | Prepared by | Checked by | Approved by |

1. 目的 / Purpose

MHF 4L LK コネクタについて製品規格(PRS-2556)に基づき評価を行う。

Testing was performed on the MHF 4L LK Connector to determine meets the requirement of I-PEX specification, PRS-2556.

2. 結果 / Conclusion

全ての試料が製品規格(PRS-2556)の条件を満足した。

All specimens met the requirements of PRS-2556.

3. 試料 / Sample

MHF 4L Plug Connector : P/N. 20632-001R-37

Cable: AWG#30 coaxial cable (jacket diameter 1.37mm)

MHF 4L Receptacle Connector: P/N. 20579-001E-**

Locking Function: 3615-000*

4. 試験方法 / Method

製品規格(PRS-2556)参照。

Refer to product specification PRS-2556.

4-1 試験順序及び評価数量 / Test Sequence and Sample Quantity

| 試験項目 / Test Item | | Group | | | | | | | | | | | | | | |
|------------------|--|-------|----|----|----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-------|-------|
| | | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
| (1) | 接触抵抗 Contact Resistance | | | | | 1,3 | | 1,3 | 1,3 | 1,5 | 1,5 | 1,3 | 1,3 | 1,3 | | |
| (2) | 絶縁抵抗 Insulation resistance | | | | | | | | | 2,6 | 2,6 | | | | | |
| (3) | 耐電圧 D. W. Voltage | 1 | | | | | | | | 3,7 | 3,7 | | | | | |
| (4) | VSWR | | 1 | | | | | | | | | | | | | |
| (5) | 挿入力 Mating /Forcedly unmating force | | | 1 | | | | | | | | | | | | |
| (6) | 強制抜去力 Forcedly unmating force | | | | 1 | | | | | | | | | | | |
| (7) | 耐久性 Durability | | | | | 2 | | | | | | | | | | |
| (8) | ケーブル保持力 Durability | | | | | | 1 | | | | | | | | | |
| (9) | 耐振動性 Vibration | | | | | | | 2 | | | | | | | | |
| (10) | 耐衝撃性 Shock | | | | | | | | 2 | | | | | | | |
| (11) | 湿度(定常状態) Humidity steady state | | | | | | | | | 4 | | | | | | |
| (12) | 熱衝撃 Thermal shock | | | | | | | | | | 4 | | | | | |
| (13) | 高温寿命 High temperature life | | | | | | | | | | | 2 | | | | |
| (14) | 硫化水素ガス H ₂ S Gas | | | | | | | | | | | | 2 | | | |
| (15) | 塩水噴霧 Salt Water Spray | | | | | | | | | | | | | 2 | | |
| (16) | 半田付け性 Solder ability | | | | | | | | | | | | | | 1 | |
| (17) | 半田耐熱性 Soldering Heat Resistance | | | | | | | | | | | | | | | 1 |
| Sample QTY pcs. | Plug | 10 | 10 | 10 | 10 | 10 | ----- | 10 | 10 | 10 | 10 | 10 | 10 | 10 | ----- | ----- |
| | Receptacle | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Test Board pcs. | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

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5.結果/Results

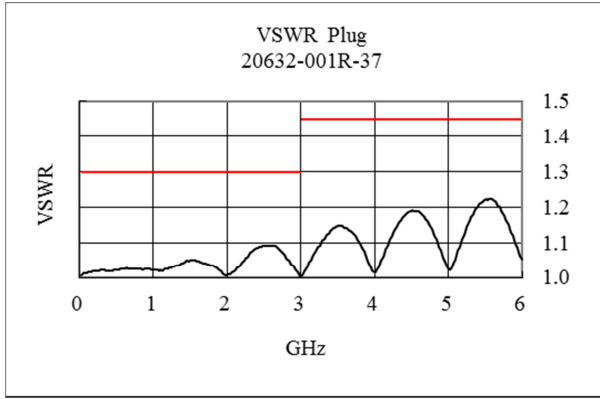
| | Test items 試験項目 | Measurements 測定内容 | Spec. 規格 | n 試料数 | Unit 単位 | AVE. 平均 | MAX. 最大 | MIN. 最小 | S S | Judge 判定 | |
|---------|---|----------------------------------|--|----------------|------------|-----------------------|-----------------------|------------|--------|-------------|----|
| A | Dielectric withstanding voltage 耐電圧 | Initial | Spec : No creeping discharge, flashover, nor insulator breakdown shall occur. 規格:沿面放電,空中放電,絶縁破壊等の異常の無き事 | | | | | | | | |
| | | | Results : No abnormality(異常無し) | | | | | | | | OK |
| B | VSWR PLUG | 0.1~3GHz | 1.3 MAX. | 10 | | 1.087 | 1.10 | 1.08 | 0.006 | OK | |
| | | 3~6GHz | 1.4 MAX. | 10 | | 1.188 | 1.22 | 1.17 | 0.014 | OK | |
| | | 6~9GHz | 1.5 MAX. | 10 | | 1.192 | 1.23 | 1.16 | 0.019 | OK | |
| | | 9~12GHz | 1.6 MAX. | 10 | | 1.186 | 1.27 | 1.14 | 0.040 | OK | |
| | VSWR Receptacle | 0.1~3GHz | 1.3 MAX. | 10 | | 1.112 | 1.12 | 1.10 | 0.011 | OK | |
| | | 3~6GHz | 1.4 MAX. | 10 | | 1.177 | 1.20 | 1.16 | 0.021 | OK | |
| 6~12GHz | | 1.85 MAX. | 10 | | 1.462 | 1.55 | 1.38 | 0.077 | OK | | |
| C | Mating force 挿入力 | Initial | 30 MAX. | 10 | N | 20.25 | 22.5 | 18.0 | 1.45 | OK | |
| | | 30 cycles | | 10 | N | 9.77 | 10.3 | 9.2 | 0.40 | OK | |
| D | Forcedly unmating force 強制抜去力 | Initial | 18 MIN. | 10 | N | 25.44 | 27.6 | 23.9 | 1.62 | OK | |
| E | Durability / 耐久性 | | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.30 | 7.3 | 5.3 | 0.58 | OK | |
| | | After testing | ----- | 10 | mΩ | 6.61 | 7.3 | 5.7 | 0.64 | ----- | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.31 | 1.5 | -0.4 | 0.58 | OK | |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 5.56 | 6.8 | 5.1 | 0.56 | OK | |
| | | After testing | ----- | 10 | mΩ | 6.53 | 8.2 | 5.9 | 0.67 | ----- | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.97 | 1.7 | 0.1 | 0.51 | OK | |
| | | Appearance 外観 | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | | OK |
| | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | | OK | |
| F | Cable retention force ケーブル保持力 | | 15 MIN. | 10 | N | 22.63 | 23.8 | 21.6 | 0.672 | OK | |
| G | Vibration / 耐振動性 | | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 5.95 | 7.0 | 5.4 | 0.52 | OK | |
| | | After testing | ----- | 10 | mΩ | 6.71 | 7.4 | 6.2 | 0.47 | ----- | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.76 | 2.0 | 0.0 | 0.59 | OK | |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.05 | 6.7 | 5.4 | 0.42 | OK | |
| | | After testing | ----- | 10 | mΩ | 6.94 | 8.1 | 5.9 | 0.73 | ----- | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.89 | 2.0 | -0.6 | 0.87 | OK | |
| | | Electrical discontinuity 電流瞬断 | Spec. : No electrical discontinuity grater than 1μsec. shall occur. 規格:1μ秒以上の電流瞬断の無い事 | | | | | | | | |
| | | Results : No discontinuity | | | | | | | | OK | |
| | Appearance 外観 | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | | OK | |
| | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | | OK | |

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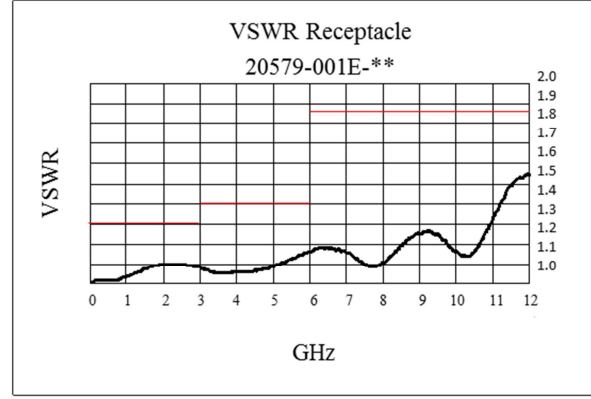
| Test items | Measurements | Spec. | n | Unit | AVE. | MAX. | MIN. | S | Judge | | | |
|---|---|-----------------------------------|--|----------------|-------|-----------------------|-----------------------|------|-------|----------------------------|----|--|
| 試験項目 | 測定内容 | 規格 | 試料数 | 単位 | 平均 | 最大 | 最小 | S | 判定 | | | |
| H | Shock / 耐衝撃性 | | | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.71 | 7.4 | 6.2 | 0.47 | OK | | |
| | | After testing | ----- | 10 | mΩ | 7.19 | 7.8 | 6.4 | 0.43 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.48 | 1.6 | -0.9 | 0.79 | OK | | |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.94 | 8.1 | 5.9 | 0.73 | OK | | |
| | | After testing | ----- | 10 | mΩ | 7.32 | 8.4 | 6.2 | 0.70 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.38 | 1.5 | -0.3 | 0.55 | OK | | |
| | Electrical discontinuity 電流瞬断 | | Spec. : No electrical discontinuity grater than 1μsec. shall occur. 規格:1μ秒以上の電流瞬断の無い事 | | | | | | | ----- | | |
| | | | ----- | | | | | | | Results : No discontinuity | | |
| | Appearance 外観 | | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| | | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| | J | Humidity(Steady State) / 湿度(定常状態) | | | | | | | | | | |
| Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.65 | 7.0 | 5.9 | 0.40 | OK | | |
| | | After testing | ----- | 10 | mΩ | 7.03 | 8.2 | 6.1 | 0.74 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.38 | 1.8 | -0.9 | 0.90 | OK | | |
| Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 5.94 | 6.7 | 5.2 | 0.51 | OK | | |
| | | After testing | ----- | 10 | mΩ | 6.91 | 8.1 | 6.2 | 0.59 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.97 | 2.2 | -0.4 | 0.86 | OK | | |
| Insulation resistance / 絶縁抵抗 | | | | | | | | | | | | |
| | | Initial | 500 MIN. | 10 | MΩ | 10,000 (minimum vale) | | | | OK | | |
| | | After testing | 100 MIN. | 10 | MΩ | 10,000 (minimum vale) | | | | OK | | |
| Dielectric withstanding voltage | | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | | |
| | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | | |
| Appearance 外観 | | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | | |
| | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | | |
| K | Thermal shock / 熱衝撃 | | | | | | | | | | | |
| | Contact resistance of inner contact (中心導体接触抵抗) | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.23 | 6.9 | 5.5 | 0.42 | OK | | |
| | | After testing | ----- | 10 | mΩ | 6.90 | 7.6 | 6.3 | 0.41 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.68 | 1.4 | -0.4 | 0.51 | OK | | |
| | Contact resistance of ground contact (外部導体接触抵抗) | | | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 5.69 | 6.6 | 5.1 | 0.65 | OK | | |
| | | After testing | ----- | 10 | mΩ | 6.90 | 8.0 | 6.0 | 0.62 | ----- | | |
| | | ΔR | 20 MAX. | 10 | mΩ | 1.21 | 2.3 | -0.5 | 0.86 | OK | | |
| | Insulation resistance | | Initial | 500 MIN. | 10 | MΩ | 10,000 (minimum vale) | | | | OK | |
| | | | After testing | 100 MIN. | 10 | MΩ | 10,000 (minimum vale) | | | | OK | |
| | Dielectric withstanding voltage | | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| | | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| | Appearance 外観 | | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| | | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | | | |

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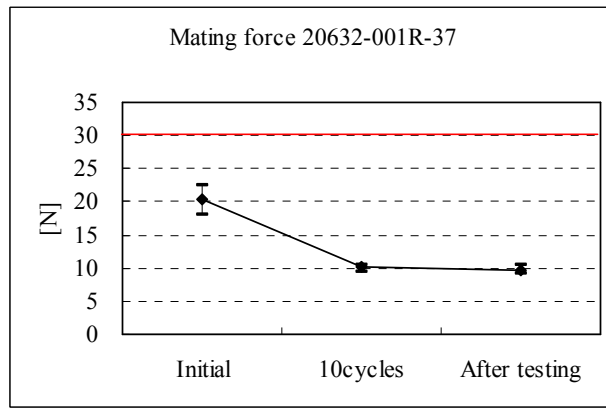
| | Test items | Measurements | Spec. | n | Unit | AVE. | MAX. | MIN. | S | Judge |
|---|---|---|----------------|----------------|-----------------------|-----------------------|-----------------------|------|------|-------|
| | 試験項目 | 測定内容 | 規格 | 試料数 | 単位 | 平均 | 最大 | 最小 | S | 判定 |
| L | High temperature life / 高温寿命 | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.31 | 7.3 | 5.4 | 0.74 | OK |
| | | After testing | ----- | 10 | mΩ | 7.00 | 7.6 | 6.1 | 0.44 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.69 | 2.0 | -0.3 | 0.78 | OK |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.17 | 6.8 | 5.4 | 0.43 | OK |
| | | After testing | ----- | 10 | mΩ | 6.77 | 7.6 | 6.1 | 0.52 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.60 | 2.2 | -0.3 | 0.68 | OK |
| | | Appearance | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK |
| | 外観 | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | |
| M | H2S Gas / 硫化水素ガス | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.68 | 7.3 | 6.1 | 0.40 | OK |
| | | After testing | ----- | 10 | mΩ | 6.74 | 7.9 | 6.1 | 0.60 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.05 | 1.2 | -1.2 | 0.78 | OK |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.30 | 6.7 | 5.7 | 0.36 | OK |
| | | After testing | ----- | 10 | mΩ | 7.28 | 8.1 | 6.4 | 0.54 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.98 | 1.7 | 0.0 | 0.58 | OK |
| | | Appearance | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK |
| | 外観 | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | |
| N | Salt water spray / 塩水噴霧 | | | | | | | | | |
| | Contact resistance of inner contact / 中心導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.47 | 7.3 | 5.5 | 0.68 | OK |
| | | After testing | ----- | 10 | mΩ | 7.17 | 8.3 | 6.5 | 0.56 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.71 | 1.5 | -0.4 | 0.60 | OK |
| | Contact resistance of ground contact / 外部導体接触抵抗 | | | | | | | | | |
| | | Initial | 20 MAX. | 10 | mΩ | 6.04 | 6.8 | 5.4 | 0.51 | OK |
| | | After testing | ----- | 10 | mΩ | 6.73 | 7.9 | 5.9 | 0.62 | ----- |
| | | ΔR | 20 MAX. | 10 | mΩ | 0.70 | 1.9 | -0.5 | 0.75 | OK |
| | | Appearance | Initial | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK |
| | 外観 | After testing | No abnormality | 10 | ----- | No abnormality (異常無し) | | | OK | |
| P | Solderability 半田付け性 | Spec.: More than 95% of the dipped surface becomes wet and the pinhole that should not gather at one point is less than 5%. | | | | | | | | |
| | | 規格: 浸した面積の95%以上に半田が付着し、かつピンホール空隙が1箇所集中せず、5%以下である事。 | | | | | | | | |
| | | ----- | 10 | ----- | No abnormality (異常無し) | | | OK | | |
| Q | Soldering heat resistance 半田耐熱性 | Spec.: Abnormality adversely affecting the performance should not occur. | | | | | | | | |
| | | 規格: 機能を損なう変形及び欠陥の無い事。 | | | | | | | | |
| | | ----- | 10 | ----- | No abnormality (異常無し) | | | OK | | |



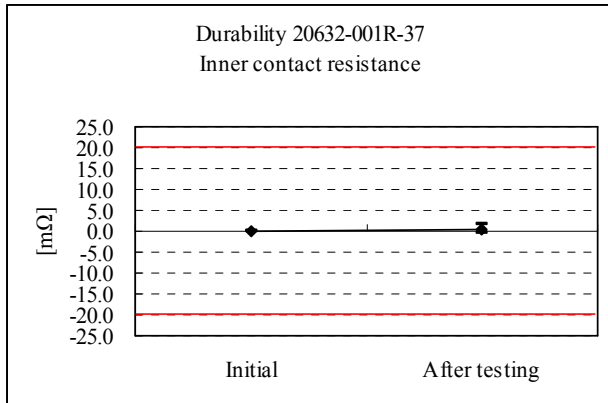
Graph.1 VSWR ~PLUG~



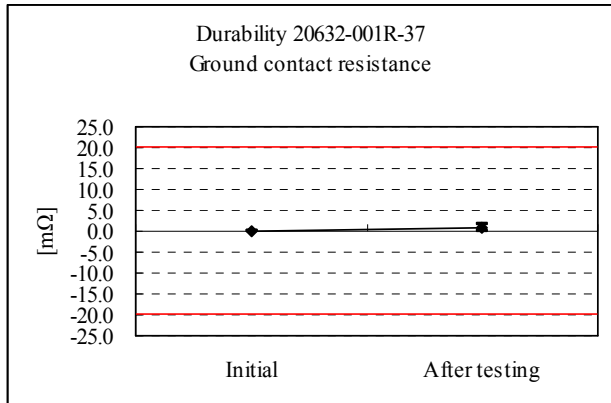
Graph.2 VSWR ~Receptacle~



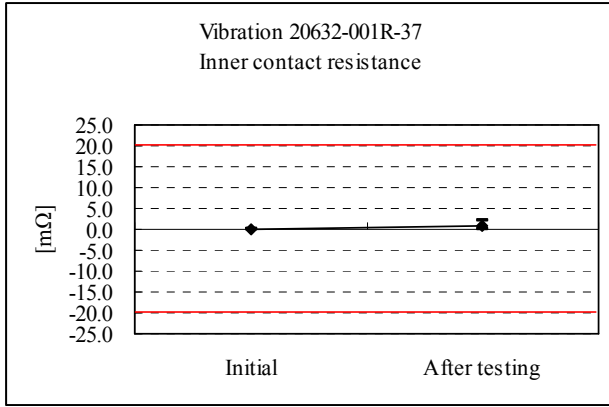
Graph.3 Mating force



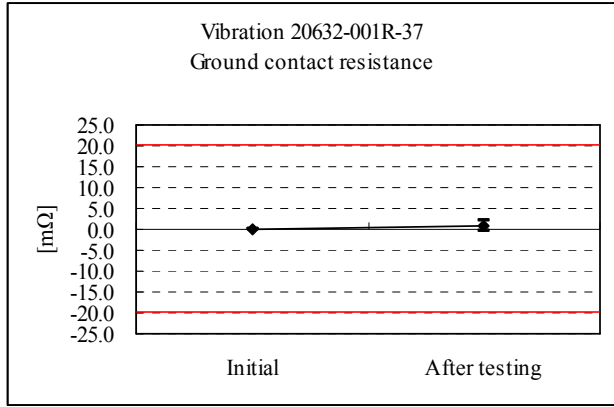
Graph.4 Durability ~Inner contact resistance~



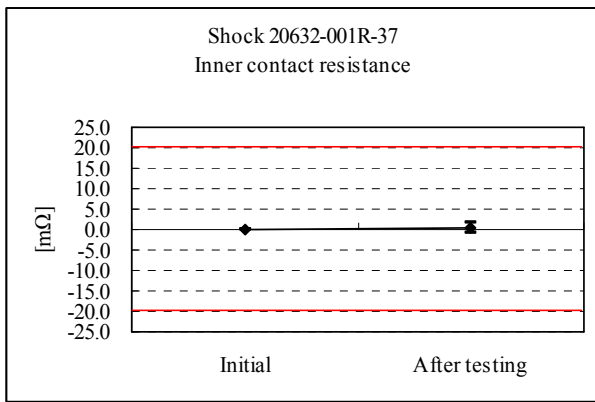
Graph.5 Durability ~Ground contact resistance~



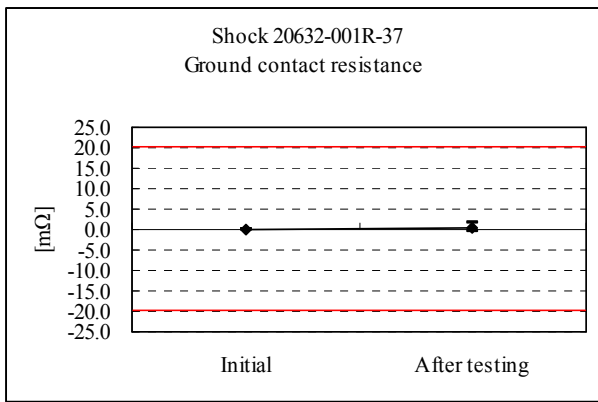
Graph.6 Vibration ~Inner contact resistance~



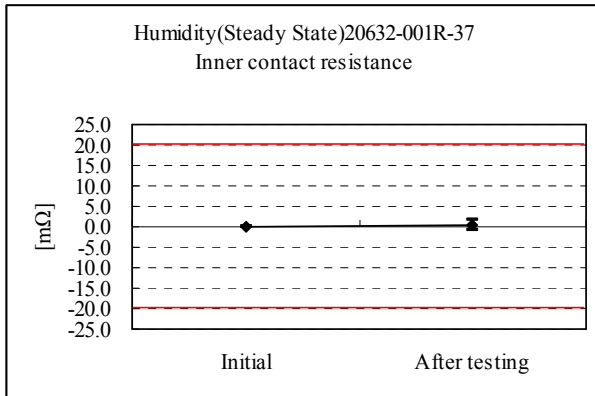
Graph.7 Vibration ~Ground contact resistance~



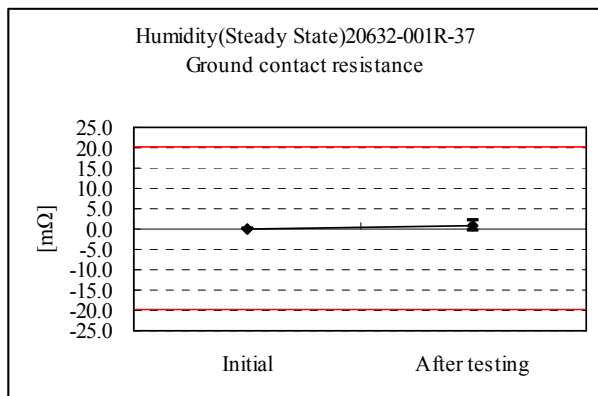
Graph.8 Shock ~Inner contact resistance~



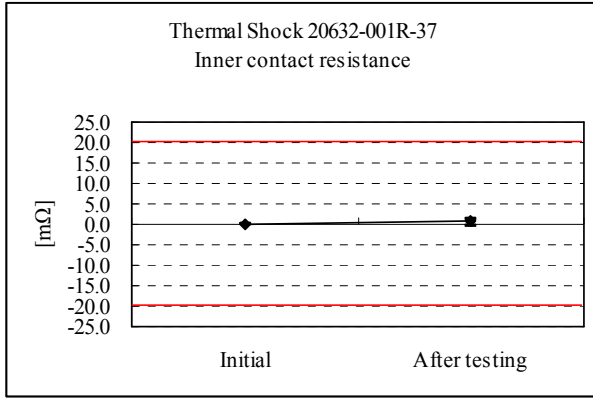
Graph.9 Shock ~Ground contact resistance~



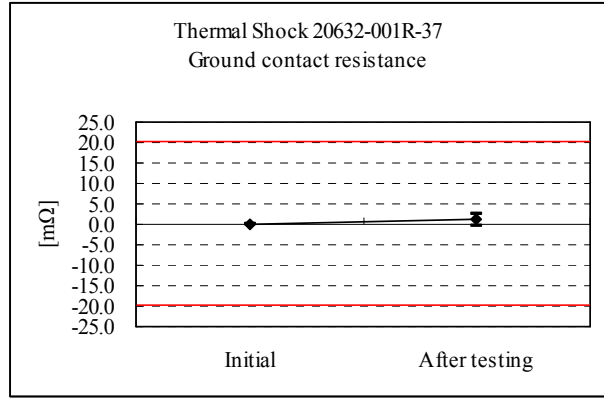
Graph.10 Humidity ~Inner contact resistance~



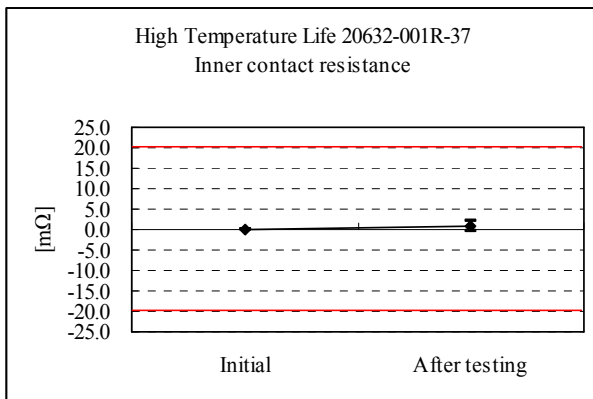
Graph.11 Humidity ~Ground contact resistance~



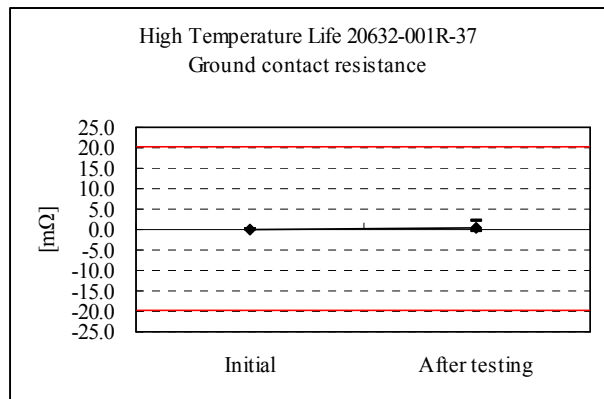
Graph.12 Thermal shock ~Inner contact resistance~



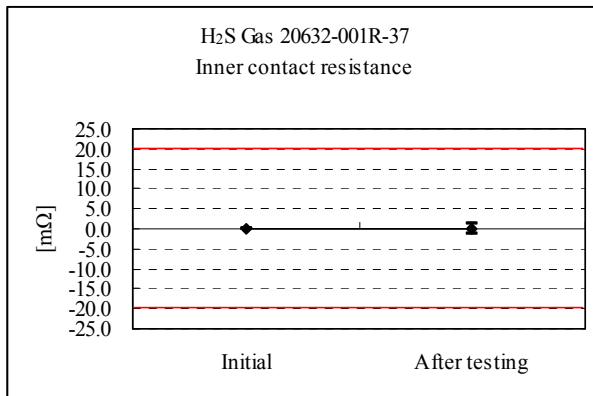
Graph.13 Thermal shock ~Ground contact resistance~



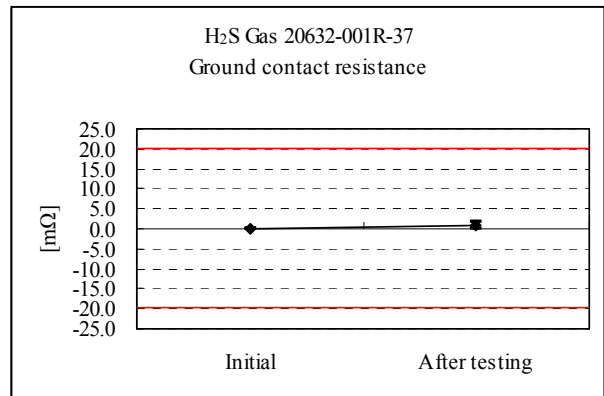
Graph.14 High temperature life ~Inner contact resistance~



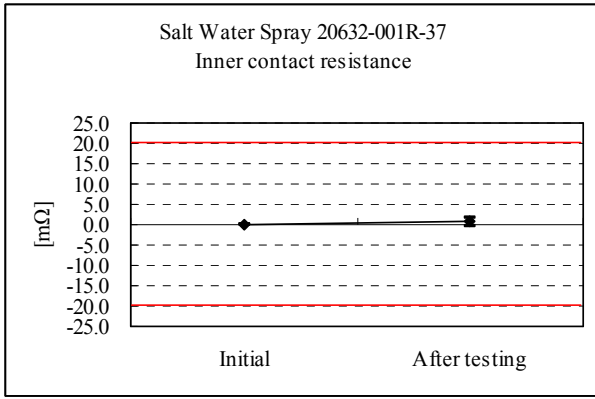
Graph.15 High temperature life ~Ground contact resistance~



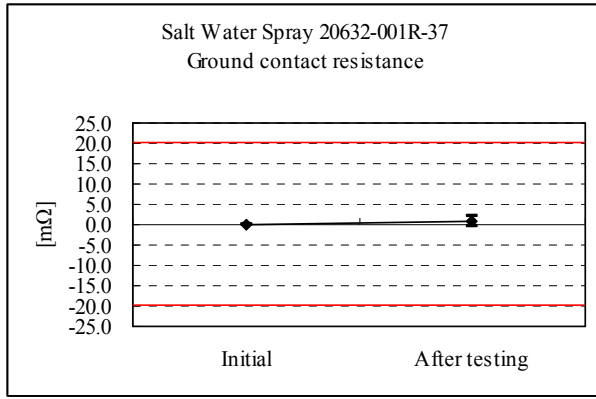
Graph.16 Salt water spray ~Inner contact resistance~



Graph.17 Salt water spray ~Ground contact resistance~



Graph.18 Salt water spray ~Inner contact resistance~



Graph.19 Salt water spray ~Ground contact resistance~