

MINIFLEX® 3-BFN LONG ACT TYPE

Part No. 20538-0\*\*E-01#

Test Report

Product Specification no. PRS-1579

|      |        |                   |              |            |             |
|------|--------|-------------------|--------------|------------|-------------|
| 6    | T21145 | November 8, 2021  | S.Shigekoshi | M.Muro     | H.Ikari     |
| 5    | T19142 | October 9, 2019   | S.Shigekoshi | M.Muro     | H.Ikari     |
| 4    | T14183 | December 22, 2014 | R.T          |            | E.K         |
| 3    | T14051 | April 30, 2014    | Y.S          |            | E.K         |
| Rev. | ECN    | Date              | Prepared by  | Checked by | Approved by |

## 1. Purpose

To evaluate the performance of MINIFLEX 3-BFN Connector LONG ACT TYPE in accordance with PRS-1579.

## 2. Specimen

(1) Connector : MINIFLEX 3-BFN Conn. LONG ACT TYPE . . . P/N 20538-0\*\*E-01#

(2) FPC : Made by Taiyo Industrial Co.,Ltd.

FPC Thickness :  $t=0.20\pm0.03$  (Actual measurement : 0.19~0.20mm)

## 3. Test Sequence

All the evaluations were performed in accordance with Table 1. Test Sequence.

## 4. Result

See Table 2-1 to 2-7, Graph 1 to 14. For the details of the testing conditions and requirements, see PRS-1579.

The “n” in the tables show the number of measurement points.

## 5. Conclusion

All the specimens met the requirements of PRS-1579.

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TR-12040-06EN

Table1 Test Sequence

| Test Items                      | Group |     |   |           |     |     |     |     |     |     |     |     |     |   |   |   |
|---------------------------------|-------|-----|---|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|
|                                 | A     | B   | C | D         | E   | F   | G   | H   | J   | K   | L   | M   | N   | P | Q | R |
| C/T Resistance                  | 2,7   |     |   | 1,3,<br>5 | 1,3 | 1,3 | 1,3 | 1,5 | 1,5 | 1,3 | 1,3 | 1,3 | 1,3 |   |   |   |
| D.W.Voltage                     |       |     |   |           |     |     |     | 2,6 | 2,6 |     |     |     |     |   |   |   |
| Insulation Resistance           |       |     |   |           |     |     |     | 3,7 | 3,7 |     |     |     |     |   |   |   |
| Temp. rising                    |       |     |   |           |     |     |     |     |     |     |     |     |     |   |   | 1 |
| Act Locking Force               | 1,5   |     |   |           |     |     |     |     |     |     |     |     |     |   |   |   |
| Act Un-locking Force            | 3,6   |     |   |           |     |     |     |     |     |     |     |     |     |   |   |   |
| FPC Retention Force             |       | 1,3 |   |           |     |     |     |     |     |     |     |     |     |   |   |   |
| Durability                      | 4     | 2   |   |           |     |     |     |     |     |     |     |     |     |   |   |   |
| C/T Retention Force             |       |     | 1 |           |     |     |     |     |     |     |     |     |     |   |   |   |
| Vibration                       |       |     |   | 2         |     |     |     |     |     |     |     |     |     |   |   |   |
| Shock                           |       |     |   | 4         |     |     |     |     |     |     |     |     |     |   |   |   |
| Fretting corrosion              |       |     |   |           | 2   |     |     |     |     |     |     |     |     |   |   |   |
| Thermal Shock                   |       |     |   |           |     | 2   |     |     |     |     |     |     |     |   |   |   |
| High Temp. Life                 |       |     |   |           |     |     | 2   |     |     |     |     |     |     |   |   |   |
| High Temp & High Hum energizing |       |     |   |           |     |     |     | 4   |     |     |     |     |     |   |   |   |
| High Temp & High Hum Life       |       |     |   |           |     |     |     |     | 4   |     |     |     |     |   |   |   |
| Cold Temp. Life                 |       |     |   |           |     |     |     |     |     | 2   |     |     |     |   |   |   |
| Gas (H <sub>2</sub> S)          |       |     |   |           |     |     |     |     |     |     | 2   |     |     |   |   |   |
| Gas (SO <sub>2</sub> )          |       |     |   |           |     |     |     |     |     |     |     | 2   |     |   |   |   |
| Salt Water Spray                |       |     |   |           |     |     |     |     |     |     |     |     | 2   |   |   |   |
| Solderability                   |       |     |   |           |     |     |     |     |     |     |     |     |     | 1 |   |   |
| Soldering Heat Resist.          |       |     |   |           |     |     |     |     |     |     |     |     |     |   | 1 |   |

Table 2-1 Test Result

| Test Item             | Measurement             |     |             | Spec.                           | Set | n   | Data             |                |                |                  |                  | Judge |
|-----------------------|-------------------------|-----|-------------|---------------------------------|-----|-----|------------------|----------------|----------------|------------------|------------------|-------|
|                       |                         |     |             |                                 |     |     | AVE.(X)          | MAX.           | MIN.           | s                | X±3s             |       |
| A Group<br>Durability | Contact Resistance (mΩ) | ※U  | Initial     | 60mΩ MAX.                       | 5   | 195 | 23.909           | 29.99          | 19.02          | 3.619            | 34.766           | ○     |
|                       |                         |     | After 20th  | ΔR=40mΩ MAX.                    |     |     | 0.491            | 4.80           | -3.60          | 1.608            | 5.315            | ○     |
|                       |                         | ※L  | Initial     | 60mΩ MAX.                       | 5   | 195 | 15.059           | 18.97          | 11.05          | 2.387            | 22.220           | ○     |
|                       |                         |     | After 20th  | ΔR=40mΩ MAX.                    |     |     | 1.127            | 4.57           | -1.85          | 1.368            | 5.231            | ○     |
|                       | Act Locking Force (N)   | 33P | Initial     | 6.93N MAX.<br>(0.21N/Pos.×33P)  | 5   | 5   | 2.800<br>(0.085) | 2.95<br>(0.09) | 2.47<br>(0.07) | 0.188<br>(0.006) | 3.364<br>(0.068) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 2.218<br>(0.067) | 2.36<br>(0.07) | 2.08<br>(0.06) | 0.122<br>(0.004) | 2.584<br>(0.078) | ○     |
|                       |                         | 35P | Initial     | 7.35N MAX.<br>(0.21N/Pos.×35P)  | 5   | 5   | 2.970<br>(0.085) | 3.12<br>(0.09) | 2.64<br>(0.08) | 0.188<br>(0.005) | 3.534<br>(0.101) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 2.352<br>(0.067) | 2.50<br>(0.07) | 2.22<br>(0.06) | 0.122<br>(0.003) | 2.718<br>(0.078) | ○     |
|                       |                         | 39P | Initial     | 8.19N MAX.<br>(0.21N/Pos.×39P)  | 5   | 5   | 3.346<br>(0.086) | 3.50<br>(0.09) | 3.02<br>(0.08) | 0.188<br>(0.005) | 3.910<br>(0.100) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 2.656<br>(0.068) | 2.80<br>(0.07) | 2.52<br>(0.06) | 0.122<br>(0.003) | 3.022<br>(0.077) | ○     |
|                       |                         | 41P | Initial     | 8.61N MAX.<br>(0.21N/Pos.×41P)  | 5   | 5   | 3.514<br>(0.086) | 3.68<br>(0.09) | 3.35<br>(0.08) | 0.140<br>(0.003) | 3.934<br>(0.096) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 2.664<br>(0.065) | 2.80<br>(0.07) | 2.49<br>(0.06) | 0.129<br>(0.003) | 3.051<br>(0.074) | ○     |
|                       |                         | 45P | Initial     | 9.45N MAX.<br>(0.21N/Pos.×45P)  | 5   | 5   | 3.846<br>(0.085) | 4.02<br>(0.09) | 3.63<br>(0.08) | 0.159<br>(0.004) | 4.323<br>(0.096) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 2.926<br>(0.065) | 3.06<br>(0.07) | 2.76<br>(0.06) | 0.125<br>(0.003) | 3.301<br>(0.073) | ○     |
|                       |                         | 49P | Initial     | 10.29N MAX.<br>(0.21N/Pos.×49P) | 5   | 5   | 4.190<br>(0.086) | 4.37<br>(0.09) | 3.98<br>(0.08) | 0.159<br>(0.003) | 4.667<br>(0.095) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 3.186<br>(0.065) | 3.32<br>(0.07) | 3.02<br>(0.06) | 0.125<br>(0.003) | 3.561<br>(0.073) | ○     |
|                       |                         | 51P | Initial     | 10.71N MAX.<br>(0.21N/Pos.×51P) | 5   | 5   | 4.362<br>(0.086) | 4.54<br>(0.09) | 4.15<br>(0.08) | 0.159<br>(0.003) | 4.839<br>(0.095) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 3.310<br>(0.065) | 3.45<br>(0.07) | 3.12<br>(0.06) | 0.136<br>(0.003) | 3.718<br>(0.073) | ○     |
|                       |                         | 55P | Initial     | 11.55N MAX.<br>(0.21N/Pos.×55P) | 5   | 5   | 4.706<br>(0.086) | 4.88<br>(0.09) | 4.49<br>(0.08) | 0.159<br>(0.003) | 5.183<br>(0.094) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 3.570<br>(0.065) | 3.71<br>(0.07) | 3.38<br>(0.06) | 0.136<br>(0.002) | 3.978<br>(0.072) | ○     |
|                       |                         | 57P | Initial     | 11.97N MAX.<br>(0.21N/Pos.×57P) | 5   | 5   | 4.848<br>(0.085) | 5.03<br>(0.09) | 4.64<br>(0.08) | 0.162<br>(0.003) | 5.334<br>(0.094) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 3.664<br>(0.064) | 3.80<br>(0.07) | 3.50<br>(0.06) | 0.125<br>(0.002) | 4.039<br>(0.071) | ○     |
|                       |                         | 61P | Initial     | 12.81N MAX.<br>(0.21N/Pos.×61P) | 5   | 5   | 5.134<br>(0.084) | 5.32<br>(0.09) | 4.82<br>(0.08) | 0.215<br>(0.004) | 5.779<br>(0.067) | ○     |
|                       |                         |     | 20th cycles |                                 |     |     | 4.090<br>(0.067) | 4.19<br>(0.07) | 3.94<br>(0.06) | 0.108<br>(0.002) | 4.414<br>(0.072) | ○     |

※U : Upper Contact    L : Lower Contact

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TR-12040-06EN

Table 2-2 Test Result

| Test Item                 | Measurement                       |     |             | Spec.                            | Set | n | Data             |                |                |                  |                  | Judge |
|---------------------------|-----------------------------------|-----|-------------|----------------------------------|-----|---|------------------|----------------|----------------|------------------|------------------|-------|
|                           |                                   |     |             |                                  |     |   | AVE.(X)          | MAX.           | MIN.           | s                | X±3s             |       |
| A Group<br><br>Durability | Act<br>Un-locking<br>Force<br>(N) | 33P | Initial     | 0.462N MIN.<br>(0.014N/Pos.×33P) | 5   | 5 | 1.899<br>(0.058) | 1.99<br>(0.06) | 1.81<br>(0.05) | 0.084<br>(0.003) | 1.647<br>(0.050) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 1.798<br>(0.054) | 1.96<br>(0.06) | 1.71<br>(0.05) | 0.082<br>(0.002) | 1.552<br>(0.047) | ○     |
|                           |                                   | 35P | Initial     | 0.490N MIN.<br>(0.014N/Pos.×35P) | 5   | 5 | 2.015<br>(0.058) | 2.11<br>(0.06) | 1.93<br>(0.06) | 0.084<br>(0.002) | 1.763<br>(0.050) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 1.906<br>(0.054) | 2.00<br>(0.06) | 1.82<br>(0.05) | 0.082<br>(0.002) | 1.660<br>(0.047) | ○     |
|                           |                                   | 39P | Initial     | 0.546N MIN.<br>(0.014N/Pos.×39P) | 5   | 5 | 2.310<br>(0.059) | 2.39<br>(0.06) | 2.21<br>(0.06) | 0.079<br>(0.002) | 2.073<br>(0.053) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.184<br>(0.056) | 2.33<br>(0.06) | 2.08<br>(0.05) | 0.104<br>(0.003) | 1.872<br>(0.048) | ○     |
|                           |                                   | 41P | Initial     | 0.574N MIN.<br>(0.014N/Pos.×41P) | 5   | 5 | 2.324<br>(0.057) | 2.42<br>(0.06) | 2.22<br>(0.05) | 0.074<br>(0.002) | 2.102<br>(0.051) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.156<br>(0.053) | 2.24<br>(0.05) | 2.04<br>(0.05) | 0.075<br>(0.002) | 1.931<br>(0.047) | ○     |
|                           |                                   | 45P | Initial     | 0.630N MIN.<br>(0.014N/Pos.×45P) | 5   | 5 | 2.559<br>(0.057) | 2.67<br>(0.06) | 2.45<br>(0.05) | 0.095<br>(0.002) | 2.274<br>(0.051) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.383<br>(0.053) | 2.48<br>(0.06) | 2.28<br>(0.05) | 0.077<br>(0.002) | 2.152<br>(0.048) | ○     |
|                           |                                   | 49P | Initial     | 0.686N MIN.<br>(0.014N/Pos.×49P) | 5   | 5 | 2.673<br>(0.055) | 2.79<br>(0.06) | 2.56<br>(0.05) | 0.095<br>(0.002) | 2.388<br>(0.049) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.489<br>(0.051) | 2.59<br>(0.05) | 2.39<br>(0.05) | 0.077<br>(0.002) | 2.258<br>(0.046) | ○     |
|                           |                                   | 51P | Initial     | 0.714N MIN.<br>(0.014N/Pos.×51P) | 5   | 5 | 2.925<br>(0.057) | 3.04<br>(0.06) | 2.81<br>(0.06) | 0.095<br>(0.002) | 2.640<br>(0.052) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.749<br>(0.054) | 2.85<br>(0.06) | 2.65<br>(0.05) | 0.077<br>(0.002) | 2.518<br>(0.049) | ○     |
|                           |                                   | 55P | Initial     | 0.770N MIN.<br>(0.014N/Pos.×55P) | 5   | 5 | 3.053<br>(0.056) | 3.17<br>(0.06) | 2.95<br>(0.05) | 0.092<br>(0.002) | 2.777<br>(0.050) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 2.872<br>(0.052) | 2.98<br>(0.05) | 2.77<br>(0.05) | 0.079<br>(0.001) | 2.635<br>(0.048) | ○     |
|                           |                                   | 57P | Initial     | 0.798N MIN.<br>(0.014N/Pos.×57P) | 5   | 5 | 3.277<br>(0.057) | 3.34<br>(0.06) | 3.19<br>(0.06) | 0.072<br>(0.001) | 3.061<br>(0.054) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 3.045<br>(0.053) | 3.15<br>(0.06) | 2.93<br>(0.06) | 0.084<br>(0.001) | 2.793<br>(0.049) | ○     |
|                           |                                   | 61P | Initial     | 0.854N MIN.<br>(0.014N/Pos.×61P) | 5   | 5 | 3.420<br>(0.056) | 3.67<br>(0.06) | 3.23<br>(0.05) | 0.185<br>(0.003) | 2.865<br>(0.047) | ○     |
|                           |                                   |     | 20th cycles |                                  |     |   | 3.306<br>(0.054) | 3.53<br>(0.06) | 3.20<br>(0.05) | 0.146<br>(0.002) | 2.868<br>(0.047) | ○     |

Table 2-3 Test Result

| Test Item                               | Measurement |             | Spec.                           | Set | n | Data              |                 |                 |                  |                   | Judge |
|-----------------------------------------|-------------|-------------|---------------------------------|-----|---|-------------------|-----------------|-----------------|------------------|-------------------|-------|
|                                         |             |             |                                 |     |   | AVE.(X)           | MAX.            | MIN.            | s                | X±3s              |       |
| B Group<br>FPC<br>Retention<br>Force(N) | 33P         | Initial     | 4.29N MIN.<br>(0.13N/Pos.×33P)  | 5   | 5 | 11.310<br>(0.343) | 11.58<br>(0.35) | 10.71<br>(0.32) | 0.365<br>(0.011) | 10.215<br>(0.310) | ○     |
|                                         |             | 20th cycles | 3.30N MIN.<br>(0.10N/Pos.×33P)  |     |   | 10.041<br>(0.304) | 10.40<br>(0.32) | 9.69<br>(0.29)  | 0.312<br>(0.009) | 9.105<br>(0.276)  | ○     |
|                                         | 35P         | Initial     | 4.55N MIN.<br>(0.13N/Pos.×35P)  | 5   | 5 | 11.996<br>(0.343) | 12.26<br>(0.35) | 11.39<br>(0.33) | 0.365<br>(0.010) | 10.901<br>(0.311) | ○     |
|                                         |             | 20th cycles | 3.50N MIN.<br>(0.10N/Pos.×35P)  |     |   | 10.649<br>(0.304) | 11.01<br>(0.31) | 10.30<br>(0.29) | 0.312<br>(0.009) | 9.713<br>(0.278)  | ○     |
|                                         | 39P         | Initial     | 5.07N MIN.<br>(0.13N /Pos.×39P) | 5   | 5 | 13.482<br>(0.346) | 13.75<br>(0.35) | 12.88<br>(0.33) | 0.365<br>(0.009) | 12.387<br>(0.318) | ○     |
|                                         |             | 20th cycles | 3.90N MIN.<br>(0.10N /Pos.×39P) |     |   | 11.914<br>(0.305) | 12.34<br>(0.32) | 11.47<br>(0.29) | 0.394<br>(0.010) | 10.732<br>(0.275) | ○     |
|                                         | 41P         | Initial     | 5.33N MIN.<br>(0.13N /Pos.×41P) | 5   | 5 | 14.362<br>(0.350) | 15.18<br>(0.37) | 13.68<br>(0.33) | 0.707<br>(0.017) | 12.241<br>(0.299) | ○     |
|                                         |             | 20th cycles | 4.10N MIN.<br>(0.10N /Pos.×41P) |     |   | 13.080<br>(0.319) | 13.71<br>(0.33) | 12.56<br>(0.31) | 0.423<br>(0.010) | 11.811<br>(0.288) | ○     |
|                                         | 45P         | Initial     | 5.85N MIN.<br>(0.13N /Pos.×45P) | 5   | 5 | 15.535<br>(0.345) | 16.15<br>(0.36) | 14.98<br>(0.33) | 0.543<br>(0.012) | 13.906<br>(0.309) | ○     |
|                                         |             | 20th cycles | 4.50N MIN.<br>(0.10N /Pos.×45P) |     |   | 14.270<br>(0.317) | 14.90<br>(0.33) | 13.75<br>(0.31) | 0.423<br>(0.009) | 13.001<br>(0.289) | ○     |
|                                         | 49P         | Initial     | 6.37N MIN.<br>(0.13N /Pos.×49P) | 5   | 5 | 16.935<br>(0.346) | 17.55<br>(0.36) | 16.38<br>(0.33) | 0.543<br>(0.011) | 15.306<br>(0.312) | ○     |
|                                         |             | 20th cycles | 4.90N MIN.<br>(0.10N /Pos.×49P) |     |   | 15.550<br>(0.317) | 16.18<br>(0.33) | 15.03<br>(0.31) | 0.423<br>(0.009) | 14.281<br>(0.291) | ○     |
|                                         | 51P         | Initial     | 6.63N MIN.<br>(0.13N /Pos.×51P) | 5   | 5 | 17.948<br>(0.352) | 18.83<br>(0.37) | 17.25<br>(0.34) | 0.730<br>(0.014) | 15.758<br>(0.309) | ○     |
|                                         |             | 20th cycles | 5.10N MIN.<br>(0.10N /Pos.×51P) |     |   | 16.430<br>(0.322) | 17.06<br>(0.33) | 15.91<br>(0.31) | 0.423<br>(0.008) | 15.161<br>(0.297) | ○     |
|                                         | 55P         | Initial     | 7.15N MIN.<br>(0.13N /Pos.×55P) | 5   | 5 | 19.068<br>(0.347) | 19.53<br>(0.36) | 18.15<br>(0.33) | 0.538<br>(0.010) | 17.454<br>(0.317) | ○     |
|                                         |             | 20th cycles | 5.50N MIN.<br>(0.10N /Pos.×55P) |     |   | 17.670<br>(0.321) | 18.14<br>(0.33) | 17.19<br>(0.31) | 0.352<br>(0.006) | 16.614<br>(0.302) | ○     |
|                                         | 57P         | Initial     | 7.41N MIN.<br>(0.13N/Pos.×57P)  | 5   | 5 | 19.744<br>(0.346) | 20.11<br>(0.35) | 19.33<br>(0.34) | 0.362<br>(0.006) | 18.658<br>(0.327) | ○     |
|                                         |             | 20th cycles | 5.70N MIN.<br>(0.10N /Pos.×57P) |     |   | 18.164<br>(0.319) | 18.45<br>(0.32) | 17.82<br>(0.31) | 0.240<br>(0.004) | 17.444<br>(0.306) | ○     |
|                                         | 61P         | Initial     | 7.93N MIN.<br>(0.13N /Pos.×61P) | 5   | 5 | 21.164<br>(0.347) | 22.21<br>(0.36) | 20.54<br>(0.34) | 0.631<br>(0.010) | 19.271<br>(0.316) | ○     |
|                                         |             | 20th cycles | 6.10N MIN.<br>(0.10N /Pos.×61P) |     |   | 19.318<br>(0.317) | 19.82<br>(0.32) | 18.82<br>(0.31) | 0.460<br>(0.008) | 17.938<br>(0.294) | ○     |

Table 2-4 Test Result

| Test Item                        | Measurement                   |                    | Spec.                                                                 | Set | N   | Data             |       |       |       |        | Judge |
|----------------------------------|-------------------------------|--------------------|-----------------------------------------------------------------------|-----|-----|------------------|-------|-------|-------|--------|-------|
|                                  |                               |                    |                                                                       |     |     | AVE.(X)          | MAX.  | MIN.  | s     | X±3s   |       |
| C Group<br>Retention Force       | C/T                           |                    | 0.3N MIN.                                                             | 5   | 30  | 1.156            | 1.30  | 1.01  | 0.089 | 0.889  | ○     |
| D Group<br>Vibration<br>Shock    | Contact<br>Resistance<br>(mΩ) | ※U                 | Initial                                                               | 5   | 195 | 23.764           | 29.97 | 19.00 | 3.357 | 33.835 | ○     |
|                                  |                               |                    | After<br>Vibration                                                    |     |     | 0.653            | 4.55  | -3.20 | 1.728 | 5.837  | ○     |
|                                  |                               |                    | After Shock                                                           |     |     | 0.587            | 4.69  | -3.32 | 1.822 | 6.053  | ○     |
|                                  |                               | ※L                 | Initial                                                               | 5   | 195 | 14.986           | 18.99 | 11.06 | 2.259 | 21.763 | ○     |
|                                  |                               |                    | After<br>Vibration                                                    |     |     | 1.143            | 4.14  | -1.96 | 1.331 | 5.136  | ○     |
|                                  |                               |                    | After Shock                                                           |     |     | 1.290            | 4.77  | -1.82 | 1.429 | 5.577  | ○     |
|                                  | Discontinuity                 | In Vibration       | 1μsec.<br>MAX.                                                        | 10  | 10  | No Discontinuity |       |       |       |        | ○     |
|                                  |                               | In Shock           |                                                                       |     |     | No Discontinuity |       |       |       |        | ○     |
|                                  | Appearance                    | After<br>Vibration | No abnormality adversely<br>affecting the performance<br>shall occur. | 10  | 10  | No Abnormality   |       |       |       |        | ○     |
|                                  |                               | After<br>Shock     |                                                                       |     |     | No Abnormality   |       |       |       |        | ○     |
| E Group<br>Fretting<br>corrosion | Contact<br>Resistance<br>(mΩ) | U                  | Initial                                                               | 5   | 195 | 23.857           | 29.96 | 19.01 | 3.474 | 34.279 | ○     |
|                                  |                               |                    | After Test                                                            |     |     | 0.508            | 4.68  | -3.79 | 1.750 | 5.758  | ○     |
|                                  |                               | L                  | Initial                                                               | 5   | 195 | 14.925           | 18.95 | 11.10 | 2.184 | 21.477 | ○     |
|                                  |                               |                    | After Test                                                            |     |     | 1.276            | 4.85  | -1.61 | 1.377 | 5.407  | ○     |
|                                  | Discontinuity                 | In Test            | 1μsec.<br>MAX.                                                        | 10  | 10  | No Discontinuity |       |       |       |        | ○     |
|                                  | Appearance                    | After Test         | No abnormality adversely<br>affecting the performance<br>shall occur. | 10  | 10  | No Abnormality   |       |       |       |        | ○     |
| F Group<br>Thermal<br>Shock      | Contact<br>Resistance<br>(mΩ) | U                  | Initial                                                               | 5   | 195 | 23.885           | 29.86 | 19.08 | 3.422 | 34.151 | ○     |
|                                  |                               |                    | After Test                                                            |     |     | 0.566            | 4.44  | -3.45 | 1.657 | 5.537  | ○     |
|                                  |                               | L                  | Initial                                                               | 5   | 195 | 14.930           | 18.98 | 11.07 | 2.335 | 21.935 | ○     |
|                                  |                               |                    | After Test                                                            |     |     | 1.235            | 4.65  | -1.73 | 1.403 | 5.444  | ○     |
|                                  | Appearance                    | After Test         | No abnormality adversely<br>affecting the performance<br>shall occur. | 10  | 10  | No Abnormality   |       |       |       |        | ○     |

※U : Upper Contact    L : Lower Contact

Table 2-5 Test Result

| Test Item                                          | Measurement                  |    |            | Spec.                                                                             | Set | N   | Data                         |       |       |       |        | Data |
|----------------------------------------------------|------------------------------|----|------------|-----------------------------------------------------------------------------------|-----|-----|------------------------------|-------|-------|-------|--------|------|
|                                                    |                              |    |            |                                                                                   |     |     | AVE.(X)                      | MAX.  | MIN.  | s     | X±3s   |      |
| G Group<br>High Temp.<br>Life                      | Contact Resistance (m Ω )    | ※U | Initial    | 60m Ω MAX.                                                                        | 5   | 195 | 23.811                       | 30.00 | 19.00 | 3.470 | 34.221 | ○    |
|                                                    |                              |    | After Test | Δ R=40m Ω MAX.                                                                    |     |     | 0.473                        | 4.76  | -3.35 | 1.740 | 5.693  | ○    |
|                                                    |                              | ※L | Initial    | 60m Ω MAX.                                                                        | 5   | 195 | 14.904                       | 18.99 | 11.02 | 2.345 | 21.939 | ○    |
|                                                    |                              |    | After Test | Δ R=40m Ω MAX.                                                                    |     |     | 1.335                        | 4.77  | -1.53 | 1.417 | 5.586  | ○    |
|                                                    | Appearance                   |    | After Test | No abnormality adversely affecting the performance shall occur.                   | 10  | 10  | No Abnormality               |       |       |       |        | ○    |
| H Group<br>High Temp.<br>& High Hum.<br>energizing | Contact Resistance (m Ω )    | U  | Initial    | 60m Ω MAX.                                                                        | 5   | 195 | 23.801                       | 29.99 | 19.03 | 3.637 | 34.712 | ○    |
|                                                    |                              |    | After Test | Δ R=40m Ω MAX.                                                                    |     |     | 0.484                        | 4.53  | -3.56 | 1.631 | 5.377  | ○    |
|                                                    |                              | L  | Initial    | 60m Ω MAX.                                                                        | 5   | 195 | 14.844                       | 18.97 | 11.01 | 2.428 | 22.128 | ○    |
|                                                    |                              |    | After Test | Δ R=40m Ω MAX.                                                                    |     |     | 1.363                        | 4.66  | -1.64 | 1.462 | 5.749  | ○    |
|                                                    | D.W.Voltage                  | U  | Initial    | No abnormalities such as creeping discharge, flashover, insulator breakdown occur | 5   | 190 | No Abnormality               |       |       |       |        | ○    |
|                                                    |                              |    | After Test |                                                                                   |     |     | No Abnormality               |       |       |       |        | ○    |
|                                                    |                              | L  | Initial    |                                                                                   | 5   | 190 | No Abnormality               |       |       |       |        | ○    |
|                                                    |                              |    | After Test |                                                                                   |     |     | No Abnormality               |       |       |       |        | ○    |
|                                                    | Insulation Resistance (M Ω ) | U  | Initial    | 100M Ω MIN                                                                        | 5   | 190 | MIN. 5.0×10 <sup>5</sup> M Ω |       |       |       |        | ○    |
|                                                    |                              |    | After Test |                                                                                   |     |     | MIN. 1.0×10 <sup>5</sup> MΩ  |       |       |       |        | ○    |
|                                                    |                              | L  | Initial    |                                                                                   | 5   | 190 | MIN. 4.0×10 <sup>5</sup> M Ω |       |       |       |        | ○    |
|                                                    |                              |    | After Test |                                                                                   |     |     | MIN. 2.5×10 <sup>5</sup> MΩ  |       |       |       |        | ○    |
|                                                    | Appearance                   |    | After Test | No abnormality adversely affecting the performance shall occur.                   | 10  | 10  | No Abnormality               |       |       |       |        | ○    |

※U : Upper Contact    L : Lower Contact



Table 2-6 Test Result

| Test Item                                    | Measurement                |    |            | Spec.                                                                             | Set                                                             | N   | Data                        |                |       |       |        | Judge |
|----------------------------------------------|----------------------------|----|------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|-----|-----------------------------|----------------|-------|-------|--------|-------|
|                                              |                            |    |            |                                                                                   |                                                                 |     | AVE.(X)                     | MAX.           | MIN.  | s     | X±3s   |       |
| J Group<br>High Temp.<br>& High Hum.<br>Life | Contact Resistance (mΩ)    | ※U | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 23.761                      | 29.94          | 19.00 | 3.372 | 33.877 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 0.636                       | 4.31           | -3.37 | 1.674 | 5.658  | ○     |
|                                              |                            | ※L | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 15.145                      | 19.00          | 11.08 | 2.326 | 22.123 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 1.079                       | 4.60           | -1.82 | 1.348 | 5.123  | ○     |
|                                              | D.W.Voltage                | U  | Initial    | No abnormalities such as creeping discharge, flashover, insulator breakdown occur | 5                                                               | 190 | No Abnormality              |                |       |       |        | ○     |
|                                              |                            |    | After Test |                                                                                   |                                                                 |     | No Abnormality              |                |       |       |        | ○     |
|                                              |                            | L  | Initial    |                                                                                   | 5                                                               | 190 | No Abnormality              |                |       |       |        | ○     |
|                                              |                            |    | After Test |                                                                                   |                                                                 |     | No Abnormality              |                |       |       |        | ○     |
|                                              | Insulation Resistance (MΩ) | U  | Initial    | 100MΩ MIN                                                                         | 5                                                               | 190 | MIN. 5.0×10 <sup>4</sup> MΩ |                |       |       |        | ○     |
|                                              |                            |    | After Test |                                                                                   |                                                                 |     | MIN. 1.5×10 <sup>4</sup> MΩ |                |       |       |        | ○     |
|                                              |                            | L  | Initial    |                                                                                   | 5                                                               | 190 | MIN. 5.0×10 <sup>4</sup> MΩ |                |       |       |        | ○     |
|                                              |                            |    | After Test |                                                                                   |                                                                 |     | MIN. 1.0×10 <sup>4</sup> MΩ |                |       |       |        | ○     |
|                                              | Appearance                 |    |            | After Test                                                                        | No abnormality adversely affecting the performance shall occur. | 10  | 10                          | No Abnormality |       |       |        |       |
| K Group<br>Cold Temp.<br>Life                | Contact Resistance (mΩ)    | U  | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 23.741                      | 29.94          | 19.00 | 3.614 | 34.583 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 0.626                       | 4.08           | -3.23 | 1.627 | 5.507  | ○     |
|                                              |                            | L  | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 15.008                      | 18.99          | 11.00 | 2.228 | 21.692 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 1.191                       | 4.71           | -1.72 | 1.383 | 5.340  | ○     |
|                                              | Appearance                 |    |            | After Test                                                                        | No abnormality adversely affecting the performance shall occur. | 5   | 5                           | No Abnormality |       |       |        |       |
| L Group<br>Gas(H <sub>2</sub> S)             | Contact Resistance (mΩ)    | U  | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 23.852                      | 29.96          | 19.01 | 3.553 | 34.511 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 0.487                       | 4.22           | -3.28 | 1.661 | 5.470  | ○     |
|                                              |                            | L  | Initial    | 60mΩ MAX.                                                                         | 5                                                               | 195 | 14.997                      | 18.98          | 11.02 | 2.399 | 22.194 | ○     |
|                                              |                            |    | After Test | ΔR=40mΩ MAX.                                                                      |                                                                 |     | 1.101                       | 4.64           | -1.97 | 1.393 | 5.280  | ○     |
|                                              | Appearance                 |    |            | After Test                                                                        | No abnormality adversely affecting the performance shall occur. | 10  | 10                          | No Abnormality |       |       |        |       |

※U : Upper Contact    L : Lower Contact

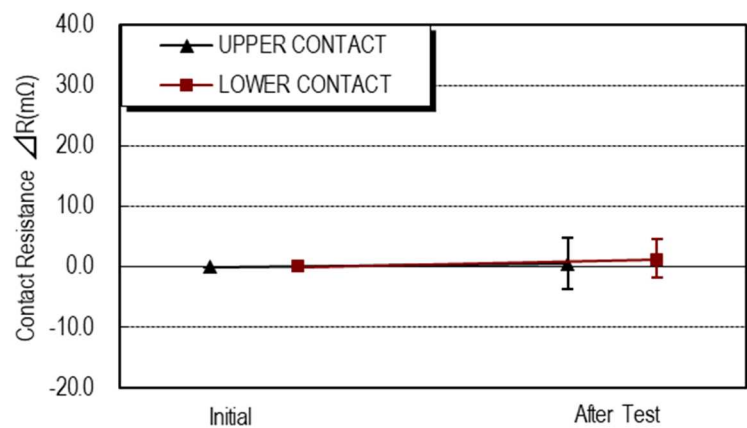
# MINIFLEX 3-BFN LONG ACT TYPE Test Report

Document No.  
TR-12040-06EN

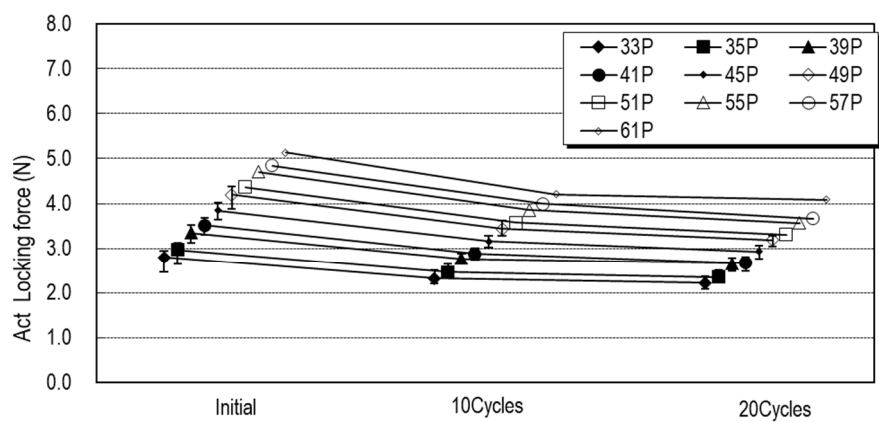
Table 2-7 Test Result

| Test Item                        | Measurement                  |                         |                                                                 | Spec.                                                           | Set       | N              | Data                     |              |       |       |        | Judge  |
|----------------------------------|------------------------------|-------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------|----------------|--------------------------|--------------|-------|-------|--------|--------|
|                                  |                              |                         |                                                                 |                                                                 |           |                | AVE.(X)                  | MAX.         | MIN.  | s     | X±3s   |        |
| M Group<br>Gas(SO <sub>2</sub> ) | Contact Resistance (mΩ)      | ※U                      | Initial                                                         | 60mΩ MAX.                                                       | 5         | 195            | 23.723                   | 29.87        | 19.03 | 3.539 | 34.340 | ○      |
|                                  |                              |                         | After Test                                                      | ΔR=40mΩ MAX.                                                    |           |                | 0.589                    | 4.66         | -3.37 | 1.728 | 5.773  | ○      |
|                                  |                              | ※L                      | Initial                                                         | 60mΩ MAX.                                                       | 5         | 195            | 15.045                   | 19.00        | 11.00 | 2.375 | 22.170 | ○      |
|                                  |                              |                         | After Test                                                      | ΔR=40mΩ MAX.                                                    |           |                | 1.117                    | 4.23         | -1.85 | 1.349 | 5.164  | ○      |
|                                  | Appearance                   |                         | After Test                                                      | No abnormality adversely affecting the performance shall occur. | 10        | 10             | No Abnormality           |              |       |       |        | ○      |
|                                  | N Group)<br>Salt Water Spray | Contact Resistance (mΩ) | U                                                               | Initial                                                         | 60mΩ MAX. | 5              | 195                      | 23.675       | 29.99 | 19.01 | 3.545  | 34.310 |
|                                  |                              |                         | After Test                                                      | ΔR=40mΩ MAX.                                                    |           |                | 0.638                    | 4.28         | -3.86 | 1.687 | 5.699  | ○      |
| L                                |                              |                         | Initial                                                         | 60mΩ MAX.                                                       | 5         | 195            | 15.014                   | 18.98        | 11.02 | 2.393 | 22.193 | ○      |
|                                  |                              |                         | After Test                                                      | ΔR=40mΩ MAX.                                                    |           |                | 1.281                    | 4.26         | -1.74 | 1.448 | 5.625  | ○      |
| Appearance                       |                              | After Test              | No abnormality adversely affecting the performance shall occur. | 10                                                              | 10        | No Abnormality |                          |              |       |       | ○      |        |
| P Group                          |                              | Zero x Time (sec.)      |                                                                 | C/T                                                             | 3sec. MAX | 5              | 5                        | MAX. 0.1sec. |       |       |        |        |
| Solderability                    | Appearance                   |                         | C/T                                                             | Wetness: 95% MIN.                                               | 5         | 5              | 95%MIN.was wet.          |              |       |       |        | ○      |
| Q Group                          | Reflow twice                 |                         |                                                                 | No Abnormality                                                  | 5         | 5              | No Abnormality           |              |       |       |        | ○      |
| Soldering Heat Resistance        | Soldering iron               |                         |                                                                 |                                                                 |           |                |                          |              |       |       |        |        |
| R Group<br>Temp. rising          | 0.3A/Contact                 |                         |                                                                 | ΔT=30K MAX.                                                     | 5         | 5              | No Problem. MAX.ΔT=10.6K |              |       |       |        | ○      |

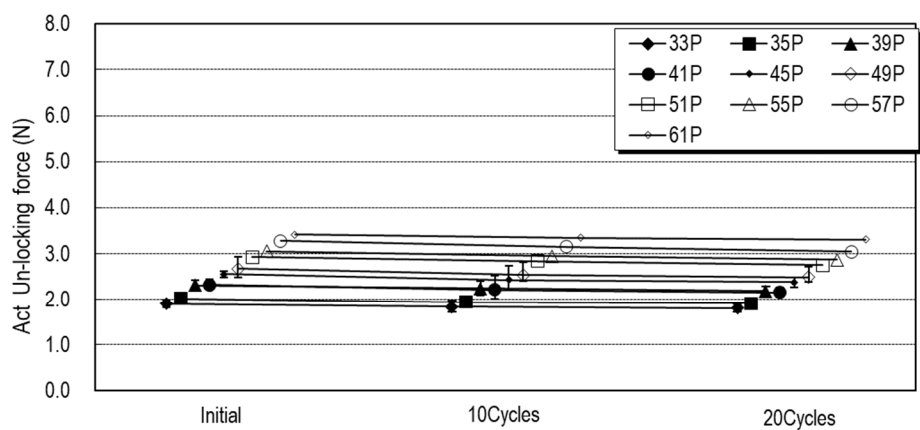
※U : Upper Contact L : Lower Contact



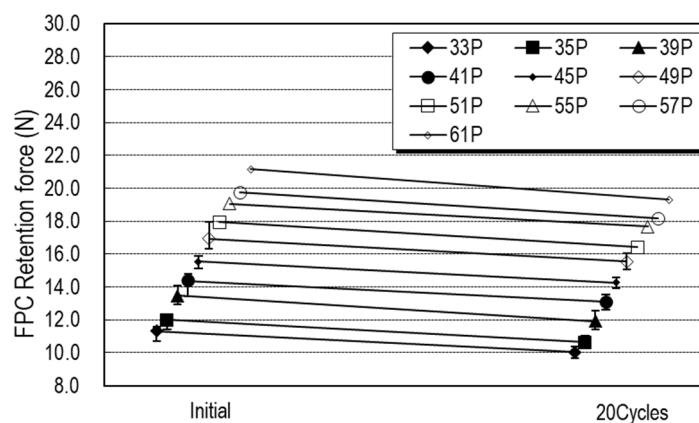
Graph.1 A change of contact resistance  
A group : Durability



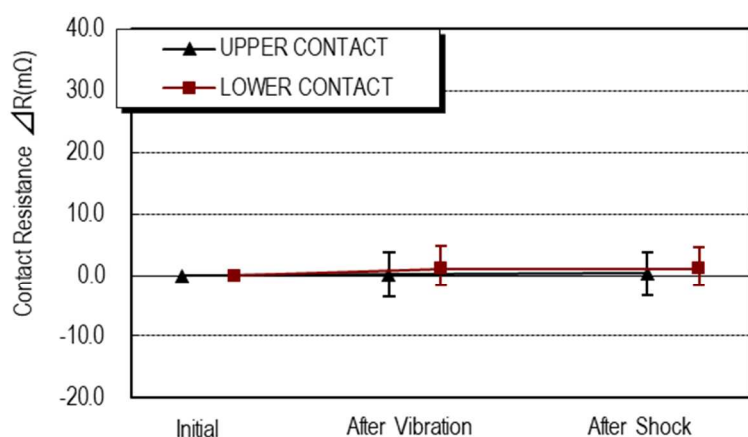
Graph.2 A change of Locking force  
A group : Durability



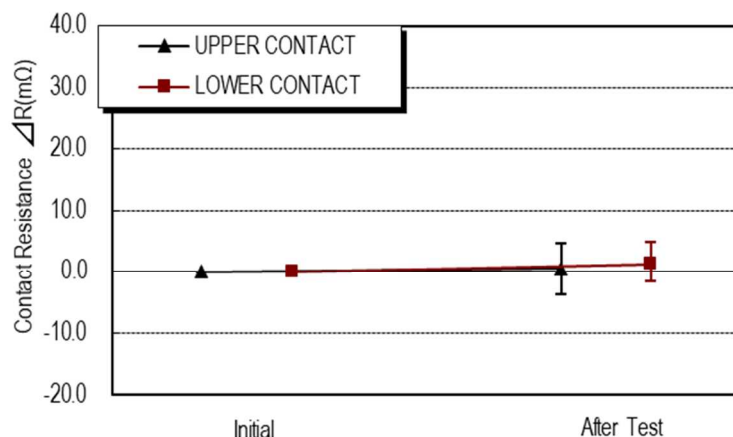
Graph.3 A change of Un-locking force  
A group : Durability



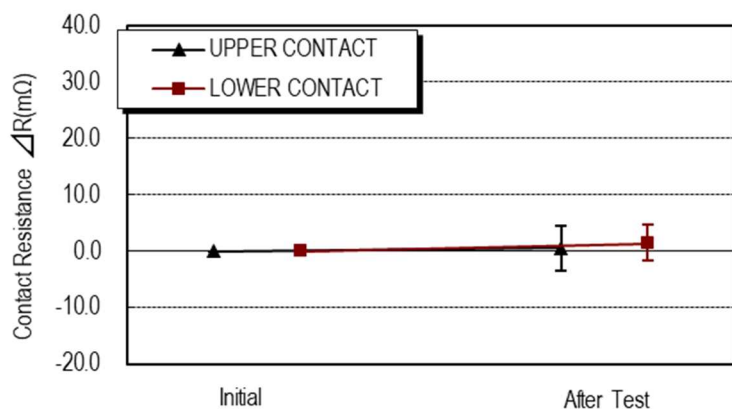
Graph.4 A change of FPC Retention Force  
B group : FPC Retention Force



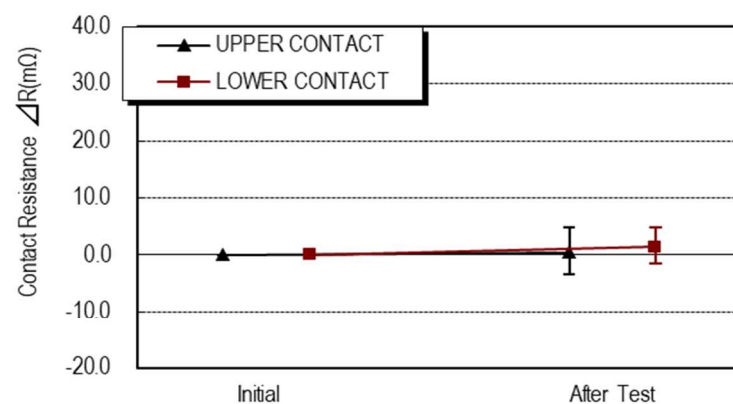
Graph.5 A change of contact resistance  
D group : Vibration / Shock



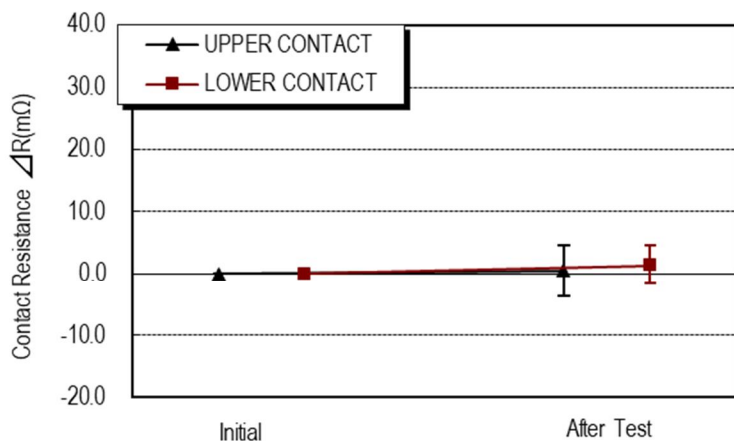
Graph.6 A change of contact resistance  
E group : Fretting Corrosion



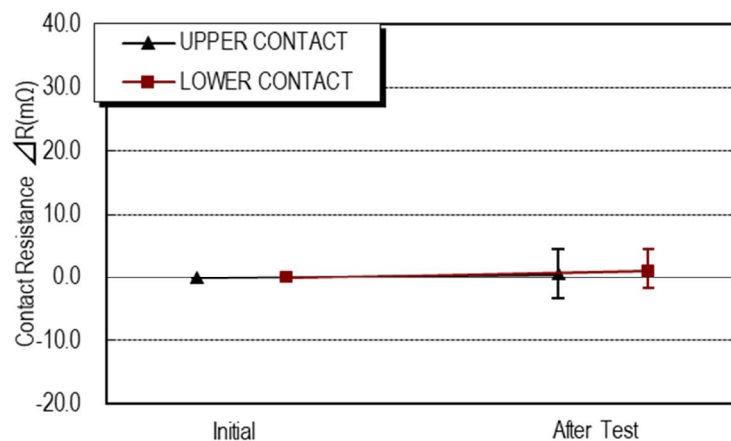
Graph.7 A change of contact resistance  
F group : Thermal Shock



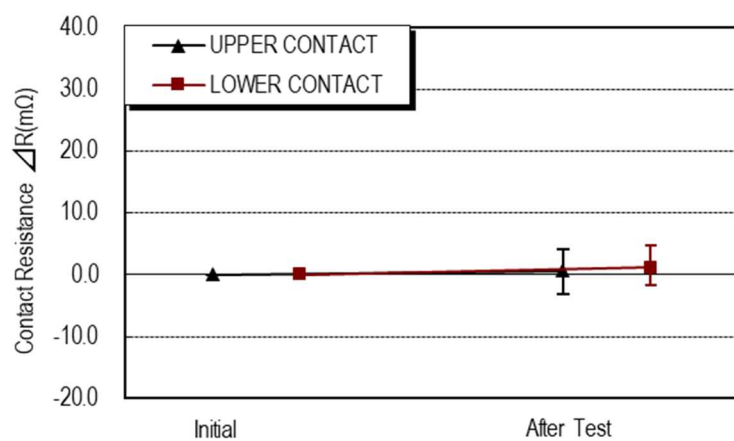
Graph.8 A change of contact resistance  
G group : High Temp. Life



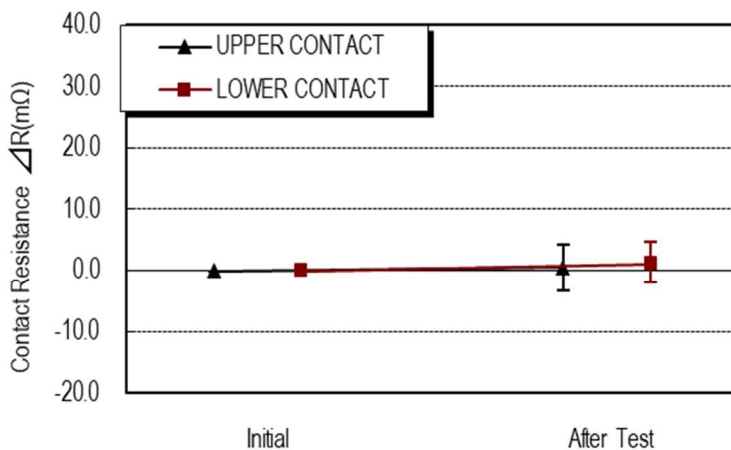
Graph.9 A change of contact resistance  
H group : High Temp. & High Hum. energizing



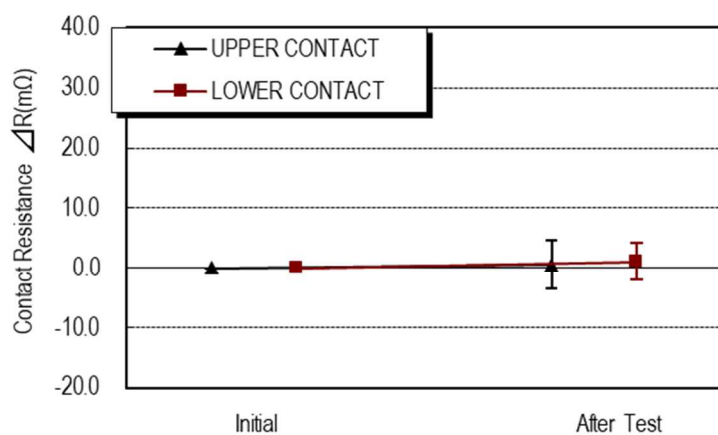
Graph.10 A change of contact resistance  
J group : High Temp. & High Hum. Life



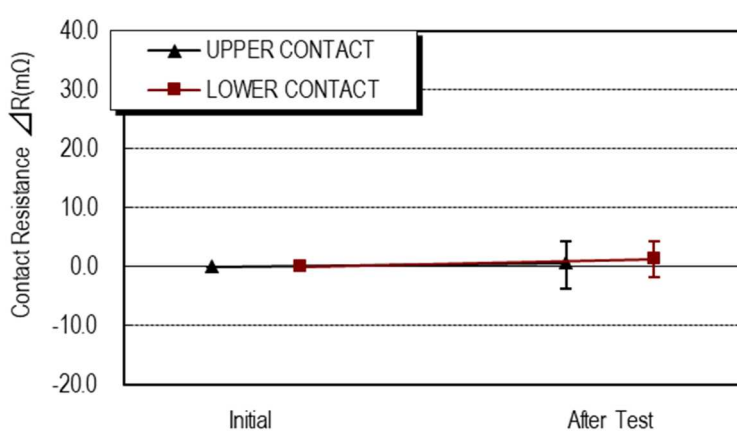
Graph.11 A change of contact resistance  
K group : Cold Temp. Life



Graph.12 A change of contact resistance  
L group : Gas (H<sub>2</sub>S)



Graph.13 A change of contact resistance  
M group : Gas (SO<sub>2</sub>)



Graph.14 A change of contact resistance  
N group : Salt Water Spray