COUNT

DESCRIPTION OF REVISIONS

BY

CHKD

DATE

COUNT

DESCRIPTION OF REVISIONS

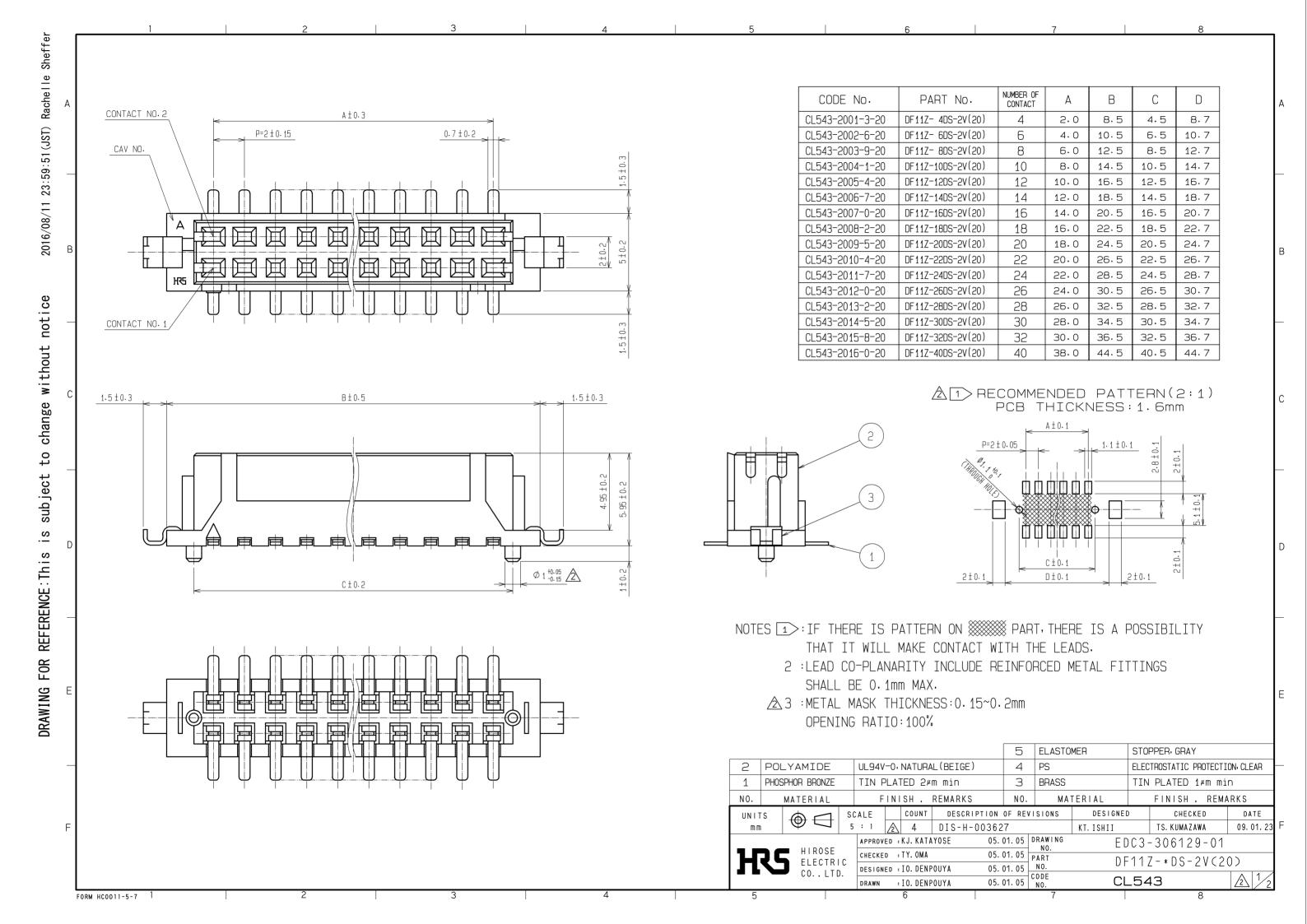
TO

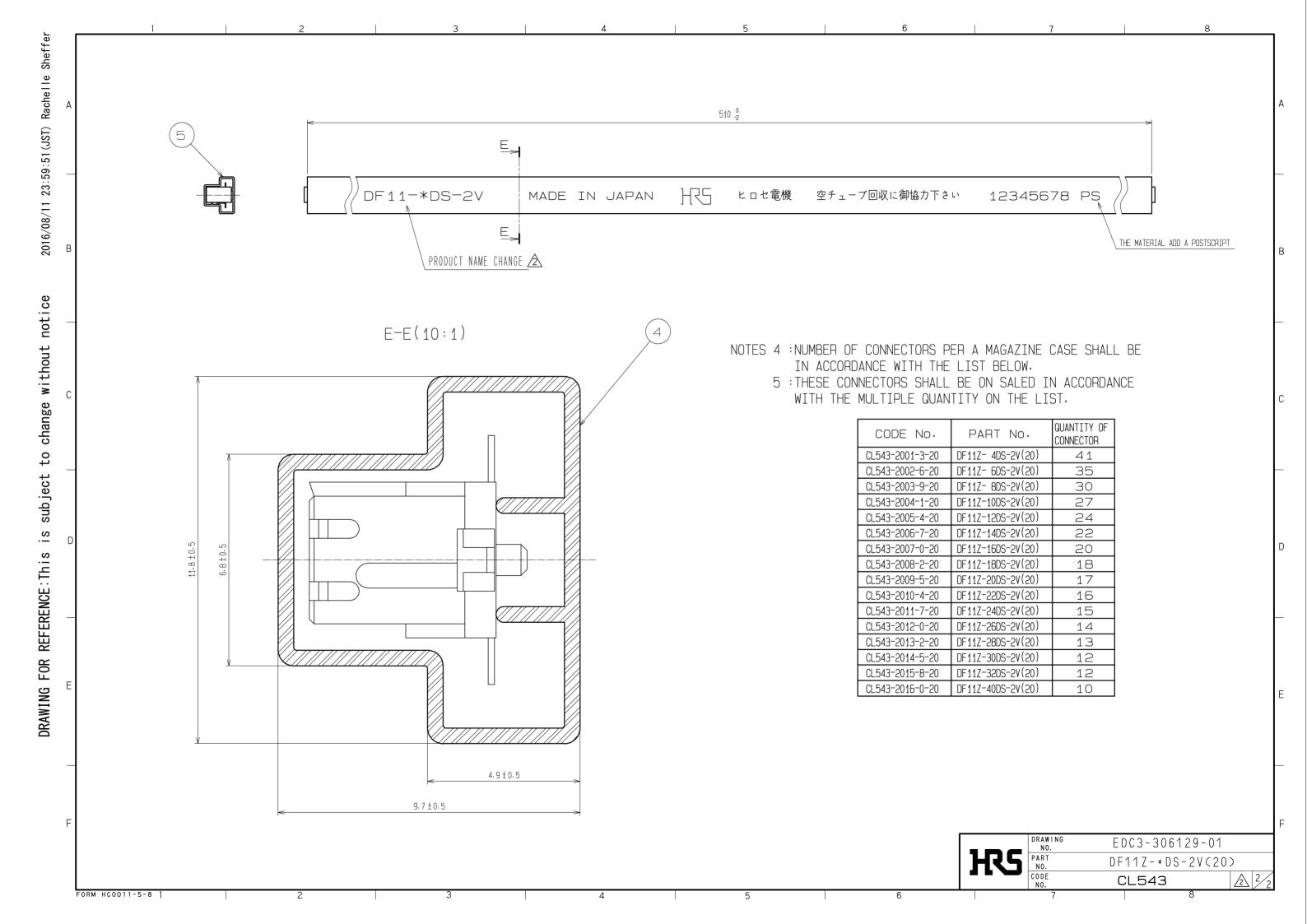
$\triangle$					<u> </u>	<del>-</del>					-			
$\triangle$					<u> </u>	$\Delta$								
APPLICA	BLE STAND	ARD												
RATING	VOLTAGE			250 \		TE	PERATIN EMPERAT FRAGE	G TURE RAN	IGE	-30 °C T				
	CURRENT	Γ		2.			_	TURE RAN	1GE	-10 °C T	O +60	°C(N	101E	2)
					PECIFIC	ATIO	NS						11	
J.	TEM		TES	T ME	THOD			R	EQ	UIREME	NTS		QT	AT
CONSTR		T				10 4 m b 17 m	14.00	ODDING		DRAWING.			11	
	EXAMINATION		*		RING INSTR	UMENT.		ORDING	3 10	DRAWING.			×	X
MARKING		1	IED VISUA	LLY.									×	×
	IC CHARACT		S - OC OR 1000	) H=/	<u> </u>		30 m	O MAY					×	
INSULATIO	ON	500 V DC.						30 mΩ MAX. 1000 MΩ MIN.				×		
RESISTANO VOLTAGE		650 V AC	FOR 1 min				NO	FLASHO	VER	OR BREAK	DOWN.		×	
MECHAN	IICAL CHARA	ACTERIS	TICS											
	AL OPERATION			NS ANI	D EXTRACTI	ONS.	<b>②</b> N		AGE,	SISTANCE: CRACK OF			×	-
VIBRATION	٧	0.75 mm,	AT 2 h, F	OR 3 D	SINGLE AMI		1	l μs.		CAL DISCO			×	_
SHOCK		1	DURATION RECTIONS		ILSE 11 ms A	T 3 TIM		NO DAM/ OF PART		CRACK OF	RLOOSE	NESS	×	
	NMENTAL CI													
RAPID CHA		TEMPERATIME UNDER 5	30		O 35→+85→ O 15→ 30→5		nin   ②   1 ③   1	NSULATI	ON F	SISTANCE: RESISTANCE CRACK OF	E:1000 Ms	Q MIN.		_
DAMP HEA (STEADY S		EXPOSE	O AT 40±2	°C, 90	TO 95 %, 96	h.	② I ③ N	NSULATI	ON F	SISTANCE RESISTANCE CRACK OF	E: 500 MΩ	MIN.	×	_
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SOLDERAI	BILITY				EMPERATUF ION ,DURATI	-	SH/	ALL COV	ER I	M COATING MINIMUM O G IMMERSE	F 95 % C		×	_
NOTE2:APPLY PRODI TEMPE	S DING THE TEMPERA TO THE CONDITION UCTS BEFORE PCB CERATURE AND HUMIRA AGE DURING TRANSI	I OF LONG TER ON BOARD, AF DITY RANGE IS	RM STORAGE TER PCB BOA	RD,OPER	RATING	F.Mats		Designer Denkou 24.04.0		CHECKED  Linehara  14.04.01	J. Q		RELEA	SED
	herwise specific							1 . 1 /	1/2	オレルレー	07.07.			
Note QT:	Qualification Tes			QE.	PECIFICA			ET PA	RT N					
CODE NO.(C	HIROSE EL		RAWING NO	<u></u>	<u> </u>		PART			DF11Z-		V (20	))	1/
CL			EL	C4-30	06129-01					CL543		M No '	001 1	/1

CHKD

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DATE





TR543E-10319

# QUALITY EVALUATION TEST REPORT ON DF11 SERIES (LEAD-FREE PRODUCT)

APPROVED SI.TOMIOKA
CHECKED SI.TOMIOKA
CHARGED HT.SAKATA



(2/23) TR543E-10319

[1] Objective:

To evaluate the performance and quality of DF11 Series (lead-free product).

[2] Specimens:

DF11Z-32DP-2V(27) DF11Z-32DS-2V(22)

[Above test specimens were tested in the condition as it is received from the client.]

[3] Test period:

From: 2004-06-09 To: 2004-06-24

[4] Test temperature:

18 °C to 28 °C

[5] Test humidity:

25 %RH to 75 %RH

[6] Test item, Number of specimens, Page No.

Test item	Test item/		G	rou	ıp		Number of	Page
No.	(Applicable standard)	Α	В	С	D	Е	Specimens	No.
1	Appearance, Construction (JIS C 5402 4.1 4.3)	0	0	0	0	0	20 sets	9
2	Contact resistance (JIS C 5402 5.4)		0	0	0	0	16 sets	10
3	Insulation resistance (JIS C 5402 5.2)			0	0		8 sets	11
4	Voltage proof (JIS C 5402 5.1)			0	0		8 sets	12
5	Contact's gauge insertion and extraction forces (JIS C 5402 6.4)		0				4 pcs	13
6	Vibration (JIS C 5402 6.1)	0					4 sets	14
7	Shock (JIS C 5402 6.2)	0					4 sets	15
8	Mechanical operation, 30 times (JIS C 5402 6.3)		0				4 sets	16
9	Change of temperature (JIS C 5402 7.2)			0			4 sets	17
10	Dry heat (JIS C 5402 7.8)			0			4 sets	18
11	Cold (JIS C 5402 7.9)			0			4 sets	19
12	Damp heat (JIS C 5402 7.3)				0		4 sets	20
13	Corrosion, salt mist				0		4 sets	21
14	Mechanical operation, 30 times (JIS C 5402 6.3)					0	4 sets	22
15	Corrosion, H <sub>2</sub> S gas (JIS C 0092)					0	4 sets	23

Note 1) Different specimens (in a condition that the specimens are not mounted on a board) are used for [Insulation resistance] and [Voltage proof] from those for [Contact resistance].

Note 2) All tests except Test item Nos. 1, 3, 4, 5, 8, and 14 and measurements are conducted in a condition that boards on the header side and the socket side are fixed (with screws and spacers).

\* Refer to the figure of measuring points in [Contact resistance] in page 10.

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#### Table for each test item to be measured

Test item No.	Test item	(1)	(2)	(3)	(4)	(5)	(6)
6	Vibration	0					0
7	Shock	0					0
8	Mechanical operation, 30 times	0	0			0	
9	Change of temperature	0	0	0	0		
10	Dry heat	0	0	0	0		
11	Cold	0	0	0	0		
12	Damp heat	0	0	0	0		
13	Corrosion, salt mist	0	0				
14	Mechanical operation, 30 times	0	0				
15	Corrosion, H₂S gas	0	0				

Remarks: (1) Appearance, Construction

- (2) Contact resistance
- (3) Insulation resistance
- (4) Voltage proof
- (5) Contact's gauge insertion and extraction forces
- (6) Electrical discontinuity

#### [7] Test results

See the page which describes each test item.

See the pages shown below for variation graphs and result data.

Contact resistance, variation graphs and result data

See page 5 for Groups B and C.

See page 6 for Groups D and E.

Insulation resistance, result data

See page 7 for Groups C and D.

Contact's gauge insertion and extraction forces, variation graph and result data See page 8 for Group B.

Step

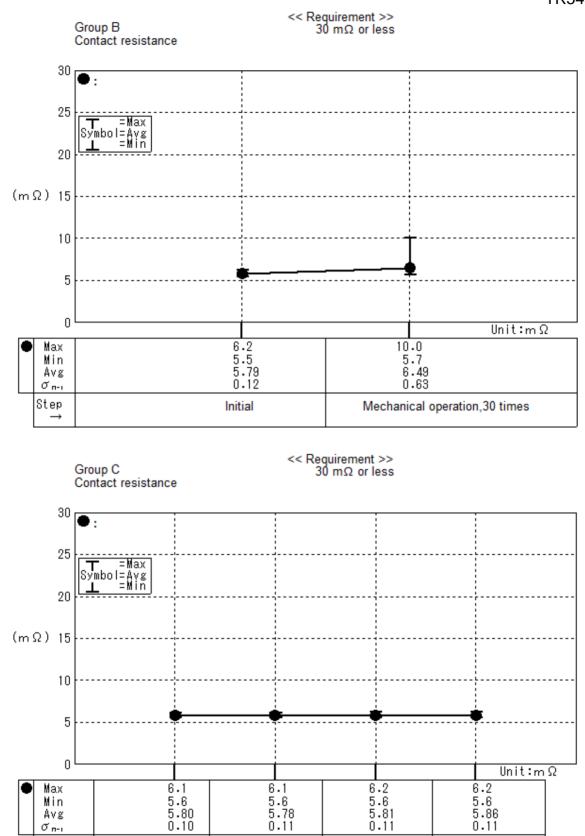
Initial

Change of

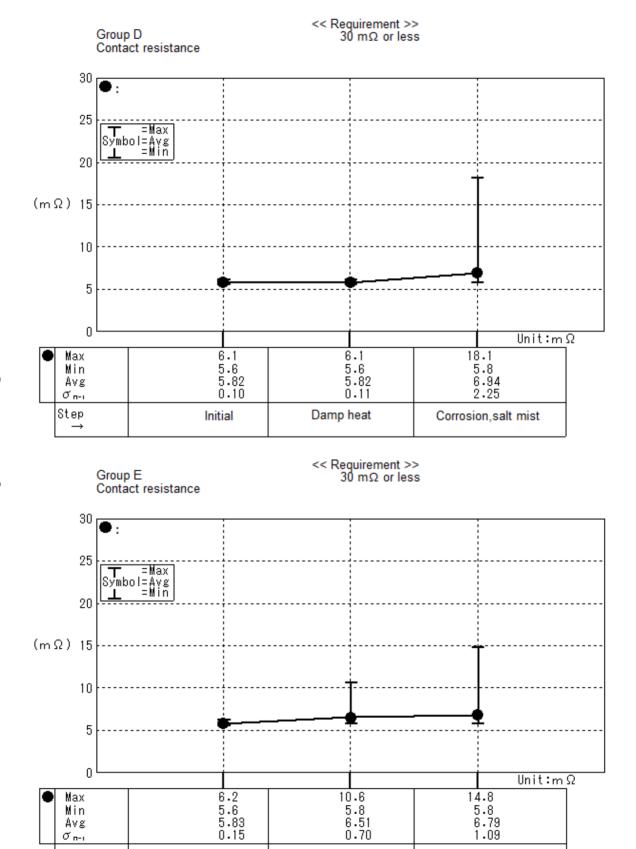
temperature

Cold

Dry heat



Step



Mechanical operation,

30 times

Initial

Corrosion, H2S gas

(7/23) TR543E-10319

#### Insulation resistance

# Requirements:

1000  $M\Omega$  or more

# Group C

Between adjacent contacts

Unit:  $[\times 10^4 \,\mathrm{M}\Omega]$ 

	Initial	Change of temperature	Dry heat	Cold
Max	100	100	100	100
Min	100	100	100	100

# Requirements:

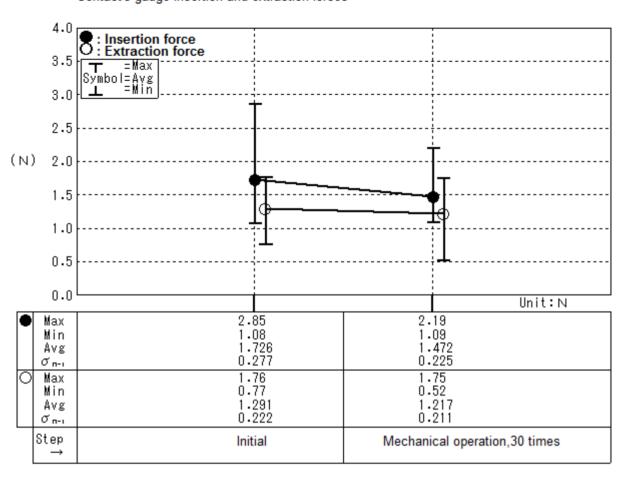
Initial:  $1000 \text{ M}\Omega$  or more

Damp heat:  $500 \text{ M}\Omega$  or more

# Group D

Betwee	en adjacent contacts	Unit: [× 10 <sup>4</sup> ΜΩ]
	Initial	Damp heat
Max	100	0.3
Min	100	0.2

Group B < Requirement >> 0.5 N to 4.4 N Contact's gauge insertion and extraction forces



(9/23) TR543E-10319

# 1. Appearance, Construction

1.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Intermateability: No defect in mating.

1.2 Test method

Appearance, Construction: Check visually with a magnifying glass for existence of

breakage, crack or looseness on the component.

Intermateability: Check for existence of any defect when specimens

are mated with the applicable connector.

1.3 Test results

Appearance, Construction:

No breakage, crack or looseness on the component was found.

Intermateability:

No defect in mating was found.

(10/23) TR543E-10319

#### 2. Contact resistance

# 2.1 Requirements $30 \text{ m}\Omega$ or less.

#### 2.2 Test method

Contact resistance is measured according to the conditions specified in the table below:

Open circuit voltage	20 mV a.c. or less, 1 kHz
Test current	1 mA a.c.

Measuring method:

Measured by milliohm-meter at the points shown in the following figure.

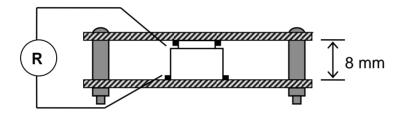


Figure: Measuring points

# 2.3 Test equipment

Test equipment	Model	Manufacturer
Milliohm-meter	2420	NF Corporation

#### 2.4 Test results

(Groups B t	o E) Unit: $[m\Omega]$
Max	6.2
Min	5.5
Avg	5.81
σ <sub>n-1</sub>	0.12

(11/23) TR543E-10319

# 3. Insulation resistance

# 3.1 Requirements $1000 \text{ M}\Omega$ or more.

#### 3.2 Test method

Insulation resistance is measured according to the conditions specified in the table below:

Test voltage	500 V d.c.
Duration	For 1 min ± 5 s. However, if the results are
	verified as the required value or more during the
	testing, the measurement can be terminated.

Measuring point: Between adjacent contacts. (Measured for each 1 pin.)

Mated/Unmated: Mated.

#### 3.3 Test equipment

Test equipment	Model	Manufacturer		
Super Megohm-meter	SM-8210	Toa Electronics		

#### 3.4 Test results

(Groups C and D) Unit: [ $\times 10^4 M\Omega$ ]

	/ 6
	Between adjacent contacts
Max	100
Min	100

(12/23) TR543E-10319

# 4. Voltage proof

#### 4.1 Requirements

No flashover or dielectric breakdown.

#### 4.2 Test method

Voltage proof is checked according to the conditions specified in the table below:

Test voltage	650 V a.c.
Duration	For 1 min ± 5 s

Imposing method: Test voltage is raised in a rate of 500 V/s or less until it

reaches to the value listed above.

Leak current: Judged flashover or dielectric breakdown at 2 mA.

Measuring point: Between adjacent contacts.

Mated/Unmated: Mated.

#### 4.3 Test equipment

Test equipment	Model	Manufacturer
Voltage proof tester	TOS8750	Kikusui Electronics

#### 4.4 Test results

(Groups C and D)

No flashover or dielectric breakdown was found.

(13/23) TR543E-10319

# 5. Contact's gauge insertion and extraction forces

5.1 Requirements 0.5 N to 4.4 N.

#### 5.2 Test method

Measured by means of that the following sized steel gauge is inserted/extracted to/from the female contact at normally applied depth.

Contact gauge dimension	□ 0.5 mm ± 0.002 mm
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# 5.3 Test equipment

Test equipment	Model	Manufacturer
Insertion and extraction tester	1840	Aikoh Engineering

#### 5.4 Test results

See page 8 for variation graph and result data.

(14/23) TR543E-10319

### 6. Vibration

6.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Electrical discontinuity: No electrical discontinuity of 1 µs or more.

#### 6.2 Test method

The test is conducted according to the conditions specified in the table below:

	<u> </u>
Frequency range	10 Hz to 55 Hz
Single amplitude	0.75 mm
Time for one cycle	10 Hz to 55 Hz to 10 Hz, for approx. 5 min
Number of cycles	3 axial directions, 10 cycles each, 30 cycles in total

Connection method: Series connection for all contacts

Test voltage: 5 V d.c.
Test current: 100 mA d.c.

Note) [Electrical discontinuity] is checked continuously during the test.

#### 6.3 Test equipment

Test equipment	Model	Manufacturer
Vibration machine	F-300BM/A-E78	Emic
Digital oscilloscope	9362	Lecroy
Variable constant dc volt and ampere generator	PAC35-3	Kikusui Electronics

#### 6.4 Test results

Appearance, Construction:

No breakage, crack or looseness on the component was found.

Electrical discontinuity:

No electrical discontinuity of 1  $\mu s$  or more was found.

(15/23) TR543E-10319

#### 7. Shock

#### 7.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Electrical discontinuity: No electrical discontinuity of 1 µs or more.

#### 7.2 Test method

The test is conducted according to the conditions specified in the table below:

Acceleration	490 m/s <sup>2</sup>
Duration	11 ms
Wave form	Half-sine wave
Number of shocks	3 both axial directions, 3 times each, 18 times in total

Connection method: Series connection for all contacts

Test voltage: 5 V d.c.
Test current: 100 mA d.c.

Note) [Electrical discontinuity] is checked during the test.

#### 7.3 Test equipment

Test equipment	Model	Manufacturer
Shock testing machine	PEP-250MR	Itoh Seiki
Digital oscilloscope	9362	Lecroy
Variable constant dc volt and ampere generator	PAC35-3	Kikusui Electronics

#### 7.4 Test results

Appearance, Construction:

No breakage, crack or looseness on the component was found.

Electrical discontinuity:

No electrical discontinuity of 1 µs or more was found.

(16/23) TR543E-10319

# 8. Mechanical operation, 30 times

8.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance: 30 m $\Omega$  or less.

Contact's gauge insertion and extraction forces: 0.5 N to 4.4 N

8.2 Test method

30 times of insertions and withdrawals are conducted at a rate of 600 times/h or

less.

8.3 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 5 for variation graph and result data.

Contact's gauge insertion and extraction forces:

See page 8 for variation graph and result data.

(17/23) TR543E-10319

# 9. Change of temperature

#### 9.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance:  $30 \text{ m}\Omega$  or less. Insulation resistance:  $1000 \text{ M}\Omega$  or more.

Voltage proof: No flashover or dielectric breakdown.

#### 9.2 Test method

The test is conducted according to the conditions specified in the table below:

Step	1	2
Temperature (°C)	-55 ± 3	85 ± 2
Duration (min)	30	30

Note) Chamber transfer time is 2 min to 3 min.

Number of cycles: 5 cycles are conducted with the above condition as 1 cycle.

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 1 h to 2 h.

#### 9.3 Test equipment

Test equipment	Model	Manufacturer
Constant low temperature chamber	TSV-40S	Espec

#### 9.4 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 5 for variation graph and result data.

Insulation resistance: See page 7 for result data.

(18/23) TR543E-10319

# 10. Dry heat

10.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance:  $30 \text{ m}\Omega$  or less. Insulation resistance:  $1000 \text{ M}\Omega$  or more.

Voltage proof: No flashover or dielectric breakdown.

#### 10.2 Test method

The test is conducted according to the conditions specified in the table below:

Temperature	85 °C ± 2 °C
Duration	96 h

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 1 h to 2 h.

#### 10.3 Test equipment

Test equipment	Model	Manufacturer
Constant high temperature chamber	PVH-220	Espec

10.4 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 5 for variation graph and result data.

Insulation resistance: See page 7 for result data.

(19/23) TR543E-10319

#### 11. Cold

#### 11.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance:  $30 \text{ m}\Omega$  or less. Insulation resistance:  $1000 \text{ M}\Omega$  or more.

Voltage proof: No flashover or dielectric breakdown.

#### 11.2 Test method

The test is conducted according to the conditions specified in the table below:

Temperature	-55 °C ± 3 °C
Duration	96 h

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 1 h to 2 h.

#### 11.3 Test equipment

Test equipment	Model	Manufacturer
Constant low temperature chamber	MC-810	Espec

#### 11.4 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 5 for variation graph and result data.

Insulation resistance: See page 7 for result data.

(20/23) TR543E-10319

# 12. Damp heat

#### 12.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance: 30 m $\Omega$  or less. Insulation resistance: 500 M $\Omega$  or more.

Voltage proof: No flashover or dielectric breakdown.

#### 12.2 Test method

The test is conducted according to the conditions specified in the table below:

Temperature	40 °C ± 2 °C
Humidity	90 %RH to 95 %RH
Duration	96 h

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 1 h to 2 h.

### 12.3 Test equipment

Test equipment	Model	Manufacturer
Constant temperature and humidity chamber	LHL-111	Espec

#### 12.4 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 6 for variation graph and result data.

Insulation resistance: See page 7 for result data.

(21/23) TR543E-10319

# 13. Corrosion, salt mist

#### 13.1 Requirements

Appearance, Construction: No excessive corrosion.

Contact resistance:  $30 \text{ m}\Omega$  or less.

#### 13.2 Test method

The test is conducted according to the conditions specified in the table below:

Concentration	5 wt% ± 1 wt%
Temperature	35 °C ± 2 °C
pH value	6.5 to 7.2
Duration	48 h

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 24 h.

#### 13.3 Test equipment

Test equipment	Model	Manufacturer
CASS tester	CASSER-ISO-3	Suga Test Instrument

#### 13.4 Test results

Appearance, Construction: No excessive corrosion was found.

Contact resistance: See page 6 for variation graph and result data.

# 14. Mechanical operation, 30 times

14.1 Requirements

Appearance, Construction: No breakage, crack or looseness on the component.

Contact resistance:  $30 \text{ m}\Omega$  or less.

14.2 Test method

30 times of insertions and withdrawals are conducted at a rate of 600 times/h or

less.

14.3 Test results

Appearance, Construction: No breakage, crack or looseness on the component

was found.

Contact resistance: See page 6 for variation graph and result data.

# 15. Corrosion, H₂S gas

#### 15.1 Requirements

Appearance, Construction: No excessive corrosion.

Contact resistance:  $30 \text{ m}\Omega$  or less.

#### 15.2 Test method

The test is conducted according to the conditions specified in the table below:

Concentration	10 ppm to 15 ppm	
Temperature	25 °C ± 2 °C	
Humidity	75 %RH ± 5 %RH	
Duration	96 h	

Mated/Unmated: Mated.

Recovery: After completion of the test, let the specimens rest in ambient

temperature for 1 h to 2 h.

#### 15.3 Test equipment

Test equipment	Model	Manufacturer
Gas corrosion tester	GH-180MT	Yamazaki Seiki

#### 15.4 Test results

Appearance, Construction: No excessive corrosion was found.

Contact resistance: See page 6 for variation graph and result data.