NICOMATIC R&D LABORATORY	QUALIFICATION TEST REPORT	QTR18015b
EMM SERIE ACCORDING TO MIL-DTL-83513G STANDARD		Page : 1 /13
		Qualification status : PASSED

TEMPERATURE CYCLING (-65°C to +260°C)

According to MIL-DTL-83513G §3.5.8 & 4.5.10 and EIA-364-32D test procedure

ISSUE	MODIFICATION	VISA	DATE
a	Original Issue	AJ	21/05/18
b	60 points qualification added	AJ	30/06/20
c			

	Name	Duty	Date	Visa
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1 Conclusion

The EMM connectors are **qualified** regarding TEMPERATURE CYCLING (-65°C to +260°C) according to MIL-DTL-83513G standard.

2 Technical Features Proposal

EMM connectors:
The connectors are not showing any evidence of cracking or breaking having undergoes

3 Connate Reports

4 Information about the tests

4.1 Object

The object of this test is to check the influence of thermal cycling test on electrical connectors range DMM according to MIL-DTL-83513G §3.5.8 & 4.5.10 standard.

4.2 Reference documents/Qualification Plan

- MDC.P16020.a
- MIL-DTL-83513G
- EIA-364-32D

4.3 Tested Products

Designation	Article Reference*	Drawing issue*	Batch / DI*	Quantity
C18892-30 (Female, Straight on PCB, E60 guiding)	C18892-30	na	DI7576	20
C18900-30 (Female Straight on PCB, E50)	C18900-30	na	DI7577	20
C18891-30 (Male, Straight on PCB, E10)	C18891-30	na	DI7579	20
C18904-30 (Male, 90° on PCB, E11 guiding)	C18904-30	na	DI7578	20
C18893-30 (Female, 90° on PCB, E61 guiding)	C18893-30	na	DI7580	20
C18901-30 (Female, 90° on PCB, E51 jackscrew)	C18901-30	na	DI7581	20
C18981-30-0250 (Male, on cable AWG30, E01 jackscrew)	C18981-30-0250	na	DI7592	20
C18980-30-0250 (Male, on cable AWG28, E01 jackscrew)	C18980-30-025	na	DI7591	20
C18902-30-0250 (Male, on cable AWG26, E01 jackscrew)	C18902-30-0250	na	DI7588	20
C18979-30-0250 (Male, on cable AWG24, E01 jackscrew)	C18979-30-0250	na	DI7589	20
C18902-30-0250-BP (Male, on cable AWG26, E01 jackscrew BP)	C18902-30-0250-BP	na	DI7586	20
18224-AWG24	18224-AWG24	na	DI7594	25
18224-AWG26	18224-AWG26	na	DI7596	25
18240-AWG28	18240-AWG28	na	DI7597	25
18240-AWG30	18240-AWG30	na	DI7598	25

Connector EMM 220 female straight on PCB, 60 LF contacts, E60	E222Y60E60	na	LCT1901318	10
Connector EMM 220 male Y straight on PCB, 60 LF contacts, E10	E221Y60E10	na	LCT1901319	10
Connector EMM 220 female 90° on PCB, 60 LF contacts, E61	E222V60E61	na	LCT1901320	10
Connector EMM 220 female straight on PCB, 60 LF contacts, E50	E222Y60E50	na	LCT1901321	10
Connector EMM 220 female 90° on PCB, 60 LF contacts, E51	E222V60E51	na	LCT1901322	10
Connector EMM 220 male 90° on PCB, 60 LF contacts, E11	E221V60E11	na	LCT1901323	10
Harness EMM220 male to crimp AWG24, 60 LF contacts, E01 fixing hardware, 250 mm	HE221J6P60E01ZF0250	na	LCT1904265	3
Harness EMM220 male to crimp AWG26, 60 LF contacts, E01 fixing hardware, 250 mm	HE221I2P60E01ZF0250	na	LCT1904264	3
Harness EMM220 male to crimp AWG28, 60 LF contacts, E01 fixing hardware, 250 mm	HE221H6P60E01ZF0250	na	LCT1904266	3
Harness EMM220 male to crimp AWG30, 60 LF contacts, E01 fixing hardware, 250 mm	HE221D5P60E01ZF0250	na	LCT1904268	3

4.4 Persons present during the tests

Name	Duty
A.JAGHMIM	Test & Measurement Manager

4.5 Date and place of the tests

NICOMATIC France Lab. from 26/02/18 to 26/02/(1st Qualification – 30 contacts connector)
NICOMATIC France Lab. from 03/04/19 to 03/04/19 (2nd Qualification – 60 contacts connector)

4.6 Environmental conditions

Ambient temperature: See Test Set up
Pressure: ambiant
Humidity: See Test Set up

4.7 Incidents during the test

None

4.8 Test Equipments

Designation	Calibration Data	
CLIMATS EXCAL 1423-HA N N°00612	Last calibration date	02/10/17
	Next calibration date	02/10/18

Designation	Calibration Data	
OVEN CLIMATS XU112/300 N N°00584	Last calibration date	17/07/17
	Next calibration date	17/07/19

4.9 Test Tooling

Designation	Tooling reference

5 Requirements according to MIL-DTL-83513G standard

There shall be no damage detrimental to the operation of the connector after being subjected to the temperature extremes following:

Extremes	°C
Low	-65 +0, -3
High	+260 +3, -0

Unmated connectors shall be tested in accordance with test procedure EIA-364-32, condition I, 5 cycles, except that the maximum temperature shall be 125°C +3°C, -0°C. At the completion of the last cycle, the connectors shall be returned to room temperature for further examination and shall meet the requirements.

6 Test Procedure

6.1 Mounting

The specimens shall be placed in such a position with respect to the air stream that there is substantially no obstruction to the flow of air across and around each specimen. When special mounting is required, it shall be specified.

6.2 Initial measurements

Specified measurements shall be made prior to the first cycle, and they shall be made at standard ambient conditions.

6.3 Specimen mass determination

The mass of the specimen in table 2 is the total mass of the mated assembly, wire and any fixture attached to the specimen.

Table 2 - Exposure time at temperature extremes

Mass of specimen	Minimum time for steps 1 and 3, hours
28 g (1 oz) and below	½; or ¼ (when specified)
> 28 g (1 oz) to 136 g (0.3 lb) inclusive	½
> 136 g (0.3 lb) to 1.36 kg (3 lb) inclusive	1
> 1.36 kg (3 lb) to 13.6 kg (30 lb) inclusive	2
> 13.6 kg (30 lb) to 136 kg (300 lb) inclusive	4
NOTE — When step one consists of cryogenic immersion of the specimen in liquid nitrogen, as specified in table 4, exposure time shall be as specified in table 2 or the amount of time necessary to obtain thermal stability of the test specimen.	

6.4 Cycling

- Subject test specimens to the test method, test condition and test duration as specified in the referencing document.
- When a test is not specified in the referencing document, method A, test condition I, test duration A, shall be used as the default.
- The first five cycles shall be run continuously. After five cycles, the test may be interrupted after the completion of any full cycle and the specimens allowed to return to room ambient temperature before testing is resumed. One cycle consists of steps 1 through 4 of the applicable test condition.
- Specimens shall not be subjected to forced circulating air while being transferred from one chamber to another or to a dewar of liquid nitrogen.

Table 3 – Method A, air-to-air thermal shock test conditions

Step	Test condition I		Test condition II		Test condition III	
	Temperature, °C	Time, minutes	Temperature, °C	Time, minutes	Temperature, °C	Time, minutes
1	+0 -55 -3	See table 2	+0 -65 -5	See table 2	+0 -65 -5	See table 2
2	+10 25 -5	5 max	+10 25 -5	5 max	+10 25 -5	5 max
3	+3 85 -0	See table 2	+3 105 -0	See table 2	+3 125 -0	See table 2
4	+10 25 -5	5 max	+10 25 -5	5 max	+10 25 -5	5 max

Table 5 – Test durations

Test duration	Number of cycles
A	5
A-1	25
A-2	50
A-3	100
A-4	10

6.5 Final measurements

The specimens shall be returned to thermal stability at standard ambient conditions before the final measurements are made, unless otherwise specified in the referencing document.

6.6 Failures

Effects of thermal shock testing may include, (the referencing document shall specify pass/fail criteria):

- Excessive permanent dimensional changes.
- Cracking delamination of finishes.
- Cracking and crazing of embedding and encapsulating compounds.
- Opening of seals and seams.
- Leakage of potting materials.
- Excessive displacement or rupture of connector shells, inserts, contacts, wire or sealing plugs.
- Excessive hardening or softening of resilient dielectric materials.
- Fusing or seizure of mating specimen components and contacts.
- Change in electrical characteristics.
- Changes in mating and unmating characteristics.

7 Test setup



Cold Chamber -65°C



Hot Chamber : +260°C

8 Measurements results

No visual damage after tests on connectors 30 contacts and connectors 60 contacts.

For Dielectric withstanding voltage after climatic test: see QTR18017

For Insulation resistance after climatic test: see QTR18018

Connectors 30 contacts						
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
C18892-30 (Female, Straight on PCB, E60 guiding)	OK	OK	OK	OK	OK	OK
C18900-30 (Female Straight on PCB, E50)	OK	OK	OK	OK	OK	OK
C18891-30 (Male, Straight on PCB, E10)	OK	OK	OK	OK	OK	OK
C18904-30 (Male, 90° on PCB, E11 guiding)	OK	OK	OK	OK	OK	OK
C18893-30 (Female, 90° on PCB, E61 guiding)	OK	OK	OK	OK	OK	OK
C18901-30 (Female, 90° on PCB, E51 jackscrew)	OK	OK	OK	OK	OK	OK
C18981-30-0250 (Male, on cable AWG30, E01 jackscrew)	OK	OK	OK	OK	OK	OK
C18980-30-0250 (Male, on cable AWG28, E01 jackscrew)	OK	OK	OK	OK	OK	OK
C18902-30-0250 (Male, on cable AWG26, E01 jackscrew)	OK	OK	OK	OK	OK	OK
C18979-30-0250 (Male, on cable AWG24, E01 jackscrew)	OK	OK	OK	OK	OK	OK
C18902-30-0250-BP (Male, on cable AWG26, E01 jackscrew BP)	OK	OK	OK	OK	OK	OK

Connectors 60 contacts			
	Sample 1	Sample 2	Sample 3
E222Y60E60	OK	OK	OK
E221Y60E10	OK	OK	OK
E222V60E61	OK	OK	OK
E222Y60E50	OK	OK	OK
E222V60E51	OK	OK	OK
E221V60E11	OK	OK	OK
HE221J6P60E01ZF0250	OK	OK	OK
HE221I2P60E01ZF0250	OK	OK	OK
HE221H6P60E01ZF0250	OK	OK	OK
HE221D5P60E01ZF0250	OK	OK	OK

9 Visual Inspection

Required by the applicable standard ?			
YES		NO	☐



**********END OF REPORT**********

10 APPENDIX

Internal use only ?			
YES	☐	NO	☒

10.1 The Laboratory Advice

10.2 Pictures

**********END OF APPENDIX**********