NICOMATIC R&D LABORATORY	QUALIFICATION TEST REPORT	QTR18013a
EMM SERIE ACCORDING TO MIL-DTL-83513G STANDARD		Page : 1 /15
		Qualification status : PASSED

CONTACT ENGAGEMENT and SEPARATION FORCES (Initial)

According to MIL-DTL-83513G §3.5.7, 4.5.3 and EIA-364-37B test procedure

ISSUE	MODIFICATION	VISA	DATE
a	Original Issue	AJ	21/05/18
b			
c			

	Name	Duty	Date	Visa
Written by	A.JAGHMIM	Test & Measurement Manager	18/05/18	AJ
Test Operator(s)	A.JAGHMIM	Test & Measurement Manager	18/05/18	AJ
Checked by	J.RIGAT	Project Manager	18/05/18	JR
Approved by	C.CHIFFARD	R&D Manager	18/05/18	CC
Requested by	J.RIGAT	Project Manager	18/05/18	JR

CONTENTS

1 CONCLUSION 3

2 TECHNICAL FEATURES PROPOSAL 3

3 CONNATE REPORTS 3

4 INFORMATION ABOUT THE TESTS 4

4.1 OBJECT 4
4.2 REFERENCE DOCUMENTS/QUALIFICATION PLAN 4
4.3 TESTED PRODUCTS 4
4.4 PERSONS PRESENT DURING THE TESTS 5
4.5 DATE AND PLACE OF THE TESTS 5
4.6 ENVIRONMENTAL CONDITIONS 5
4.7 INCIDENTS DURING THE TEST 5
4.8 TEST EQUIPMENTS 5
4.9 TEST TOOLING 6

5 REQUIREMENTS 6

6 TEST PROCEDURE 6

7 TEST SETUP 7

8 MEASUREMENTS RESULTS 8

8.1 RESUME 8
8.2 DETAILS 9
8.2.1 Couple 1 - C18891-30 + C18892-30 9
8.2.2 Couple 2 - C18891-30 with C18893-30 10
8.2.3 Couple 3 - C18904-30 with C18893-30 11
8.2.4 Couple 4 - C18901-30 with C18979-30-0250 12
8.2.5 Couple 5 - C18900-30 with C18979-30-0250 13

9 VISUAL INSPECTION 14

10 APPENDIX 15

10.1 THE LABORATORY ADVICE 15
10.2 PICTURES 15

1 Conclusion

The EMM connectors are **qualified** regarding CONTACT ENGAGEMENT and SEPARATION FORCES (Initial) according to MIL-DTL-83513G standard.

2 Technical Features Proposal

EMM connectors:
Engagement force = 1N max
Separation force = 0.15N min

3 Connate Reports

4 Information about the tests

4.1 Object

Measure the engagement and separation forces of EMM Connectors contact using standard maximum and minimum diameter pins and rings gauges.

4.2 Reference documents/Qualification Plan

- MDC.P16020.a
- MIL-DTL-83513G
- EIA-364-37B

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

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 12/03/18 to 13/03/18

4.6 Environmental conditions

Ambient temperature: 22.1°C
Pressure: 953 mbar
Humidity: 27 % HR

4.7 Incidents during the test

None

4.8 Test Equipments

Designation	Calibration Data	
Dynamometer CENTOR EASY 50 N LB01	**Last calibration date**	02/02/18
	Next calibration date	02/02/19

Designation	Calibration Data	
Contact engagement pin N°01627	**Last calibration date**	09/03/18
	Next calibration date	09/03/21

Designation	Calibration Data	
Contact engagement pin N°01625	**Last calibration date**	09/03/18
	Next calibration date	09/03/21

4.9 Test Tooling

Designation	Tooling reference
Manual test bench	

5 Requirements

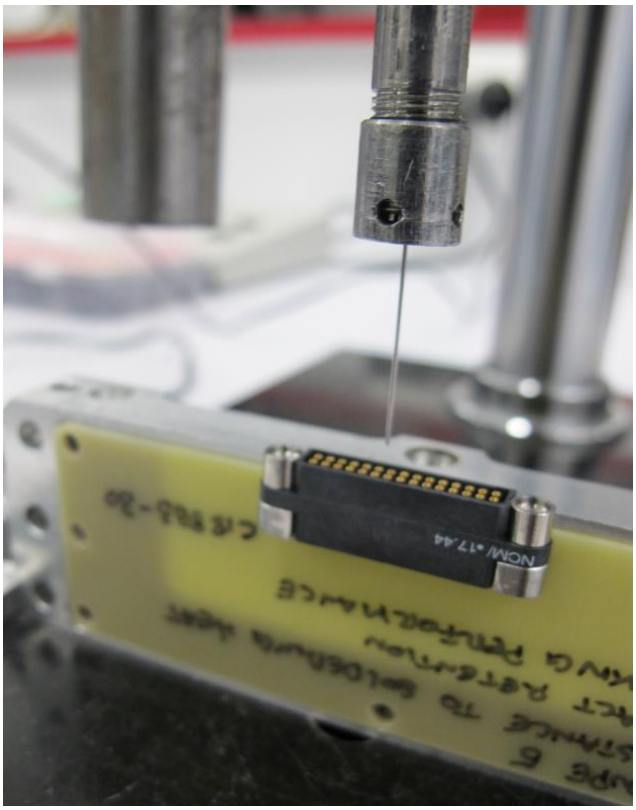
Engagement force: 1.7N Max per contact
Separation force: 0.1 N Min per contact

6 Test Procedure

- Cleaned the pins gauge before the measurements
- Aligned each contacts with the pins gauges.
- Conditioned the spring member (2 times) by the insertion and withdrawing.
- Engaged the maximal pins gauge to the specified depth and measured the engagement force required.
- Engaged the minimal pins gauge and measured the force required to withdraw.

7 Test setup





8 Measurements results

8.1 Resume

CONTACT ENGAGEMENT	
MIN	0.40
MAX	0.68
AVERAGE	0.49

SEPARATION FORCE	
MIN	0.15
MAX	0.23
AVERAGE	0.19

8.2 Details

8.2.1 Couple 1 - C18891-30 + C18892-30

Sample 1		Sample 2		Sample 3	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.54	1	0.45	1	0.43
2	0.56	2	0.49	2	0.52
3	0.68	3	0.47	3	0.46
4	0.57	4	0.41	4	0.49
5	0.57	5	0.40	5	0.44
6	0.49	6	0.48	6	0.41
7	0.54	7	0.47	7	0.44
MIN	0.49	MIN	0.40	MIN	0.41
MAX	0.68	MAX	0.49	MAX	0.52
AVERAGE	0.56	AVERAGE	0.45	AVERAGE	0.46
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.20	1	0.16	1	0.17
2	0.15	2	0.16	2	0.19
3	0.21	3	0.15	3	0.21
4	0.17	4	0.21	4	0.23
5	0.18	5	0.18	5	0.19
6	0.22	6	0.16	6	0.15
7	0.20	7	0.22	7	0.23
MIN	0.15	MIN	0.15	MIN	0.15
MAX	0.22	MAX	0.22	MAX	0.23
AVERAGE	0.19	AVERAGE	0.18	AVERAGE	0.20

Sample 4		Sample 5		Sample 6	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.48	1	0.45	1	0.42
2	0.49	2	0.42	2	0.53
3	0.50	3	0.56	3	0.43
4	0.48	4	0.44	4	0.45
5	0.43	5	0.44	5	0.50
6	0.48	6	0.49	6	0.47
7	0.42	7	0.42	7	0.42
MIN	0.42	MIN	0.42	MIN	0.42
MAX	0.50	MAX	0.56	MAX	0.53
AVERAGE	0.47	AVERAGE	0.46	AVERAGE	0.46
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.19	1	0.18	1	0.19
2	0.17	2	0.23	2	0.16
3	0.15	3	0.15	3	0.15
4	0.22	4	0.20	4	0.20
5	0.23	5	0.21	5	0.18
6	0.19	6	0.16	6	0.21
7	0.22	7	0.20	7	0.15
MIN	0.15	MIN	0.15	MIN	0.15
MAX	0.23	MAX	0.23	MAX	0.21
AVERAGE	0.20	AVERAGE	0.19	AVERAGE	0.18

8.2.2 Couple 2 - C18891-30 with C18893-30

Sample 1		Sample 2		Sample 3	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.49	1	0.56	1	0.49
2	0.49	2	0.46	2	0.41
3	0.52	3	0.40	3	0.51
4	0.49	4	0.51	4	0.56
5	0.50	5	0.47	5	0.53
6	0.47	6	0.52	6	0.51
7	0.50	7	0.40	7	0.48
MIN	0.47	MIN	0.40	MIN	0.41
MAX	0.52	MAX	0.56	MAX	0.56
AVERAGE	0.49	AVERAGE	0.47	AVERAGE	0.50
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.17	1	0.19	1	0.23
2	0.15	2	0.19	2	0.18
3	0.18	3	0.22	3	0.23
4	0.16	4	0.20	4	0.22
5	0.21	5	0.19	5	0.16
6	0.23	6	0.17	6	0.23
7	0.15	7	0.22	7	0.16
MIN	0.15	MIN	0.17	MIN	0.16
MAX	0.23	MAX	0.22	MAX	0.23
AVERAGE	0.18	AVERAGE	0.20	AVERAGE	0.20

Sample 4		Sample 5		Sample 6	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.57	1	0.59	1	0.43
2	0.40	2	0.54	2	0.48
3	0.45	3	0.40	3	0.58
4	0.46	4	0.43	4	0.41
5	0.54	5	0.55	5	0.41
6	0.42	6	0.59	6	0.52
7	0.54	7	0.47	7	0.49
MIN	0.40	MIN	0.40	MIN	0.41
MAX	0.57	MAX	0.59	MAX	0.58
AVERAGE	0.48	AVERAGE	0.51	AVERAGE	0.47
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.23	1	0.18	1	0.19
2	0.16	2	0.16	2	0.18
3	0.18	3	0.21	3	0.23
4	0.17	4	0.15	4	0.15
5	0.16	5	0.17	5	0.23
6	0.22	6	0.21	6	0.20
7	0.23	7	0.20	7	0.22
MIN	0.16	MIN	0.15	MIN	0.15
MAX	0.23	MAX	0.21	MAX	0.23
AVERAGE	0.19	AVERAGE	0.18	AVERAGE	0.20

8.2.3 Couple 3 - C18904-30 with C18893-30

Sample 1		Sample 2		Sample 3	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.41	1	0.40	1	0.55
2	0.46	2	0.56	2	0.58
3	0.40	3	0.45	3	0.49
4	0.45	4	0.58	4	0.54
5	0.47	5	0.50	5	0.58
6	0.43	6	0.43	6	0.46
7	0.55	7	0.51	7	0.53
MIN	0.40	MIN	0.40	MIN	0.46
MAX	0.55	MAX	0.58	MAX	0.58
AVERAGE	0.45	AVERAGE	0.49	AVERAGE	0.53
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.21	1	0.18	1	0.23
2	0.23	2	0.21	2	0.16
3	0.22	3	0.18	3	0.19
4	0.20	4	0.23	4	0.18
5	0.17	5	0.16	5	0.16
6	0.20	6	0.21	6	0.23
7	0.21	7	0.20	7	0.15
MIN	0.17	MIN	0.16	MIN	0.15
MAX	0.23	MAX	0.23	MAX	0.23
AVERAGE	0.21	AVERAGE	0.20	AVERAGE	0.19

Sample 4		Sample 5		Sample 6	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.57	1	0.41	1	0.53
2	0.49	2	0.50	2	0.56
3	0.40	3	0.48	3	0.40
4	0.47	4	0.50	4	0.56
5	0.55	5	0.44	5	0.47
6	0.42	6	0.40	6	0.59
7	0.56	7	0.48	7	0.58
MIN	0.40	MIN	0.40	MIN	0.40
MAX	0.57	MAX	0.50	MAX	0.59
AVERAGE	0.49	AVERAGE	0.46	AVERAGE	0.53
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.19	1	0.22	1	0.19
2	0.21	2	0.22	2	0.23
3	0.22	3	0.17	3	0.18
4	0.22	4	0.22	4	0.21
5	0.19	5	0.20	5	0.17
6	0.21	6	0.23	6	0.17
7	0.18	7	0.15	7	0.19
MIN	0.18	MIN	0.15	MIN	0.17
MAX	0.22	MAX	0.23	MAX	0.23
AVERAGE	0.20	AVERAGE	0.20	AVERAGE	0.19

8.2.4 Couple 4 - C18901-30 with C18979-30-0250

Sample 1		Sample 2		Sample 3	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.44	1	0.58	1	0.51
2	0.40	2	0.52	2	0.59
3	0.49	3	0.57	3	0.52
4	0.48	4	0.54	4	0.59
5	0.44	5	0.43	5	0.42
6	0.52	6	0.51	6	0.53
7	0.40	7	0.56	7	0.55
MIN	0.40	MIN	0.43	MIN	0.42
MAX	0.52	MAX	0.58	MAX	0.59
AVERAGE	0.45	AVERAGE	0.53	AVERAGE	0.53
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.23	1	0.23	1	0.19
2	0.23	2	0.19	2	0.16
3	0.21	3	0.17	3	0.21
4	0.17	4	0.19	4	0.19
5	0.20	5	0.17	5	0.15
6	0.19	6	0.17	6	0.21
7	0.18	7	0.22	7	0.23
MIN	0.17	MIN	0.17	MIN	0.15
MAX	0.23	MAX	0.23	MAX	0.23
AVERAGE	0.20	AVERAGE	0.19	AVERAGE	0.19

Sample 4		Sample 5		Sample 6	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.56	1	0.54	1	0.48
2	0.46	2	0.55	2	0.58
3	0.50	3	0.50	3	0.55
4	0.48	4	0.47	4	0.41
5	0.49	5	0.52	5	0.45
6	0.55	6	0.47	6	0.41
7	0.41	7	0.48	7	0.40
MIN	0.41	MIN	0.47	MIN	0.40
MAX	0.56	MAX	0.55	MAX	0.58
AVERAGE	0.49	AVERAGE	0.50	AVERAGE	0.47
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.22	1	0.17	1	0.18
2	0.20	2	0.18	2	0.21
3	0.20	3	0.18	3	0.18
4	0.19	4	0.19	4	0.16
5	0.22	5	0.19	5	0.15
6	0.23	6	0.22	6	0.20
7	0.23	7	0.22	7	0.19
MIN	0.19	MIN	0.17	MIN	0.15
MAX	0.23	MAX	0.22	MAX	0.21
AVERAGE	0.21	AVERAGE	0.19	AVERAGE	0.18

8.2.5 Couple 5 - C18900-30 with C18979-30-0250

Sample 1		Sample 2		Sample 3	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.53	1	0.50	1	0.42
2	0.51	2	0.59	2	0.43
3	0.47	3	0.58	3	0.40
4	0.48	4	0.51	4	0.52
5	0.44	5	0.58	5	0.47
6	0.42	6	0.42	6	0.44
7	0.49	7	0.55	7	0.46
MIN	0.42	MIN	0.42	MIN	0.40
MAX	0.53	MAX	0.59	MAX	0.52
AVERAGE	0.48	AVERAGE	0.53	AVERAGE	0.45
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.18	1	0.19	1	0.19
2	0.15	2	0.20	2	0.18
3	0.22	3	0.19	3	0.17
4	0.19	4	0.17	4	0.15
5	0.16	5	0.16	5	0.21
6	0.23	6	0.23	6	0.16
7	0.16	7	0.15	7	0.16
MIN	0.15	MIN	0.15	MIN	0.15
MAX	0.23	MAX	0.23	MAX	0.21
AVERAGE	0.18	AVERAGE	0.18	AVERAGE	0.17

Sample 4		Sample 5		Sample 6	
Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)	Pin Ø 0.419	CONTACT ENGAGEMENT 30-3420 (N)
1	0.57	1	0.53	1	0.40
2	0.59	2	0.54	2	0.42
3	0.47	3	0.54	3	0.44
4	0.51	4	0.40	4	0.57
5	0.44	5	0.54	5	0.51
6	0.45	6	0.59	6	0.42
7	0.57	7	0.50	7	0.59
MIN	0.44	MIN	0.40	MIN	0.40
MAX	0.59	MAX	0.59	MAX	0.59
AVERAGE	0.51	AVERAGE	0.52	AVERAGE	0.48
Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)	Pin Ø 0.381	SEPARATION FORCE 30-3420 (N)
1	0.22	1	0.20	1	0.20
2	0.20	2	0.15	2	0.21
3	0.22	3	0.18	3	0.21
4	0.18	4	0.23	4	0.20
5	0.21	5	0.20	5	0.16
6	0.23	6	0.19	6	0.21
7	0.22	7	0.20	7	0.22
MIN	0.18	MIN	0.15	MIN	0.16
MAX	0.23	MAX	0.23	MAX	0.22
AVERAGE	0.21	AVERAGE	0.19	AVERAGE	0.20

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**********