Pages 1 to 20

FAST-LOCKING SCREW LOCK ASSEMBLIES FOR RECTANGULAR CONNECTORS 3401/001, 3401/002 AND CONNECTOR SAVERS 3401/020, 3401/080

ESCC Detail Specification No. 3401/085

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DCR No.	CHANGE DESCRIPTION

TABLE OF CONTENTS

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Fast-Locking Screw Lock Assemblies for Rectangular Connectors (D*M and D*MA) and Connector Savers (D*BM and D*BMA). It shall be read in conjunction with ESCC Generic Specification No. 3401, the requirements of which are supplemented herein and ESCC Detail Specifications Nos. 3401/001, 3401/002, 3401/020 and 3401/080.

1.2 COMPONENT TYPE VARIANTS

The type variants of accessories covered by this specification are given in Table 1(a).

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the accessories specified herein, are given in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the accessories specified herein are shown in Figure 2.

2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
(b) ESCC Detail Specification No. 3401/001, Connectors, Electrical, Rectangular, Miniature, Non-removable Solder Bucket, PCB and Wire-Wrap Contacts and Removable Coaxial and Power Contacts, based on Type D*M.
(c) ESCC Detail Specification No. 3401/002, Connectors, Electrical, Rectangular, Removable Crimp Contacts, based on type D*MA.
(d) ESCC Detail Specification No. 3401/020, Connector Savers, Electrical, Rectangular, Miniature, Removable Contacts, based on type D*BMA.
(e) ESCC Detail Specification No. 3401/022, Accessories for Rectangular Connectors 3401/001, 3401/002 and Connector Savers 3401/020, 3401/080
(f) ESCC Detail Specification No. 3401/080, Connector Savers, Electrical, Rectangular, Miniature, Non-removable Signal Contacts and Removable Coaxial and Power Contacts, based on type D*BM.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

TABLE 1(a) - TYPE VARIANTS

VARIANT	DESCRIPTION		WEIGHT MAX. (g)
01	Fast-Locking Screw Lock Assembly Brass (Male)	Without Back Shell	1
02	Fast-Locking Screw Lock Assembly Brass (Male)	With Back Shell	1
03	Fast-Locking Screw Lock Assembly Brass (Female)	-	1.5
04	Fast-Locking Screw Lock Assembly Brass for Savers	-	1.2
05	Fast-Locking Screw Lock Assembly Brass for Hybrid Savers	-	1.2

TABLE 1(b) - MAXIMUM RATINGS

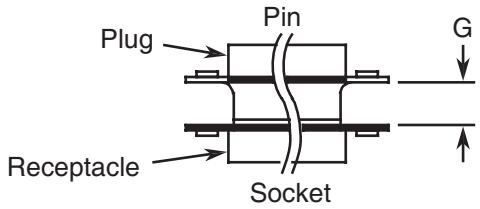
No.	Characteristic	Symbol	Maximum Ratings	Unit	Remarks
1	Operating Temperature Range	T_{op}	-55 to +125	˚C	T_{amb}
2	Storage Temperature Range	T_{stg}	-55 to +125	˚C	
3	Locking Force	F_{LO}	15	N	For Male
4	Unlocking Force	F_{UN}	12	N	For Female
5	Torque Value for Nuts and Bushing	T_{qe}	See Figure 2	cm.daN	For Female and Hybrid Savers

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2 - FAST-LOCKING SCREW LOCK ASSEMBLIES (All dimensions in millimetres)
MATED SPACING BETWEEN SHELL FRONT SURFACES

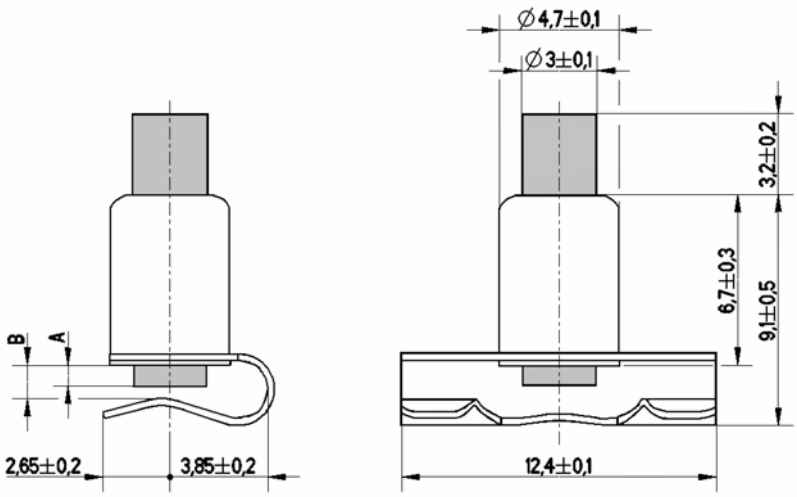


DIMENSION	MIN.	MAX.	NOTES
G	6.35 6.12	7.11 6.88	1 2

NOTES:

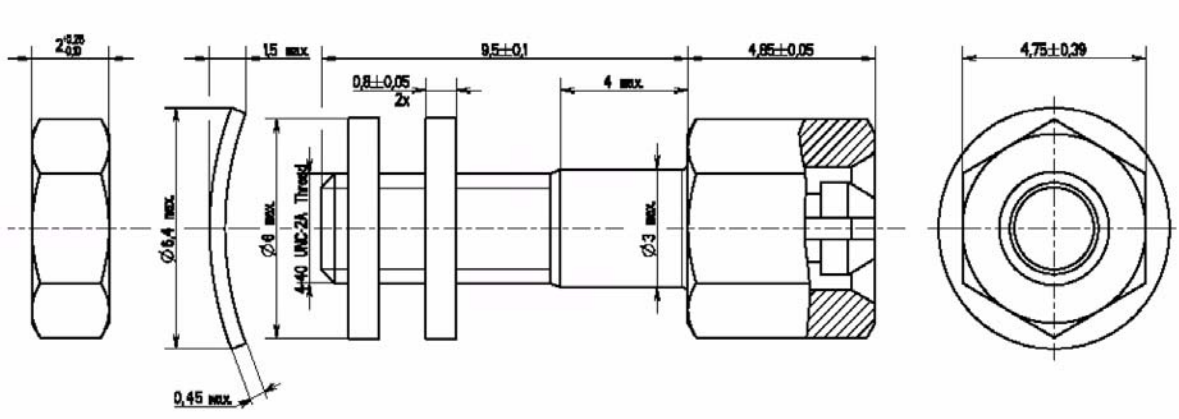
1. For shell sizes E and A.
2. For shell sizes B, C, D and F.

MALE (VARIANTS 01 and 02)



Variants	A		B	
	MIN	MAX	MIN	MAX
01	0.6	1	1.1	1.5
02	1	1.4	1.5	1.9

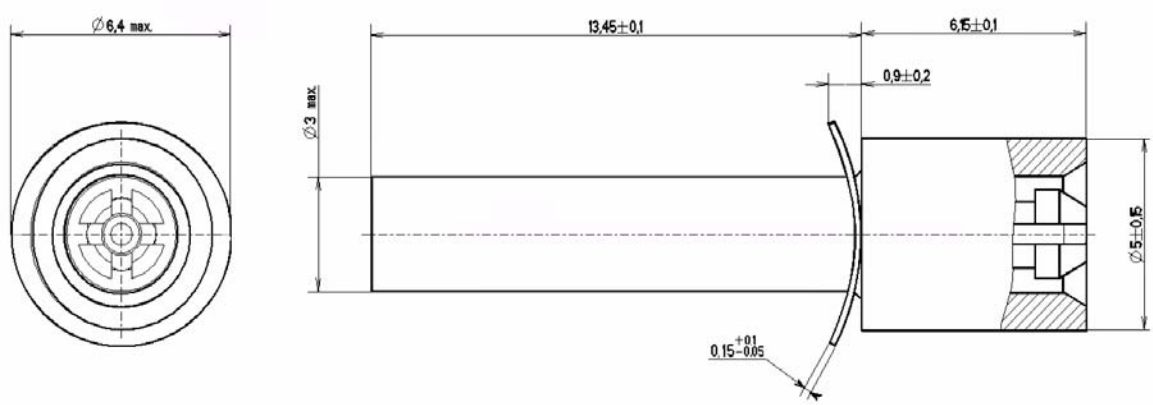
FEMALE (VARIANT 03)



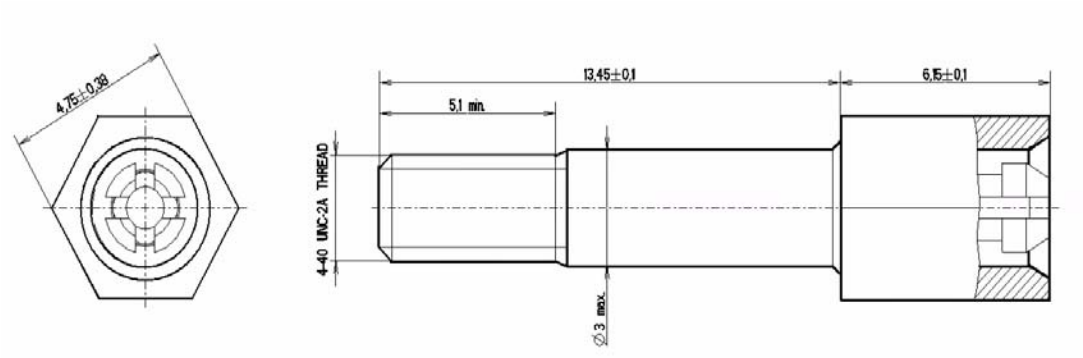
3. The spacing between the reference planes of two mated connectors shall be adjusted by the use of three washers maximum so the spacing is equal to dimension G.

No.	Characteristics	Symbol	Min. Limit	Max. Limit	Unit
1	Torque Value for Nuts	Tqe	5.5	6	cm.daN

SAVERS (VARIANT 04)



HYBRID SAVERS (VARIANT 05)



No.	Characteristics	Symbol	Min. Limit	Max. Limit	Unit
1	Torque Value for Bushing	Tqe	3.3	3.8	cm.daN

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the accessories specified herein are stated in this specification and ESCC Generic Specification No. 3401. Deviations from the Generic Specification, applicable to this specification only, are listed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Special In-Process Controls

None.

4.2.2 Deviations from Final Production Tests (Chart II)

Only the following tests shall be performed:

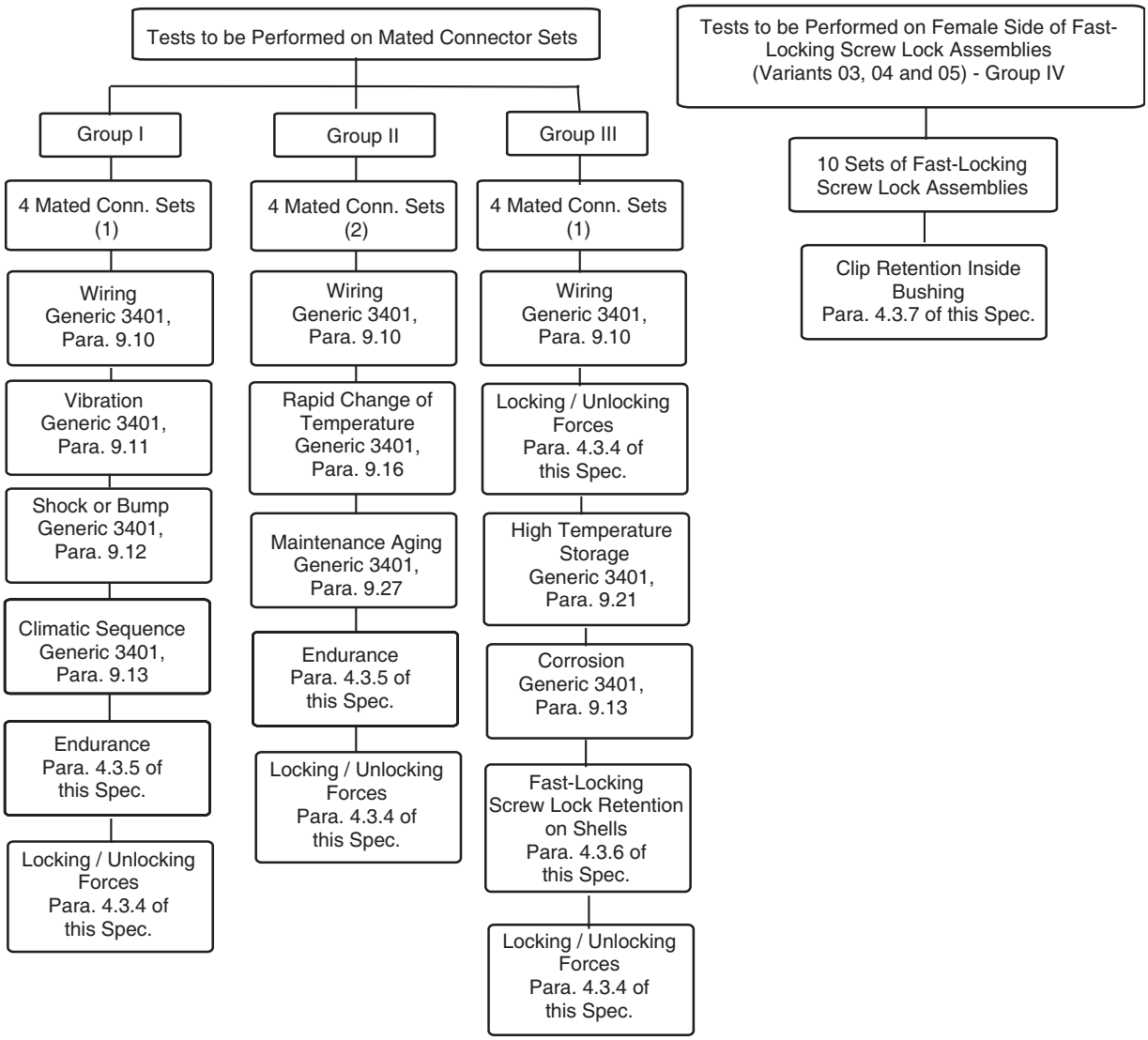
(a) Para. 9.2, Mating Verification.
(b) Para. 9.5, Magnetism Level.
(c) Para. 9.6, Dimension Check.
(d) Para. 9.7, External Visual Inspection. The magnification shall be X3.
(e) Para. 4.3.4 of this Specification, Locking/Unlocking Forces.
(f) Para. 4.6.1 of this Specification, Mated Lock Conductivity (Variants 03,04 and 05).

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

Not applicable.

4.2.4 Deviations from Qualification Tests (Chart IV)

Qualification testing shall be performed in accordance with the following Chart. No failures allowed.

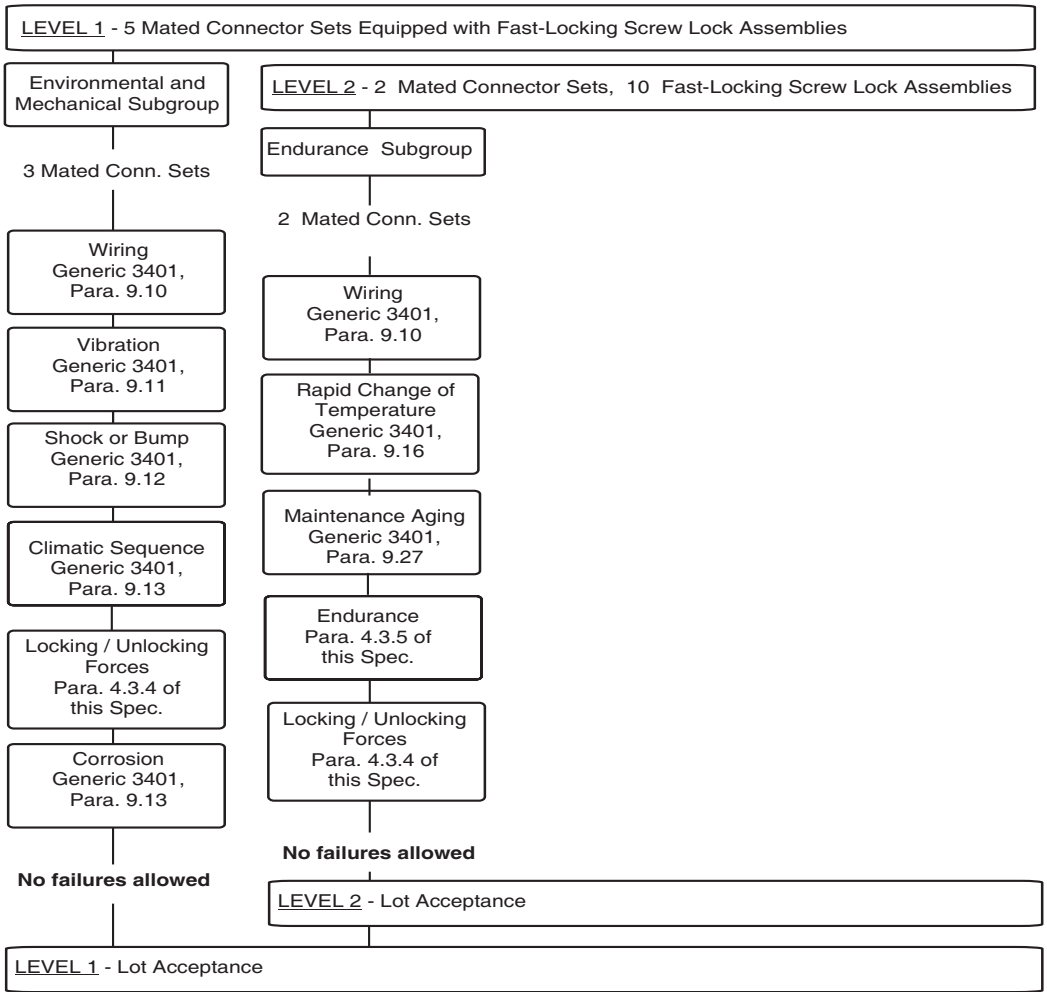


NOTES:

1. Equipped with Fast-Locking Screw Lock Assemblies but without contact 340100501B in male side.
2. Equipped with Fast-Locking Screw Lock Assemblies and contact 340100501B in male side.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

Lot Acceptance Levels 1 and 2 Tests shall be performed in accordance with the following Chart.



4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the accessories specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification No. 3401 and shall conform to those shown in Figure 2 of this specification.

4.3.2 Weight

The maximum weight of the accessories specified herein shall be as shown in Table 1(a) of this specification.

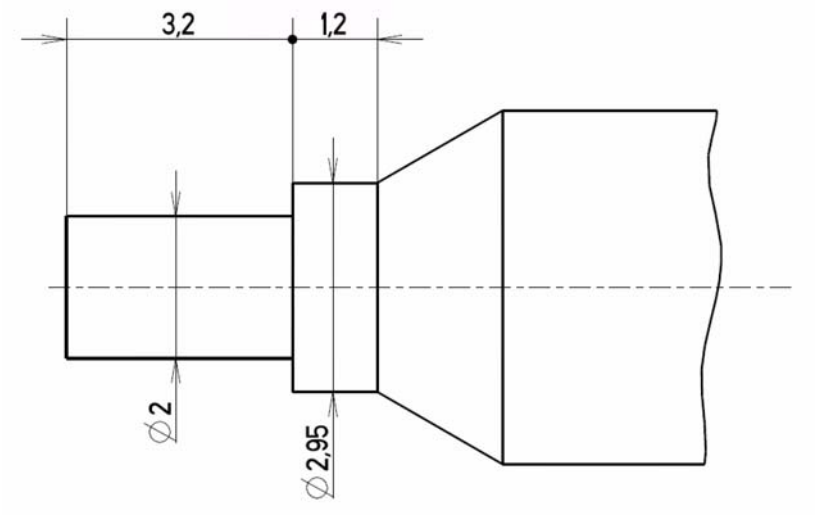
4.3.3 Torque Value

The torque value to be used for tightening the screws of the accessories specified herein shall be as mentioned in Table 1(b) of this specification.

4.3.4 Locking / Unlocking Forces

The screw locks to be tested shall be put on appropriate equipment that reproduces the opposite side and ensures a mated spacing between shell front surfaces as defined in ESCC 3401/022 Figure 2. The

locking operation is performed with the applicable test tool defined as follows:

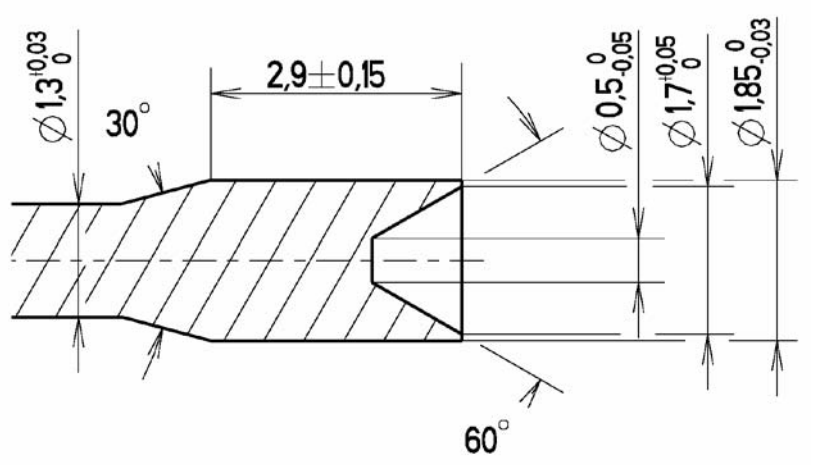


The locking speed shall be 5mm/s maximum.

The locking force is defined as the maximum force registered during the travel.

The locking force shall be measured and shall meet the requirements of Table 1(b) of this specification.

The unlocking operation is performed with the applicable test tool defined as follows:



The unlocking speed shall be 5mm/s maximum.

The unlocking force is defined as the maximum force registered during the test.

The unlocking force shall be measured and shall meet the requirements of Table 1(b) of this specification.

4.3.5 Endurance

(a) Procedure

The screw locks to be tested shall be put on appropriate equipment that reproduces the opposite

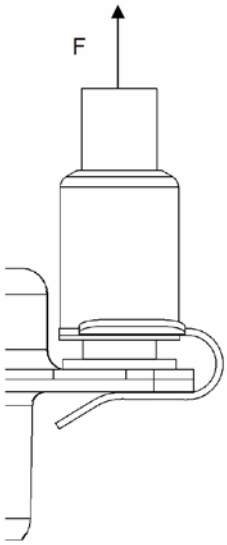
side and ensures a mated spacing between shell front surfaces as defined in ESCC 3401/022 Figure 2. The screw locks shall be subjected to 50 cycles (for both Qualification (Chart IV) and Lot Acceptance (Chart V) testing) with the tools defined in Paragraph 4.3.4.
A cycle is defined as one locking and one unlocking.
The male and female screw locks shall be completely separated during each cycle.
The locking speed shall be 5mm/s maximum.
The cycling rate shall be 8 cycles/minute maximum.

(b) Final Inspection
the components shall be visually examined and shall show no evidence of physical damage.

4.3.6 Fast-Locking Screw Lock Retention on Shells

This test is only applicable to male Variants.

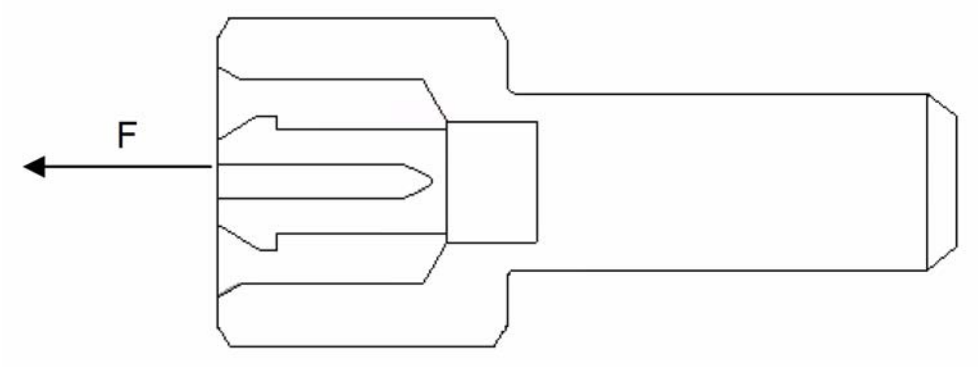
The male screw lock is mounted on a connector defined in ESCC 3401/001 Figure 2. The male screw lock shall withstand an axial force of 20N without being dislodged from the shells.



4.3.7 Clip Retention Inside Bushing

This test is only applicable to female Variants.

The clip inside the female screw lock shall withstand an axial force of 20N without being dislodged from the bushing.



4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the components specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 Fast-Locking Screw Lock Assemblies

The body shall be made of brass with gold (0.7µm minimum) over copper (1µm minimum) plating.

The button shall be made of passivated stainless steel. The spring washer (as required) shall be made of beryllium copper with gold (0.7µm minimum) over copper (1µm minimum) plating. The spring and retaining clip (as required) shall be made of beryllium copper.

4.4.2 Magnetism Level

The allowable value of magnetism shall not exceed that specified for the relevant level (see Para. 4.5.3.1).

4.5 MARKING

4.5.1 General

The marking of components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and the following paragraphs. When the component is too small to accommodate all of the marking as specified, as much as space permits shall be marked and the marking information, in full, shall accompany the component in its primary package.

The information to be marked and the order of precedence, shall be as follows:

(a) The ESCC Component Number.
(b) Characteristics.
(c) Traceability Information.

4.5.2 The ESCC Component Number

Each component shall bear the ESCC Component Number which shall be constituted and marked as

follows:

340108501B

- Detail Specification Number: 3401085
- Type Variant (See Table 1(a)): 01
- Testing Level: B

4.5.3 Characteristics

The characteristics to be marked in the following order of precedence are:

(a) Magnetism Level.

4.5.3.1 Magnetism Level

The following codes shall be used for magnetism level:

CODE	DEFINITION		
NMA	Magnetism Level:	≤	2000 gamma
NMB	Magnetism Level:	≤	200 gamma
NMC	Magnetism Level:	≤	20 gamma
NMD	Magnetism Level:	≤	2 gamma

4.5.4 Traceability Information

Traceability information shall be marked in accordance with ESCC Basic Specification No. 21700.

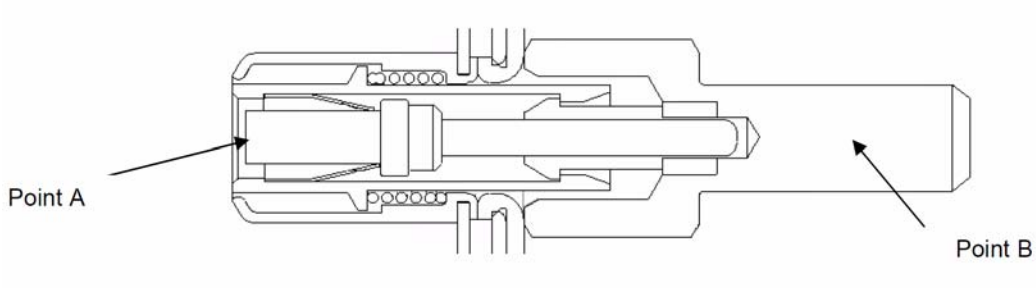
4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured in respect of electrical characteristics are scheduled below. Unless otherwise specified, these measurements shall be performed at T_{amb}=+22±3 ^{o}C.

4.6.1.1 Mated Lock Conductivity

A test current of 1±0.1A (DC or AC rms) at a maximum voltage of 1.5V (DC or AC rms) shall be used. The resistance of the mated assembled screw locks shall be measured between points A and B defined below and shall meet the requirement of Table 6 of this specification.



The point of measurement on the male side is on the rear of a D*MA contact 3401/005 variant 01 installed in the locking system.

The point of measurement on the female side is on the body of the bushing.

Probes with spherical ends of 0.13mm minimum radius shall be used to make measurements.

4.6.2 Electrical Measurements at High and Low Temperatures

Not applicable.

4.6.3 Circuit for Electrical Measurements

Not applicable.

4.7 BURN-IN AND ELECTRICAL MEASUREMENTS

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental testing are scheduled in Table 6. Unless otherwise specified, these measurements shall be performed at T_{amb} = +22 ±3°C.

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests

Not applicable.

4.8.3 Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance tests shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at T_{amb} = +22 ±3°C.

4.8.4 Conditions for Operating Life Test (Part of Endurance Testing)

Not applicable.

4.8.5 Electrical Circuits for Operating Life Test

Not applicable.

4.8.6 Conditions for High Temperature Storage Test (Part of Endurance Testing)

The requirements for the high temperature storage test are specified in Section 9 of ESCC Generic Specification No. 3401. The conditions for high temperature storage testing shall be the maximum storage temperature specified in Table 1(b) of this specification.

TABLES 2, 3, 4 AND 5

Not applicable.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTING

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests Note 1	Test Method and Conditions	Identification	Conditions		Min	Max	
01	Vibration	Para. 9.11	**Initial Measurements** Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Final Measurements Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Locking / Unlocking Forces Drift		Δ	-25	+25	%
			Micro Cutting		-	-	100	ms
			Visual Examination		-	-	-	-
02	Shock or Bump	Para. 9.12	**Initial Measurements** Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Final Measurements Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Micro Cutting Full engagement		-	-	100	ms
			Visual Examination		-	-	-	-
03	Climatic Sequence	Para. 9.13	**Dry Heat** Insulation Resistance	Not applicable				
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Damp Heat Insulation Resistance	**Immediately after test** not applicable				

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests Note 1	Test Method and Conditions	Identification	Conditions		Min	Max	
				After 1-24 hrs Recovery				
			External Visual Inspection	ESCC 3401 Para. 9.7	-	-	-	-
			Insulation Resistance	not applicable				
			Voltage Proof	not applicable				
			Leakage Current					
04	Plating Thickness	Para. 9.14	Thickness		-	Para. 4.4.1 of this Spec.		µm
05	Rapid Change of Temperature	Para. 9.16	**Initial Measurements**					
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Final Measurements					
			Visual Examination		-	-	-	-
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Insulation Resistance	not applicable				
			Voltage Proof	not applicable				
			Leakage Current					
			Visual Examination		-	-	-	-
06	Endurance	Para. 4.3.5 of this Spec.	**Initial Measurements**					
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Low Level Contact Resistance	not applicable				
			Mated Lock Conductivity	Para. 4.6.1 of this Specification	R_C	-	100	mΩ
			Final Measurements					
			Visual Examination		-	-	-	-
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests Note 1	Test Method and Conditions	Identification	Conditions		Min	Max	
			Low Level Contact Resistance Drift	not applicable				
			Mated Lock Conductivity	Para. 4.6.1 of this Specification	R_C	-	100	mΩ
			Insulation Resistance	not applicable				
			Voltage Proof	not applicable				
07	High Temperature Storage	Para. 9.21	**Initial Measurements**					
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Low Level Contact Resistance	not applicable				
			Mated Lock Conductivity	Para. 4.6.1 of this Specification	R_C	-	100	mΩ
			Final Measurements					
			Visual Examination		-	-	-	-
			Locking / Unlocking Forces	Para. 4.3.4 of this Specification	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Low Level Contact Resistance Drift	not applicable				
			Mated Lock Conductivity	Para. 4.6.1 of this Specification	R_C	-	100	mΩ
			Insulation Resistance	not applicable				
			Voltage Proof	not applicable				
08	Corrosion	Para. 9.22	Visual Examination		-	-	-	-
09	Locking / Unlocking Forces	Para. 4.3.4 of this spec.	Force		F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
10	Maintenance Aging	Para. 9.27	Visual Examination		-	-	-	-
			Contact Retention	Para. 4.3.4 of ESCC 3401/005	-	ESCC 3401 Para. 9.17		N
			Contact Insertion and Withdrawal Forces	Para. 4.3.8 of ESCC 3401/005	-	Para. 4.3.8 of ESCC 3401/005		N

NOTES:

1. The tests in this table refer to either Chart IV or V and shall be used as applicable.