



**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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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 AND RANGE OF COMPONENTS

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	Male Fast-Locking Screw Lock Assembly, For Connectors without Back Shell, Brass	1
02	Male Fast-Locking Screw Lock Assembly, For Connectors with Back Shell, Brass	1
03	Female Fast-Locking Screw Lock Assembly, Brass	1.5
04	Fast-Locking Screw Lock Assembly, For Saver Connectors, Brass	1.2
05	Fast-Locking Screw Lock Assembly, For Hybrid Saver Connectors, Brass	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 and Male Saver side
4	Unlocking Force	F_{UN}	30	N	For Female and Female Saver side
5	Torque Value for Nuts and Bushing	T_{qe}	See Figure 2	cm.daN	For Female and Hybrid Savers

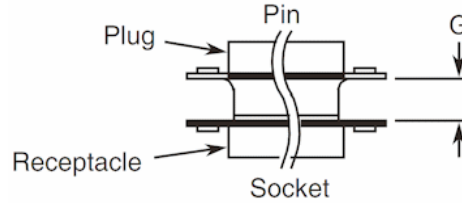
FIGURE 1 – PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 – PHYSICAL DIMENSIONS

MATED SPACING BETWEEN SHELL FRONT SURFACES

(All dimensions in millimetres)



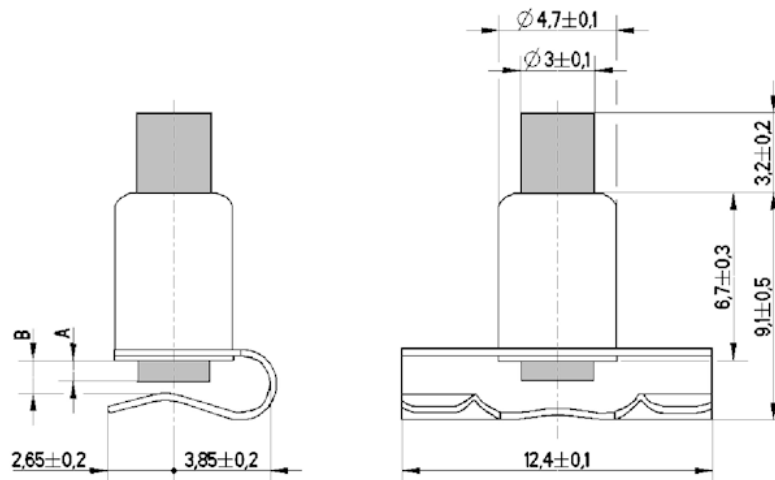
DIMENSION	MIN	MAX	NOTES
G	6.35	7.11	1, 3
	6.12	6.88	2, 3

NOTES:

1. For shell sizes E and A.
2. For shell sizes B, C, D and F.
3. The spacing between the reference planes of two mated connectors shall be adjusted by the use of three washers maximum (see Variant 03 dimensions) so the spacing is equal to dimension G.

MALE FAST-LOCKING SCREW LOCK ASSEMBLIES (VARIANTS 01 AND 02)

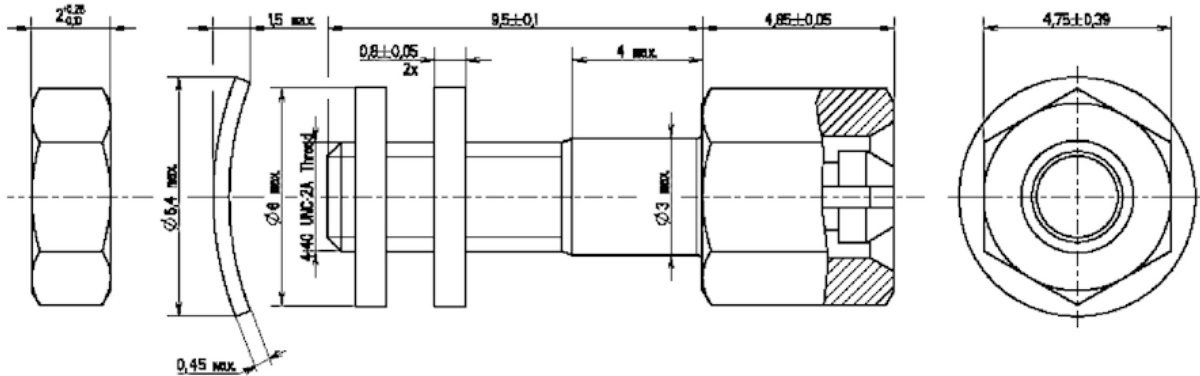
(All dimensions in millimetres)



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

FEMALE FAST-LOCKING SCREW LOCK ASSEMBLY (VARIANT 03)

(All dimensions in millimetres)



No.	Characteristics	Symbol	Min. Limit	Max. Limit	Unit
1	Torque Value for Nuts	Tqe	4.4	4.9	cm.daN

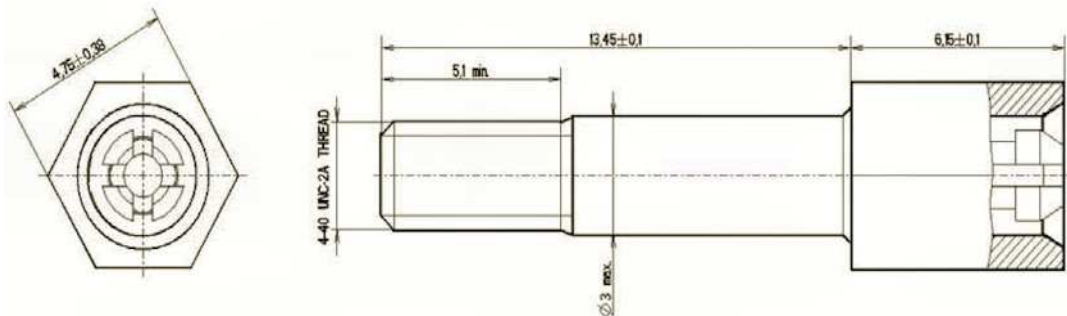
FAST-LOCKING SCREW LOCK ASSEMBLY FOR SAVER CONNECTORS (VARIANT 04)

(All dimensions in millimetres)



FAST-LOCKING SCREW LOCK ASSEMBLY FOR HYBRID SAVER CONNECTORS (VARIANT 05)

(All dimensions in millimetres)



No.	Characteristics	Symbol	Min. Limit	Max. Limit	Unit
1	Torque Value for Bushing	Tqe	4.4	4.9	cm.daN

4 REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the accessories specified herein shall be as 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 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:

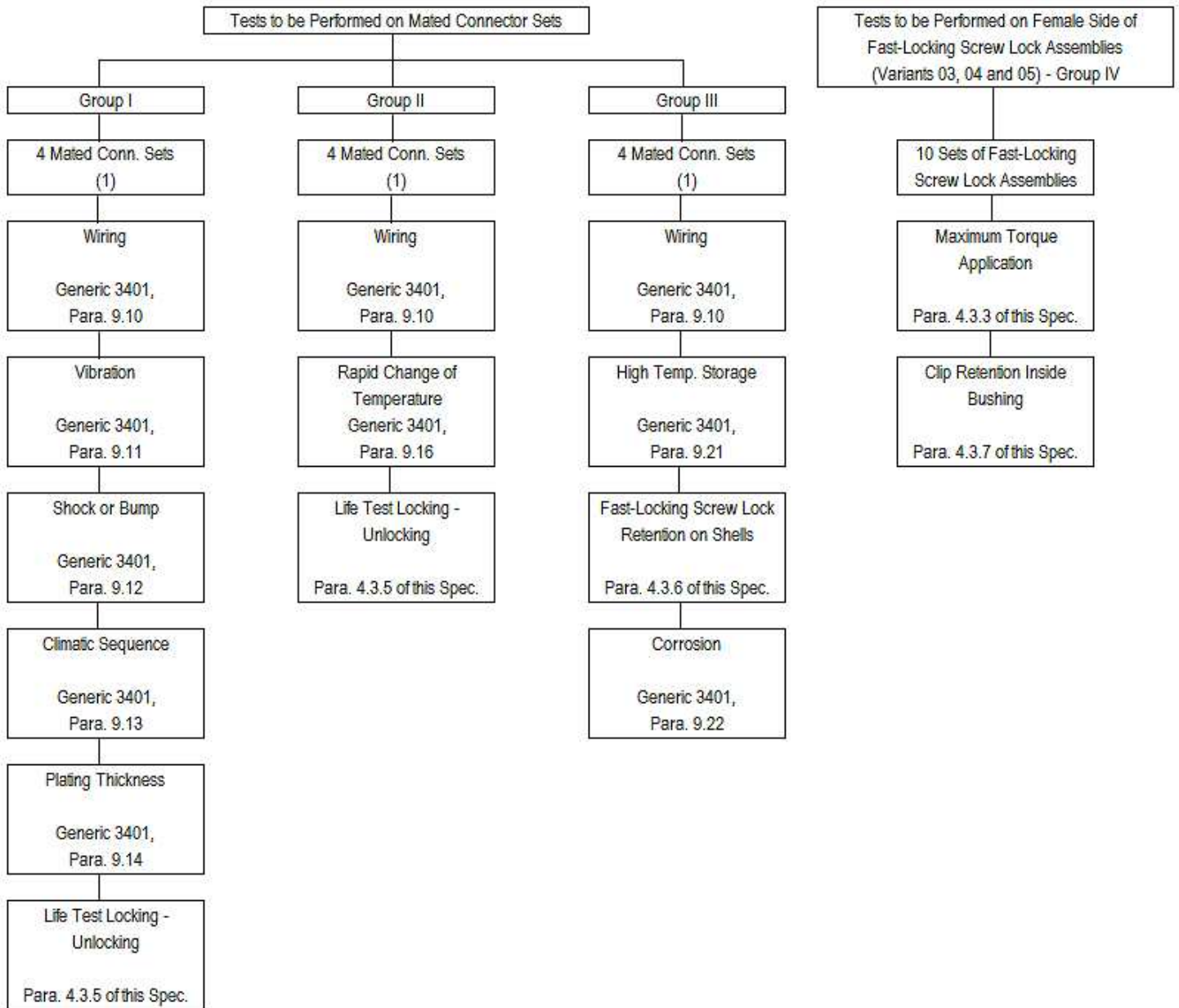
- (a) Para. 9.2, Mating Verification.
- (b) Para. 9.5, Magnetism Level.
- (c) Para. 9.6, Dimension Check.
- (d) Para. 9.7, External Visual Inspection. The magnification shall be $\times 3$.
- (e) Para. 4.3.4 of this Specification, Locking/Unlocking Forces.

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.

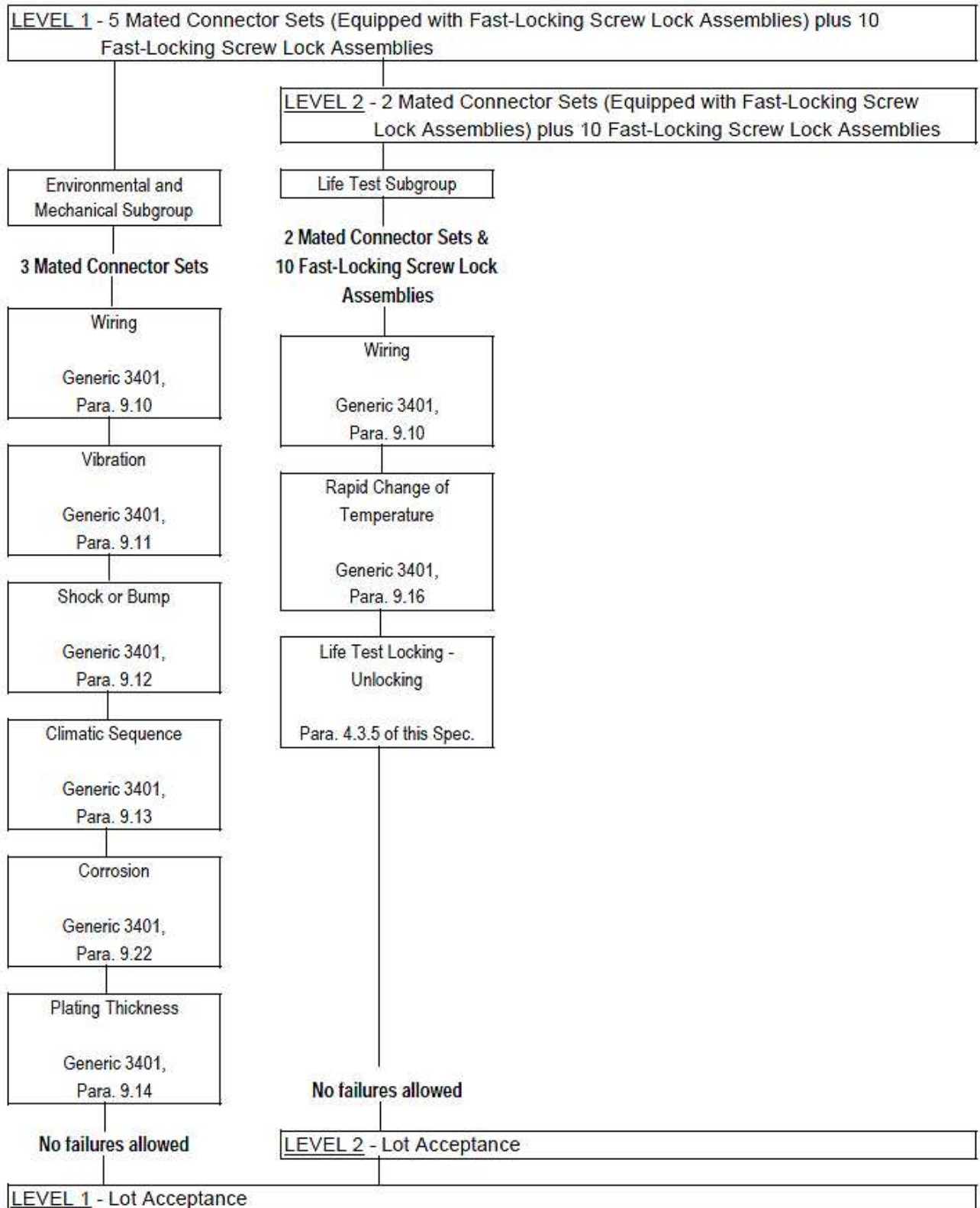


NOTES:

1. Equipped with Fast-Locking Screw Lock Assemblies.

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

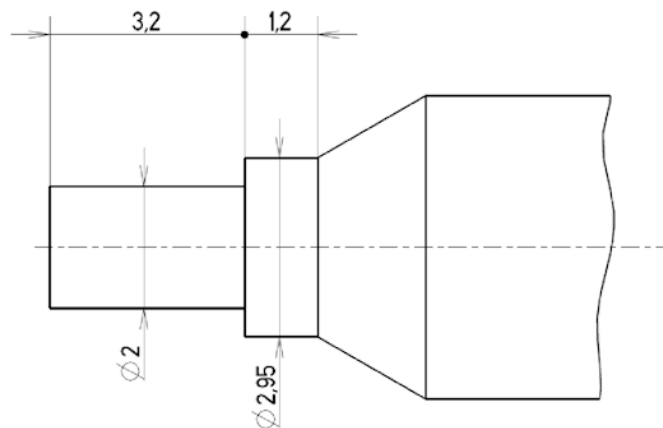
The maximum weight of the accessories specified herein shall be as shown in Table 1(a) of this specification.

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:

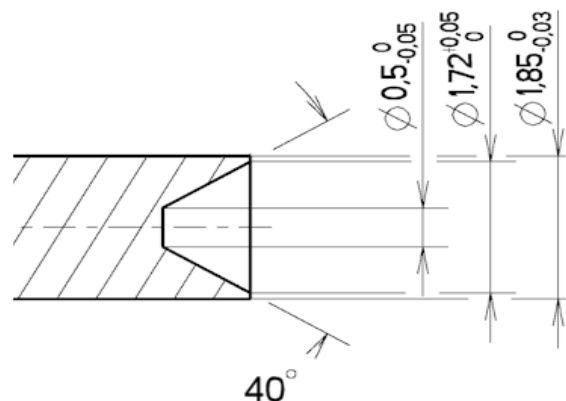


The locking speed shall be 5mm/s maximum.

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

The locking force shall be checked and shall meet the requirements of Table 1(b) of this specification. For Qualification and Final Production tests, the measurements shall be recorded.

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 checked and shall meet the requirements of Table 1(b) of this specification. For Qualification and Final Production tests, the measurements shall be recorded.

4.3.5 Life Test Locking – Unlocking

(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.

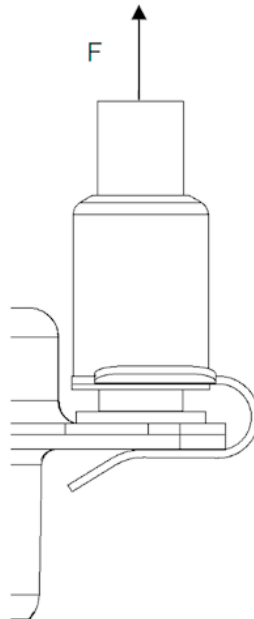
(b) Final Inspection

The components shall be physically 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.

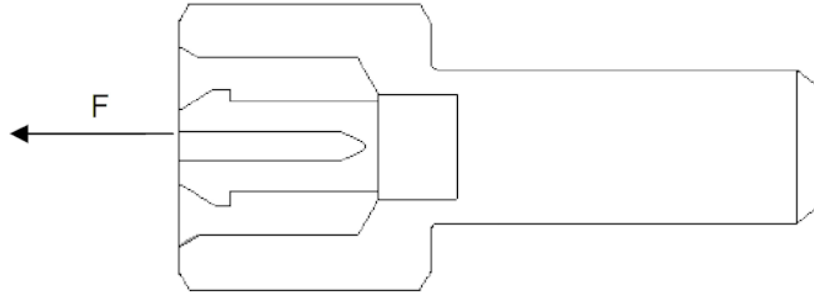
The male screw lock is mounted on a connector defined in ESCC 3401/001 Figure 2. The male screw lock shall withstand an axial force, F , of 20N without being dislodged from the shell.



4.3.7 Clip Retention Inside Bushing

This test is only applicable to female, saver and hybrid saver variants.

The clip inside the female screw lock shall withstand an axial force, F , of 150N 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 ($0.7\mu\text{m}$ minimum) over copper ($1\mu\text{m}$ minimum) plating.

The button shall be made of passivated stainless steel. The spring washer (as required) shall be made of beryllium copper with gold ($0.7\mu\text{m}$ minimum) over copper ($1\mu\text{m}$ 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 all 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 specified, as much as space permits shall be marked and the marking information, in full, shall accompany each 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:

Example: 340108501B

- Detail Specification Number: 3401085
- Type Variant (see Table 1(a)): 01
- Testing Level: B (Note: this is mandatory, as Testing Level 'C' is not applicable).

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

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 $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

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 $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

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 TESTS 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
			Coupling Nuts Locking Torque (if applicable)	Para. 4.3.3 of this Specification	Tqe	Table 1(b), Item 5		cm.daN
			Final Measurements					
			Locking / Unlocking Forces Drift	Para. 4.3.4 of this Specification	$\Delta F_{LO}, \Delta F_{UN}$	±25		%
Coupling Nuts Locking Torque Drift (if applicable)	Para. 4.3.3 of this Specification	ΔTqe	±0.5		cm.daN			
Micro Cutting		-		-	1	µs		
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		-		-	1
Full engagement		-		-	-	-		
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	Not applicable				
External Visual Inspection	ESCC 3401 Para. 9.7	-		-	-	-		
Insulation Resistance	Not applicable							
Voltage Proof Leakage Current	Not applicable							
04	Plating Thickness	Para. 9.14	Thickness		-	Para. 4.4.1 of this Specification		µm

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	
05	Life Test Locking - Unlocking	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
			Final Measurements Visual Examination Locking / Unlocking Forces Insulation Resistance Voltage Proof	Para. 4.3.4 of this Specification Not applicable Not applicable	- F_{LO}, F_{UN}	- Table 1(b), Items 3 & 4	- N	
06	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 Insulation Resistance Voltage Proof Leakage Current Visual Examination	Para. 4.3.4 of this Specification Not applicable Not applicable	- F_{LO}, F_{UN} -	- Table 1(b), Items 3 & 4 -	- N -	
07	High Temperature Storage	Para. 9.21	Initial Measurements Locking / Unlocking Forces Low Level Contact Resistance	Para. 4.3.4 of this Specification Not applicable	F_{LO}, F_{UN}	Table 1(b), Items 3 & 4		N
			Final Measurements Visual Examination Locking / Unlocking Forces Low Level Contact Resistance Drift Insulation Resistance Voltage Proof	Para. 4.3.4 of this Specification Not applicable Not applicable	- F_{LO}, F_{UN}	- Table 1(b), Items 3 & 4	- N	
08	Fast-Locking Screw Lock Retention on Shells (Note 2)	Para. 4.3.6 of this Spec.	Visual Examination	Screw Lock not damaged	-	-	-	-
09	Corrosion	Para. 9.22	Visual Examination		-	-	-	-
10	Maximum Torque Application (Note 3)	Para. 4.3.3 of this Spec.	Torque Value	Para. 4.3.3 of this Specification	T_{qe}	Table 1(b), Item 5		cm.daN
11	Clip Retention Inside Bushing (Note 4)	Para. 4.3.7 of this Spec.	Visual Examination	Clip inside Screw Lock not dislodged	-	-	-	-

NOTES:

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. Applicable to male variants.
3. Applicable to female and hybrid saver variants.
4. Applicable to female, saver and hybrid saver variants.