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**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 |
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| tba | Specification upissued to incorporate editorial and technical changes per DCR. |

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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 |
| 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 |

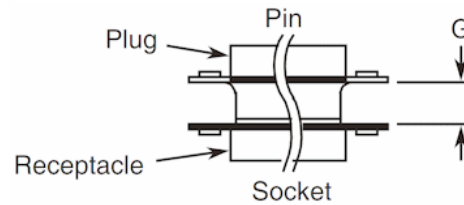
FIGURE 1 – PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 – PHYSICAL DIMENSIONS

MATED SPACING BETWEEN SHELL FRONT SURFACES

(All dimensions in millimetres)



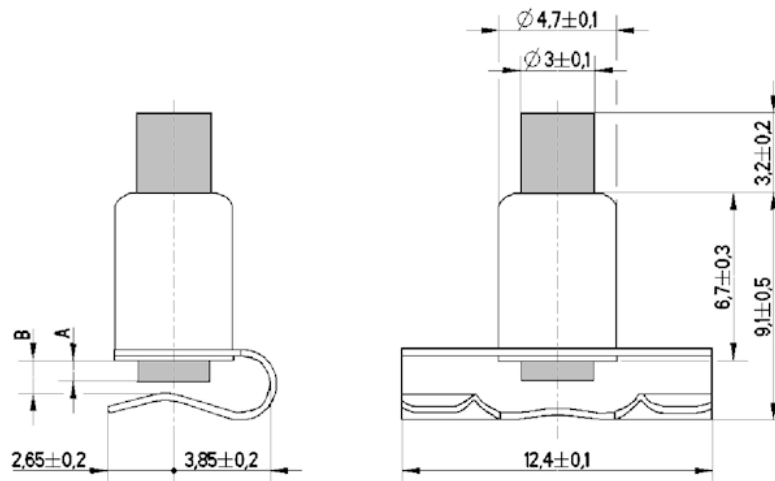
| DIMENSION | MIN | MAX | NOTES |
|-----------|------|------|-------|
| G | 6.35 | 7.11 | 1, 3 |
| | 6.12 | 6.88 | 2, 3 |

NOTES:

- For shell sizes E and A.
- For shell sizes B, C, D and F.
- 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)

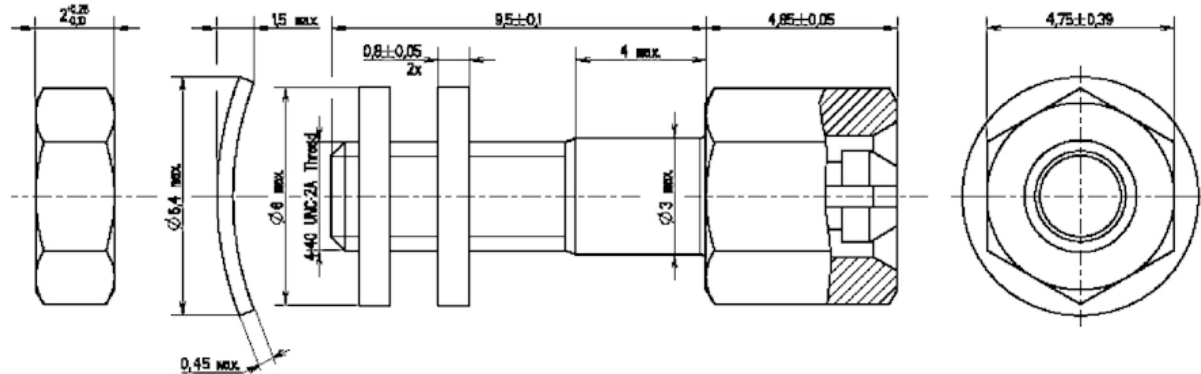


| VARIANT | DIMENSION A | | DIMENSION B | |
|---------|-------------|-----|-------------|-----|
| | MIN | MAX | MIN | MAX |
| 01 | 0.6 | 1 | 1.1 | 1.5 |
| 02 | 1 | 1.4 | 1.5 | 1.9 |

FIGURE 2 – PHYSICAL DIMENSIONS (CONTINUED)

FEMALE FAST-LOCKING SCREW LOCK ASSEMBLY (VARIANT 03)

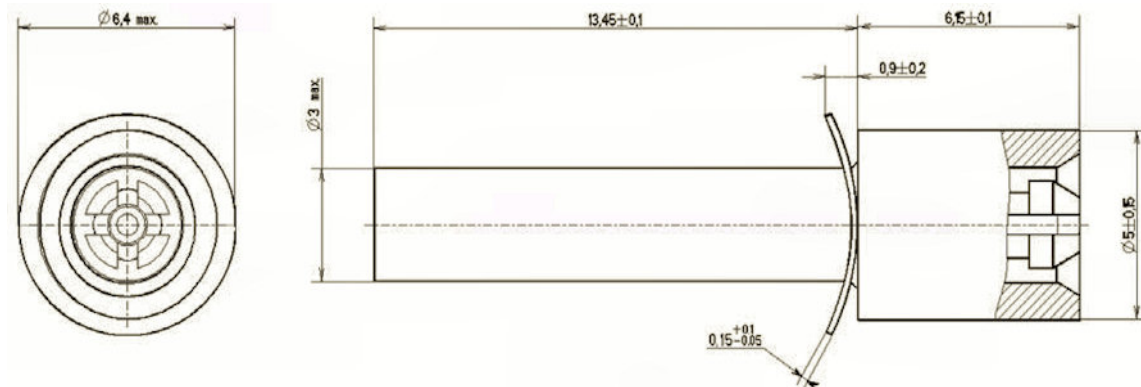
(All dimensions in millimetres)



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

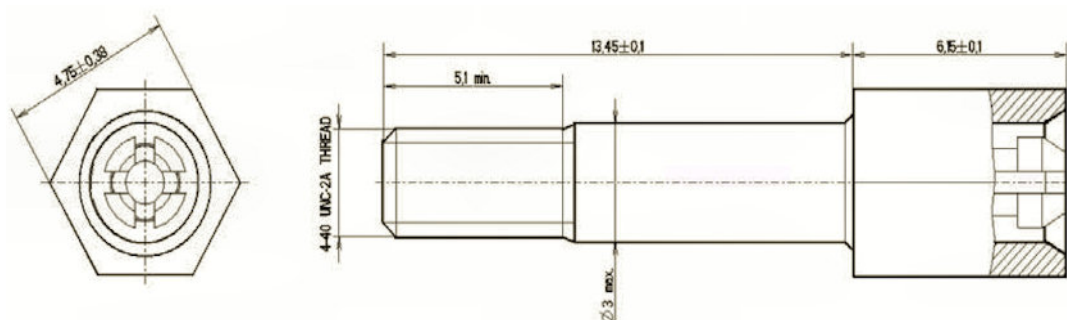
FAST-LOCKING SCREW LOCK ASSEMBLY FOR SAVER CONNECTORS (VARIANT 04)

(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 | 3.3 | 3.8 | 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.

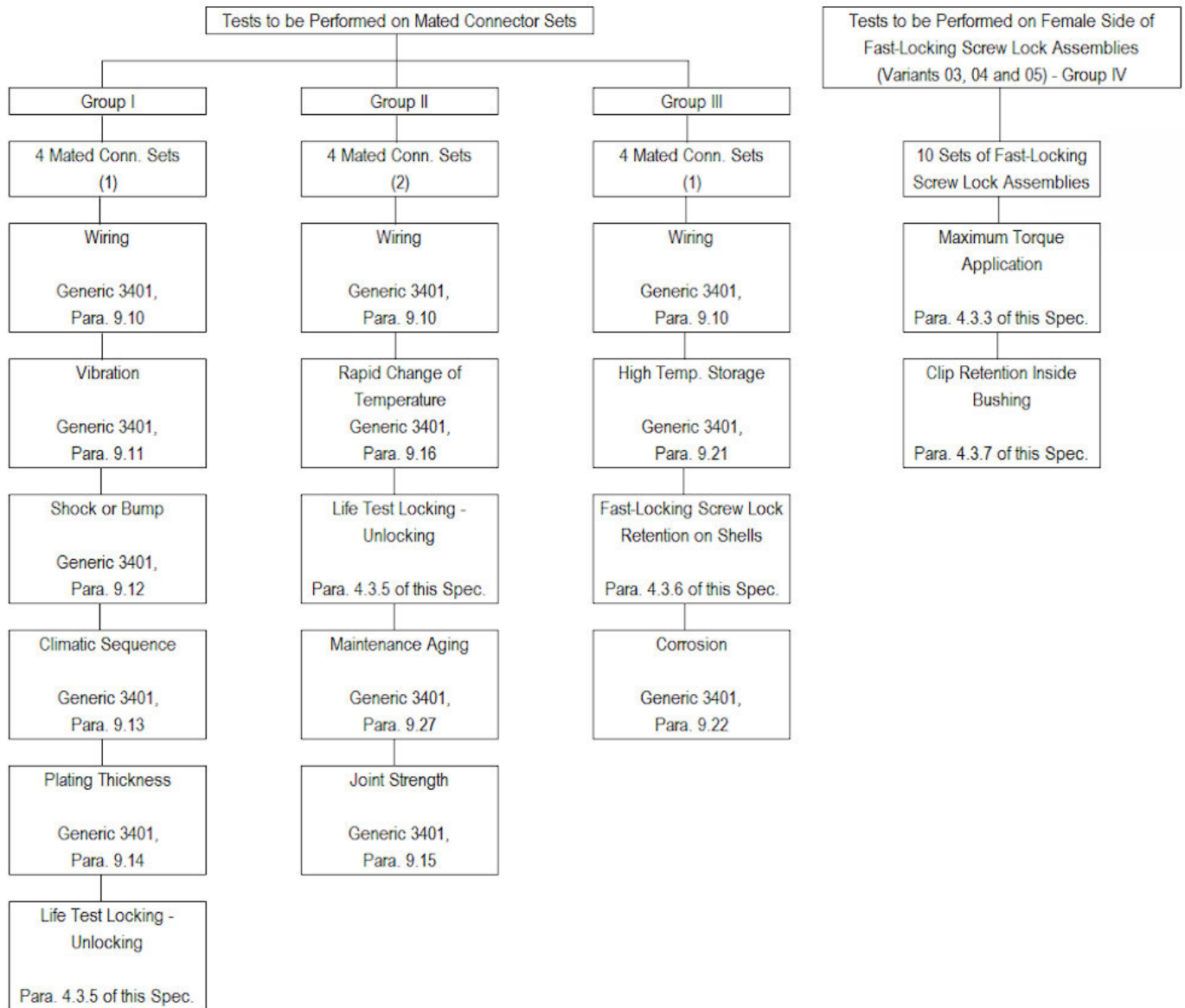
4.2.2 Deviations from Final Production Tests (Chart II) Only the following tests shall be performed:

- (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.

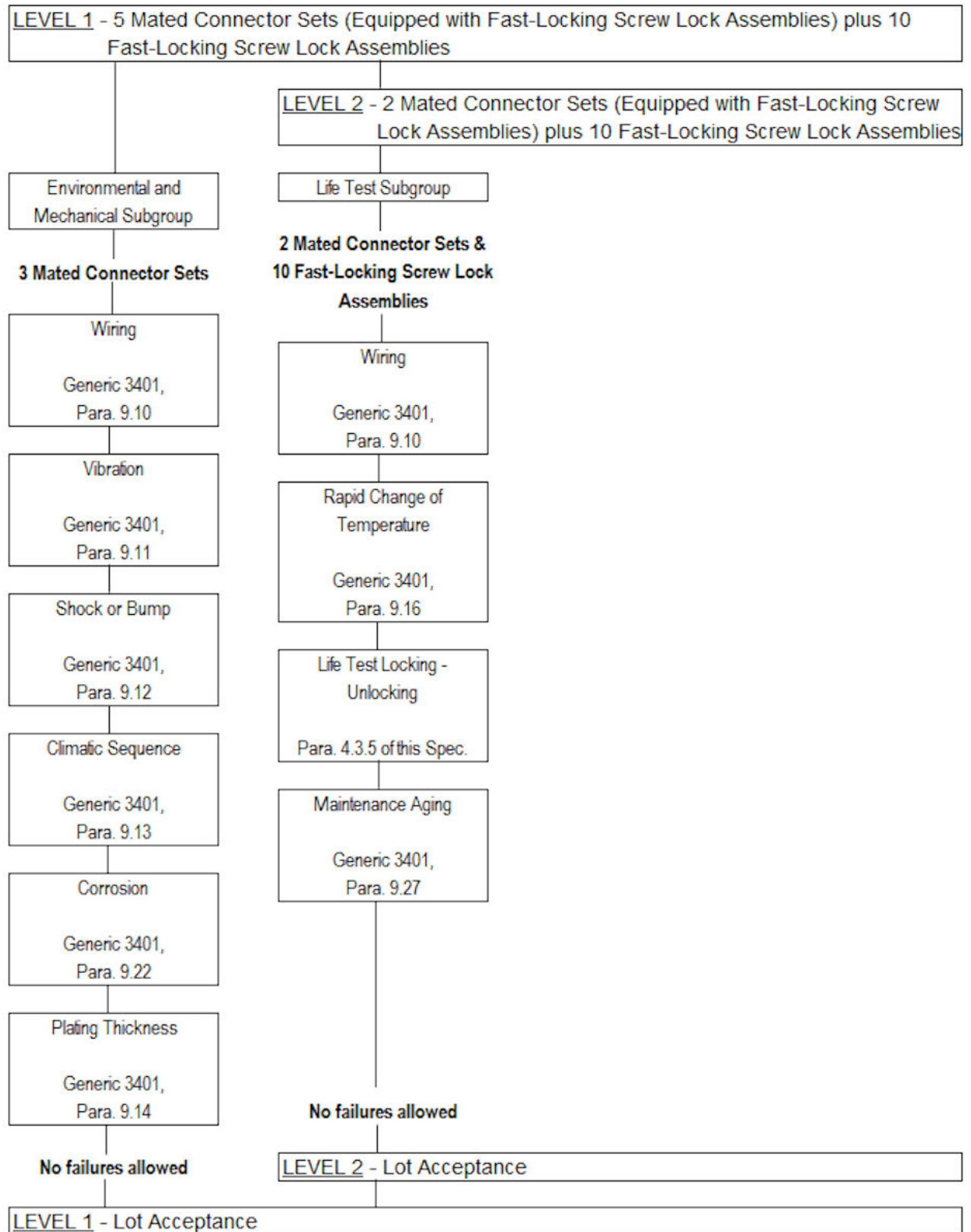


NOTES:

1. Equipped with Fast-Locking Screw Lock Assemblies (no contact shall be installed in the male screw lock).
2. Equipped with Fast-Locking Screw Lock Assemblies. A 340100501B contact shall be installed in the male screw lock.

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

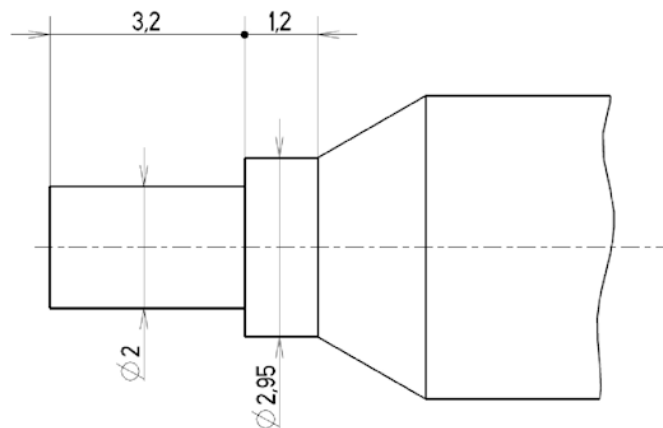
The maximum weight of the accessories specified herein shall be as shown in Table 1(a) of this specification.

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:

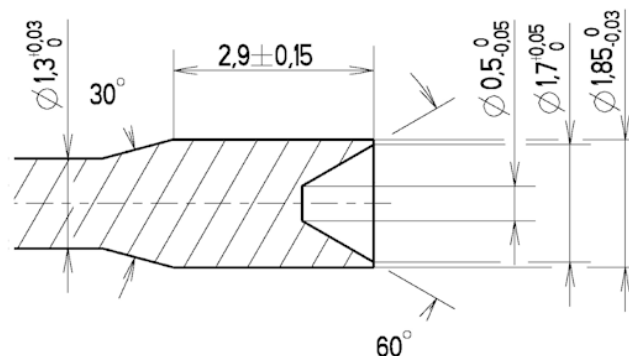


The locking speed shall be 5mm/s maximum.

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.

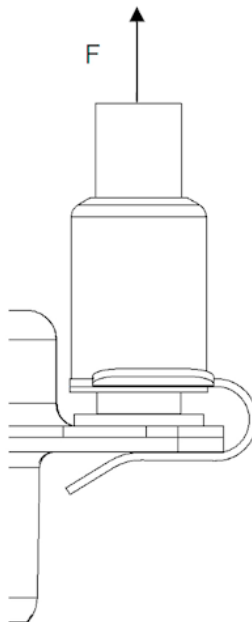
(b) Final Inspection

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.

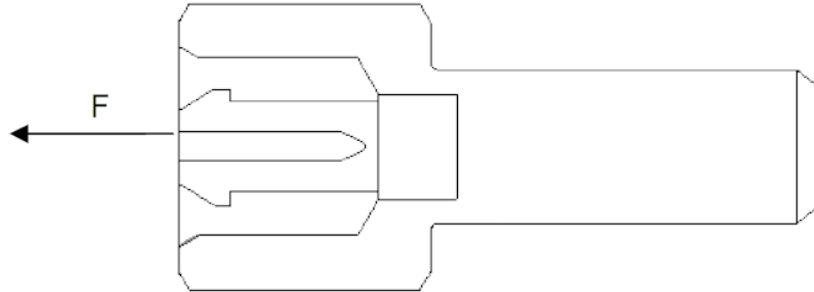
The male screw lock is mounted on a connector defined in ESCC 3401/001 Figure 2. The male screw lock shall withstand an axial force, F , of 20N without being dislodged from the shell.



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.

4.5.3.2 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

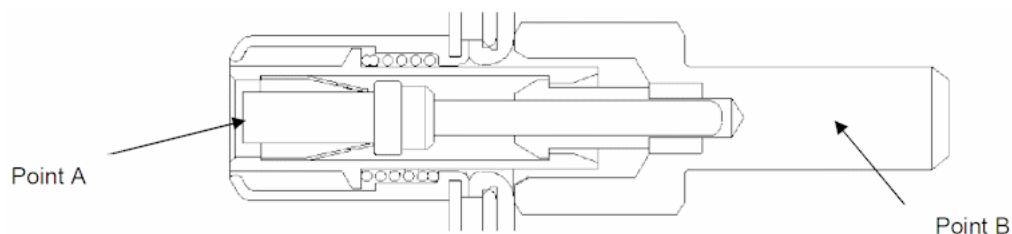
4.6.1 Electrical Measurements at Room Temperature

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

4.6.1.1 Low Level Contact Resistance

Unless otherwise specified, the test method and conditions shall be as specified in ESCC Generic Specification No. 3401.

The low level contact resistance of the mated assembled screw locks shall be measured between points A and B defined below and shall meet the requirements 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 Circuits 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 $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

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 | Wiring | Para. 9.10 | Low Level Contact Resistance (Note 2) | Para. 4.6.1.1 of this Specification | R _{CL} | - | 100 | mΩ |
| 02 | 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 | ΔF _{LO} , ΔF _{UN} | ±25 | | % |
| | | | Coupling Nuts Locking Torque Drift (if applicable) | Para. 4.3.3 of this Specification | ΔTqe | ±0.5 | | cm.daN |
| | | | Micro Cutting Visual Examination | | - - | - - | 1 - | μs - |
| 03 | 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 | μs |
| | | | Full engagement | | - | - | - | - |
| | | | Visual Examination | | - | - | - | - |
| 04 | Climatic Sequence | Para. 9.13 | Dry Heat Insulation Resistance | Not applicable | F _{LO} , F _{UN} | Table 1(b), Items 3 & 4 | | N |
| | | | Locking / Unlocking Forces | Para. 4.3.4 of this Specification | | | | |
| | | | Damp Heat Insulation Resistance | Immediately after test Not applicable | - | - | - | - |
| | | | External Visual Inspection | After 1-24 hrs Recovery ESCC 3401 Para. 9.7 | | | | |
| 05 | Plating Thickness | Para. 9.14 | Insulation Resistance | Not applicable | - | Para. 4.4.1 of this Specification | | μm |
| | | | Voltage Proof Leakage Current | 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 | |
| 06 | 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 |
| | | | Low Level Contact Resistance (Note 2) | Para. 4.6.1.1 of this Specification | R_{CL} | - | 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 (Note 3) | Para. 4.6.1.1 of this Specification | ΔR_{CL} | ±25 | | % |
| | | | Insulation Resistance | Not applicable | | | | |
| 07 | 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 Leakage Current | Not applicable | | | | |
| | | | Visual Examination | | - | - | - | - |
| 08 | 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 |
| 09 | Joint Strength | Para. 9.15 | Joint Strength | Para. 9.15 of ESCC 3401 | - | ESCC 3401 Para. 9.15 | | N |
| 10 | 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 | | | | |
| | | | 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 | | | | |
| | | | Insulation Resistance | Not applicable | | | | |
| | | | Voltage Proof | 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 | |
| 11 | Fast-Locking Screw Lock Retention on Shells (Note 4) | Para. 4.3.6 of this Spec. | Visual Examination | Screw Lock not damaged | - | - | - | - |
| 12 | Corrosion | Para. 9.22 | Visual Examination | | - | - | - | - |
| 13 | Maximum Torque Application (Note 5) | Para. 4.3.3 of this Spec. | Torque Value | Para. 4.3.3 of this Specification | Tqe | Table 1(b), Item 5 | | cm.daN |
| 14 | Clip Retention Inside Bushing (Note 6) | 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. The Low Level Contact Resistance measurement is only made during Group II Qualification Tests (Chart IV).
3. The Low Level Contact Resistance is only measured, and the drift value calculated, during Group II Qualification Tests (Chart IV).
4. Applicable to male variants.
5. Applicable to female and hybrid saver variants.
6. Applicable to female, saver and hybrid saver variants.