



**CONNECTORS, ELECTRICAL, RECTANGULAR,  
REMOVABLE CRIMP CONTACTS**

**BASED ON TYPE D\*MA**

**ESCC Detail Specification No. 3401/002**

|         |            |
|---------|------------|
| Issue 9 | April 2015 |
|---------|------------|



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| DCR No. | CHANGE DESCRIPTION   |
|---------|--|
| 921     | Specification upissued to incorporate 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 Connectors, Electrical, Rectangular with Removable Crimp Contacts, Standard (Gauge 20) and High Density (Gauge 22) Contact Arrangements, based on Type D\*MA.

It shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- ESCC Detail Specification No. 3401/005, Contacts, Electrical, Crimp, for 3401/002 Connectors.
- ESCC Detail Specification No. 3401/022, Accessories for Rectangular Connectors 3401/001, 3401/002 and Connector Savers 3401/020, 3401/080.
- ESCC Detail Specification No. 3401/072, Lightweight Accessories for Rectangular Connectors 3401/001 and 3401/002.
- ESCC Detail Specification No. 3401/085, Fast-Locking Screw Lock Assemblies for Rectangular Connectors 3401/001, 3401/002 and Connector Savers 3401/020, 3401/080.

the requirements of which are supplemented herein.

### 1.2 COMPONENT TYPE VARIANTS

The different sizes of connectors specified herein, which are also covered by this specification, together with their mechanical characteristics, 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 connectors specified herein, are scheduled in Table 1(b).

### 1.4 PARAMETER DERATING INFORMATION

The applicable derating information for the connectors specified herein is shown in Figure 1.

### 1.5 PHYSICAL DIMENSIONS

The physical dimensions of the connectors 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 for Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- (b) ESCC Detail Specification No. 3401/005, Contacts, Electrical, Crimp, for 3401/002 Connectors.
- (c) ESCC Detail Specification No. 3401/022, Accessories for Rectangular Connectors 3401/001, 3401/002 and Connector Savers 3401/020, 3401/080.
- (d) ESCC Detail Specification No. 3401/072, Lightweight Accessories for Rectangular Connectors 3401/001 and 3401/002.
- (e) ESCC Detail Specification No. 3401/085, Fast-Locking Screw Lock Assemblies for Rectangular Connectors 3401/001, 3401/002 and Connector Savers 3401/020, 3401/080.
- (f) MIL-DTL-24308, Rack and Panel Connectors, Miniature.

**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                      | Shell Size<br>(2) | Max. Weight<br>(g) (1) |        | Max Weight With<br>Grommet<br>(g) (2) |        | Mating Force<br>(N. max) | Unmating Force |        |
|------------------------------|-------------------|------------------------|--------|---------------------------------------|--------|--------------------------|----------------|--------|
|                              |                   | Male                   | Female | Male                                  | Female |                          | N. min         | N. max |
| 01<br>(Gauge 20<br>Contacts) | E                 | 5.5                    | 6      | 6.5                                   | 7      | 30                       | 3.5            | 20     |
|                              | A                 | 7.6                    | 8.3    | 9                                     | 9.7    | 50                       | 4.5            | 34     |
|                              | B                 | 12.5                   | 13.6   | 14.6                                  | 15.7   | 83                       | 8              | 55     |
|                              | C                 | 17.4                   | 18.9   | 20.4                                  | 21.9   | 123                      | 11             | 83     |
|                              | D                 | 20.5                   | 22.3   | 24                                    | 25.8   | 166                      | 14.5           | 120    |
| 02<br>(Gauge 22<br>Contacts) | E                 | 5.2                    | 6      | 6.15                                  | 6.95   | 46                       | 3.4            | 28     |
|                              | A                 | 7.4                    | 8      | 8.7                                   | 9.3    | 77                       | 4.5            | 46     |
|                              | B                 | 11                     | 12     | 13                                    | 14     | 127                      | 7.9            | 77     |
|                              | C                 | 15.6                   | 17     | 18.35                                 | 19.75  | 177                      | 11.3           | 109    |
|                              | D                 | 18.2                   | 20     | 21.6                                  | 23.4   | 222                      | 14.7           | 136    |
|                              | F                 | 23                     | 25     | -                                     | -      | 295                      | 20.3           | 177    |

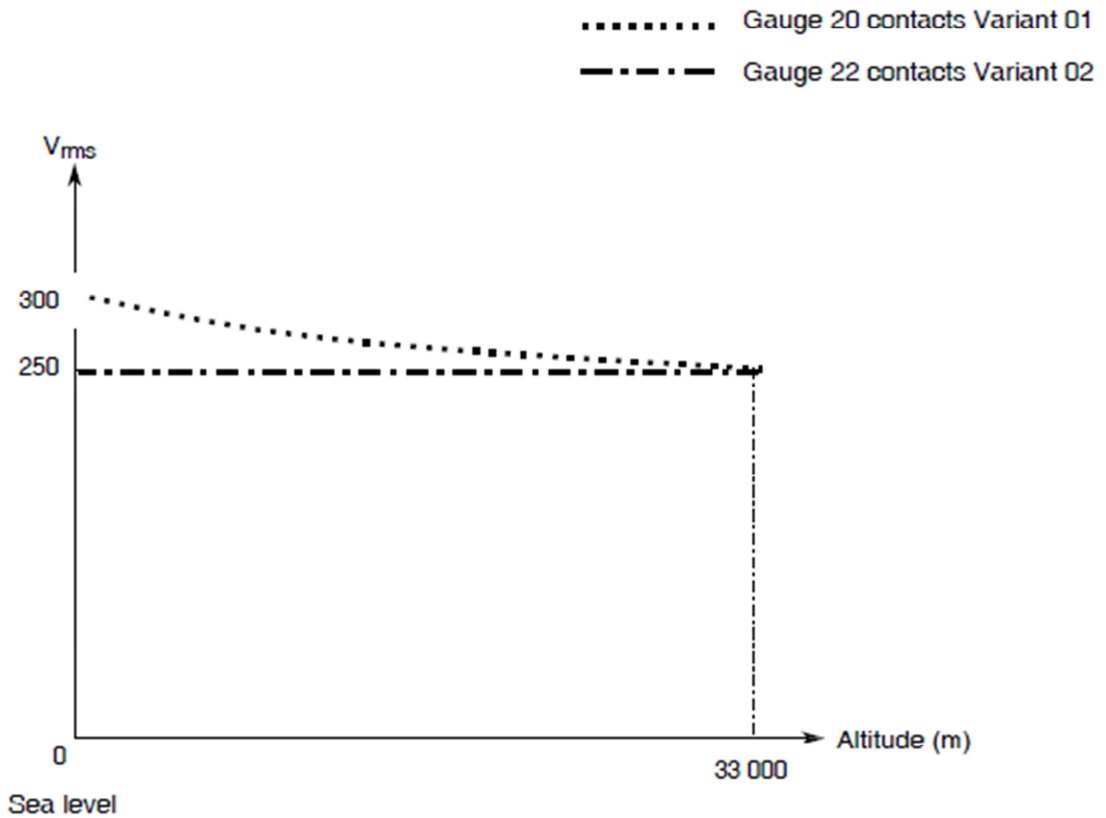
**NOTES**

- 1. For connectors without contacts and without rear grommet, but see Para. 4.5.4.10. See ESCC Detail Specification No. 3401/005 for contact weights.
- 2. For connectors with rear grommet, without contacts, but see Para. 4.5.4.10. See ESCC Detail Specification No. 3401/005 for contact weights.

**TABLE 1(b) MAXIMUM RATINGS**

| No. | Characteristics  | Symbol    | Maximum Rating |      | Unit |
|-----|--|-----------|----------------|------|------|
|     |  |           | Min            | Max  |      |
| 1   | Working Voltage<br>(Sea Level)<br>Variant 01<br>Variant 02 | $U_R$     | -              | 300  | Vrms |
|     |  |           | -              | 250  | Vrms |
|     |  |           | -              | -    | -    |
| 2   | Operating Temperature Range                                | $T_{op}$  | -55            | +125 | °C   |
| 3   | Storage Temperature Range                                  | $T_{stg}$ | -65            | +125 | °C   |

**FIGURE 1 - PARAMETER DERATING INFORMATION**





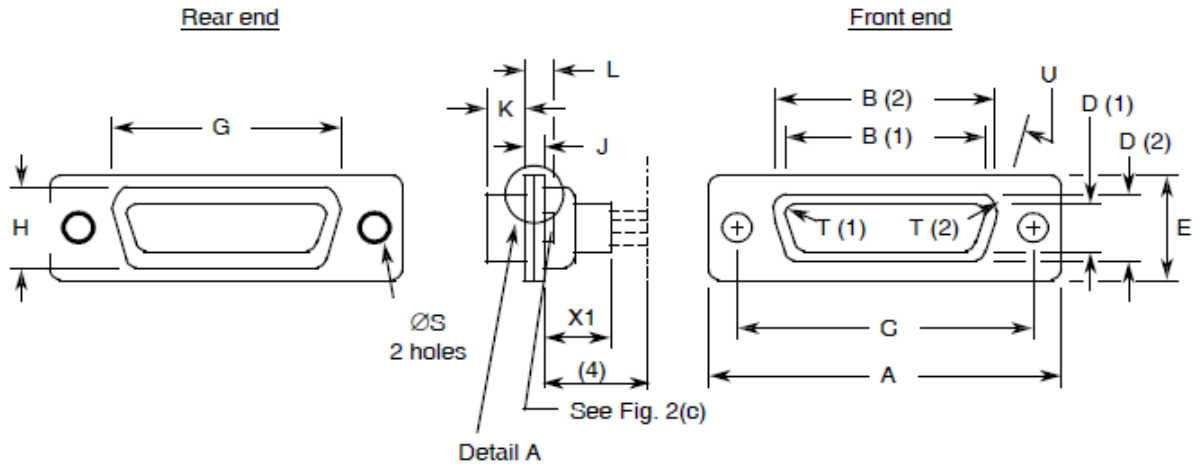
**FIGURE 2 – PHYSICAL DIMENSIONS**

**FIGURE 2(a) - RECEPTACLES AND PLUGS**

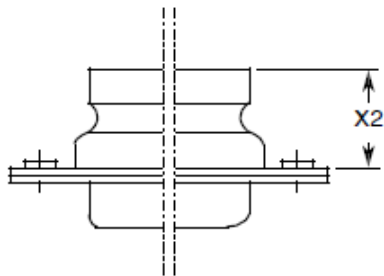
SHELL SIZE E

STANDARD MOUNTING HOLES

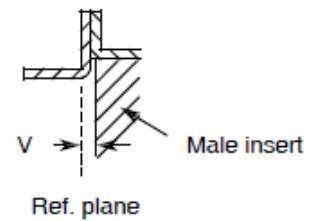
FIXED MOUNT



REAR GROMMET VERSION



DETAIL A

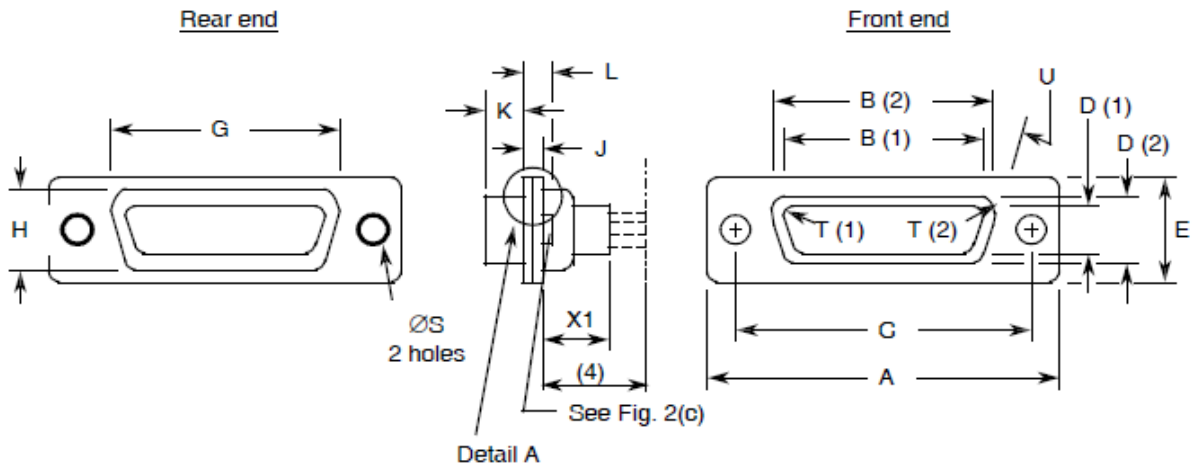


| Contact Type | Connector Type | Symbol/ Dim. | A     | <u>B</u> | <u>C</u> | <u>D</u> | E     | G     | H     | J    | <u>K</u> | L    | ØS   | I    | <u>U</u> | V   | X1   | X2    |
|--------------|----------------|--------------|-------|----------|----------|----------|-------|-------|-------|------|----------|------|------|------|----------|-----|------|-------|
| Male         | Plug           | Min          | 30.43 | 16.79    | 24.87    | 8.23     | 12.17 | 19.02 | 10.46 | 0.51 | 5.82     | 0.89 | 2.92 | 2.59 | 9        | 0   | -    | -     |
|              |                | Max          | 31.19 | 17.04    | 25.12    | 8.48     | 12.93 | 19.53 | 10.97 | 1.02 | 6.05     | 1.52 | 3.2  | 2.69 | 11       | 0.4 | 9.53 | 15.18 |
| Female       | Receptacle     | Min          | 30.43 | 16.21    | 24.87    | 7.77     | 12.07 | 19.02 | 10.46 | 0.51 | 6.05     | 0.89 | 2.92 | 2.46 | 9        | -   | -    | -     |
|              |                | Max          | 31.19 | 16.46    | 25.12    | 8.03     | 12.93 | 19.53 | 10.97 | 1.02 | 6.3      | 1.52 | 3.2  | 2.62 | 11       | -   | -    | 9.53  |

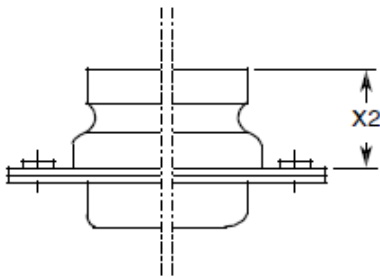
**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Contacts 340100505B and 340100506B protrude 16.5mm maximum.
5. Underlined dimensions, in table, are critical to ensure intermateability.

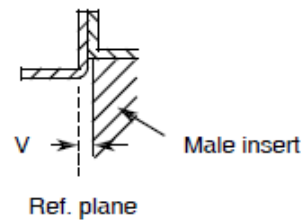
**SHELL SIZE A**  
**STANDARD MOUNTING HOLES**  
**FIXED MOUNT**



**REAR GROMMET VERSION**



**DETAIL A**

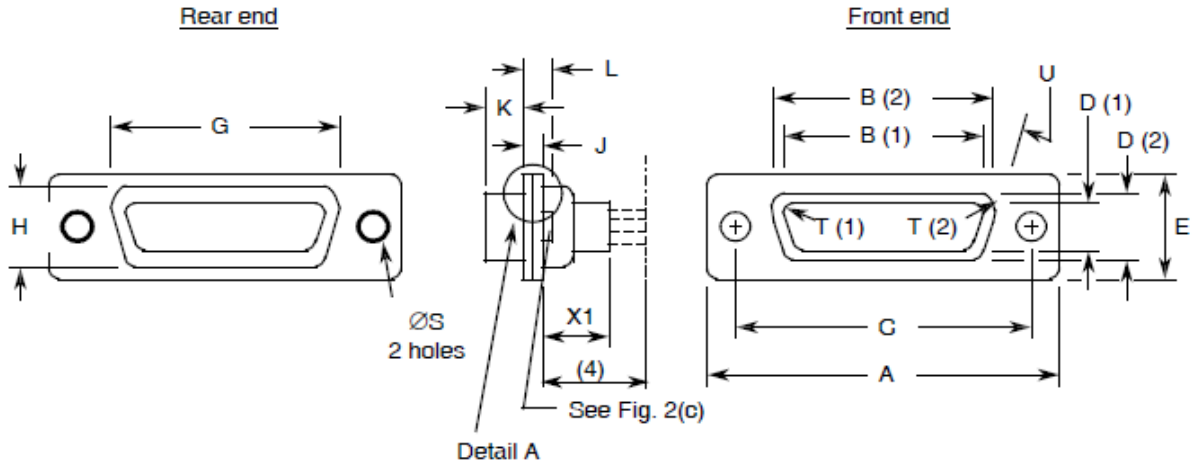


| Contact Type | Connector Type | Symbol/Dim. | <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> | E     | G     | H     | J    | <u>K</u> | L    | ØS   | <u>I</u> | <u>U</u><br>° | V   | X1   | X2    |
|--------------|----------------|-------------|----------|----------|----------|----------|-------|-------|-------|------|----------|------|------|----------|---------------|-----|------|-------|
| Male         | Plug           | Min         | 38.76    | 25.12    | 33.2     | 8.23     | 12.17 | 27.25 | 10.46 | 0.51 | 5.82     | 0.89 | 2.92 | 2.59     | 9             | 0   | -    | -     |
|              |                | Max         | 39.52    | 25.37    | 33.45    | 8.48     | 12.93 | 27.76 | 10.97 | 1.02 | 6.05     | 1.52 | 3.2  | 2.69     | 11            | 0.4 | 9.53 | 15.18 |
| Female       | Receptacle     | Min         | 38.76    | 24.54    | 33.2     | 7.77     | 12.17 | 27.25 | 10.46 | 0.51 | 6.05     | 0.89 | 2.92 | 2.46     | 9             | -   | -    | -     |
|              |                | Max         | 39.52    | 24.79    | 33.45    | 8.03     | 12.93 | 27.76 | 10.97 | 1.02 | 6.3      | 1.52 | 3.2  | 2.62     | 11            | -   | 9.53 | 15.18 |

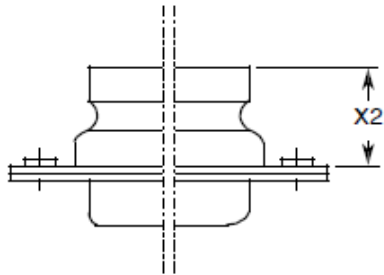
**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Contacts 340100505B and 340100506B protrude 16.5mm maximum.
5. Underlined dimensions, in table, are critical to ensure intermateability.

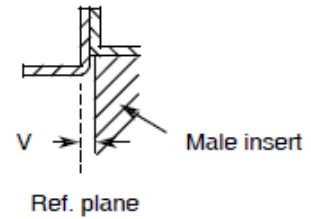
SHELL SIZE B  
STANDARD MOUNTING HOLES  
FIXED MOUNT



REAR GROMMET VERSION



DETAIL A

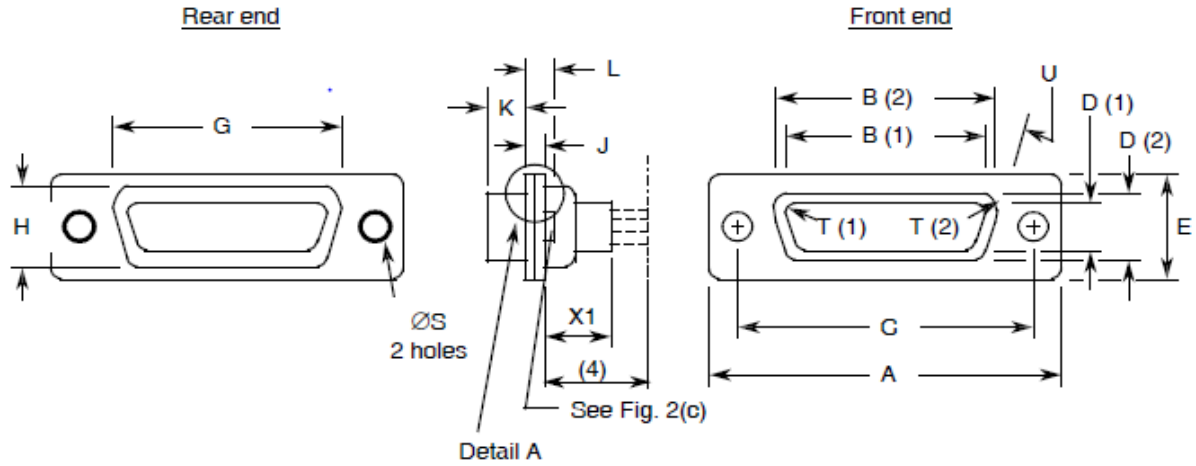


| Contact Type | Connector Type | Symbol/Dim. | A     | <u>B</u> | <u>C</u> | <u>D</u> | E     | G     | H     | J    | <u>K</u> | L    | ØS   | I    | <u>U</u> | V   | X1   | X2    |
|--------------|----------------|-------------|-------|----------|----------|----------|-------|-------|-------|------|----------|------|------|------|----------|-----|------|-------|
| Male         | Plug           | Min         | 52.65 | 38.84    | 46.91    | 8.23     | 12.17 | 41.02 | 10.46 | 0.51 | 5.69     | 1.05 | 2.92 | 2.59 | 9        | 0   | -    | -     |
|              |                | Max         | 53.42 | 39.09    | 47.17    | 8.48     | 12.93 | 41.53 | 10.97 | 1.24 | 5.99     | 1.78 | 3.2  | 2.69 | 11       | 0.6 | 9.53 | 15.18 |
| Female       | Receptacle     | Min         | 52.65 | 38.25    | 46.91    | 7.77     | 12.17 | 41.02 | 10.46 | 0.51 | 6.05     | 0.89 | 2.92 | 2.46 | 9        | -   | -    | -     |
|              |                | Max         | 53.42 | 38.51    | 47.17    | 8.03     | 12.93 | 41.53 | 10.97 | 1.02 | 6.3      | 1.52 | 3.2  | 2.62 | 11       | -   | 9.53 | 15.18 |

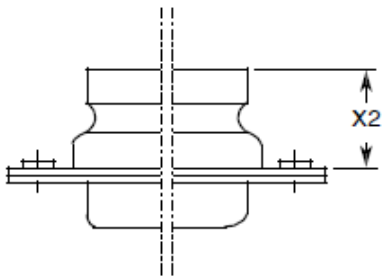
**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Contacts 340100505B and 340100506B protrude 16.5mm maximum.
5. Underlined dimensions, in table, are critical to ensure intermateability.

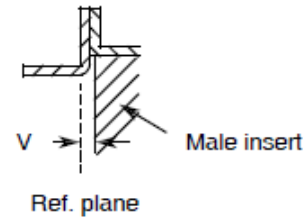
SHELL SIZE C  
STANDARD MOUNTING HOLES  
FIXED MOUNT



REAR GROMMET VERSION



DETAIL A

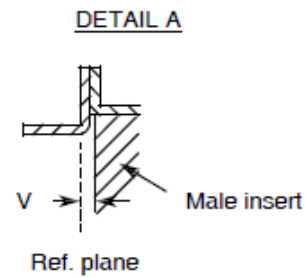
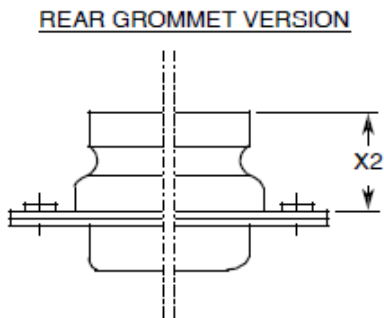
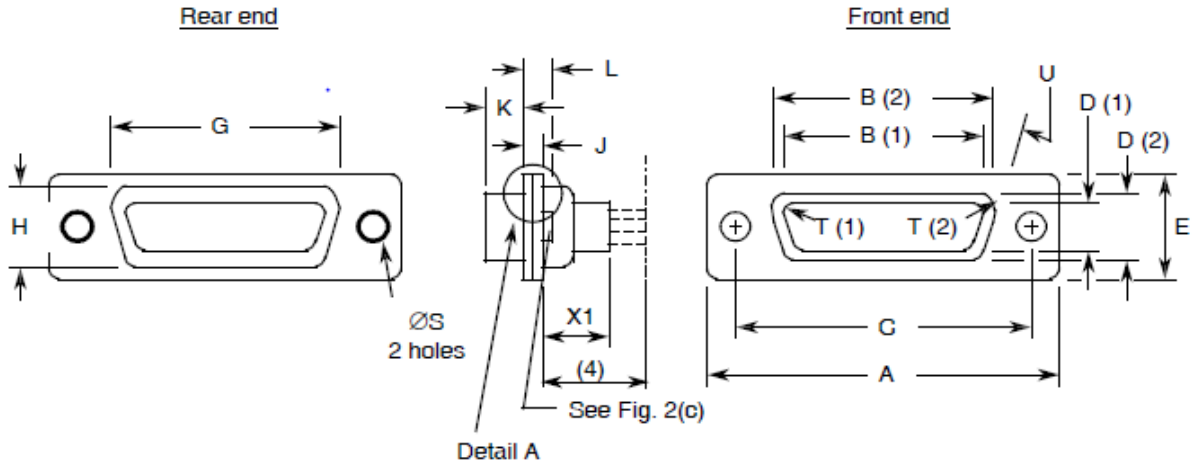


| Contact Type | Connector Type | Symbol/Dim. | A     | <u>B</u> | <u>C</u> | <u>D</u> | E     | G     | H     | J    | <u>K</u> | L    | ØS   | <u>I</u> | <u>U</u> | V   | X1   | X2    |
|--------------|----------------|-------------|-------|----------|----------|----------|-------|-------|-------|------|----------|------|------|----------|----------|-----|------|-------|
| Male         | Plug           | Min         | 68.94 | 55.3     | 63.37    | 8.23     | 12.17 | 57.45 | 10.46 | 0.51 | 5.69     | 1.05 | 2.92 | 2.59     | 9        | 0   | -    | -     |
|              |                | Max         | 69.7  | 55.55    | 63.63    | 8.48     | 12.93 | 57.96 | 10.97 | 1.24 | 5.99     | 1.78 | 3.2  | 2.69     | 11       | 0.6 | 9.53 | 15.18 |
| Female       | Receptacle     | Min         | 68.94 | 54.71    | 63.37    | 7.77     | 12.17 | 57.45 | 10.46 | 0.51 | 6.05     | 0.89 | 2.92 | 2.46     | 9        | -   | -    | -     |
|              |                | Max         | 69.7  | 54.97    | 63.63    | 8.03     | 12.93 | 57.96 | 10.97 | 1.02 | 6.3      | 1.52 | 3.2  | 2.62     | 11       | -   | 9.53 | 15.18 |

**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Contacts 340100505B and 340100506B protrude 16.5mm maximum.
5. Underlined dimensions, in table, are critical to ensure intermateability.

SHELL SIZE D  
STANDARD MOUNTING HOLES  
FIXED MOUNT

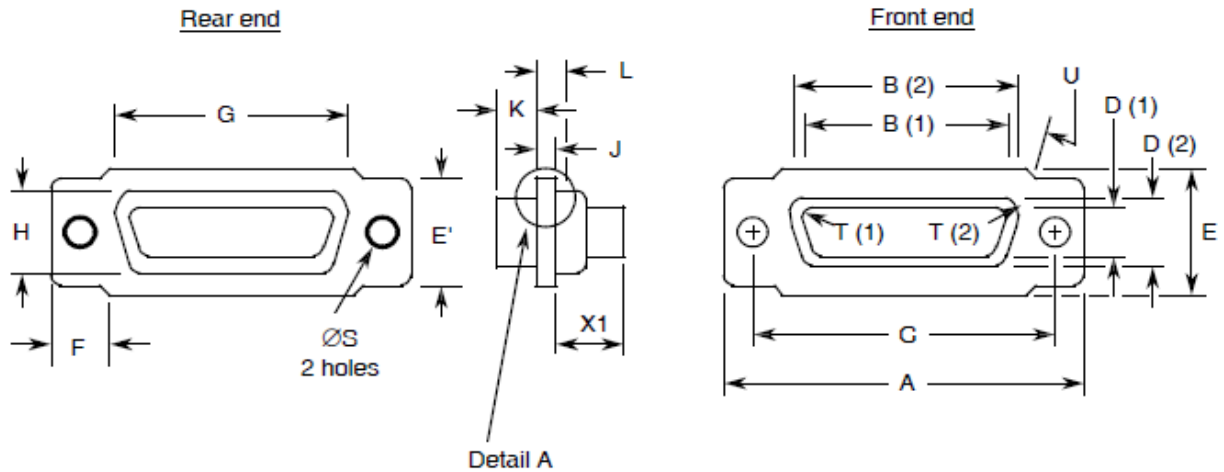


| Contact Type | Connector Type | Symbol/Dim. | A     | <u>B</u> | <u>C</u> | <u>D</u> | E     | G     | H     | J    | <u>K</u> | L    | ØS   | <u>I</u> | <u>U</u> | V   | X1   | X2    |
|--------------|----------------|-------------|-------|----------|----------|----------|-------|-------|-------|------|----------|------|------|----------|----------|-----|------|-------|
| Male         | Plug           | Min         | 66.55 | 52.68    | 60.99    | 11.07    | 14.99 | 55.07 | 13.31 | 0.51 | 5.69     | 1.05 | 2.92 | 2.59     | 9        | 0   | -    | -     |
|              |                | Max         | 67.31 | 52.93    | 61.24    | 11.33    | 15.75 | 55.58 | 13.82 | 1.24 | 5.99     | 1.78 | 3.2  | 2.69     | 11       | 0.6 | 9.53 | 15.18 |
| Female       | Receptacle     | Min         | 66.55 | 52.3     | 60.99    | 10.62    | 14.99 | 55.07 | 13.31 | 0.51 | 6.05     | 0.89 | 2.92 | 2.46     | 9        | -   | -    | -     |
|              |                | Max         | 67.31 | 52.55    | 61.24    | 10.87    | 15.75 | 55.58 | 13.82 | 1.02 | 6.3      | 1.52 | 3.2  | 2.62     | 11       | -   | 9.53 | 15.18 |

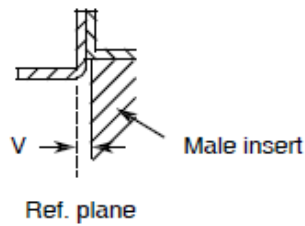
**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Contacts 340100505B and 340100506B protrude 16.5mm maximum.
5. Underlined dimensions, in table, are critical to ensure intermateability.

SHELL SIZE F  
STANDARD MOUNTING HOLES  
FIXED MOUNT



DETAIL A



| Contact Type | Connector Type | Symbol/Dim. | A     | <u>B</u> | <u>C</u> | <u>D</u> | E     | E'    | F    | G     | H     | J    | <u>K</u> | $\varnothing S$ | I    | <u>U</u> | <u>V</u> | X1   |
|--------------|----------------|-------------|-------|----------|----------|----------|-------|-------|------|-------|-------|------|----------|-----------------|------|----------|----------|------|
| Male         | Plug           | Min         | 68.94 | 56.06    | 63.37    | 12.65    | 16.92 | 14.99 | 5.17 | 57.25 | 15.45 | 0.74 | 5.69     | 2.92            | 2.59 | 9        | 0        | -    |
|              |                | Max         | 69.7  | 56.31    | 63.63    | 12.9     | 17.68 | 15.75 | 5.43 | 57.75 | 15.95 | 1.24 | 5.99     | 3.2             | 2.69 | 11       | 0.6      | 9.53 |
| Female       | Receptacle     | Min         | 68.94 | 55.47    | 63.37    | 12.19    | 16.92 | 14.99 | 5.17 | 57.25 | 15.45 | 0.51 | 6.05     | 2.92            | 2.46 | 9        | -        | -    |
|              |                | Max         | 69.7  | 55.73    | 63.63    | 12.45    | 17.68 | 15.75 | 5.43 | 57.75 | 15.95 | 1.02 | 6.3      | 3.2             | 2.62 | 11       | -        | 9.53 |

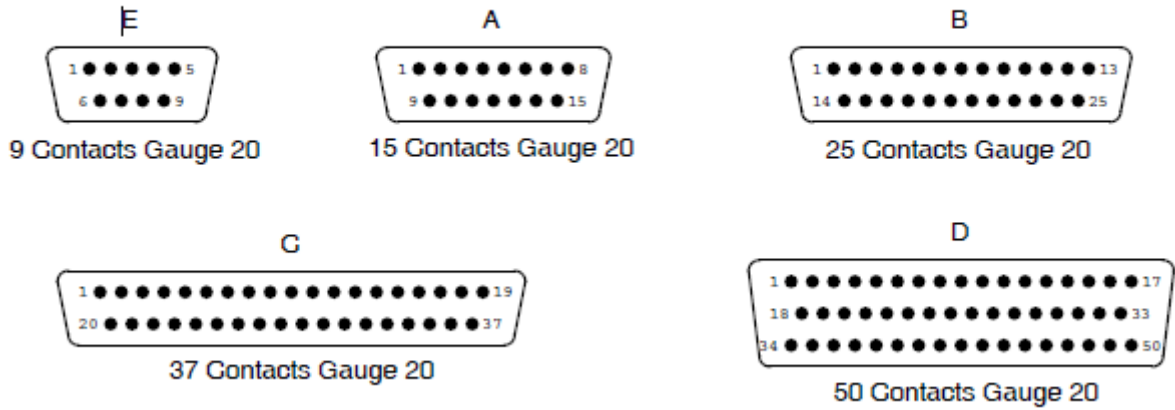
**NOTES**

1. Inside dimension for connectors with male contacts.
2. Outside dimension for connectors with female contacts.
3. All dimensions are in millimetres (angles in degrees).
4. Underlined dimensions, in table, are critical to ensure intermateability.

**FIGURE 2(b) - CONTACT ARRANGEMENTS**

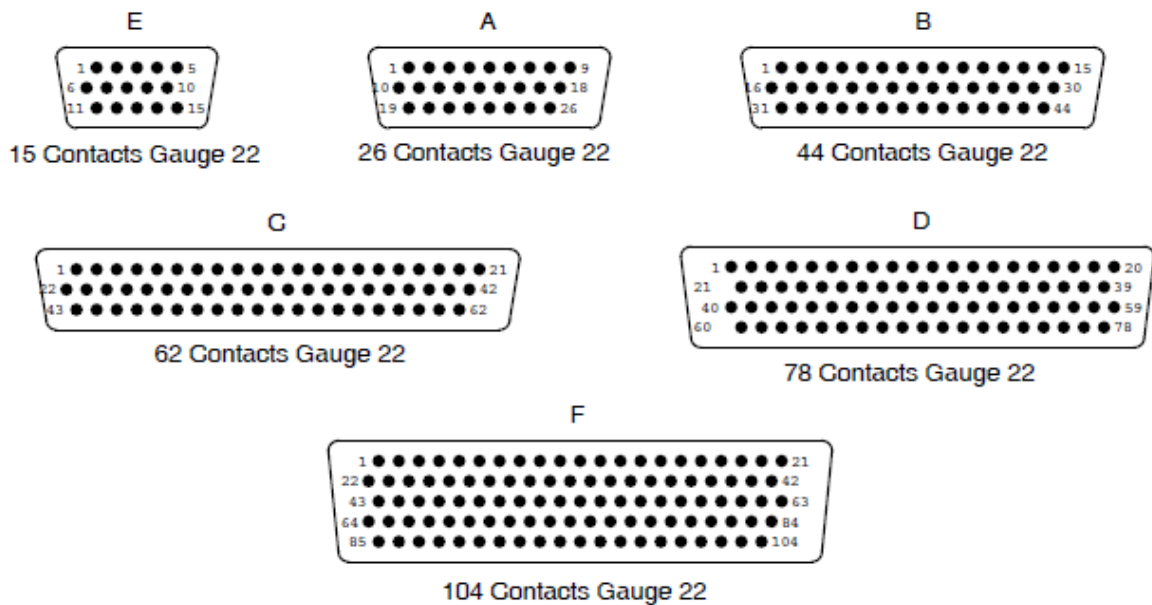
**VARIANT 01 - STANDARD CONTACT ARRANGEMENTS**

**FRONT VIEW MALE INSERT**



**VARIANT 02 - HIGH DENSITY CONTACT ARRANGEMENTS**

**FRONT VIEW MALE INSERT**



**NOTES**

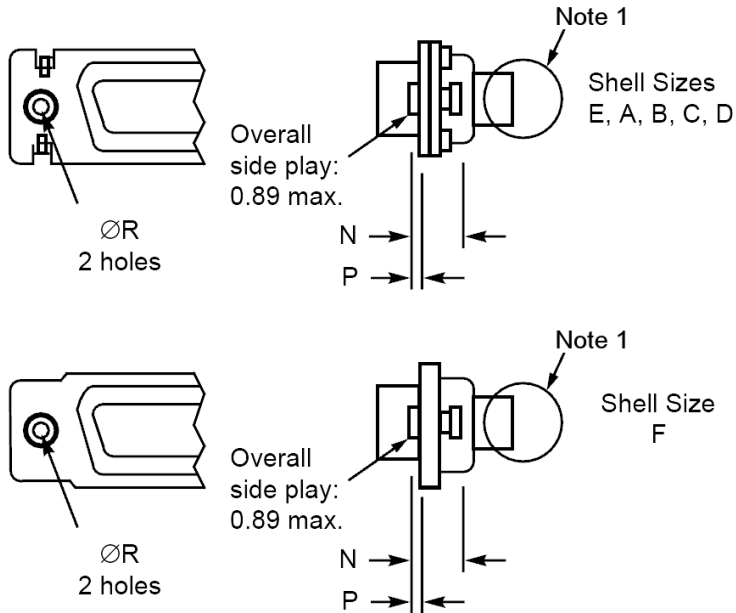
- Contact locations are in conformity with MIL-DTL-24308 specification sheets and shall not be checked during procurement.
- Both sides of the insert shall be marked with the minimum marking shown.

**FIGURE 2(c) - RECEPTACLES AND PLUGS**

OTHER MOUNTING TYPES

FLOATING MOUNT - TYPE 'Y'

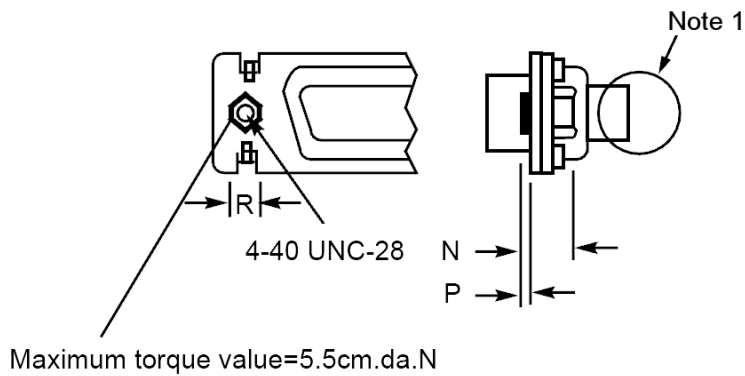
SHELL SIZES E, A, B, C, D AND F



| Contact Type | Symbol/ Dim. | N   | P    | ØR  |
|--------------|--------------|-----|------|-----|
| Male         | Min.         | 2.4 | 0.76 | 2.2 |
|              | Max.         | 3.3 | 0.86 | 2.3 |
| Female       | Min.         | 2.4 | 0.76 | 2.2 |
|              | Max.         | 3.3 | 0.86 | 2.3 |

CAPTIVE NUT - TYPE 'E'

SHELL SIZES E, A, B, C AND D



| Contact Type | Symbol/ Dim. | N   | P   | R   |
|--------------|--------------|-----|-----|-----|
| Male         | Min.         | 3.4 | 0   | 4.3 |
|              | Max.         | 4.2 | 0.4 | 4.7 |
| Female       | Min.         | 3.4 | 0   | 4.3 |
|              | Max.         | 4.2 | 0.4 | 4.7 |

**NOTES**

1. See Figure 2(a) for other dimensions.



## 4 REQUIREMENTS

### 4.1 GENERAL

The complete requirements for procurement of the connectors 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)

(a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.

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

Not applicable.

#### 4.2.4 Deviations from Qualification Tests (Chart IV)

- (a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.
- (b) Para. 9.9, Seal Test: Not applicable.
- (c) Para. 9.24, Jackscrew Retention: Not applicable.

#### 4.2.5 Deviations from Lot Acceptance Tests (Chart V)

- (a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.
- (b) Para. 9.9, Seal Test: Not applicable.

### 4.3 MECHANICAL REQUIREMENTS

#### 4.3.1 Dimension Check

The dimensions of the connectors specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification 3401 and shall conform to those shown in Figure 2 of this specification. Only the underlined dimensions shall be checked during procurement.

#### 4.3.2 Weight

The maximum weight of the connectors specified herein, without contacts, shall be as specified in Table 1(a).

#### 4.3.3 Contact Capability

As specified in ESCC Detail Specification No. 3401/005.

#### 4.3.4 Contact Retention (In Insert)

As specified in ESCC Detail Specification No. 3401/005.

4.3.5 Mating and Unmating Forces

The forces applied for mating and unmating of the connectors shall conform to the values specified in Table 1(a).

4.3.6 Insert Retention (In Shell)

Connector inserts shall withstand a pressure of  $42.8\text{N/cm}^2$  without being dislodged from the shell.

4.3.7 Jackscrew Retention

Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces

As specified in ESCC Detail Specification No. 3401/005.

4.3.9 Engagement and Separation Forces

As specified in ESCC Detail Specification No. 3401/005.

4.3.10 Oversize Pin Exclusion

As specified in ESCC Detail Specification No. 3401/005.

4.3.11 Probe Damage

As specified in ESCC Detail Specification No. 3401/005.

4.3.12 Solderability

As specified in ESCC Detail Specification No. 3401/005.

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 connectors 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 Shells

Shells of shell sizes E, A, B, C and D shall be made of brass. The plating shall be  $0.7\mu\text{m}$  minimum of gold over  $1\mu\text{m}$  minimum of copper.

Shells of shell size F shall be made of aluminium alloy. The plating shall be either  $25.4\mu\text{m}$  minimum of electroless nickel (Modification Code A174) or  $0.7\mu\text{m}$  minimum of gold with  $25.4\mu\text{m}$  minimum electroless nickel underplating (Modification Code FR172).

4.4.2 Inserts

Inserts shall be made of glass-fibre filled diallylphthalate resin or a suitable thermoplastic material. The rear grommet shall be made of silicone elastomer.

4.4.3 Contacts

As specified in ESCC Detail Specification No. 3401/005.

4.4.4 Contact Retaining Clip

The retaining clip shall be made of beryllium copper.

4.4.5 Guiding and Locking Devices

As specified in ESCC Detail Specification Nos. 3401/022, 3401/072 and 3401/085

4.4.6 Magnetism Level

The allowable value of magnetism shall not exceed that specified for the relevant level (see Para. 4.5.4.8). Only magnetism levels NMC and NMD are verified.

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 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) Contact Identification.
- (b) The ESCC Component Number.
- (c) Characteristics.
- (d) Traceability Information.

4.5.2 Contact Identification

Contact identification shall be marked in accordance with Figure 2.

4.5.3 The ESCC Component Number

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

Example: 340100201B

- Detail Specification Number: 3401002
- Type Variant (see Table 1(a)): 01
- Testing level: B

#### 4.5.4 Characteristics

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

- (a) Series.
- (b) Shell size.
- (c) Insert type.
- (d) Alternative designs.
- (e) Contact arrangement.
- (f) Type of contact.
- (g) Magnetism Level.
- (h) Modification Code.
- (i) Contact information

The information shall be constituted and marked as follows:

Example: DFMAY-104S-NMC-A174-FO

- Series: D
- Shell size: F
- Insert type: MA
- Alternative designs (floating mounts): Y
- Contact arrangement: 104
- Type of contact (female): S
- Magnetism Level (20 gamma): NMC
- Modification Code (electroless nickel finish): A174
- Contact information: FO

##### 4.5.4.2 *Series*

This connector series shall be designated by the letter 'D'.

##### 4.5.4.3 *Shell Size*

The shell size shall be indicated by the letters specified hereafter.

|      |   |   |   |   |   |   |
|------|---|---|---|---|---|---|
| Code | E | A | B | C | D | F |
|------|---|---|---|---|---|---|

##### 4.5.4.4 *Insert Type*

This connector type with crimp contacts is defined by the letters 'MA'.

##### 4.5.4.5 *Alternative Designs*

- The letter 'E' indicates captive nuts.
- The letter 'Y' indicates floating mounts.
- The letter 'G' indicates a rear grommet dust proof version.
- The letters 'YG' indicate floating mounts and rear grommet dust proof version.

If the shell has standard mounting holes, these letters shall be omitted.

4.5.4.6 *Contact Arrangements*

The number of contacts shall be as shown in Figure 2(b) and contact arrangements shall be indicated by the codes specified hereafter.

| Shell Size | Code       |            |
|------------|------------|------------|
|            | Variant 01 | Variant 02 |
| E          | 9          | 15         |
| A          | 15         | 26         |
| B          | 25         | 44         |
| C          | 37         | 62         |
| D          | 50         | 78         |
| F          | -          | 104        |

4.5.4.7 *Type of Contact*

The contact types shall be indicated by the following code letters.

| Code Letter | Contact Type |
|-------------|--------------|
| P           | Male         |
| S           | Female       |

4.5.4.8 *Magnetism Level*

The following codes shall be used for magnetism level.

| Code | Definition                            |
|------|---------------------------------------|
| NMB  | Magnetism Level: $\leq 200$ gamma (1) |
| NMC  | Magnetism Level: $\leq 20$ gamma      |
| NMD  | Magnetism Level: $\leq 2$ gamma       |

**NOTES**

1. Guaranteed, but not measured.

4.5.4.9 *Modification Code*

The modification code for the finish of shell size F (aluminium alloy) shall be:

- A174 for the electroless nickel finish
- FR172 for the gold over electroless nickel finish.

The modification code shall be omitted for shell sizes E, A, B, C and D.

4.5.4.10 *Contact Information*

FO = Connector ordered without contacts. This information shall be only marked on the packaging and is not marked on the connector.

Contacts must be from the same Manufacturer as the connector in which they are mounted and this shall be verified prior to assembly.

4.5.5 Traceability Information

Traceability information shall be marked in accordance with the requirements of 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 in Table 2. Unless otherwise specified, these measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

##### 4.6.2 Electrical Measurements at High and Low Temperatures (Table 3)

Not applicable.

##### 4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

#### 4.7 BURN-IN AND ELECTRICAL MEASUREMENTS (TABLES 4 AND 5)

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 shall be those specified in Table 6. Unless otherwise specified, the 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, the 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.

**TABLE 2 – ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE**

| No. | Characteristic  | Symbol         | Specification and Test Method | Test Condition           | Limits         |        | Unit |
|-----|---|----------------|-------------------------------|--------------------------|----------------|--------|------|
|     |   |                |                               |                          | Min            | Max    |      |
| 1   | Insulation Resistance                                     | Ri             | ESCC 3401<br>Para. 9.1.1.1    | Para. 9.1.1.1            | 5000           | -      | MΩ   |
| 2   | Voltage Proof Leakage Current<br>Variant 01<br>Variant 02 | I <sub>L</sub> | ESCC 3401<br>Para. 9.1.1.2    | 1250Vrms (1)<br>1000Vrms | -<br>-         | 2<br>2 | mA   |
| 3   | Mated Shell Conductivity (Voltage Drop) (2)               | Vd             | ESCC 3401<br>Para. 9.1.1.4    | Para. 9.1.1.3            | Not applicable |        | mV   |

**NOTES**

1. When connectors are equipped with 340100505B or 340100506B contacts, each crimp barrel shall be isolated from adjacent contacts with insulation material.
2. Applicable to mated connectors with grounding option.

**TABLES 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 (1) | Test Method and Conditions | Identification   | Conditions                              |                 | Min                                     | Max    |      |
| 01  | Wiring                                | Para. 9.10                 | ESCC 3401/005  | -                                       | -               | -                                       | -      |      |
| 02  | Vibration                             | Para. 9.11                 | <b>Initial Measurements</b><br>Coupling Screw(s)<br>Unlocking Torque<br><br><b>Final Measurements</b><br>Coupling Screw(s)<br>Unlocking Torque Drift<br>Visual Examination | -<br><br>Full Engagement<br>-<br>-<br>- | -<br><br>Δ<br>- | Record Values<br><br>-25   +25<br>-   - |        | %    |
| 03  | Shock or Bump                         | Para. 9.12                 | <b>Final Measurements</b><br>Visual Examination  | Full Engagement<br>-                    | -<br>-          | -<br>-                                  | -<br>- |      |

| No.                             | ESCC Generic Spec. No. 3401           |                                       | Measurements and Inspections       |                        | Symbol         | Limits               |     | Unit |               |
|---------------------------------|---------------------------------------|---------------------------------------|------------------------------------|------------------------|----------------|----------------------|-----|------|---------------|
|                                 | Environmental and Endurance Tests (1) | Test Method and Conditions            | Identification                     | Conditions             |                | Min                  | Max |      |               |
| 04                              | Climatic Sequence                     | Para. 9.13                            | <b>Dry Heat</b>                    | Table 2 Item 1         | Ri             | 1000                 | -   | MΩ   |               |
|                                 |                                       |                                       | Insulation Resistance              |                        |                |                      |     |      |               |
|                                 |                                       |                                       | <b>Low Air Pressure</b>            | Figure 1               | I <sub>L</sub> | Table 2 Item 2       | -   | -    | -             |
|                                 |                                       |                                       | Voltage Proof Leakage Current      |                        |                |                      |     |      |               |
|                                 |                                       |                                       | <b>Damp Heat</b>                   | Immediately after test | Ri             | Table 2 Item 1       | 100 | -    | -             |
|                                 |                                       |                                       | Insulation Resistance              |                        |                |                      |     |      |               |
| <b>After 1 - 24hrs Recovery</b> | ESCC 3401 Para. 9.7                   | -                                     | -                                  | -                      | -              | -                    |     |      |               |
| External Visual Inspection      |                                       |                                       |                                    |                        |                |                      |     |      |               |
| Insulation Resistance           | Table 2 Item 1                        | Ri                                    | Table 2 Item 1                     |                        |                |                      |     |      |               |
| Voltage Proof Leakage Current   | Table 2 Item 2                        | I <sub>L</sub>                        | Table 2 Item 2                     |                        |                |                      |     |      |               |
| 05                              | Seal Test                             | Para. 9.9                             | ESCC 3401 Para. 9.9                | -                      | -              | Not applicable       |     |      |               |
| 06                              | Plating Thickness                     | Para. 9.14                            | Thickness                          | -                      | -              | ESCC 3401/005        |     |      |               |
| 07                              | Joint Strength                        | Para. 9.15                            | ESCC 3401 Para. 9.15               | -                      | -              | ESCC 3401 Para. 9.15 |     |      |               |
| 08                              | Rapid Change of Temperature           | Para. 9.16                            | Visual Examination                 | -                      | -              | -                    | -   |      |               |
|                                 |                                       |                                       | Insulation Resistance              | Table 2 Item 1         | Ri             | Table 2 Item 1       |     |      |               |
|                                 |                                       |                                       | Voltage Proof Leakage Current      | Table 2 Item 2         | I <sub>L</sub> | Table 2 Item 2       |     |      |               |
| 09                              | Contact Retention (In Insert)         | Para. 9.17 & Para. 4.3.4 of this spec | Contact Displacement               | -                      | -              | ESCC 3401 Para. 9.17 |     |      |               |
| 10                              | Endurance                             | Para. 9.18                            | <b>Initial Measurements</b>        | -                      | F              | -                    | -   | -    |               |
|                                 |                                       |                                       | Mating/Unmating Forces             |                        |                |                      |     |      |               |
|                                 |                                       |                                       | Low Level Contact Resistance       |                        |                |                      |     |      | ESCC 3401/005 |
|                                 |                                       |                                       | Mated Shell Conductivity           | Table 2 Item 3         | Vd             | Not applicable       |     |      |               |
|                                 |                                       |                                       | <b>Final Measurements</b>          | -                      | -              | -                    | -   | -    | -             |
|                                 |                                       |                                       | Visual Examination                 |                        |                |                      |     |      |               |
|                                 |                                       |                                       | Mating/Unmating Forces             |                        |                |                      |     |      |               |
|                                 |                                       |                                       | Low Level Contact Resistance Drift | ESCC 3401/005          | ΔRcl           | ESCC 3401/005        |     |      |               |
|                                 |                                       |                                       | Mated Shell Conductivity           | Table 2 Item 3         | Vd             | Not applicable       |     |      |               |
|                                 |                                       |                                       | Insulation Resistance              | Table 2 Item 1         | Ri             | Table 2 Item 1       |     |      |               |
| Voltage Proof Leakage Current   | Table 2 Item 2                        | I <sub>L</sub>                        | Table 2 Item 2                     |                        |                |                      |     |      |               |



| No. | ESCC Generic Spec. No. 3401           |  | Measurements and Inspections  |  | Symbol  | Limits  |     | Unit                                   |
|-----|---------------------------------------|--|---|--|---|---|-----|--|
|     | Environmental and Endurance Tests (1) | Test Method and Conditions             | Identification  | Conditions   |   | Min   | Max |  |
| 11  | Permanence of Marking                 | Para. 9.19                             | As applicable   | -  | -   | -   | -   |  |
| 12  | Mating Unmating Forces                | Para. 9.20                             | Force   | -  | F   | Para. 4.3.5 of this spec.   |     |  |
| 13  | High Temperature Storage              | Para. 9.21                             | <b>Initial Measurements</b><br><br>Low Level Contact Resistance<br>Mated Shell Conductivity<br><br><b>Final Measurements</b><br>Visual Examination<br>Mating/Unmating Forces<br><br>Low Level Contact Resistance Drift<br>Rated Current Contact Resistance<br>Mated Shell Conductivity<br>Insulation Resistance<br>Voltage Proof Leakage Current<br>Contact Retention (In Insert) | ESCC 3401/005<br><br>Table 2 Item 3<br><br>-<br>-<br><br>ESCC 3401/005<br><br>ESCC 3401/005<br><br>Table 2 Item 3<br>Table 2 Item 1<br>Table 2 Item 2<br><br>Para. 4.3.4 of this spec. | Rcl<br>Vd<br><br>-<br>F<br><br>ΔRcl<br>Rcr<br>Vd<br>Ri<br>I <sub>L</sub><br>- | Record Values<br><br>Not applicable<br><br>-<br>-<br>Para. 4.3.5 of this spec.<br><br>ESCC 3401/005<br><br>ESCC 3401/005<br><br>Not applicable<br>Table 2 Item 1<br>Table 2 Item 2<br><br>ESCC 3401<br>Para. 9.17 |     |  |
| 14  | Corrosion                             | Para. 9.22                             | Visual Examination  | -  | -   | -   | -   |  |
| 15  | Insert Retention (In Shell)           | Para. 9.23 & Para. 4.3.6 of this spec. | Visual Examination  | -  | -   | Para. 4.3.6   |     |  |
| 16  | Jackscrew Retention                   | Para. 9.24 & Para. 4.3.7 of this spec. | Visual Examination  | -  | -   | Not applicable  |     |  |
| 17  | High Temperature Measurements         | Para. 9.25                             | Insulation Resistance   | Table 2 Item 1   | Ri  | 500   | -   | MΩ                                     |
| 18  | Overload Test                         | Para. 9.26                             | Internal Temperature<br>Rated Current Contact Resistance<br>Mated Shell Conductivity<br>Insulation Resistance<br>Voltage Proof Leakage Current  | -<br>ESCC 3401/005<br><br>Table 2 Item 3<br>Table 2 Item 1<br>Table 2 Item 2   | T<br>Rcr<br>Vd<br>Ri<br>I <sub>L</sub>  | -<br>+100<br>ESCC 3401/005<br><br>Not applicable<br>Table 2 Item 1<br>Table 2 Item 2  | °C  |  |
| 19  | Maintenance Ageing                    | Para. 9.27                             | Visual Examination<br>Contact Retention<br>Contact Insertion & Withdrawal Forces  | -<br>Para. 4.3.4 of this spec.<br>Para. 4.3.8 of this spec.  | -   | -   | -   | ESCC 3401<br>Para. 9.17<br>Para. 4.3.8 |
| 20  | Engage/Separation Forces              | Para. 9.28 & Para. 4.3.9 of this spec. | Force   | -  | -   | Para. 4.3.9   |     |  |

| No. | ESCC Generic Spec. No. 3401           |   | Measurements and Inspections |                           | Symbol | Limits                  |     | Unit |
|-----|---------------------------------------|---|------------------------------|---------------------------|--------|-------------------------|-----|------|
|     | Environmental and Endurance Tests (1) | Test Method and Conditions              | Identification               | Conditions                |        | Min                     | Max |      |
| 21  | Oversize Pin Exclusion                | Para. 9.29 & Para. 4.3.10 of this spec. | -                            | -                         | -      | ESCC 3401<br>Para. 9.29 |     |      |
| 22  | Probe Damage                          | Para. 9.30 & Para. 4.3.11 of this spec. | Contact Separation Force     | Para. 4.3.9 of this spec. |        | Para. 4.3.9             |     |      |
| 23  | Solderability                         | Para. 9.31 & Para. 4.3.12 of this spec. | -                            | -                         | -      | Para. 4.3.12            |     |      |

**NOTES**

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

**APPENDIX A**  
**AGREED DEVIATIONS FOR C & K COMPONENTS (F)**

| ITEMS<br>AFFECTED | DESCRIPTION OF DEVIATIONS   |
|-------------------|---|
| Para. 4.2.2       | Para. 9.3, Contact Retainer Test may be omitted provided that a 100% external visual inspection of the contact retainer clips positioned within the insert is performed in accordance with the C & K COMPONENTS PID requirements. |