CONNECTING PIECES, ELECTRICAL, FOR WIRES WITH STANDARD DENSITY REMOVABLE CRIMP CONTACTS

BASED ON TYPE SPACE SPLICE

ESCC Detail Specification No. 3401/097

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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 Connecting Pieces, Electrical, for Wires with Standard (Gauge 20) Density Removable Crimp Contacts, based on Type Space Splice.

It shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connecting pieces, Electrical, Non-Filtered, Circular and Rectangular.
- ESCC Detail Specification No. 3401/005, Contacts, Electrical, Crimp, for 3401/002 Connectors and 3401/097 Connecting Pieces.

the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

The available Component Type Variants are detailed in Table 1(a).

1.2.1 Manufacturer Specific Connecting Piece Design Drawing (Applicable to Variants 02 and 03 Only)

A Specific Connecting Piece Design Drawing shall be produced by the Manufacturer after negotiation with the Orderer and shall be held under configuration control by the Manufacturer who will allocate a unique drawing number which shall be used to identify the connecting piece.

Each Manufacturer Specific Connecting Piece Design Drawing shall include the following information:

(a) The outline, dimensions, marking information and all interfaces of the connecting piece (see Figures 2(b) and 2(c) for examples).
(b) The ESCC Component Number for the connecting piece, as defined in Para. 4.5.2.

1.3 MAXIMUM RATINGS

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

1.4 PARAMETER DERATING INFORMATION

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

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the connecting pieces 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 Connecting pieces, Electrical, Non-Filtered, Circular and Rectangular.
(b) ESCC Detail Specification No. 3401/005, Contacts, Electrical, Crimp, for 3401/002 Connectors and 3401/097 Connecting Pieces.
(c) 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) – COMPONENT TYPE VARIANTS

Variant Number	Description	Number of Rows	Mounting Type	Max. Weight (g) (Note 5)
01	A 1-way connecting piece for use with standard density crimp contacts. See Notes 1, 2	N/A	N/A	0.2
02	Customisable multi-way connecting pieces for use with standard density crimp contacts. See Notes 1, 3	1	Axial, Radial, None (see Para. 4.5.2.1(b))	Note 6
03	Customisable multi-way connecting pieces for use with standard density crimp contacts. See Notes 1, 4	2	Axial, Radial, None (see Para. 4.5.2.1(b))	Note 6

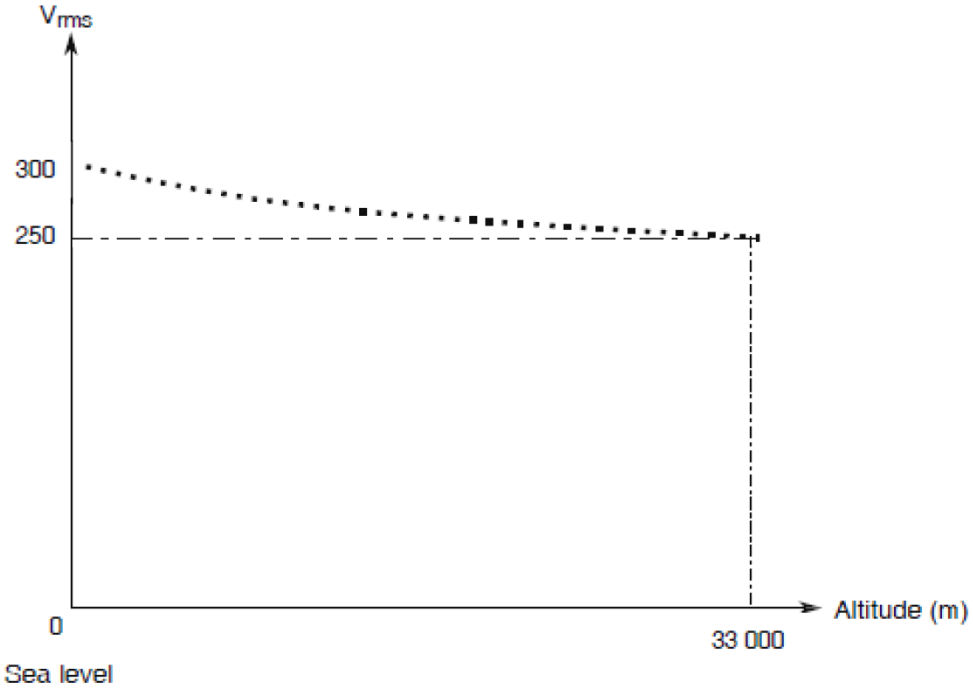
NOTES:

1. The following contacts in accordance with the ESCC Detail Specification No. 3401/005 may be used:
   - Pin contact: 340100501B and/or 340100503B
   - Socket contact: 340100502B and/or 340100504B
2. Variant 01 is used to connect standard density (Gauge 20) crimp contacts (1 Pin contact and 1 Socket contact). See Figure 2(a) and Figure 3.
3. Variant 02 (see Figure 2(b) and Figure 3) is customisable as follows:
   - Number of ways: 4 to 20
4. Variant 03 (see Figure 2(c) and Figure 3) is customisable as follows:
   - Number of ways: 9 to 39, only odd numbers.
5. Max. weight of connecting pieces (without contacts). See ESCC Detail Specification No. 3401/005 for contact weights.
6. As specified in the Manufacturer Specific Connecting Piece Design Drawing.

TABLE 1(b) – MAXIMUM RATINGS

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

FIGURE 1 - PARAMETER DERATING INFORMATION



Working Voltage versus Altitude

FIGURE 2 – PHYSICAL DIMENSIONS AND CONTACT IDENTIFICATION

FIGURE 2(a) – VARIANT 01 (1-WAY CONNECTING PIECE) (NOTES 1, 2)

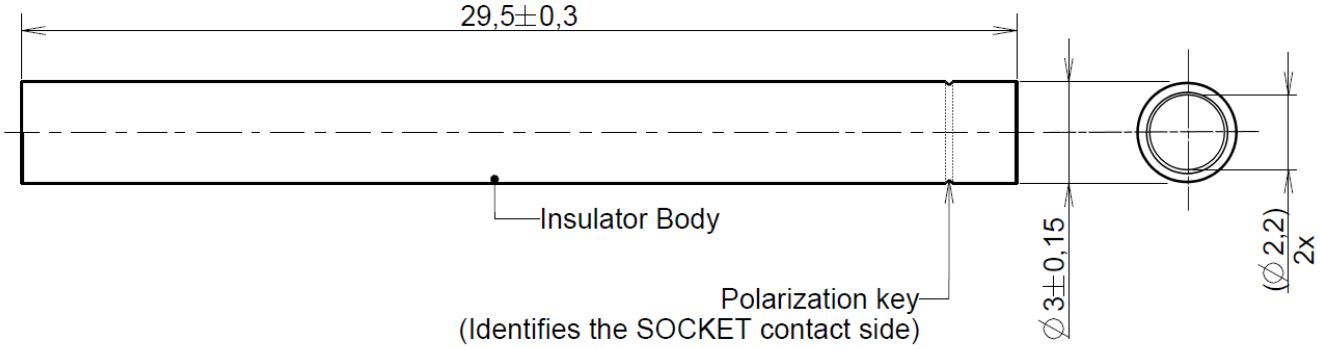
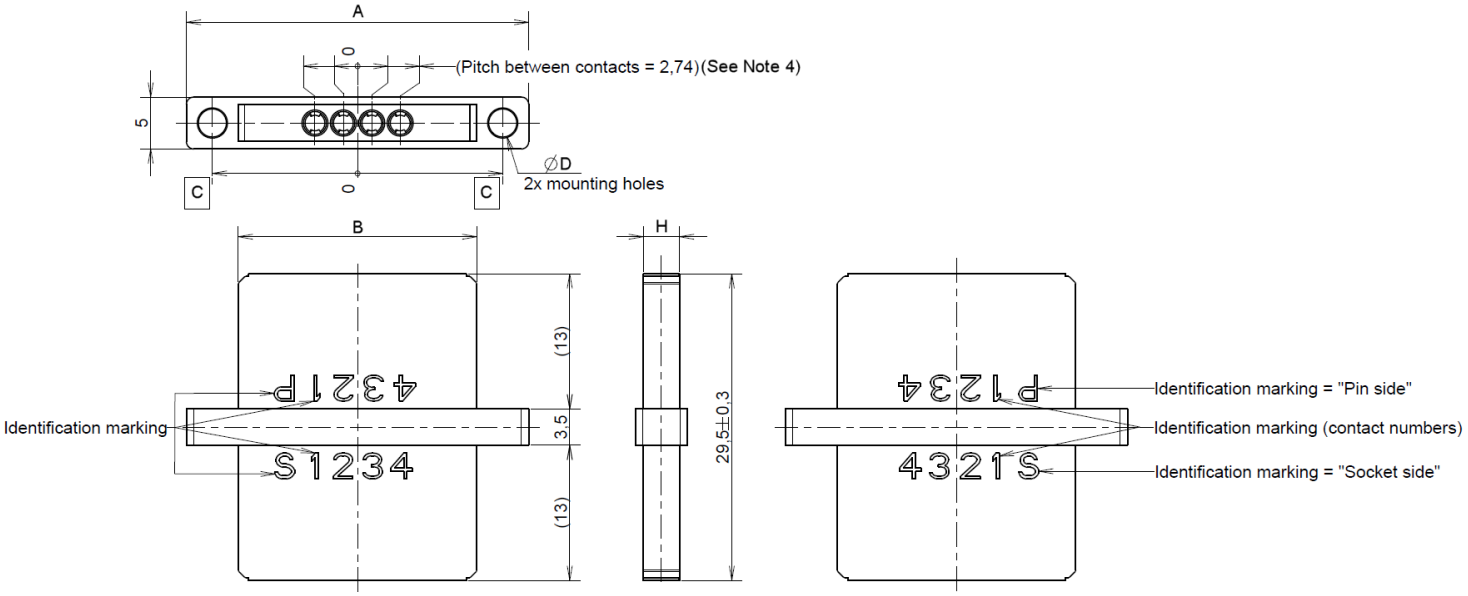


FIGURE 2(b) – VARIANT 02 EXAMPLES (NOTES 1, 2, 3)

1-ROW, 4-WAY CONNECTING PIECE, AXIAL MOUNTING



1-ROW, 20-WAY CONNECTING PIECE, RADIAL MOUNTING

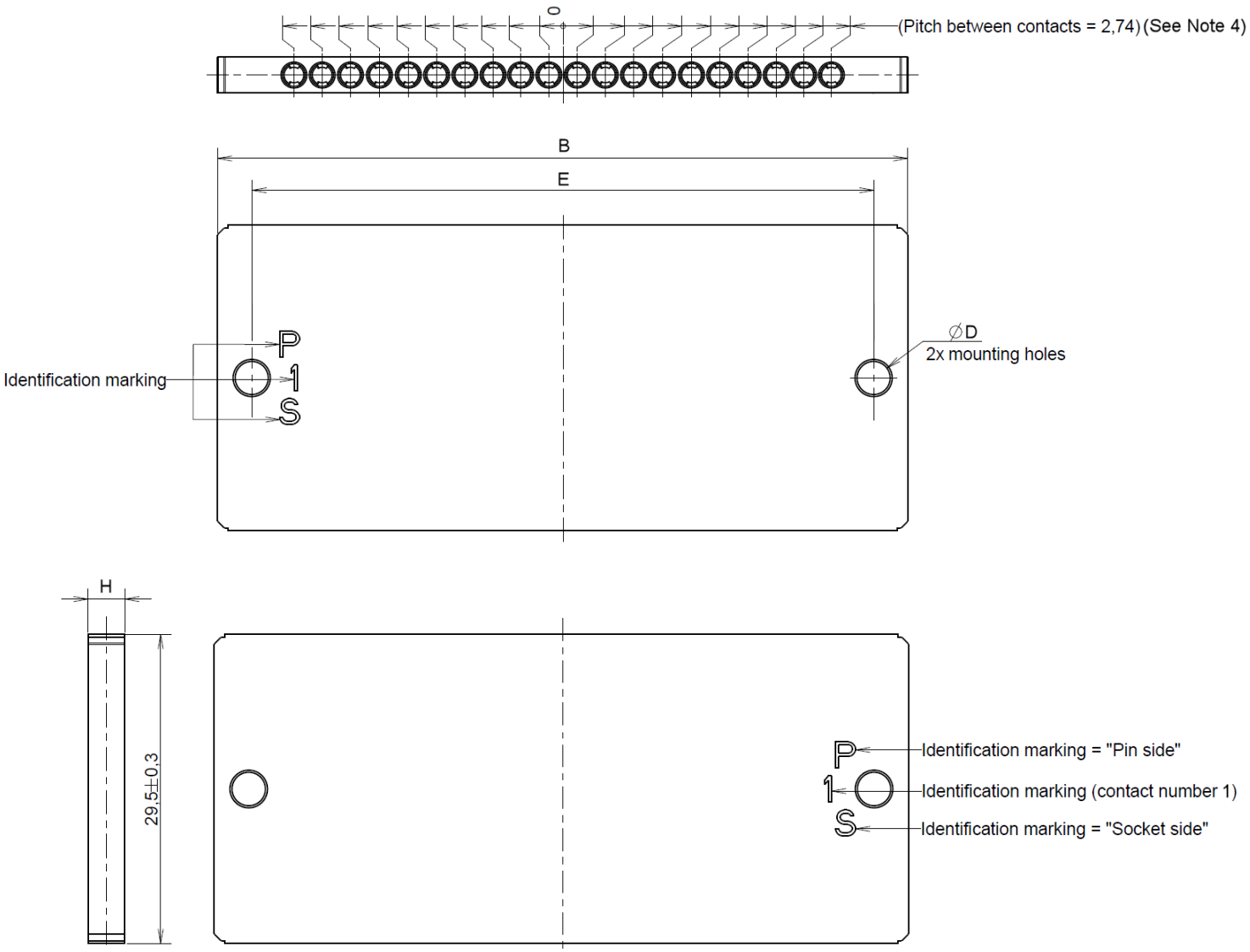
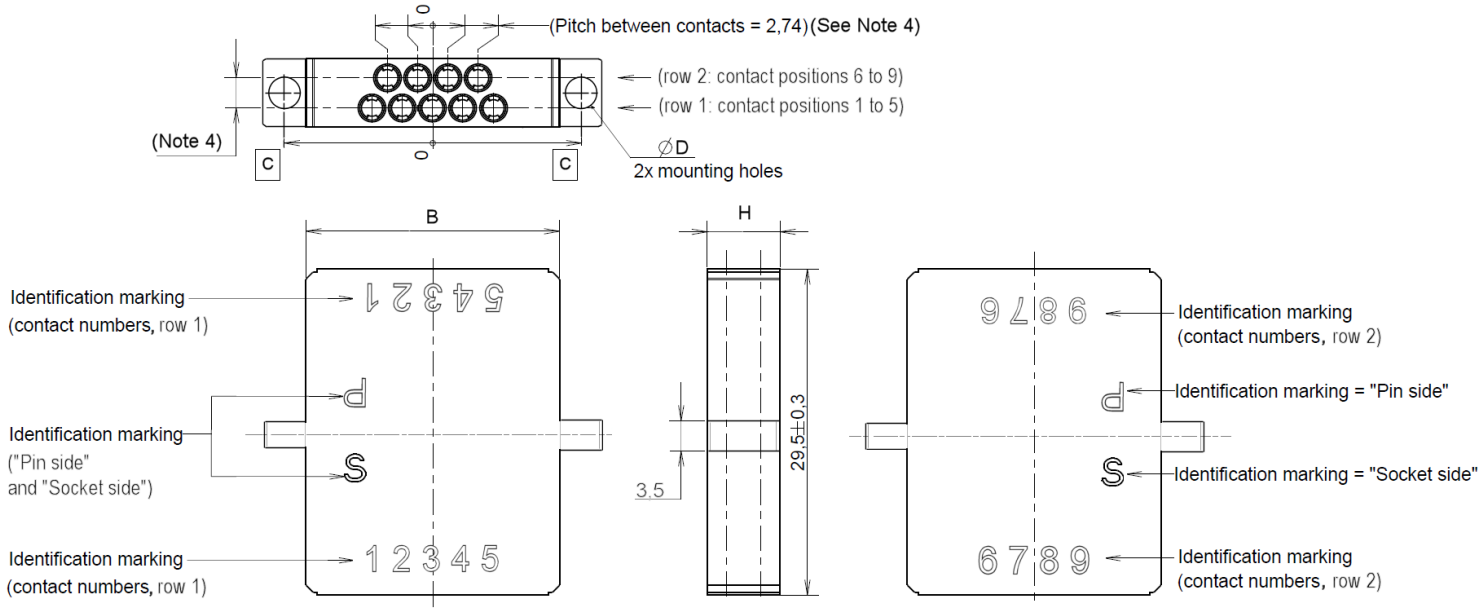
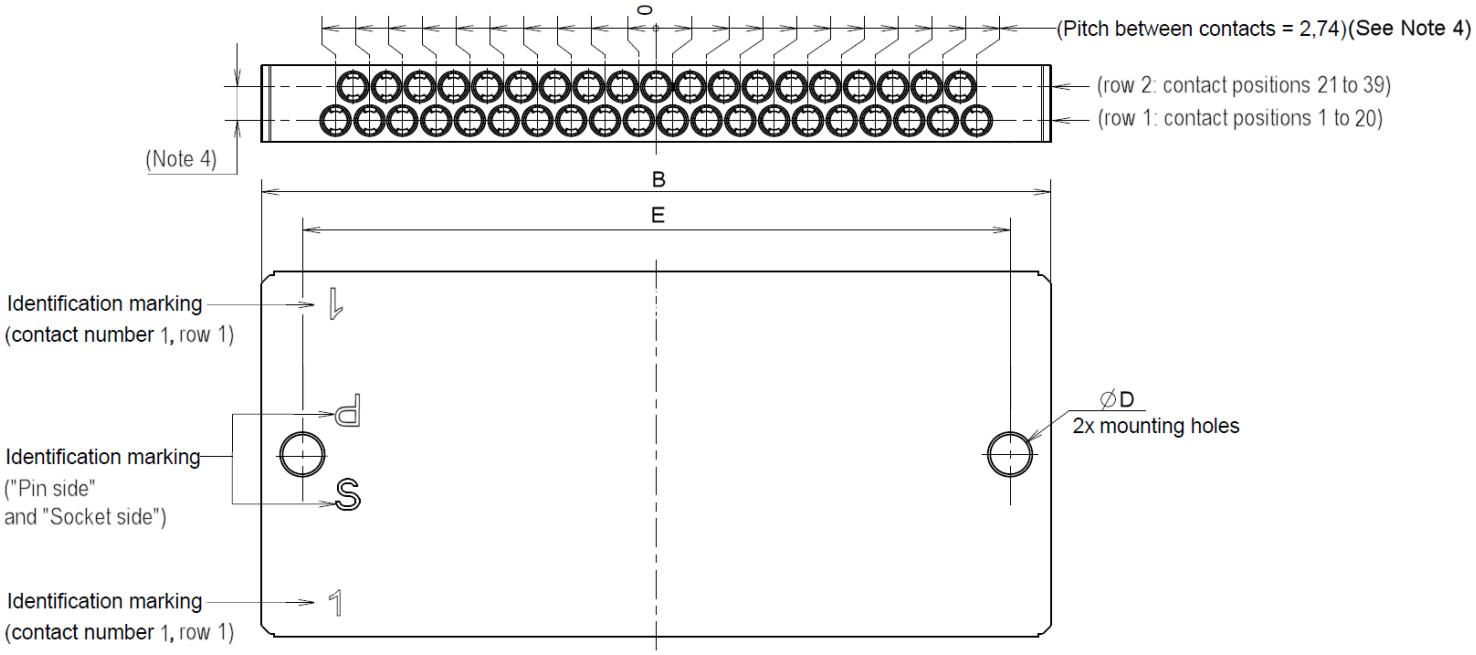


FIGURE 2(c) – VARIANT 03 EXAMPLES (NOTES 1, 2, 3)

2-ROW, 9-WAY CONNECTING PIECE, AXIAL MOUNTING



2-ROW, 39-WAY CONNECTING PIECE, RADIAL MOUNTING



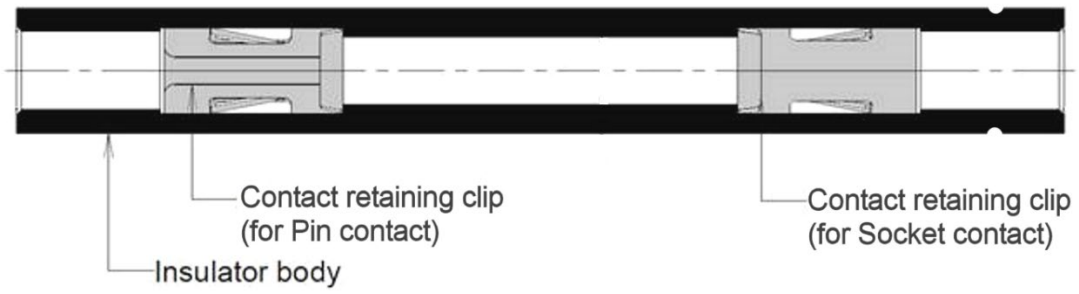
2-ROW, 39-WAY CONNECTING PIECE, RADIAL MOUNTING (CONTINUED)

NOTES TO FIGURE 2:

1. Contact identification:
   - For Variant 01, the socket contact side shall be identified by means of a polarization key as shown.
   - For Variants 02 and 03, the contact locations shall be as specified in the Manufacturer Specific Connecting Piece Design Drawing. See the examples shown in Figures 2(b) and 2(c).
2. All dimensions are in millimetres.
3. Per Para. 1.2.1, all dimensions shall be specified in each Manufacturer Specific Connecting Piece Design Drawing.
4. For Variants 02 and 03, the contact position dimensions are specified in MIL-DTL-24308. For Variant 03, the spacing between rows is specified in MIL-DTL-24308. The contact hole diameters for all Variant 02 and 03 designs are the same as for Variant 01.

FIGURE 3 – CONNECTING PIECE INTERNAL VIEW

Variant 01 shown for illustrative purposes



4 REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the connecting pieces 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))

(a) Para. 9.2, Mating Verification: Not applicable.
(b) Para. 9.5, Magnetism Level: Not applicable.

4.2.3 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.22, Corrosion: Not applicable.

4.2.4 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.22, Corrosion: Not applicable.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the connecting pieces 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 either Figure 2 of this specification or the applicable Manufacturer Specific Connecting Piece Design Drawing.

4.3.2 Weight

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

4.3.3 Contact Retention

The applicable contact retention forces are specified in ESCC Detail Specification No. 3401/005.

4.3.4 Contact Insertion and Withdrawal Forces

Either 18.5N maximum or 21.8N maximum, where:

18.5N applies to the first contact to be inserted and the second contact to be withdrawn, and
21.8N applies to the second contact to be inserted and the first contact to be withdrawn.

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 connecting pieces 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 Body

The body shall be made of:

- For Variant 01: PEEK.
- For Variants 02 and 03: PEEK, bonded with epoxy resin.

4.4.2 Contact Retaining Clips

The contact retaining clips shall be made of beryllium copper.

4.5 MARKING

4.5.1 General

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component or its primary package shall be:

(a) The ESCC qualified components symbol (for ESCC qualified components only).
(b) Contact Identification (for Variants 02 and 03 only) (as applicable, see Figures 2(b) and 2(c)).
(c) The ESCC Component Number (see Para. 4.5.2).
(d) 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:

(a) For Variant 01:

340109701B, where:

- Detail Specification Number: 3401097
- Type Variant: 01
- Testing level: B

(b) For Variants 02 and 03:

Example: 340109702B04RA1234, where:

- Detail Specification Number: 3401097
- Type Variant (see Table 1(a)): 02 (as required)
- Testing level: B
- Characteristic Code: Number of Ways: 04 (as required)
- Characteristic Code: Mounting Type (Radial): R (as required)
- Manufacturer Specific Connecting Piece Identification: A1234 (as applicable) where:
  - A: Unique code letter representing the applicable Manufacturer.
  - 1234: A unique 4-digit number, allocated by the applicable Manufacturer to a specific connecting piece design (see Para. 1.2.1).

4.5.2.1 Characteristics Codes

For Variants 02 and 03 only, characteristics to be codified as part of the ESCC Component Number shall be as follows:

(a) Number of Ways expressed by means of the following codes:

Variant Number	Number of Ways	Codes
02	4 to 20	04 to 20
03	9 to 39 (Note 1) (row 1: 5 ways, row 2: 4 ways) to (row 1: 20 ways, row 2: 19 ways)	09 to 39 (Note 1)

NOTES:

1. Only odd numbers; see Table 1(a) and Figure 2(c).

(b) Mounting Type expressed by means of the following codes (See Figures 2(b) and 2(c)):

Mounting Type	Code Letter
Axial	A
Radial	R
No mounting holes	N

4.5.3 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 ±3°C.

4.7 ENVIRONMENTAL AND ENDURANCE TESTS

4.7.1 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 ±3°C.

4.7.2 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 ±3°C.

TABLE 2 – ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristic	Symbol	Specification, Test Method and Conditions	Limits		Unit
				Min	Max	
1	Insulation Resistance	Ri	ESCC No. 3401	5000	-	MΩ
2	Voltage Proof Leakage Current	I_L	ESCC No. 3401 1250Vrms	-	2	mA

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	**Initial Measurements**					
			Contact insertion force	Para. 4.3.4 of this spec.	-	Para. 4.3.4		N
			Final Measurements					
			Contact withdrawal force	Para. 4.3.4 of this spec.	-	Para. 4.3.4		N
			Visual Examination	-	-	-	-	
03	Shock or Bump	Para. 9.12	**Final Measurements**					
			Visual Examination	-	-	-	-	
04	Climatic Sequence	Para. 9.13	**Dry Heat**					
			Insulation Resistance	Table 2 Item 1	Ri	1000	-	MΩ
			Low Air Pressure					
			Voltage Proof Leakage Current	Figure 1	I_L	Table 2 Item 2		
			Damp Heat	Immediately after test				
			Insulation Resistance	Table 2 Item 1	Ri	100	-	MΩ
				After 1 - 24hrs Recovery				
			External Visual Inspection	ESCC 3401 Para. 9.7	-	ESCC 3401 Para. 9.7		
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2 Item 2		
05	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_L	Table 2 Item 2		
06	Contact Retention	Para. 9.17 & Para. 4.3.3 of this spec.	Contact Displacement	-	-	ESCC 3401/005		

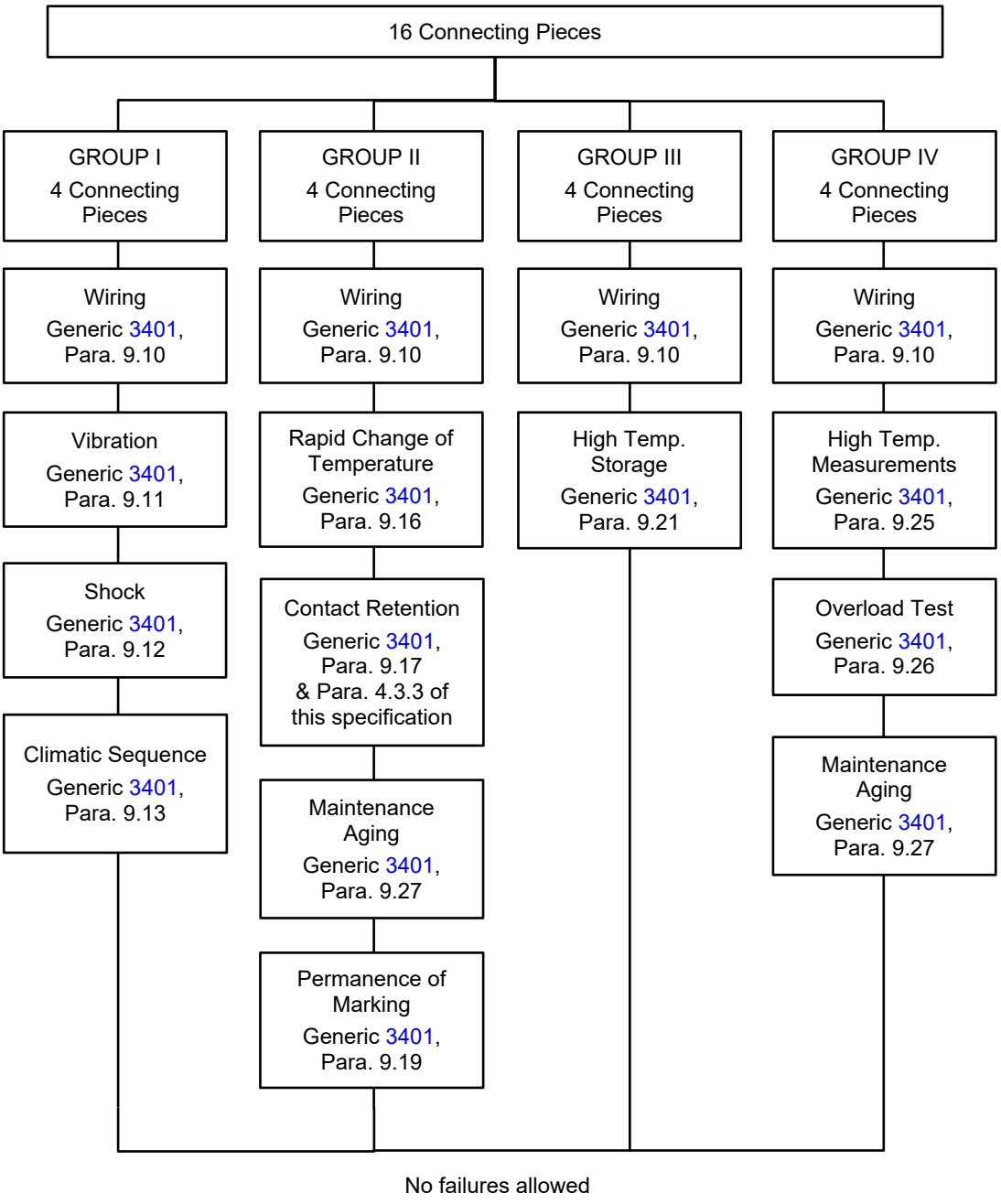
No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
07	Permanence of Marking	Para. 9.19	As applicable	-	-	-	-	
08	High Temperature Storage	Para. 9.21	**Final Measurements**					
			Visual Examination	-	-	-	-	
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2 Item 2		
09	High Temperature Measurements	Para. 9.25	Insulation Resistance	Table 2 Item 1	Ri	500	-	MΩ
10	Overload Test	Para. 9.26	Internal Temperature	-	T	-	+100	ºC
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2 Item 2		
11	Maintenance Ageing	Para. 9.27	Visual Examination	-	-	-	-	
			Contact Insertion & Withdrawal Forces	Para. 4.3.4 of this spec.		Para. 4.3.4		

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)

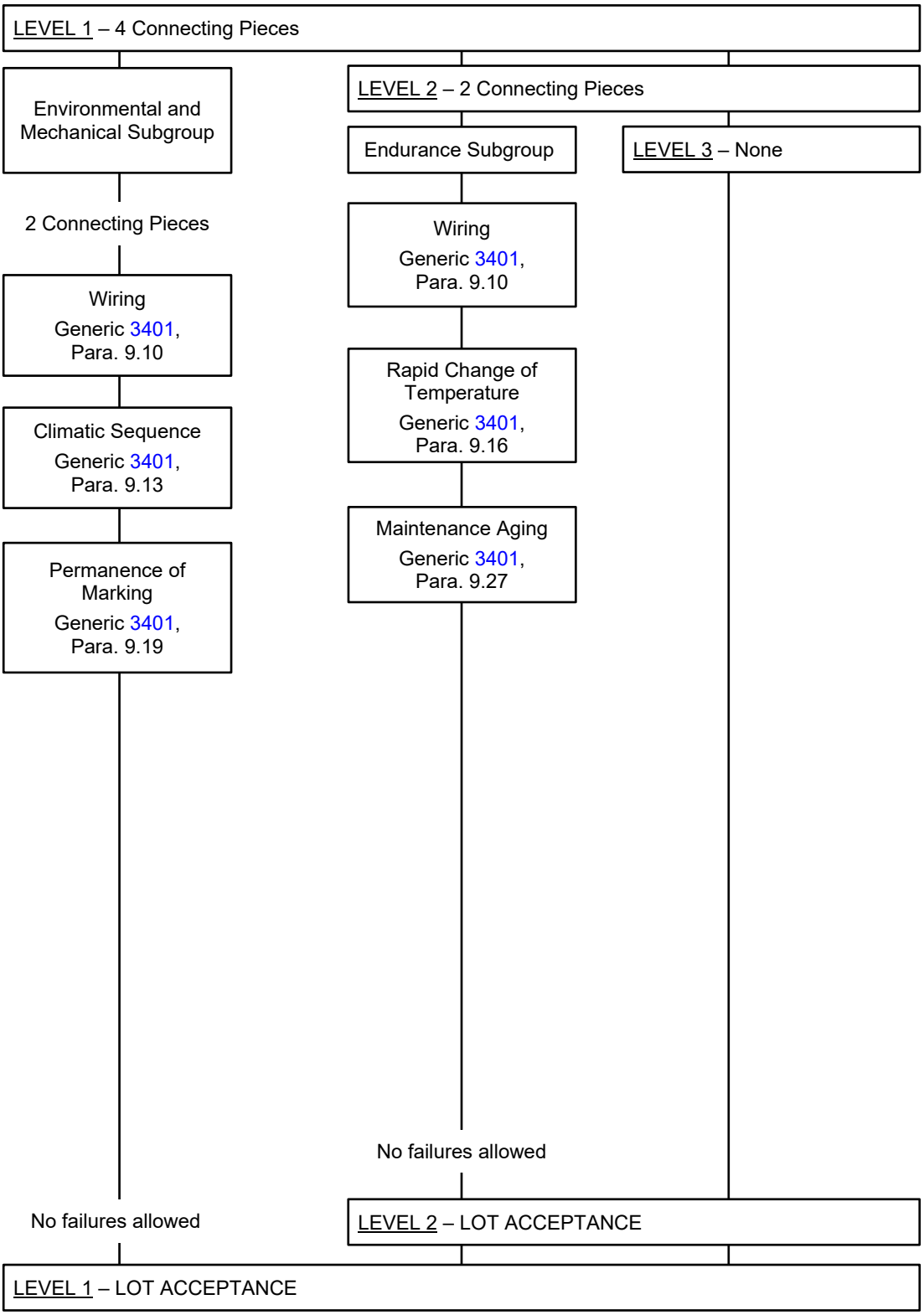
ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 4.2.2 – Deviations from Final Production Tests (Chart II(a))	Para. 9.3, Contact Retainer Test may be omitted provided that a 100% external visual inspection of the contact retainer clips positioned within the insulator body is performed in accordance with the C & K Components PID requirements.
Para. 4.2.3 – Deviations from Qualification Tests (Chart IV)	Qualification testing shall be performed in accordance with the following Chart with no failures allowed:



ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 4.2.3 – Deviations from Qualification Tests (Chart IV) (Continued)	Para. 9.11, Vibration: Para. 9.11.1(a): Method of Mounting Connecting pieces shall be fixed on test equipment. The wires shall be clamped to a non-vibrating point which is at least 20cm away from the connecting pieces such that resonance of the wires is avoided. Para. 9.11.1(c): Examination after Testing Connecting pieces shall not be damaged and there shall be no loosening of parts caused by vibration. Para. 9.12, Shock: Para. 9.12.1(a): Method of Mounting Connecting pieces shall be fixed on test equipment. The wires shall be clamped to a non-vibrating point which is at least 20cm away from the connecting pieces such that resonance of the wires is avoided. Para. 9.12.1(c): Examination after Testing Connecting pieces shall not be damaged and there shall be no loosening of parts caused by shock.

(Agreed Deviations for C & K Components (F) continues on the next page)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 4.2.4 – Deviations from Lot Acceptance Tests (Chart V)	Lot Acceptance Tests shall be performed in accordance with the following Chart with no failures allowed:



ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 9.1.1.1 of the Generic Specification: Insulation Resistance	(a) Applicability: This test applies to all Variants and the test shall be performed 100%. (b) Procedure: The insulation resistance shall be measured between all contacts connected together and an external metallic device put around the connecting pieces. • Test voltage: 500 ±50V. The measurements shall exceed the value defined in Table 2 herein. Dummy contacts may be used (metallic parts with overall dimensions identical to those of the contacts without retention system).
Para. 9.1.1.2 of the Generic Specification: Voltage Proof (Sea Level)	(a) Applicability: This test applies to all Variants and the test shall be performed 100%. (b) Procedure: The voltage proof test shall be performed between the contacts connected together and an external metallic device put around the connecting pieces. • Test voltage: as specified in Table 2 herein. • Test duration (Final Production Tests): 5 seconds minimum. • Test duration (Qualification and Lot Acceptance Testing): 1 minute minimum. Dummy contacts may be used (metallic parts with overall dimensions identical to those of the contacts without retention system).