CONTACTS, ELECTRICAL, MALE/FEMALE TYPE, FOR 3401/020 CONNECTOR SAVERS

ESCC Detail Specification No. 3401/021

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DCR No.	CHANGE DESCRIPTION
795	Specification upissued to incorporate editorial 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 Contacts, Electrical, Male/Female Type, Gauge 20 and 22, for 3401/020 Connector Savers.

These contacts shall be packed separately from the connector savers and may be procured either with the connector savers or separately.

It shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered Circular and Rectangular
- ESCC Detail Specification No. 3401/020, Connector Savers, Electrical, Rectangular, Miniature, Removable Contacts, Based on Type D*BMA,

the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

The different sizes of contacts specified herein, which are also covered by this specification are scheduled 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 contacts specified herein, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the contacts 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. 3401/020, Connector Savers, Electrical, Rectangular, Miniature, Removable Contacts, Based on Type D*BMA.
(c) MIL-G-45204, Gold Plating, Electro-deposited.
(d) MIL-C-14550, Copper Plating, Electro-deposited.

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	Type	Mating End Size AWG	Rated Current A	Max Weight g	Engagement & Separation				Contact Capability		Contact Retent. Force Max N	Contact Insert. Withdr. Forces Max N	Probe Damage			Oversize Pin Excl.		
					Engag. Forces N (1)	Separ. Forces N (1)	Test Pins DIA mm		Weight				Moment N.cm	Probe DIA mm		Force Max N	Test Pin DIA mm	
							Min	Max	Pick-up (2) g	Drop (3) g				Min	Max		Min	Max
01	Male/Female	20	7.5	0.25	3.33 -	2.22 0.28	1.039 0.99	1.04 0.993	- 28.35	226.8 -	40	18.5	5.65	1.007	1.033	3.33	1.166	1.17
02	Male/Female	22	5	0.16	3.33 -	2.22 0.2	0.773 0.749	0.775 0.751	- 19.84	226.8 -	40	18.5	1.3	0.749	0.774	2.43	0.905	0.907

NOTES

1. 1st line, maximum values with maximum diameter test pin; 2nd line, minimum values with minimum diameter test pin.
2. With minimum diameter test pin and minimum insertion depth of 4mm.
3. With maximum diameter test pin and minimum insertion depth of 4mm.

TABLE 1(b) MAXIMUM RATINGS

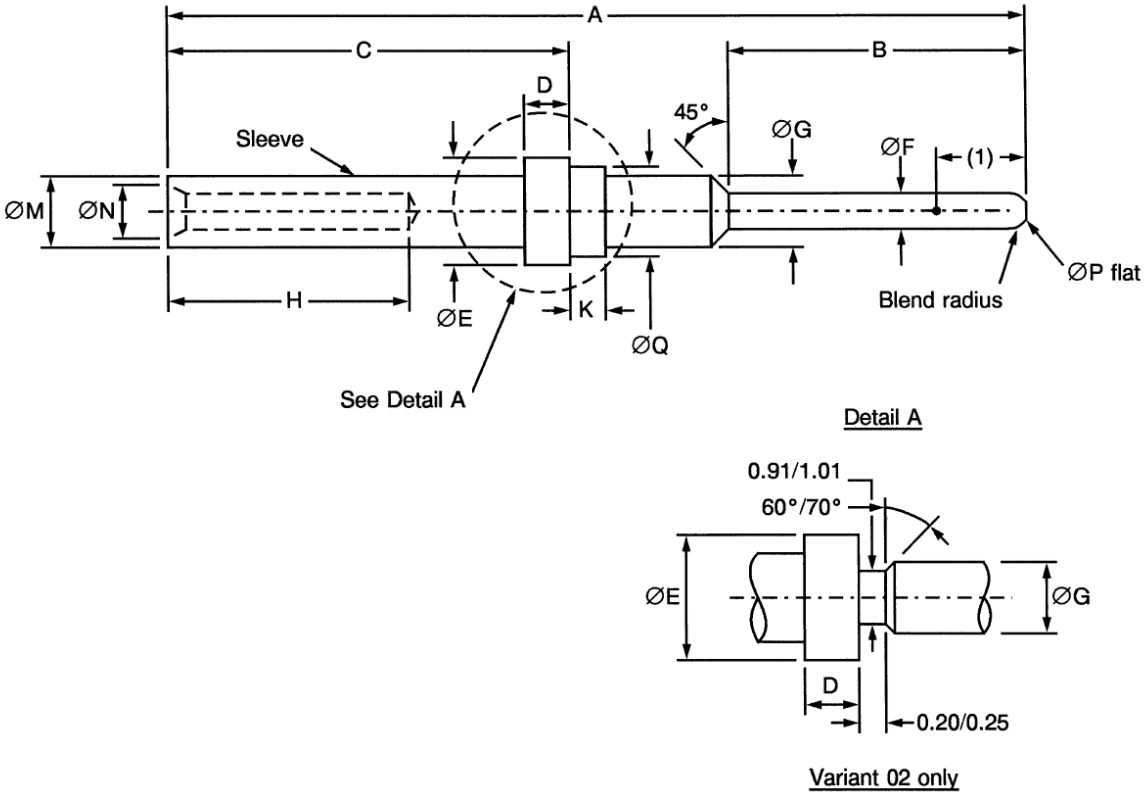
No.	Characteristics	Symbol	Maximum Rating	Unit	Remarks
1	Rated Current	I_{CR}	See Table 1(a)	A	
2	Operating Temperature Range	T_{op}	-55 to +125	°C	T_{amb}
3	Storage Temperature Range	T_{stg}	-65 to +125	°C	

FIGURE 1 - PARAMETER DERATING INFORMATION

Not Applicable.

FIGURE 2 – PHYSICAL DIMENSIONS

MALE/FEMALE CONTACT - VARIANTS 01 AND 02



Variants		Dimensions												
		A	B	C	D	ØE	ØF	ØG	H	K	ØM	ØN	P	ØQ
01	Min	19.76	5.27	9.45	0.72	2.08	0.99	1.65	7	1.01	1.7	1.07	-	1.73
	Max	20.12	6.05	9.65	0.86	2.16	1.04	1.73	-	1.25	1.85	1.14	0.3	1.8
02	Min	19.5	5.95	7.1	0.79	1.52	0.749	1.17	4.22	-	-	0.78	-	-
	Max	19.95	6.05	7.35	0.89	1.56	0.775	1.21	-	-	1.57	-	0.2	-

NOTES

1. Measurement point for plating thickness: 4 ±1mm.
2. All dimensions are in millimetres (angles in degrees).
3. Underlined dimensions in Table are critical to ensure intermateability.

4 REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the contacts 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)

None

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. 9.10, Wiring: Not applicable.
(b) Para. 9.15, Joint Strength: Not applicable.
(c) Para. 9.31, Solderability: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.10, Wiring: Not applicable.
(b) Para. 9.15, Joint Strength: Not applicable.
(c) Para. 9.31, Solderability: Not applicable.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the contacts 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 contacts specified herein shall be as specified in Table 1(a).

4.3.3 Contact Capability

For the purpose of this test, the pick-up and drop weights shall be as specified in Table 1(a).

4.3.4 Contact Retention (In Insert)

The contact retention force shall be as specified in Table 1(a).

4.3.5 Mating and Unmating Forces

As specified in ESCC Detail Specification No. 3401/020.

4.3.6 Insert Retention (In Shell)
As specified in ESCC Detail Specification No. 3401/020.

4.3.7 Jackscrew Retention
Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces
The contact insertion and withdrawal forces shall be as specified in Table 1(a).

4.3.9 Engagement and Separation Forces
The diameter of the test pin and the engagement and separation forces of the female contacts shall be as specified in Table 1(a).

4.3.10 Oversize Pin Exclusion
The diameter of the test pin and the force applied to it shall be as specified in Table 1(a).

4.3.11 Probe Damage
The probe diameter and the moment at the end of the probe shall be as specified in Table 1(a).

4.3.12 Solderability
Not applicable.

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 contacts 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
As specified in ESCC Detail Specification No. 3401/020.

4.4.2 Inserts
As specified in ESCC Detail Specification No. 3401/020.

4.4.3 Contacts
The contact body shall be made of copper alloy with an underplate of 1µm minimum of non-magnetic nickel or copper to MIL-C-14550, gold plated with 1.27µm minimum of gold, Type 2 Grade C of MIL-G-45204.

The female contact spring element shall be made of copper alloy with an underplate of 1µm minimum of nickel or copper to MIL-C-14550, gold plated with 1.27µm minimum of gold, Type 2 Grade C of MIL-G-45204.

4.4.4 Contact Retaining Clip
As specified in ESCC Detail Specification No. 3401/020.

4.4.5 Guiding and Locking Devices
As specified in ESCC Detail Specification No. 3401/020.

4.4.6 Magnetism Level
As specified in ESCC Detail Specification No. 3401/020.

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 the component in its primary package.

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

(a) The ESCC Component Number.
(b) Traceability information.

4.5.2 The ESCC Component Number

The ESCC Component Number shall be constituted and marked as follows:

Example: 340102102B

- Detail Specification Number: 3401021
- Type Variant (see Table 1(a)): 02
- Testing Level: B

4.5.3 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 in Table 2. Unless otherwise specified these measurements shall be performed at T_{amb} = +22 ±3°C.

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

Not applicable.

4.6.3 Circuit for Electrical Measurements (Figure 4)

Not applicable.

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

Not applicable.

TABLE 2 – ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESCC 3401 Test Method	Test Condition	Variants	Limits		Unit
						Min	Max	
1	Contact Resistance (Low Level Current)	Rcl	Para 9.1.1.3	Para 9.1.1.3	01 and 02	-	17	mΩ
2	Contact Resistance (Rated Current)	Rcr	Para 9.1.1.3	Para 9.1.1.3 7.5A 5.0A	 01 02	 - -	 14.7 16	mΩ

TABLES 3, 4, 5 AND 6

Not applicable

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESCC GENERIC SPECIFICATION NO. 3401)

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

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests
Not applicable.

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

4.8.4 Conditions for Operating Life Test (Part of Endurance Testing)
Not applicable.

4.8.5 Electrical Circuits for Operating Life Tests (Figure 5)
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 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	Seal Test	Para. 9.9	ESCC 3401/020	-	-	-	-	
02	Wiring	Para. 9.10	Not applicable					
03	Vibration	Para 9.11	ESCC 3401/020	-	-	-	-	
04	Shock or Bump	Para. 9.12	ESCC 3401/020	-	-	-	-	
05	Climatic Sequence	Para. 9.13	ESCC 3401/020	-	-	-	-	
06	Plating Thickness	Para. 9.14	Thickness	-	-	Para. 4.4.3 of this spec.		
07	Joint Strength	Para. 9.15	Not applicable					
08	Rapid Change of Temperature	Para. 9.16	ESCC 3401/020	-	-	-	-	
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	**Initial Measurements** Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		
			Final Measurements Low Level Contact Resistance Drift	Table 2 Item 1	ΔRcl	-	3	mΩ
11	Permanence of Marking	Para. 9.19	As applicable	-	-	-	-	
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/020	-	-	-	-	
13	High Temperature Storage	Para. 9.21	**Initial Measurements** Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		
			Final Measurements Low Level Contact Resistance Drift	Table 2 Item 1	ΔRcl	-	3	mΩ
			Rated Current Contact Resistance	Table 2 Item 2	Rcr	Table 2 Item 2		
			Contact Retention (In Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 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.	ESCC 3401/020	-	-	-	-	
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	ESCC 3401/020	-	-	-	-	
17	High Temperature Measurements	Para. 9.25	ESCC 3401/020	-	-	-	-	
18	Overload Test	Para. 9.26	Rated Current Contact Resistance	Table 2 Item 2	Rcr	Table 2 Item 2		
19	Maintenance Aging	Para. 9.27	Visual Examination	-	-	-	-	
			Contact Retention (In Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 Para. 9.17		
			Contact Insertion & Withdrawal Forces	Para. 4.3.8 of this spec.	-	Para. 4.3.8		

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	
20	Engage/Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force	-	-	Para. 4.3.9		
21	Oversize Pin Exclusion	Para. 9.29 & Para. 4.3.10 of this spec.	-	-	-	ESCC 3401 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.	Not applicable					

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)	Para. 9.4, Contact Capability: 100% Contact Capability Test may be omitted provided that a 100% visual inspection of the contact and a 10% Contact Capability test are performed in accordance with the C&K PID requirements. The results of the Contact Capability test shall be considered for PDA.