

CONCLUSION MARK-up
FOR DCR425
3/9/8.



(Also includes
DCR316)

FINAL VERSION
19/9/08

Pages 1 to 16

CONTACTS, POWER, CRIMP-TYPE,
AND SOLDER-TYPE FOR
AND PCB-TYPE

3401/001 *AND 3401/002* CONNECTORS

ESCC Detail Specification No. 3401/040


⁴
ISSUE 3

May 2005

August 2008.



Document Custodian: European Space Agency - see <https://escies.org>

	<p style="text-align: center;">ESCC Detail Specification No. 3401/040</p>	<p>PAGE 5 ISSUE 3</p>
---	---	---------------------------

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Contacts, Power, Crimp-type ^{and PCB-type} and Solder-type ~~for 3401/001 and 3401/002~~ Connectors.

It shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, ^{Non-filtered} Circular and Rectangular.
- ESCC Detail Specification No. 3401/001, Connectors, Electrical, Rectangular, ^{bucket, PCB} Miniature, Non-removable Solder, and Wire-wrap ^{type} Contacts and Removable Coaxial and Power, ~~Crimp-type and Solder-type~~ Contacts, Based on Type D*~~M~~.
- ESCC Detail Specification No. 3401/002, Connectors, Electrical, Rectangular, Miniature, Removable Crimp-type Contacts and Removable Coaxial and Power Crimp-type and Solder-type Contacts, Based on Type D*~~MA~~.

the requirements of which are supplemented herein.

These contacts are not mounted in the connectors and are therefore delivered separately.

1.2 TYPE VARIANTS

Variants of the basic type contacts 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 contacts specified herein, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

The derating information applicable to the contacts specified herein is shown in Figure 1.

1.5 PHYSICAL DIMENSION

The physical dimensions of the contacts specified herein are shown in Figure 2.

1.6 CONTACT ARRANGEMENTS

Not applicable.



TABLE 1(a) - TYPE VARIANTS

Variant	Type	Max. Weight (gr)	Accepted Cable (AWG)	Bucket Type <i>Rear End</i>
01	Male	2.2	8	Solder <i>Bucket</i>
02	Female	1.9	8	Solder
03	Male	2.15	12	Solder
04	Female	1.9	12	Solder
05	Male	2.05	16	Solder
06	Female	1.75	16	Solder
07	Male	2.8	8	Crimp <i>Barrel</i>
08	Female	2.45	8	Crimp
09	Male	2.25	10	Crimp
10	Female	2.0	10	Crimp
11	Male	2.0	12 - 14	Crimp
12	Female	1.65	12 - 14	Crimp

Add 13
to 16



TABLE 1(b) - MAXIMUM RATINGS

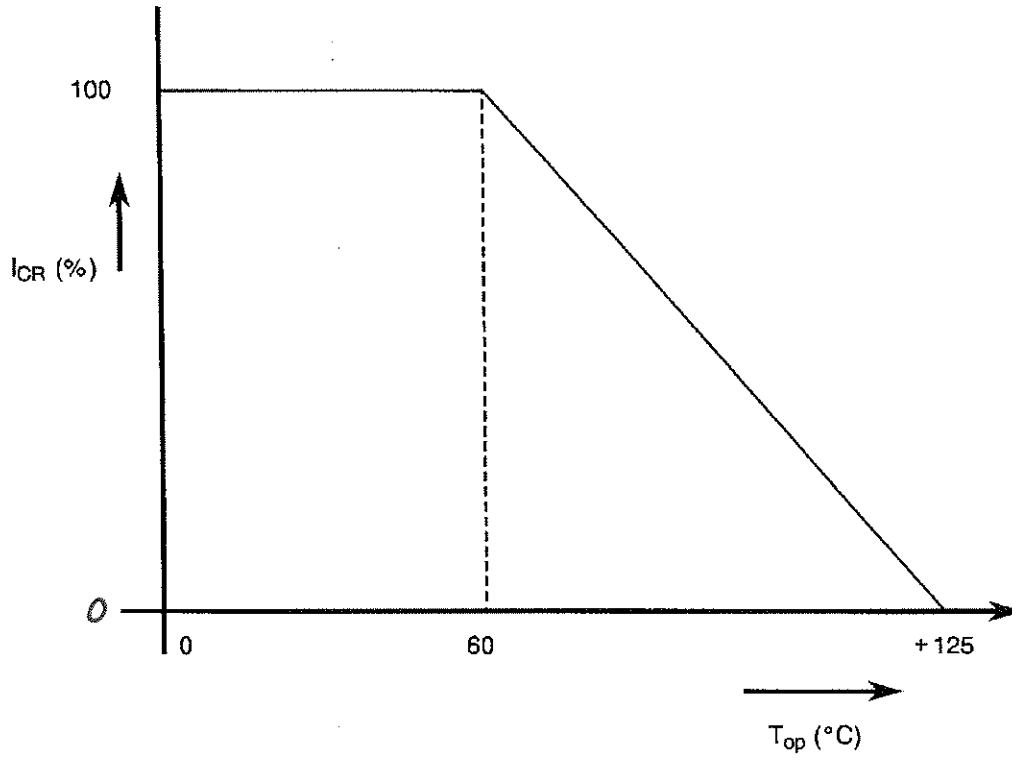
No.	Characteristic	Symbol	Maximum Rating	Unit	Remarks
1	Rated Current	I_{CR}	40	A	Note 1 Note 2
2	Operating Temperature Range	T_{op}	-55 to +125	°C	T_{amb}
3	Storage Temperature Range	T_{stg}	-55 to +125	°C	
4	Soldering Temperature	T_{sol}	+260	°C	Note 3

NOTES

1. This is limited either by the current carrying capability of the cable to which the contact is fitted or the derating.
2. At $T_{amb} \leq +60^{\circ}C$. For derating at $T_{amb} > +60^{\circ}C$, see Figure 1.
3. 10 seconds maximum.

13	Male	2.15	N.A.	Straight PCB
14	Female	1.75	N.A.	Straight PCB
15	Male	2.65	N.A.	90° PCB
16	Female	2.45	N.A.	90° PCB

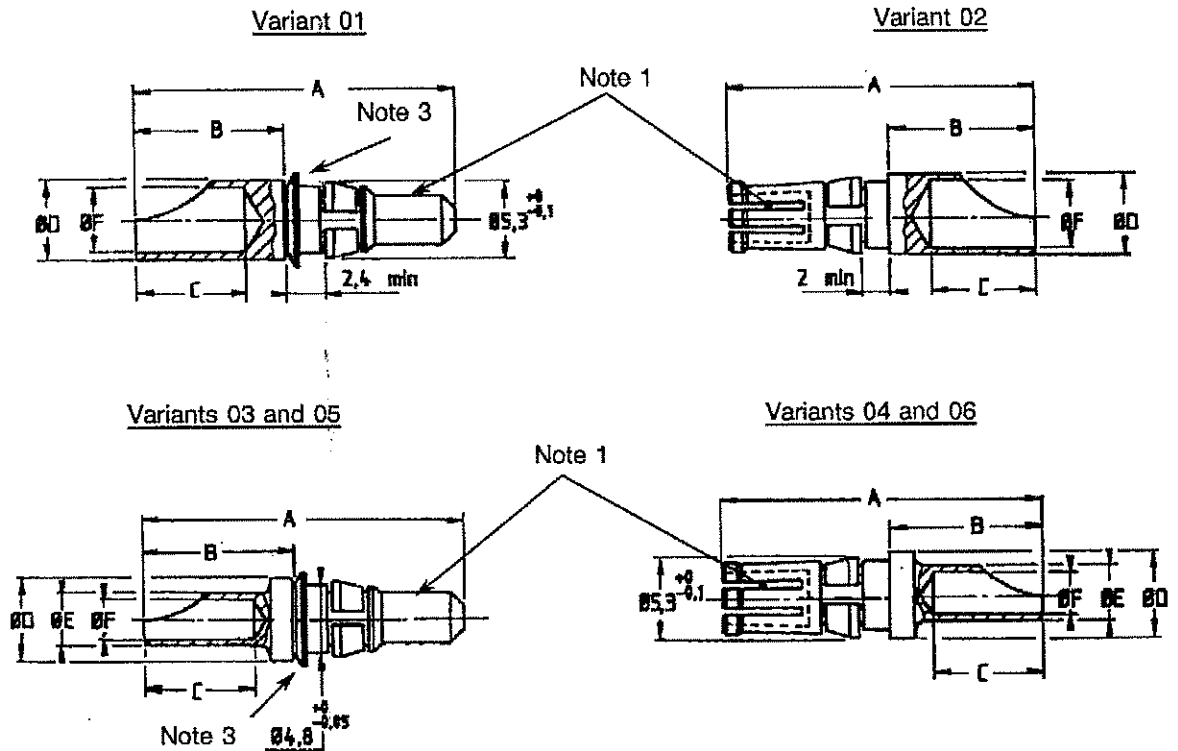
FIGURE 1 - PARAMETER DERATING INFORMATION



Rated Contact Current versus Temperature

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - SOLDER TYPE



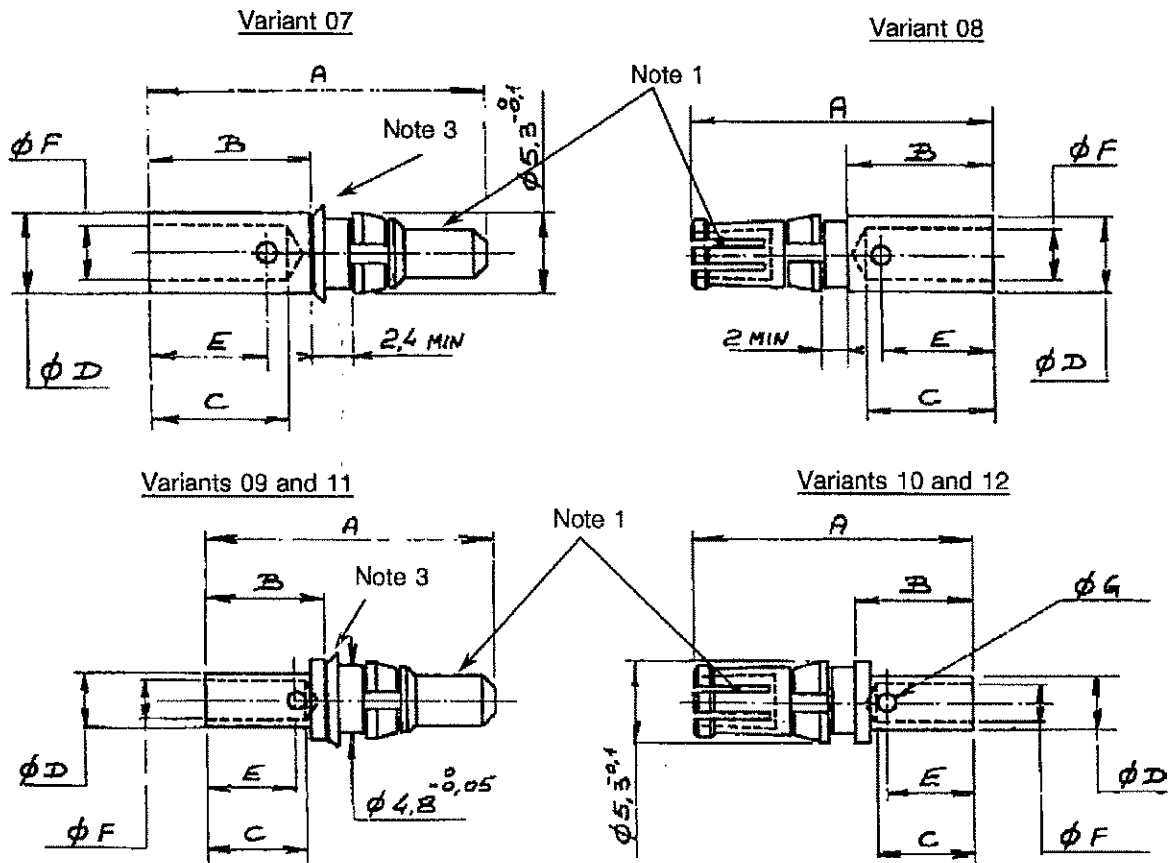
Variant (Note 2)	Type	AWG	A Max.	B Max.	C Max.	ØD Max.	ØE Max.	ØF Max.
01	Male	8	22.1	10.8	8.13	5.66	-	4.90
02	Female	8	21.8	10.8	8.13	5.66	-	4.90
03	Male	12	22.1	10.8	8.13	5.66	3.76	3.00
04	Female	12	21.8	10.8	8.13	5.66	3.76	3.00
05	Male	16	22.1	10.8	8.13	5.66	2.67	1.90
06	Female	16	21.8	10.8	8.13	5.66	2.67	1.90

NOTES

1. Measurement point for ~~0.05~~ plating thickness.
2. All dimensions are in millimetres.
3. Washer is optional.

FIGURE 2 - PHYSICAL DIMENSIONS (Continued)

FIGURE 2(b) - CRIMP TYPE



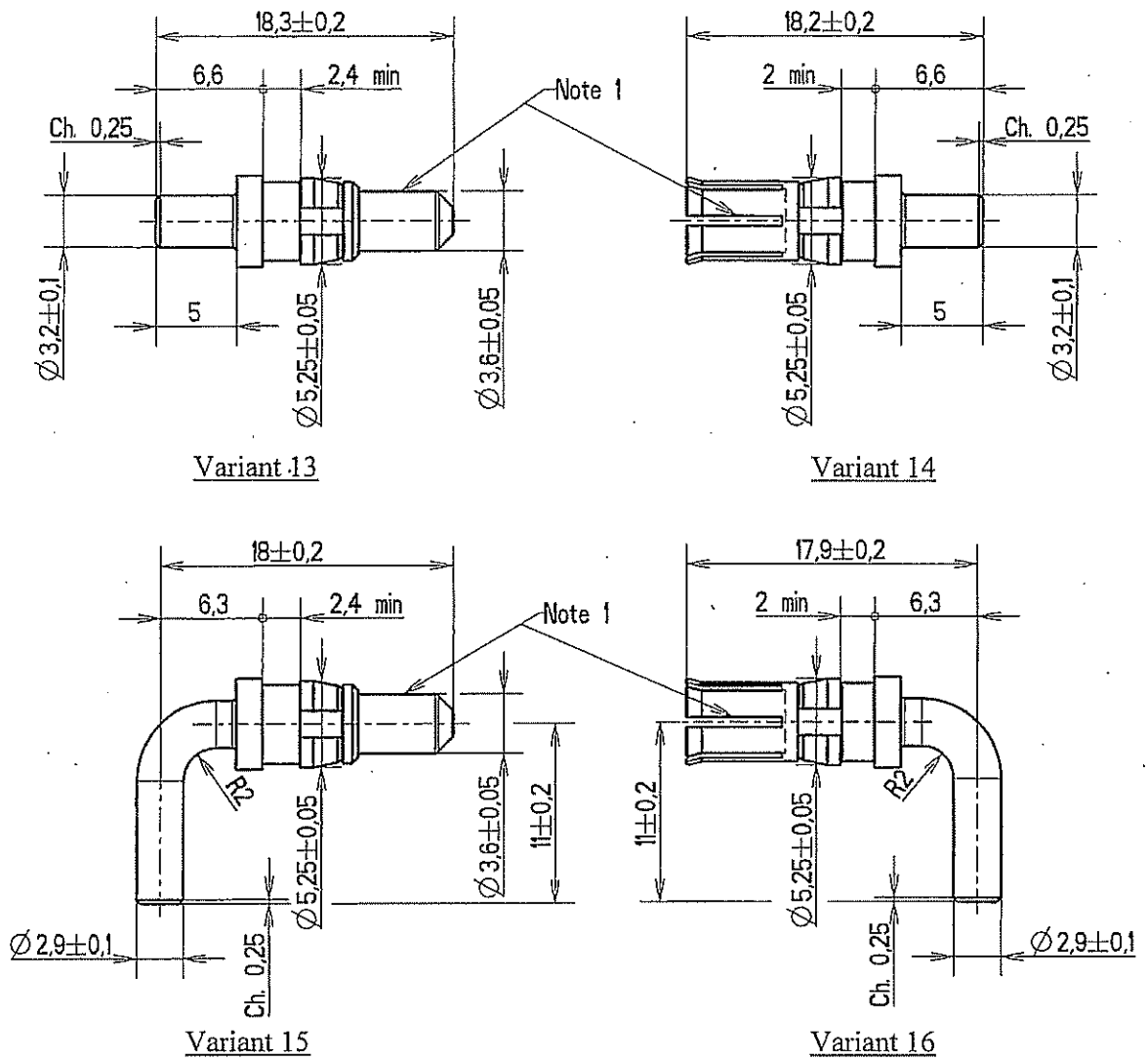
Variant (Note 2)	Type	AWG	A Max.	B Max.	C Min.	ØD Max.	E Ref.	ØF Min.	ØG Ref.
07	Male	8	24.7	12.9	11.1	5.8	10	4.2	1.7
08	Female	8	24.6	12.9	11.1	5.8	10	4.2	1.7
09	Male	10	21.6	10	8.4	4.7	7.5	3.25	1.3
10	Female	10	21.5	10	8.4	4.7	7.5	3.25	1.3
11	Male	12/14	19.3	7.7	6.35	3.8	6	2.5	1
12	Female	12/14	19.2	7.7	6.35	3.8	6	2.5	1

NOTES

1. Measurement point for ~~AWG~~ plating thickness.
2. All dimensions are in millimetres.
3. Washer is optional.

FIGURE 2 – PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(c) – STRAIGHT AND 90° PCB TYPES



NOTES:

1. Measurement point for ~~plating~~ plating thickness.
2. All dimensions are in millimetres.

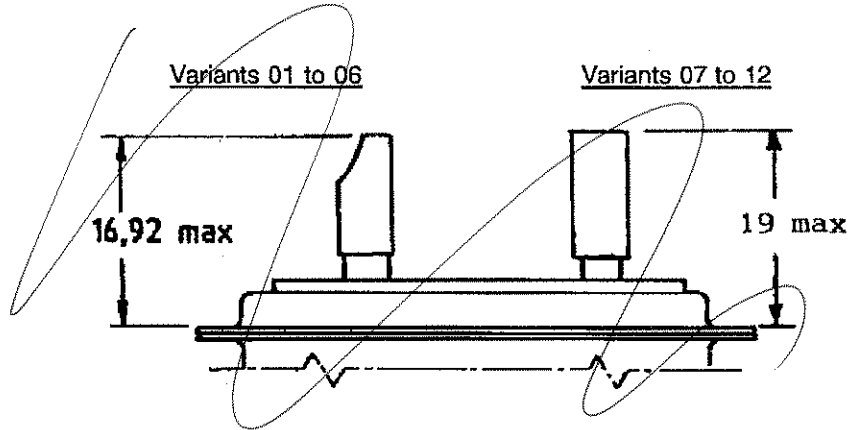
DRAFT

FIGURE 2 - PHYSICAL DIMENSIONS (Continued)

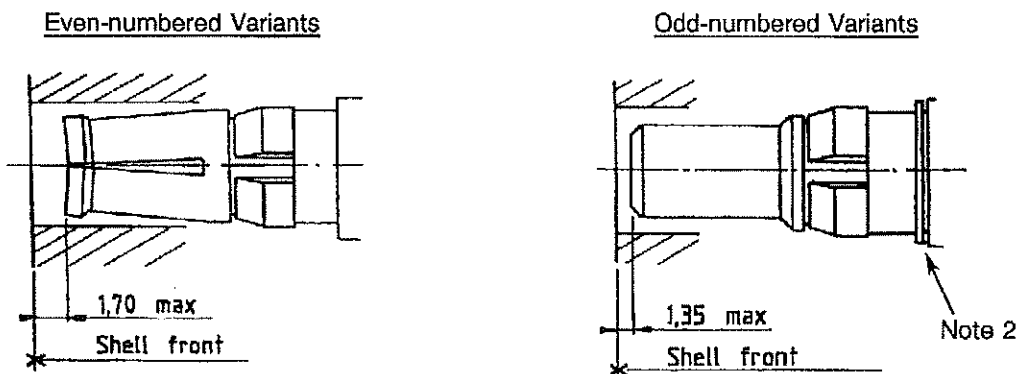
FIGURE 2(b) - PROTRUSION AND RECESS

MAXIMUM PROTRUSION OF CONTACTS RELATIVE TO REAR OF SHELL FLANGE

replace
* →
see
attached



MAXIMUM RECESS OF CONTACTS RELATIVE TO FRONT OF SHELL



NOTES

1. All dimensions are in millimetres.
2. The washer is optional (no change of the insert: the assembling dimension is compensated on the contact).

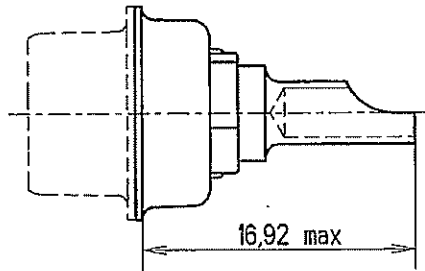


FIGURE 2 – PHYSICAL DIMENSIONS (CONTINUED)

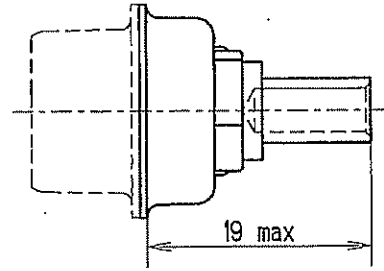
FIGURE 2(a) - PROTRUSION AND RECESS

MAXIMUM PROTRUSION OF CONTACTS RELATIVE TO REAR OF SHELL FLANGE

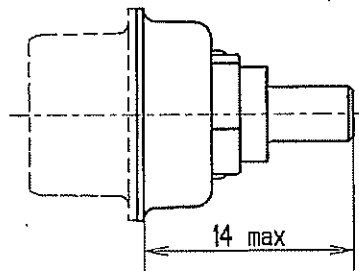
Variants 01 to 06



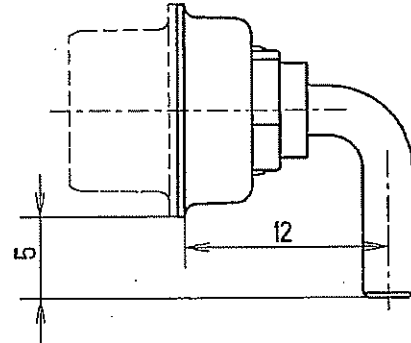
Variants 07 to 12



Variants 13 & 14

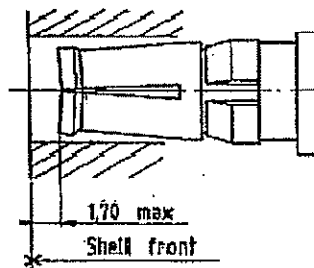


Variants 15 & 16

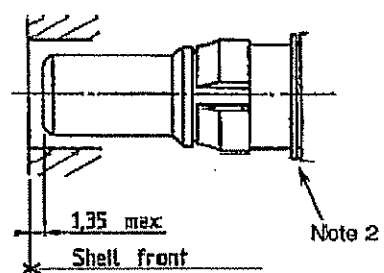


MAXIMUM RECESS OF CONTACTS RELATIVE TO FRONT OF SHELL

Even-numbered Variants



Odd-numbered Variants



NOTES

1. All dimensions are in millimetres.

2. The washer is optional (no change of the insert: the assembling dimension is compensated on the contact).

DRAFT



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, ^{bullet, PCB} Miniature, Non-removable Solder and Wire-wrap ~~type~~ Contacts and Removable Coaxial and Power, ~~Crimp-type~~ ^{Crimp-type} and ~~Solder-type~~ Contacts, Based on Type D*^M.
- (c) ESCC Detail Specification No. 3401/002, Connectors, Electrical, Miniature, Removable Crimp-type Contacts and Removable Coaxial and Power Crimp-type and Solder-type Contacts, based on Type D*^M.
- (C) (d) ESCC Basic Specification No. 20534, External Visual Inspection of Electrical Connectors.
- (e) MIL-C-14550, Copper Plating, Electro-deposited.
- (f) MIL-G-45204, Gold 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.

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 for Connectors, Electrical, Circular and Rectangular. Deviations from the Generic Specification, applicable to this Detail 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)

~~None~~ Not applicable

(C) Para. 9.31 Solderability: Not applicable to variants 07 to 12.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.21, Oversize Pin Exclusion: Not applicable.

(b) Para. 9.24, Probe Damage ~~Test~~: Not applicable.

(d) Para. 9.15 Joint Strength: The test shall be performed as specified in Para. 4.3.13.

(C) → (c) Para. 9.27, Solderability: Bit size 7.5mm.

(d) Para. 9.29, Pull Test: The direction of pull shall be in the contact axis.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

The deviations as listed in Para. 4.2.4 shall apply.

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. 9.11 of ESCC Generic Specification No. 3401 and shall conform to those shown in Figure 2. *Overall dimensions are specified with compatible inserts in ESCC Detail Specification No. 3401/001.*

4.3.2 Weight

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

4.3.3 ~~Crimp Tensile Strength or Pull Test~~ Joint Strength (Variants 07 to 12)

13

4.3.3.1 Crimp Tensile Strength (Variants 07 to 12)

The contacts shall be crimped to stranded wire of the appropriate size as shown below. The contact and the wire shall be separated from each other, using a tensile strength machine. The values of the force at separation of the contact and wire and the method of failure shall be recorded and shall be in accordance with the following values:

Variant	Wire Size (AWG)	Minimum Value of Tensile Strength (daN) (N)
07/08	8	>50 500
09/10	10	>50 500
11/12	12 - 14	>30 500

i.e. "pull-out", "break in crimp", "break in wire".

4.3.3.2 Pull Test (Variants 01 to 06)

The contacts shall be soldered to stranded wire of the appropriate size shown in Table 1(a) of this specification. The wire shall break before the solder. If the solder breaks before the wire, examine the solder pot for incomplete covering.

4.3.4 Gold Plate Thickness

The thickness of the gold plate deposited on the contacts specified herein shall be checked and meet the requirements of Subpara. 4.4.1. Measurements shall be performed on active parts as specified in Figure 2.

4.3.5 ~~Contact Insertion and Withdrawal Forces~~ Engagement and Separation Forces (Variants 02, 04, 06, 08, 10, 12, 14, 16)

9

The ~~contact insertion and withdrawal~~ *engagement and separation* forces of the female contacts shall be as specified hereunder.

	Maximum Diameter Test Pin 3.632 (+0-0.0025) mm 3.632	Minimum Diameter Test Pin 3.581 (+0.0025-0) mm
Engagement (N) → Insertion	6.87 700gr max	0.83 95gr min
Separation (N) → Withdrawal	5.56 557gr max	0.83 85gr min

4.3.6 ~~Final~~ Contact Capability (Variants 02, 04, 06, 08, 10, 12, 14, 16) *move column to left.*
 For the purposes of this test, the pick-up and drop weights shall be as follows.

	Drop Pickup Weight	Pick-up Drop Weight
Weight (g)	567 567	85 85
Pin Diameter (mm)	3.83 3.83	3.58 3.58
Insertion Depth	3.17	3.17

4.3.7 ¹⁰ Oversize Pin Exclusion
 Not applicable. *(mm) 3.632 (+0-0.0025) 3.581 (+0.0025-0)*

4.3.8 ¹¹ Probe Damage Test
 Not applicable.

4.4 MATERIAL 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 Contact Body

The contacts shall be made of copper base alloy selected from raw materials with a minimum of impurities. ~~The contacts shall be plated as specified in MIL-G-45204, Type II, Grade 'C', gold over copper in accordance with MIL-C-14550.~~ Gold plating thickness shall be 1.27µm minimum over 1µm minimum of copper.

4.5 ^{4.4.2} MARKING

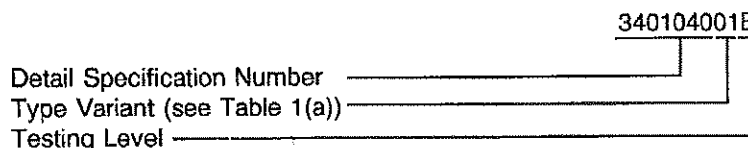
4.5.1 General

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 subparagraphs. These components being the too small to accommodate the marking as specified hereafter, the marking requirements in full shall accompany each lot of components in its primary package. Such marking shall comprise:-

- (a) The ESCC Component Number.
- (b) Traceability Information.
- (c) Quantity of Components.

4.5.2 The ESCC Component Number

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



4.4.2 Magnetism Level
 As specified in ESCC Detail Specification No. 3401/001.

Add →
 4.3.4
 4.3.5
 4.3.6
 4.3.7
 4.3.8
 4.3.12
 see attached.

Para 4-3 additional Paras.
~~82 New Text Document.txt~~

4.3.4 Contact Retention (In Insert)

Contact retention within the insert shall be 40.86N. There shall be no displacement of the contact in excess of 0.3mm.

4.3.5 Mating and Unmating Forces

As specified in ESCC Detail Specification No. 3401/001.

4.3.6 Insert Retention (In Shell)

As specified in ESCC Detail Specification No. 3401/001.

4.3.7 Jackscrew Retention


Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces

The contact insertion and withdrawal forces shall be ~~720N~~ ^{65N} maximum.

4.3.12 Solderability

Not applicable to Variants 07 to 12. ^{For all other Variants} Soldering iron bit size ~~shall be~~ ^{shall be used} 7.5mm. _{^S}

	ESCC Detail Specification No. 3401/040		PAGE 14 ISSUE 3
---	---	--	--------------------

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

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 Screening Tests (Tables 4 and 5)

Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESCC Gen. Spec. 3401	Test Condition	Limits		Unit
					Min.	Max.	
1	Contact Resistance (Low Level Current)	R _C	Para. 9.28 9.1.1.3	Para. 9.28:2 9.1.1.3	-	2.5	mΩ
2	Contact Resistance (Rated current)	R _C	Para. 9.28 9.1.1.3	Para. 9.28:2 9.1.1.3	-	2	mΩ

TABLES 3, 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, 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 Measurement and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance testing 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 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 temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.~~

The conditions for high temperature storage testing



TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTS

No.	ESCC Gen. Spec. No. 3401		Measurements and Inspections			Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions	Symbol	Min.	Max.	
01	Female Contact Capability	Para. 9.6	Pick Up Weight Drop Weight	Para. 4.3.6 Para. 4.3.6		Pick Up Drop		
02	Oversize Pin Exclusion	Para. 9.21	Not applicable	-		-	-	
03	Gold Plate Thickness	Para. 9.22	Gold Plate Thickness	Para. 4.3.4		Para. 4.3.4		
04	Gold Plate Porosity	Para. 9.23	Not applicable	-		-	-	
05	Probe Damage Test	Para. 9.24	Not applicable	-		-	-	
06	Contact Insertion and Withdrawal Forces	Para. 9.25	Forces	Para. 4.3.5		Para. 4.3.5		
07	Crimp Visual Inspection	Para. 9.26	Visual Examination	-		-	-	
08	Solderability	Para. 9.27 and Para. 4.2.4 of this Spec.	-	-		-	-	
09	Contact Resistance	Para. 9.28	Contact Resistance	Low Level Table 2 Item 1 Rated Level Table 2 Item 2	R_C R_C	Table 2 Item 1 Table 2 Item 2		
10	Crimp Tensile Strength	Para. 9.29	-	Para. 4.3.3.1		-	-	
11	Pull Test	Para. 9.29 and Para. 4.2.4 of this Spec.	-	Para. 4.3.3.2		-	-	
12	Endurance	Para. 9.15	Contact Resistance Drift	Low Level Table 2 Item 1	ΔR_C	-	0.5	m Ω
			Contact Resistance	Low Level Table 2 Item 1	R_C	-	2.5	m Ω
13	High Temperature Storage	Para. 9.19 + 125°C	Contact Resistance Drift	Low Level Table 2 Item 1	ΔR_C	-	0.5	m Ω
			Contact Resistance	Low Level Table 2 Item 1	R_C	-	2.5	m Ω

replace & see attached.

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

No.	ESCC Gen. Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min.	Max.	
1	Wiring	Para. 9.10	Visual Examination	-	-	-	-	-
			Contact Resistance	Low Level, Table 2 Item 1	R _C	-	2.5	mΩ
2	Vibration	Para. 9.11	ESCC 3401/001	-	-	-	-	-
3	Shock or Bump	Para. 9.12	ESCC 3401/001	-	-	-	-	-
4	Climatic Sequence	Para. 9.13	ESCC 3401/001	-	-	-	-	-
5	Seal Test	Para. 9.9	Not Applicable	-	-	-	-	-
6	Plating Thickness	Para. 9.14 and Para. 4.4.1 of this Spec.	Thickness	Para. 4.4.1	-	Para. 4.4.1		-
7	Joint Strength	Para. 9.15 and Para. 4.3.13 of this Spec.	Visual Examination	-	-	-	-	-
			Contact Resistance	Low Level, Table 2 Item 1	R _C	-	2.5	mΩ
8	Rapid Change of Temperature	Para. 9.16	ESCC 3401/001	-	-	-	-	-
9	Contact Retention (in Insert)	Para. 9.17 and Para. 4.3.4 of this Spec. Force: 40.86N	Contact Displacement	Para. 4.3.4	-	Para. 4.3.4		-
10	Endurance	Para. 9.18	Initial Measurement: Contact Resistance	Low Level, Table 2 Item 1	R _C	-	2.5	mΩ
			Final Inspection: Visual Examination	-	-	-	-	-
			Final Measurement: Contact Resistance Drift	Low Level, Table 2 Item 1	ΔR _C	-	0.5	mΩ
11	Permanence of Marking	Para. 9.19	As Applicable	-	-	-	-	-
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/001	-	-	-	-	-
13	High Temperature Storage	Para. 9.21	Initial Measurement: Contact Resistance	Low Level, Table 2 Item 1	R _C	-	2.5	mΩ
			Final Inspection: Visual Examination	-	-	-	-	-
			Final Measurement: Contact Resistance Drift	Low Level, Table 2 Item 1	ΔR _C	-	0.5	mΩ
			Final Measurement: Contact Resistance	Rated, Table 2 Item 2	R _C	-	2	mΩ
			Final Measurement: Contact Retention (In Insert)	Para. 4.3.4	-	Para. 4.3.4	-	-

14	Corrosion	Para. 9.22	ESCC 3401/001	-	-	-	-	-
15	Insert Retention (In Shell)	Para. 9.23	ESCC 3401/001	-	-	-	-	-
16	Jackscrew Retention	Para. 9.24	Not Applicable	-	-	-	-	-
17	High Temperature Measurements	Para. 9.25	ESCC 3401/001	-	-	-	-	-
18	Overload Test	Para. 9.26	Final Measurement: Contact Resistance	Rated, Table 2 Item 2	R _c	-	2	mΩ
19	Maintenance Aging	Para. 9.27	Final Measurement: Contact Retention (In Insert)	Para. 4.3.4	-	Para. 4.3.4	-	-
			Final Measurement: Contact Insertion & Withdrawal Forces	Para. 4.3.8	-	Para. 4.3.8	-	-
20	Engagement and Separation Forces	Para. 9.28 and Para. 4.3.9 of this Spec.	Engagement and Separation Forces	Para. 4.3.9	-	Para. 4.3.9	-	-
21	Oversize Pin Exclusion	Para. 9.29	Not Applicable	-	-	-	-	-
22	Probe Damage	Para. 9.30	Not Applicable	-	-	-	-	-
23	Solderability	Para. 9.31 and Para. 4.3.12 of this Spec.	Visual Examination	-	-	-	-	-