RELAYS, ELECTROMAGNETIC, NON-LATCHING

28Vdc, 10A, 2PDT

BASED ON TYPE GP7

ESCC Detail Specification No. 3601/004

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Pages 1 to 16

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space components
coordination group

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		SCCG Chairman	ESA Director General or his Deputy
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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supersedes Issue 2 and incorporates all modifications defined in Revisions 'A', 'B', 'C', 'D' and 'E' to Issue 2 and the changes agreed in the following DCRs:-		
		Cover Page		None
		DCN		None
		Table 1	: No.2, Maximum Rating amended for "15" and "7.5" Volts	221438
		Figure 2	: Variant 01, in the drawing, Dimensions "F" and "H" corrected	221438
			: Variant 03, in the drawing, Dimensions "F" and "H" corrected	221438
			: Variant 05, in the drawing, Dimensions "F" and "H" corrected	221438
		Para. 4.1	: Text added	21019
		Table 2	: No. 1, Max. Limits amended for all voltages	221438
			: No. 10, "Ω" added to Unit	221438
'A'	Sept. '98	P1. Cover page		None
		P2. DCN		None
		P14. Table 3	: Nos. 3, 4 and 5, Max. Limits added	221474
'B'	Jan. '01	P1. Cover page	: Title amended	221599
		P2. DCN		None
		P5. Para. 1.1	: 2nd line text amended	221599
		Table 1	: Moved to new Page 5A	None
		P5A.	: New Page 5A added	None
		Table 1	: Moved from Page 5	None
			: No. 1, Symbol amended	221599
			: No. 2, Characteristics, Symbol and Maximum Ratings amended	221599

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1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Electromagnetic, Non-Latching Relays, 28Vdc, 10A, 2PDT, based on Type GP7. It shall be read in conjunction with ESA/SCC Generic Specification No. 3601, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic type relays specified herein, which are also covered by this specification, are given in Figure 2.

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the relays specified herein, are as scheduled in Table 1.

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the relays specified herein are shown in Figures 2-01 to 2-06 inclusive.

1.6 FUNCTIONAL DIAGRAM

The functional diagram, showing lead identification etc. for the relays specified herein, is shown in Figure 3.

2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:-

(a) ESA/SCC Generic Specification No. 3601 for Relays, Electromagnetic, Non-latching.

(b) MIL-STD-202, Test Methods for Electronic and Electrical Component Parts.

TABLE 1 - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATING	UNIT	REMARKS
1	Rated Coil Voltage:- 28V 12V 6V	V_{CR}	 28 12 6.0	Vdc	
2	Coil Voltage Range:- 28V 12V 6V	V_{CR}	 24.25 to 32 11 to 14.8 5.5 to 7.3	Vdc	
3	Rated Contact Current	I_{CR}	10	A	28Vdc resistive Note 1
4	Overload Current Resistive	$I_{over\ L}$	40	A	28Vdc resistive See Table 6
5	Rated Contact Current Inductive Load	I_{CL}	8.0	A	28Vdc inductive Note 1
6	Contact Resistance	R_C	10	mΩ	
7	High Temperature	T_{amb}	+125	°C	
8	Low Temperature	T_{amb}	−65	°C	
9	Soldering Temperature	T_{sol}	+260	°C	Note 2

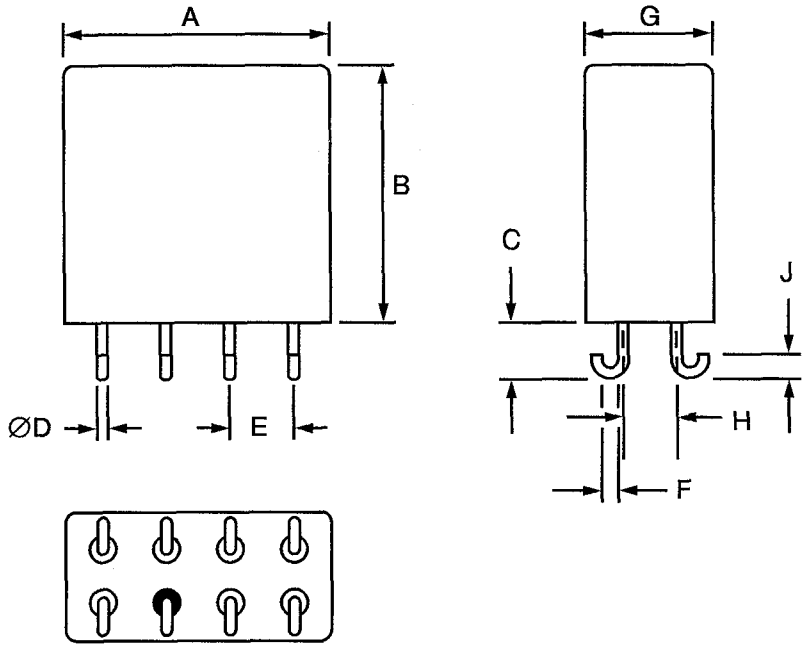
NOTES

1. Relays should not be used in change-over mode where the potential difference between stationary contacts is greater than 10V and the switched current is greater than 0.1A.
2. Duration 10 seconds maximum at a distance of not less than 3.0mm from the device body and the same terminal shall not be resoldered until 3 minutes have elapsed.

FIGURE 2 - PHYSICAL DIMENSIONS

VARIANT 01, RELAY WITH SOLDERABLE HOOK-END TERMINALS AND PLAIN CASE

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	6.20	6.50
ØD	-	1.30
E	5.00	5.20
F	1.30	1.50
G	-	13.10
H	5.00	5.20
J	3.00	3.30



VARIANT 02,RELAY WITH PLUG-IN TERMINALS AND PLAIN CASE

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	4.80	5.30
ØD	-	1.30
E	5.00	5.20
F	-	13.10
G	5.00	5.20

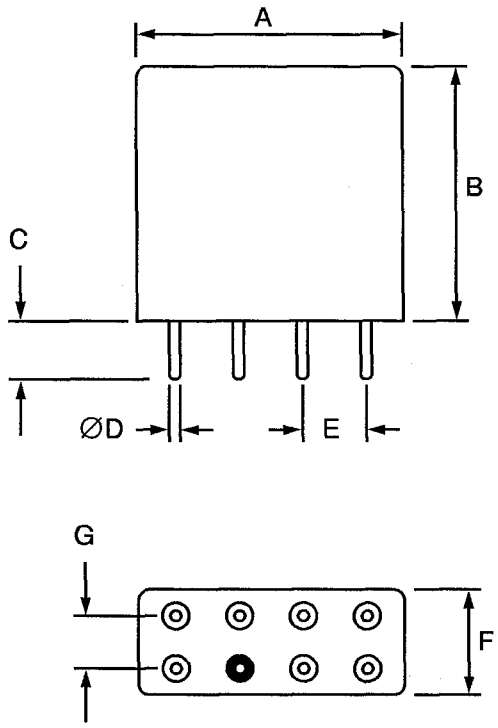
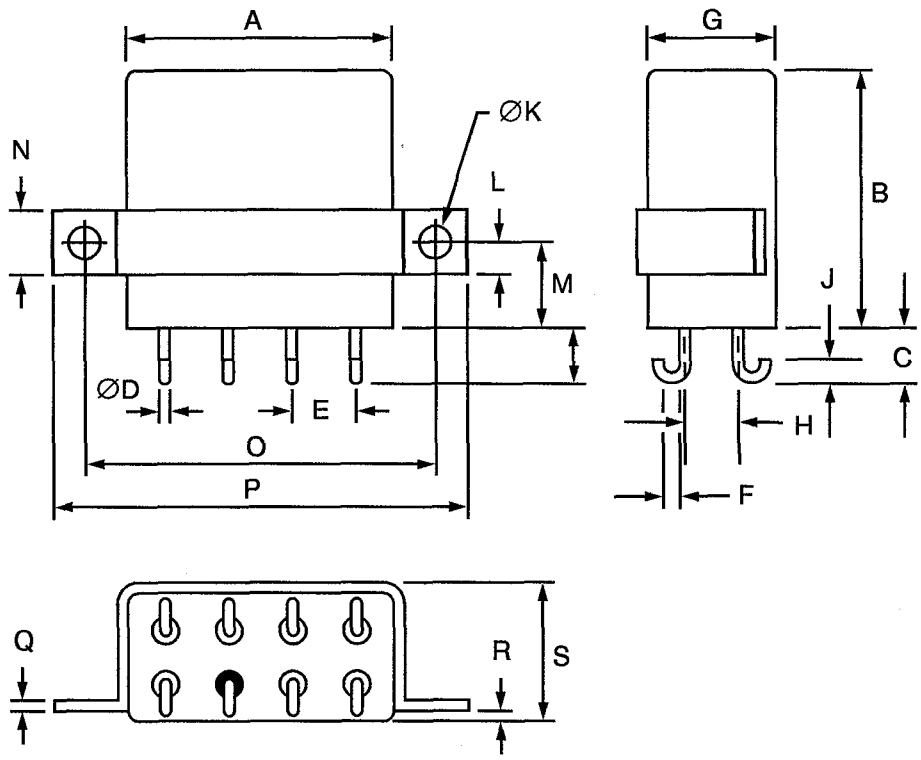


FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

VARIANT 03, RELAY WITH SOLDERABLE HOOK-END TERMINALS AND VERTICAL FLANGE MOUNT

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	6.20	6.50
ØD	-	1.30
E	5.00	5.20
F	1.30	1.50
G	-	13.10
H	5.00	5.20
J	3.00	3.30
ØK	3.90	4.00
L	4.70	4.90
M	12.60	12.80
N	9.40	9.70
O	34.90	35.00
P	42.10	42.90
Q	0.70	0.90
R	0.40	0.60
S	-	14.00



VARIANT 04, RELAY WITH PLUG-IN TERMINALS AND VERTICAL FLANGE MOUNT

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	4.80	5.30
ØD	-	1.30
E	5.00	5.20
F	-	13.10
G	5.00	5.20
H	0.70	0.90
ØJ	3.90	4.00
K	7.80	8.10
L	12.60	12.80
M	9.40	9.70
N	34.90	35.00
O	42.10	42.90
P	0.40	0.60
Q	-	14.00

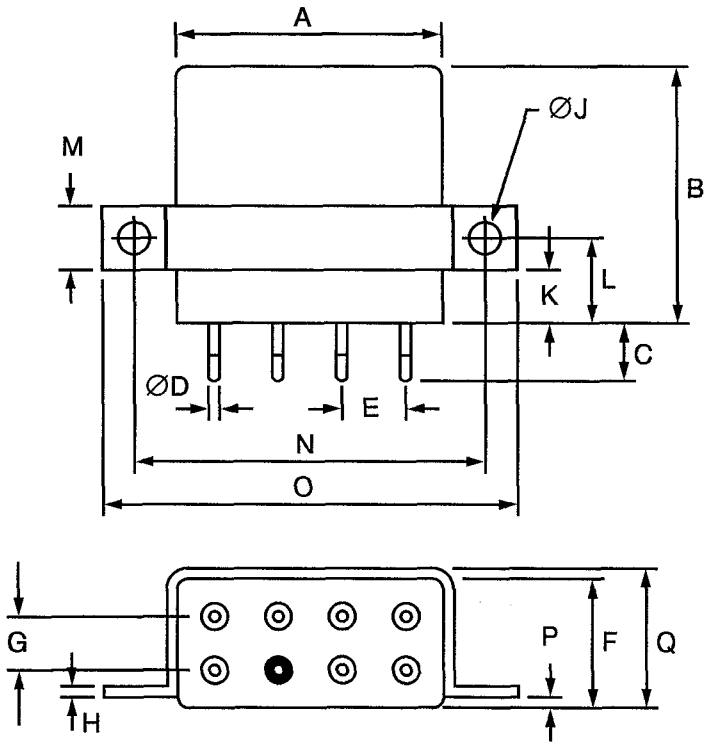
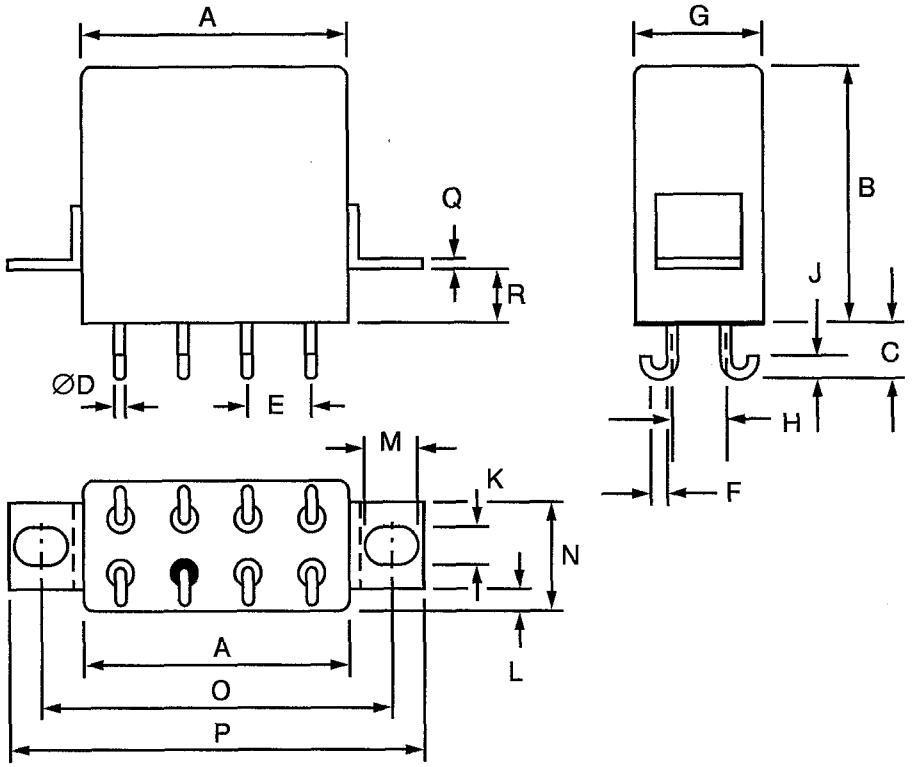


FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

VARIANT 05, RELAY WITH SOLDERABLE HOOK-END TERMINALS AND FLANGE MOUNT

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	6.20	6.50
ØD	-	1.30
E	5.00	5.20
F	1.30	1.50
G	-	13.10
H	5.00	5.20
J	3.00	3.30
K	3.00	4.00
L	1.50	1.70
M	4.30	4.60
N	0.40	9.70
O	35.60	35.80
P	-	43.70
Q	0.70	0.90
R	6.20	6.50



VARIANT 06, RELAY WITH PLUG-IN TERMINALS AND HORIZONTAL FLANGE MOUNT

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	27.30
B	-	33.00
C	4.80	5.30
ØD	-	1.30
E	5.00	5.20
F	-	13.10
G	5.00	5.20
H	3.70	3.90
J	1.50	1.70
K	4.30	4.60
L	9.40	9.70
M	35.60	35.80
N	-	43.70
O	0.70	0.90
P	6.20	6.50

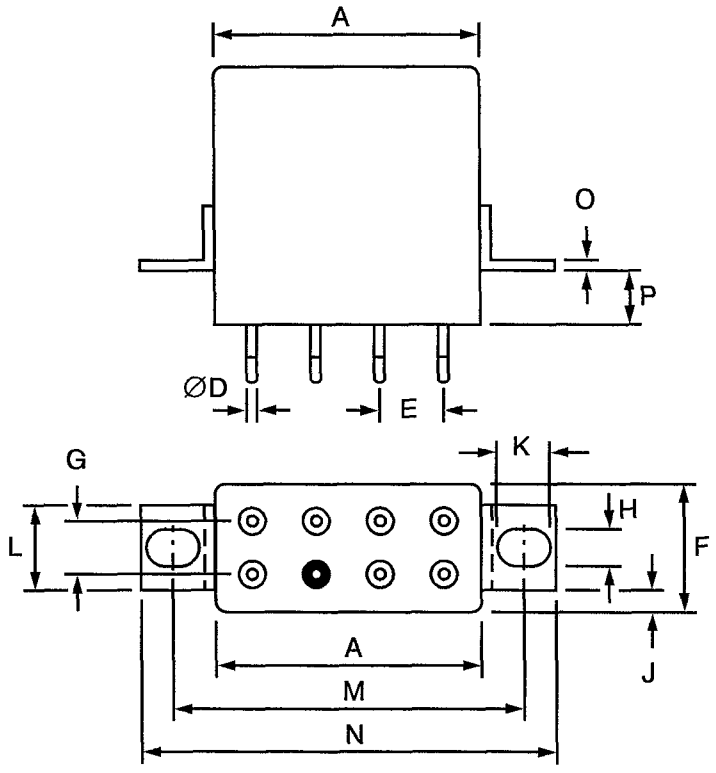


FIGURE 3 - FUNCTIONAL DIAGRAM

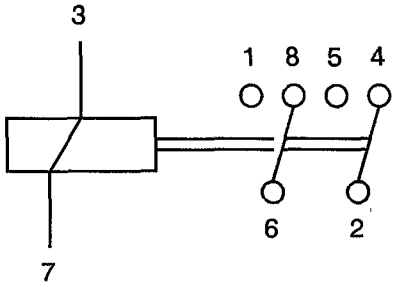
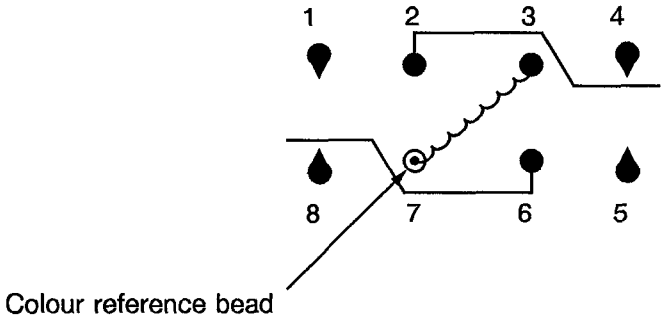


FIGURE 4 - CIRCUIT SCHEMATIC



3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall apply.

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the relays specified herein are stated in this specification and ESA/SCC Generic Specification No. 3601 for Electromagnetic Non-Latching Relays. 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 ESA/SCC requirements and do not affect the component's reliability, are listed in the Appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Final Production Tests (Chart II)

None.

4.2.2 Deviations from Screening Tests (Chart III)

None.

4.2.3 Deviations from Environmental and Endurance Tests (Charts IV and V)

(a) Para. 9.11, Shock: Test condition 'I'.

(b) Para. 9.12.2, Overload, inductive: Not applicable.

(c) Para. 9.19.2, Low level load: Not applicable.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the relays specified herein shall be checked. They shall conform to those shown in Figure 2.

4.3.2 Weight

The maximum weight of the relays specified herein shall be 33 grammes.

4.3.3 Terminal Strength

The requirements for terminal strength testing are specified in Section 9 of ESA/SCC Generic Specification No. 3601. The test conditions shall be as follows:-

Applied Force : 50N.
Duration : 15 to 30 seconds.

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 relays 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 Case

Copper nickel, welded construction. Electro-deposited tin shall not be used. EP 90/10 SnPb alloy or nickel plating may be used.

4.4.2 Leads

Tinned, solderable.

4.5 MARKING

4.5.1 General

The marking of components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700.

Each component shall be marked in respect of:-

(a) Lead Identification.

(b) The SCC Component Number.

(c) Electrical Characteristics.

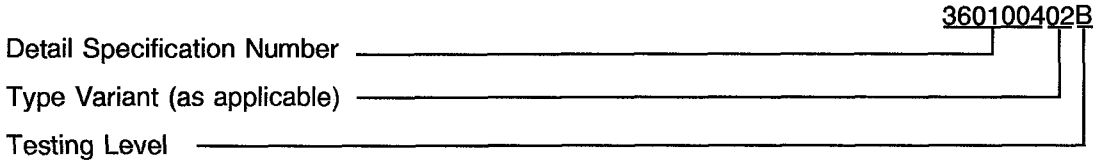
(d) Traceability Information.

4.5.2 Lead Identification

Lead identification shall be marked on the relay can in accordance with Figure 3.

4.5.3 The SCC Component Number

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



4.5.4 Electrical Characteristics

The electrical characteristic to be marked is the rated coil voltage. The information shall be constituted and marked as follows:-

Coil Voltage	Code
26.5	26V
12	12V
6.0	6V

4.5.5 Traceability Information

Each component shall be marked in respect of traceability information in accordance with ESA/SCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured at room temperature are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3.

4.6.3 Circuits for Electrical Measurements

Not applicable.

4.7 SCREENING

4.7.1 Miss Test

During the miss test, the contact resistance shall be continuously monitored and shall not exceed the values specified in Table 5.

4.7.2 Conditions for Screening

The requirements for screening are specified in Section 7 of ESA/SCC Generic Specification No. 3601. The conditions for screening shall be as specified in Table 5(a).

4.7.3 Electrical Circuits for Burn-in

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION No. 3601)

4.8.1 Electrical Measurements on Completion of Environmental Tests

The parameters to be measured on completion of environmental tests are scheduled in the test sequence of ESA/SCC Generic Specification No. 3601. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

4.8.2 Electrical Measurements during Endurance Tests

The parameters to be measured during endurance tests are scheduled in Table 6.

4.8.3 Electrical Measurements on Completion of Endurance Tests

The parameters to be measured on completion of endurance tests are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

4.8.4 Conditions for Operating Life Tests (Part of Endurance Testing)

The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 3601. The conditions for operating life testing shall be as specified in Table 5(b).

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	CHARACTERISTICS	SYMBOL	SPEC. AND TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN.	MAX.	
1	Pick-up Voltage 6V 12V 26V	U_c	ESA/SCC Gen. Spec. No. 3601	-	 - - -	 3.5 6.5 13.5	V
2	Drop-out Voltage 6V 12V 26V	U_d	ESA/SCC Gen. Spec. No. 3601	-	 0.3 0.6 1.3	 - - -	V
3	Operating Time	T_E	ESA/SCC Gen. Spec. No. 3601	-	-	7.0	ms
4	Release Time	T_D	ESA/SCC Gen. Spec. No. 3601	-	-	7.0	ms
5	Bounce Time	R_{eb}	ESA/SCC Gen. Spec. No. 3601	-	-	2.0	ms
6	Contact Resistance	R_C	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202, Method 307	-	-	50	mΩ
7	Insulation Resistance	I_R	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202, Method 302	At 500V	10 000	-	MΩ
8	Voltage Proof (Note 1)	V_P	ESA/SCC Gen. Spec. No. 3601	-	1 250	-	Vrms
9	Contact Resistance after Life and Overload Tests	R_C	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202, Method 307	-	-	0.2	Ω
10	Coil Resistance 6V 12V 26V	R_B	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202, Method 303	-	 14.4 59.5 270	 17.6 71.5 330	Ω

NOTES

1. 1 000V between coil and case - between open contacts.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN.	MAX.	
1	Pick-up Voltage 6V 12V 26V	U_c	ESA/SCC Gen. Spec. No. 3601	-	 - - -	 4.4 8.4 18	V
2	Drop-out Voltage 6V 12V 26V	U_d	ESA/SCC Gen. Spec. No. 3601	-	 0.3 0.6 1.3	 - - -	V
3	Operating Time	T_E	ESA/SCC Gen. Spec. No. 3601	-	-	7.0	ms
4	Release Time	T_D	ESA/SCC Gen. Spec. No. 3601	-	-	7.0	ms
5	Bounce Time	R_{eb}	ESA/SCC Gen. Spec. No. 3601	-	-	2.0	ms
6	Contact Resistance	R_C	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202 Method 307	-	-	50	mΩ
7	Insulation Resistance (Note 1)	I_R	ESA/SCC Gen. Spec. No. 3601 and MIL-STD-202 Method 302	At 500V	50	-	MΩ

NOTES

1. This measurement shall be run only under the high temperature condition.

TABLE 4 - MEASUREMENTS DURING SCREENING

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	MAXIMUM LIMIT	UNIT
1	Miss Test, Contact Resistance	R_G	ESA/SCC Gen. Spec. No. 3601	Para. 9.8	100	Ω

TABLE 5(a) - CONDITIONS FOR SCREENING

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient High Temperature	T_{amb}	+125(+0−3)	°C
2	Ambient Low Temperature	T_{amb}	−65(+3−0)	°C
3	Ambient Room Temperature	T_{amb}	+22±3	°C

TABLE 5(b) - CONDITIONS FOR OPERATING LIFE TEST

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+125(+0−3)	°C

TABLE 6 - ELECTRICAL MEASUREMENTS AT INTERMEDIATE POINTS DURING ENDURANCE TESTING

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	MAXIMUM LIMIT	UNIT
1	Contact Resistance or Voltage Drop	R_C	ESA/SCC Gen. Spec. No. 3601	Resistive, High Level	280 2.8	mΩ V
2	Contact Resistance or Voltage Drop	R_C	ESA/SCC Gen. Spec. No. 3601	Intermediate Current	5.0 500	Ω mV