RELAY, ELECTROMAGNETIC, NON-LATCHING, 28VDC, 2A, 2PDT, HALF-SIZE CRYSTAL CAN

ESCC Detail Specification No. 3601/003

| Issue 9 | June 2021 |

Document Custodian: European Space Agency – see https://escies.org

LEGAL DISCLAIMER AND COPYRIGHT

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
1424	Specification updated to incorporate changes per DCR.

TABLE OF CONTENTS

1   GENERAL

1.1   SCOPE
This specification details the ratings, physical and electrical characteristics, and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

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

(a)   ESCC Generic Specification No. 3601.

1.3   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.

1.4   THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1   The ESCC Component Number
The ESCC Component Number shall be constituted as follows:

Example: 36010030126V1

- Detail Specification Reference: 3601003
- Component Type Variant Number: 01 (as required)
- Characteristic code: Rated Coil Voltage and Coil Resistance (26.5Vdc, 900Ω): 26V1 (as required)

1.4.1.1   Characteristics and/or Ratings Codes
Characteristics and/or ratings to be codified as part of the ESCC Component Number shall be as follows:

(a)   The Rated Coil Voltage and Coil Resistance are expressed by means of the following codes:

Rated Coil Voltage (Vdc)	Coil Resistance (Ω)	Code
26.5	900	26V1
26.5	700	26V2
12	190	12V1
12	150	12V2

1.4.2   Component Type Variants and Range of Components

The component type variants and range of components applicable to this specification are as follows:

Variant Number	Case and Terminal Description (Note 1)	Coil Characteristics	Weight max (g)
01	Plain Case (No Mount) Solder Pin Terminals	Note 2	8.1
02	Raised Vertical Flange Mount Solder Pin Terminals	Note 2	8.8
03	Horizontal Flange Mount Solder Hook Terminals	Note 2	10
04	Horizontal Flange Mount Solder Pin Terminals	Note 2	9.7
05	Plain Case (No Mount) Solder Hook Terminals	Note 2	8.4
06	Raised Vertical Flange Mount Solder Hook Terminals	Note 2	9.1
09	Plain Case (No Mount) Long Solder Pin Terminals	Note 2	8.5

NOTES:

1.   See Para. 1.6.

2.   The following Rated Coil Voltages and Coil Resistances are available and selectable for each Variant:

Rated Coil Voltage	Coil Resistance
26.5Vdc	900Ω
26.5Vdc	700Ω
12Vdc	190Ω
12Vdc	150Ω

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Coil Voltage Range	V_{CR}		Vdc	
		25 to 32		Rated Coil Voltage: 26.5Vdc
		11 to 15		Rated Coil Voltage: 12Vdc
Rated Resistive Load Contact Current	I_{CR}	2	A	28Vdc resistive Note 1
Rated Inductive Load Contact Current	I_{CL}	400	mA	28Vdc inductive Inductance: 320mH Note 1
Overload Current	$I_{OVERLOAD}$	4	A	28Vdc resistive
Operating Temperature Range	T_{op}	-65 to +125	°C	T_{amb}
Storage Temperature Range	T_{stg}	-65 to +125	°C	T_{amb}
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 100mA.
2. Duration 10 seconds maximum at a distance not less than 3mm from the device body. The same terminal shall not be resoldered until 3 minutes have elapsed.

1.6   PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.6.1   Plain Case (No Mount) with Solder Pin Terminals (Variant 01)

Colour reference bead
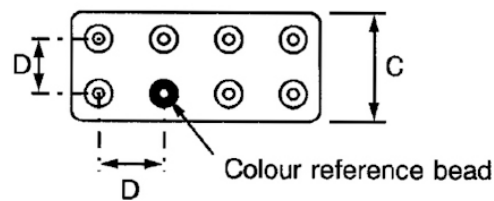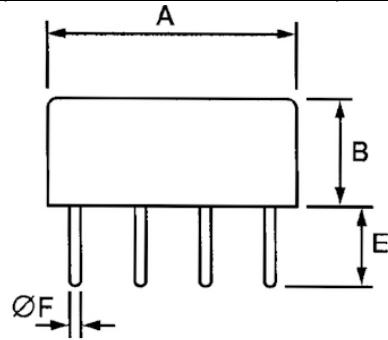
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.24	5.4
ØF	0.66	0.86

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.2   Raised Vertical Flange Mount and Solder Pin Terminals (Variant 02)

Colour reference bead
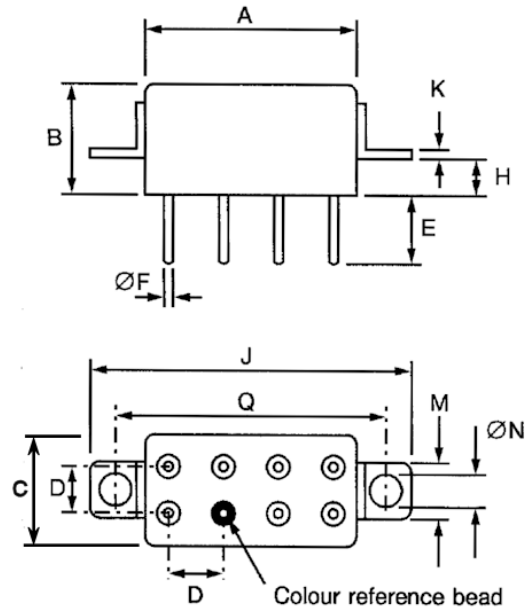
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.24	5.4
ØF	0.66	0.86
H	3.1	3.3
J	-	32.9
K	0.5	0.8
M	6.22	8.1
ØN	3	3.55
Q	26.6	27.4

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.3   Horizontal Flange Mount and Solder Hook Terminals (Variant 03)

Colour reference bead
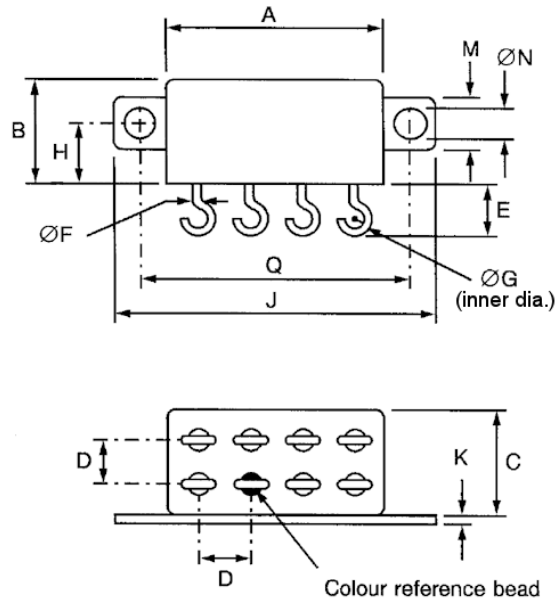
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.11	4.83
ØF	0.66	0.86
ØG	-	1.8
H	5.97	6.73
J	-	32.64
K	0.38	0.9
M	6.22	8
ØN	3	3.55
Q	26.8	27.2

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.4   Horizontal Flange Mount and Solder Pin Terminals (Variant 04)
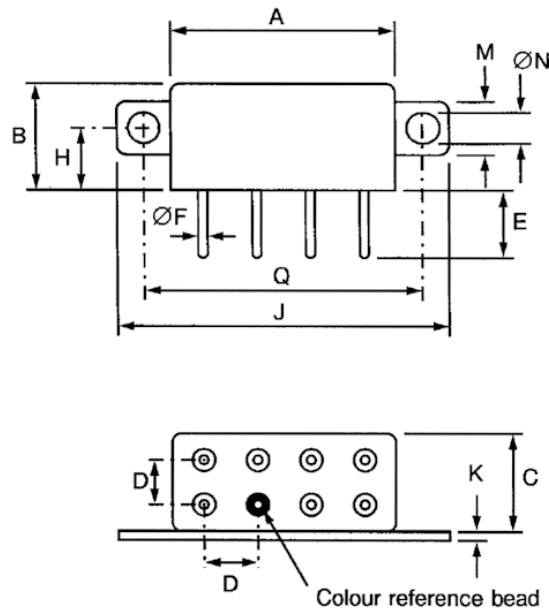
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.24	5.4
ØF	0.66	0.86
H	5.97	6.73
J	-	32.64
K	0.38	0.9
M	6.22	8
ØN	3	3.55
Q	26.8	27.2

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.5   Plain Case (No Mount) and Solder Hook Terminals (Variant 05)
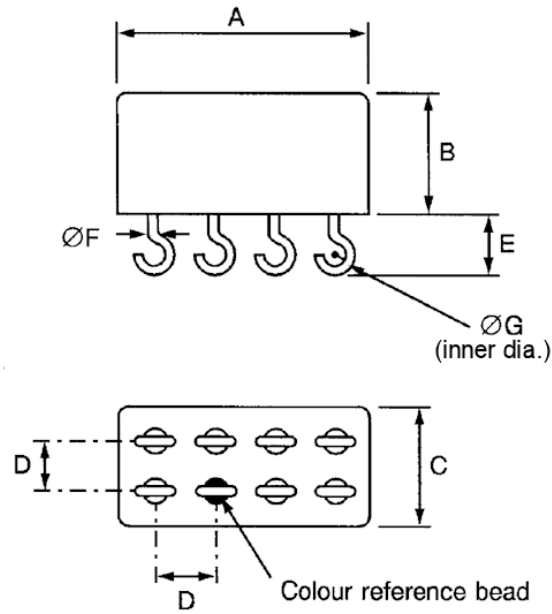
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.11	4.83
ØF	0.66	0.86
ØG	-	1.8

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.6   Raised Vertical Flange Mount and Solder Hook Terminals (Variant 06)
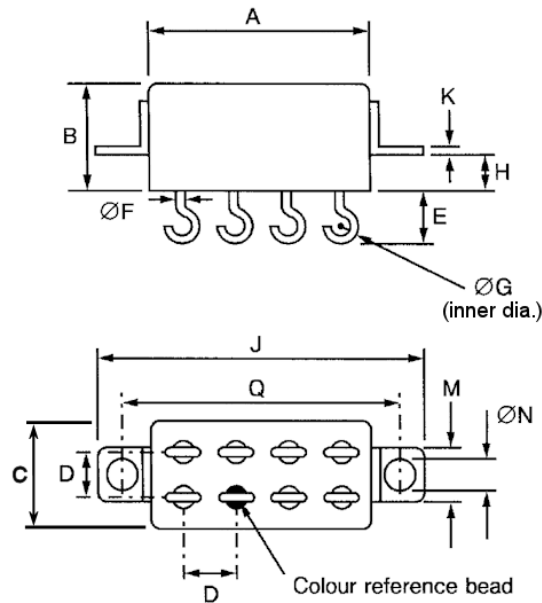
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	4.11	4.83
ØF	0.66	0.86
ØG	-	1.8
H	3.1	3.3
J	-	32.9
K	0.5	0.8
M	6.22	8.1
ØN	3	3.55
Q	26.6	27.4

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.6.7   Plain Case (No Mount) with Long Solder Pin Terminals (Variant 09)

Colour reference bead
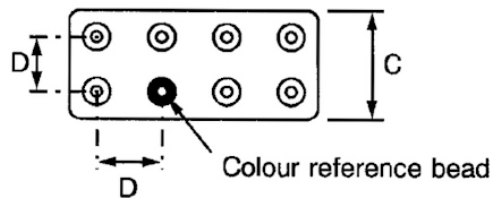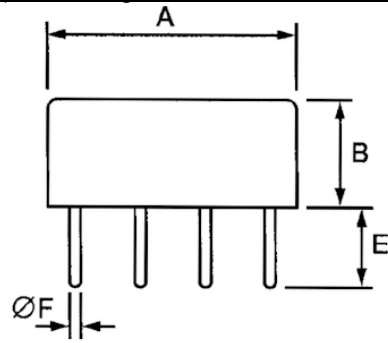
Symbols	Dimensions (mm)	
	Min	Max
A	-	20.57
B	-	10.41
C	-	10.41
D	4.95	5.21
E	6.2	6.86
ØF	0.66	0.86

NOTES:
1.   Terminal identification is specified by reference to the colour reference bead. See Para. 1.7.

1.7   FUNCTIONAL DIAGRAM
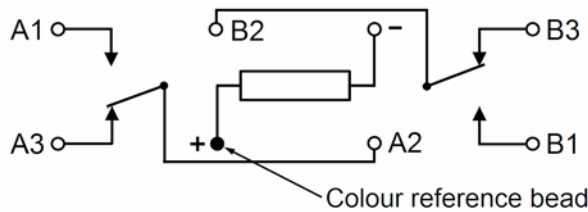
        NOTES:
        1.   As viewed from the terminal side with coil de-energised.
        2.   Individual terminal designations are for reference purposes only.

1.8   MATERIALS AND FINISHES

1.8.1   Case
        Copper nickel, hermetically sealed. Tin-lead alloy plating may be used.

1.8.2   Terminals
        The lead material and finish shall by type D3, D4, D19, F3, F4 or F19 in accordance with the requirements of ESCC Basic Specification No. 23500.

2   **REQUIREMENTS**

2.1   GENERAL
        The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

        Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1   Deviations from the Generic Specification
        None.

2.2   MARKING
        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 shall be:

        (a)   The ESCC qualified components symbol (for ESCC qualified components only).
        (b)   The ESCC Component Number (see Para. 1.4.1).
        (c)   Traceability information.

2.3 TERMINAL STRENGTH
The terminals of all Variants are defined as rigid.

The test conditions for Terminal Strength, tested as specified in the ESCC Generic Specification, shall be as follows:

(a) Pull Test :
- Applied Force: 15N

2.4 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES
Electrical measurements shall be performed at room, high and low temperatures.

2.4.1 Room Temperature Electrical Measurements
The measurements shall be performed at T_{amb} = +22 ±3°C.

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Pick-up Voltage	U_C	ESCC No. 3601	26.5	-	13.5	V
			12	-	6.8	
Drop-out Voltage	U_D	ESCC No. 3601	26.5	1.5	6.5	V
			12	0.7	3.5	
Operate Time	t_C	ESCC No. 3601	All	-	4	ms
Release Time	t_D	ESCC No. 3601	All	-	4	ms
Bounce Time	t_B	ESCC No. 3601	All	-	2	ms
Insulation Resistance	R_I	ESCC No. 3601 V_{TEST} = 100Vdc	All	10	-	GΩ
Voltage Proof (Test Voltage)	VP	ESCC No. 3601 Maximum Leakage Current I_{LVP} = 1mA	All	1000 (Note 1)	-	Vrms
				500 (Note 2)	-	
Voltage Proof Leakage Current	I_{LVP}	ESCC No. 3601 Note 3	All	-	1	mA
Contact Voltage Drop	V_D	ESCC No. 3601 I_{TEST} = 100mA max	All	-	0.05 x I_{TEST}	V
Coil Resistance	R_B	ESCC No. 3601				Ω
		Coil resistance = 900Ω	26.5	810	990	
		Coil resistance = 700Ω	26.5	630	770	
		Coil resistance = 190Ω	12	170	210	
		Coil resistance = 150Ω	12	135	165	

NOTES:
1. Points of application (1000V):
   - Between terminals (except coil) and case, coil de-energised.
   - Between terminals (except coil) and case, coil energised with Rated Coil Voltage.
   - Between coil and other terminals.
   - Between switching circuits, coil de-energised.
   - Between switching circuits, coil energised with Rated Coil Voltage.
2. Points of application (500V):
   - Between coil and case.
   - Between open contacts, coil de-energised.
   - Between open contacts, coil energised with Rated Coil Voltage.
3. Measured during Voltage Proof test.

2.4.2   High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Pick-up Voltage	U_C	ESCC No. 3601 T_{amb} = +125(+0 -5)°C and -65 (+5 -0)°C	26.5 12	- -	19.8 9.9	V
Drop-out Voltage	U_D	ESCC No. 3601 T_{amb} = +125(+0 -5)°C and -65 (+5 -0)°C	26.5 12	1 0.6	14 6.5	V
Operate Time	t_C	ESCC No. 3601 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	4	ms
Release Time	t_D	ESCC No. 3601 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	4	ms
Bounce Time	t_B	ESCC No. 3601 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	2	ms
Insulation Resistance	R_I	ESCC No. 3601 T_{amb} = +125 (+0 -5)°C V_{TEST} = 100Vdc	All	100	-	MΩ
Contact Voltage Drop	V_D	ESCC No. 3601 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C I_{TEST} = 100mA max	All	-	0.05 x I_{TEST}	V

2.5   PARAMETER DRIFT VALUES

Parameter Drift Values shall be measured as specified in the ESCC Generic Specification.

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.4.1 Room Temperature Electrical Measurements.

The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits			Units
		Drift Value Δ	Absolute		
			Min	Max	
Pick-up Voltage	U_C	Note 1	Note 2	Note 2	V
Drop-out Voltage	U_D	Note 1	Note 2	Note 2	V

NOTES:
1.   Drift Value (Δ) limits are not specified. Drift Values shall be recorded for information purposes only.
2.   The limit specified in Para. 2.4.1 shall apply.

2.6   INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

Unless otherwise specified the test methods and test conditions shall be as per the corresponding test defined in Para. 2.4.1 Room Temperature Electrical Measurements.

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Thermal Shock	During 5th Cycle				
	Pick-up Voltage	U_C	Note 2		V
	Drop-out Voltage	U_D	Note 2		V
	Operate Time	t_C	Note 2		ms
	Release Time	t_D	Note 2		ms
	Final Measurements				
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
Low Level Sine Vibration	Final Measurements				
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
Random Vibration	Final Measurements				
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
High Level Sine Vibration	Final Measurements				
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
Low Level Mechanical Shock	Final Measurements				
	Contact Voltage Drop	V_D	Note 3		V
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
High Level Mechanical Shock	Final Measurements				
	Contact Voltage Drop	V_D	Note 3		V
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
Resistance to Soldering Heat	Final Measurements				
	Insulation Resistance	R_I	Note 3		GΩ
	Contact Voltage Drop	V_D	Note 3		V
	Pick-up Voltage	U_C	Note 3		V
	Drop-out Voltage	U_D	Note 3		V
	Coil Resistance	R_B	Note 3		Ω
Low Level Life	Final Measurements				
	Contact Voltage Drop	V_D	-	$0.1 \times I_{TEST}$	V
	Insulation Resistance	R_I	5000	-	MΩ
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Operate Time	t_C	Note 3		ms
	Release Time	t_D	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Resistive Life	During Monitoring				
	Contact Voltage Drop	V_D	-	2.8	V
	Final Measurements				
	Contact Voltage Drop	V_D	-	$0.1 \times I_{TEST}$	V
	Insulation Resistance	R_I	5000	-	MΩ
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
	Pick-up Voltage	U_C	Note 3		V
	Pick-up Voltage Drift	$\Delta U_C/U_C$	Note 1		%
	Drop-out Voltage	U_D	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Operate Time	t_C	Note 3		ms
	Release Time	t_D	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω
Coil Life	During Step 1 of each Cycle				
	Contact Voltage Drop	V_D	Note 3		V
	Coil Resistance	R_B	Note 3		Ω
	During Step 3 of 1st Cycle				
	Contact Voltage Drop	V_D	Note 2		V
	Operate Time	t_C	Note 2		ms
	Release Time	t_D	Note 2		ms
	During Steps 4 & 5 of 4th Cycle				
	Pick-up Voltage	U_C	Note 2		V
	Drop-out Voltage	U_D	Note 2		V
	Final Measurements				
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
	Insulation Resistance	R_I	Note 3		GΩ
	Contact Voltage Drop	V_D	Note 3		V
	Coil Resistance	R_B	Note 3		Ω
	Operate Time	t_C	Note 3		ms
	Release Time	t_D	Note 3		ms
	Bounce Time	t_B	Note 3		ms

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Intermediate Current	<u>During Monitoring</u>				
	Contact Voltage Drop	V_D	-	300	mV
	<u>Final Measurements</u>				
	Insulation Resistance	R_I	5000	-	MΩ
	Voltage Proof	VP		Note 3	Vrms
	Voltage Proof Leakage Current	I_{LVP}		Note 3	mA
	Pick-up Voltage	U_C		Note 3	V
	Pick-up Voltage Drift	$\Delta U_C/U_C$		Note 1	%
	Drop-out Voltage	U_D		Note 3	V
	Drop-out Voltage Drift	$\Delta U_D/U_D$		Note 1	%
	Operate Time	t_C		Note 3	ms
	Release Time	t_D		Note 3	ms
	Bounce Time	t_B		Note 3	ms
	Coil Resistance	R_B		Note 3	Ω
	Contact Voltage Drop	V_D	-	0.1 x I_{TEST}	V
Overload	<u>During Monitoring</u>				
	Contact Voltage Drop	V_D	-	1.4	V
	<u>Final Measurements</u>				
	Contact Voltage Drop	V_D	-	0.1 x I_{TEST}	V
	Insulation Resistance	R_I	5000	-	MΩ
	Voltage Proof	VP		Note 3	Vrms
	Voltage Proof Leakage Current	I_{LVP}		Note 3	mA
	Pick-up Voltage	U_C		Note 3	V
	Pick-up Voltage Drift	$\Delta U_C/U_C$		Note 1	%
	Drop-out Voltage	U_D		Note 3	V
	Drop-out Voltage Drift	$\Delta U_D/U_D$		Note 1	%
	Operate Time	t_E		Note 3	ms
	Release Time	t_D		Note 3	ms
	Bounce Time	t_B		Note 3	ms
	Coil Resistance	R_B		Note 3	Ω

NOTES:
1. Parameter Drift shall be calculated referenced to the measurement immediately prior to the test in question. An additional initial measurement may be performed prior to the test in question if considered necessary. Drift limits are not specified. Drift Values shall be recorded for information purposes only.
2. The limits specified in Para. 2.4.2, as applicable to the same test temperature, shall apply.
3. The limits specified in Para. 2.4.1 shall apply.

2.7   RUN-IN CONDITIONS

The test conditions for Run-in, tested as specified in the ESCC Generic Specification, shall be as follows:

(a)   Test Temperature: +22 ±3°C.

APPENDIX A
AGREED DEVIATIONS FOR LEACH INTERNATIONAL EUROPE (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 2.1.1 Deviations from the Generic Specification: Qualification and Periodic Tests - Chart F4	Chart F4: Coil Life subgroup test sequence (under Endurance Subgroup 1): Coil Life and the subsequent tests shall only be performed for Qualification. They are not required for Periodic Testing except in the case of any significant change to the design.