



**RELAY, ELECTROMAGNETIC, NON-LATCHING,  
28VDC, 1A, 2PDT, TO5 CAN**

**ESCC Detail Specification No. 3601/002**

***DRAFT***

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**DOCUMENTATION CHANGE NOTICE**

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DCR No.	CHANGE DESCRIPTION
703, TBA	Specification updated to incorporate editorial and technical changes per DCR. Specification converted to MSWORD. Changes in presentation are possible.

**TABLE OF CONTENTS**

1	GENERAL	5
1.1	SCOPE	5
1.2	APPLICABLE DOCUMENTS	5
1.3	TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS	5
1.4	THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS	5
1.4.1	The ESCC Component Number	5
1.4.1.1	Characteristics and/or Ratings Codes	5
1.4.2	Component Type Variants and Range of Components	6
1.5	MAXIMUM RATINGS	7
1.6	PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION	8
1.7	FUNCTIONAL DIAGRAM	9
1.8	MATERIALS AND FINISHES	9
1.8.1	Case	9
1.8.2	Leads	9
2	REQUIREMENTS	9
2.1	GENERAL	9
2.1.1	Deviations from the Generic Specification	9
2.2	MARKING	9
2.3	TERMINAL STRENGTH	10
2.4	ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES	10
2.4.1	Room Temperature Electrical Measurements	10
2.4.2	High and Low Temperatures Electrical Measurements	11
2.5	PARAMETER DRIFT VALUES	12
2.6	INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS	12
2.7	RUN-IN CONDITIONS	16
	APPENDIX A	17

## 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: 36010020126V

- Detail Specification Reference: 3601002
- Component Type Variant Number: 01 (as required)
- Characteristic code: Rated Coil Voltage (26.5Vdc): 26V (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) Rated Coil Voltage expressed by means of the following codes:

Rated Coil Voltage (Vdc)	Code
26.5	26V
18	18V
12	12V
9	9V
6	6V
5	5V

#### 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	Minimum Lead Length L (mm) (Note 1)	Terminal Material and Finish (Note 2)	Rated Coil Voltage (Vdc)	Weight max (g)
01	38	D2	26.5, 18, 12, 9, 6, 5	2
02	4.75	D2	26.5, 18, 12, 9, 6, 5	1.5
03	3.2	D2	26.5, 18, 12, 9, 6, 5	1.5
04	38	D3	26.5, 18, 12, 9, 6, 5	2
05	4.75	D3	26.5, 18, 12, 9, 6, 5	1.5
06	3.2	D3	26.5, 18, 12, 9, 6, 5	1.5

**NOTES:**

1. See Physical Dimensions and Terminal Identification.
2. Terminal material and finish shall be in accordance with the requirements of ESCC Basic Specification No. 23500.

1.5 MAXIMUM RATINGS

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

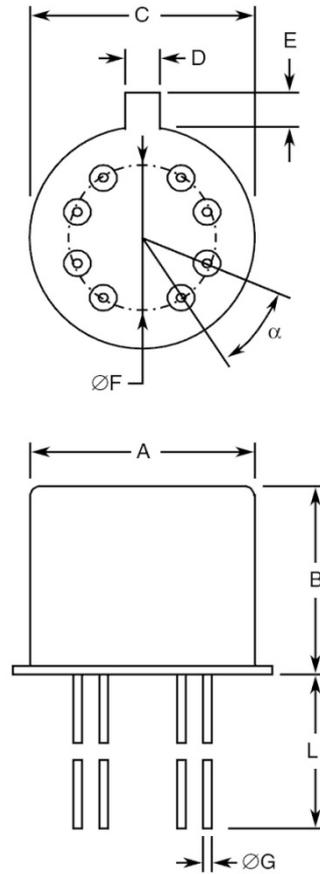
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Coil Voltage Range	$V_{CR}$	25 to 32 17 to 24 11 to 16 8.5 to 12 5.5 to 8 4.5 to 5.8	Vdc	Rated Coil Voltage: 26.5Vdc Rated Coil Voltage: 18Vdc Rated Coil Voltage: 12Vdc Rated Coil Voltage: 9Vdc Rated Coil Voltage: 6Vdc Rated Coil Voltage: 5Vdc
Rated Resistive Load Contact Current	$I_{CR}$	1	A	28Vdc resistive Note 1
Rated Inductive Load Contact Current	$I_{CL}$	200	mA	28Vdc inductive Inductance: 320mH Note 1
Overload Current	$I_{OVERLOAD}$	2	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 lead shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

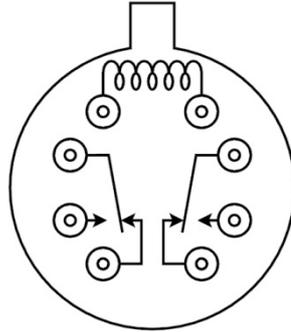


Symbols	Dimensions (mm)		Remarks
	Min	Max	
A	-	8.5	
B	-	7	
C	-	9.4	
D	0.7	0.9	Note 1
E	0.8	1	Note 1
ØF	4.83	5.33	
ØG	0.41	0.48	
L	Note 2	-	
α	36° BSC		

**NOTES:**

1. Terminal identification is determined by reference to the tab position. See Functional Diagram.
2. See Component Type Variants and Range of Components for dimension L value.

## 1.7 FUNCTIONAL DIAGRAM



### **NOTES:**

1. As viewed from the terminal side with coil de-energised.
2. All leads are electrically insulated from the case.

## 1.8 MATERIALS AND FINISHES

### 1.8.1 Case

Nickel, hermetically sealed.

### 1.8.2 Leads

As specified in Component Type Variants and Range of Components.

## 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.
- (c) Traceability information.

2.3 TERMINAL STRENGTH

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

- (a) Pull Test :
  - Applied Force: 4.4N
  - Duration: 10s
- (b) Bend Test (Test Condition C) :
  - Load: 227g

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

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Pick-up Voltage	$U_C$	ESCC No. 3601	26.5	-	14.2	V
			18	-	10.5	
			12	-	7	
			9	-	5.3	
			6	-	3.5	
			5	-	2.7	
Drop-out Voltage	$U_D$	ESCC No. 3601	26.5	1.37	8	V
			18	0.91	6	
			12	0.63	4	
			9	0.54	3	
			6	0.28	2	
			5	0.22	1.4	
Operate Time	$t_E$	ESCC No. 3601	All	-	2	ms
Release Time	$t_D$	ESCC No. 3601	All	-	2	ms
Bounce Time	$t_B$	ESCC No. 3601	All	-	1.5	ms
Insulation Resistance	$R_I$	ESCC No. 3601 $V_{TEST} = 100Vdc$	All	10	-	$G\Omega$
Voltage Proof (Test Voltage)	VP	ESCC No. 3601 Maximum Leakage Current $I_{LVP} = 1mA$	All	500	-	Vrms
Voltage Proof Leakage Current	$I_{LVP}$	ESCC No. 3601 Note 1	All	-	1	mA
Contact Voltage Drop	$V_D$	ESCC No. 3601 $I_{TEST} = 100mA \text{ max}$	All	-	$0.1 \times I_{TEST}$	V

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Coil Resistance	R <sub>B</sub>	ESCC No. 3601	26.5	1400	1720	Ω
			18	792	968	
			12	350	430	
			9	198	242	
			6	88	108	
			5	45	55	

**NOTES:**

1. 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 <sub>C</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C	26.5	-	18	V
			18	-	13.5	
			12	-	9	
			9	-	6.8	
			6	-	4.5	
			5	-	3.5	
Drop-out Voltage	U <sub>D</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C	26.5	0.89	13	V
			18	0.59	10	
			12	0.41	6.5	
			9	0.35	4.9	
			6	0.18	3.2	
			5	0.14	2.3	
Operate Time	t <sub>E</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	2.5	ms
Release Time	t <sub>D</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C and -65(+5 -0)°C	All	-	2.5	ms
Bounce Time	t <sub>B</sub>	ESCC No. 3601 T <sub>amb</sub> = +125(+0 -5)°C and -65 (+5 -0)°C	All	-	1.5	ms
Insulation Resistance	R <sub>I</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C V <sub>TEST</sub> = 100Vdc	All	100	-	MΩ
Contact Voltage Drop	V <sub>D</sub>	ESCC No. 3601 T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C I <sub>TEST</sub> = 100mA max	All	-	0.1 x I <sub>TEST</sub>	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  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

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

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

Characteristics	Symbols	Limits			Units
		Drift Value $\Delta$	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 ( $\Delta$ ) limits are not specified. Drift Values shall be recorded for information purposes only.
2. The limit specified in Room Temperature Electrical Measurements shall apply.

2.6 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3^{\circ}\text{C}$ .

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

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Thermal Shock	<u>During 5th Cycle</u>				
	Pick-up Voltage	$U_C$	Note 2		V
	Drop-out Voltage	$U_D$	Note 2		V
	Operate Time	$t_E$	Note 2		ms
	Release Time	$t_D$	Note 2		ms
	<u>Final Measurements</u>				
	Voltage Proof	VP	Note 3		Vrms
Voltage Proof Leakage Current	$I_{LVP}$	Note 3		mA	
Low Level Sine Vibration	<u>Final Measurements</u>				
	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		%	

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Random Vibration	<u>Final Measurements</u>				
	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	<u>Final Measurements</u>				
	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	<u>Final Measurements</u>				
	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	
High Level Mechanical Shock	<u>Final Measurements</u>				
	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	<u>Final Measurements</u>				
	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	

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Low Level Life	<u>Final Measurements</u>				
	Contact Voltage Drop	$V_D$	-	$0.2 \times I_{TEST}$	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	$t_E$	Note 3		ms
	Release Time	$t_D$	Note 3		ms
	Bounce Time	$t_B$	Note 3		ms
Coil Resistance	$R_B$	Note 3		Ω	
Resistive Life	<u>During Monitoring</u>				
	Contact Voltage Drop	$V_D$	-	2.8	V
	<u>Final Measurements</u>				
	Contact Voltage Drop	$V_D$	-	$0.2 \times I_{TEST}$	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	$t_E$	Note 3		ms
	Release Time	$t_D$	Note 3		ms
	Bounce Time	$t_B$	Note 3		ms
Coil Resistance	$R_B$	Note 3		Ω	

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Coil Life	<u>During Step 1 of each Cycle</u>				
	Contact Voltage Drop	$V_D$	Note 3		V
	Coil Resistance	$R_B$	Note 3		$\Omega$
	<u>During Step 3 of 1st Cycle</u>				
	Contact Voltage Drop	$V_D$	Note 2		V
	Operate Time	$t_E$	Note 2		ms
	Release Time	$t_D$	Note 2		ms
	<u>During Steps 4 &amp; 5 of 4th Cycle</u>				
	Pick-up Voltage	$U_C$	Note 2		V
	Drop-out Voltage	$U_D$	Note 2		V
	<u>Final Measurements</u>				
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	$I_{LVP}$	Note 3		mA
	Insulation Resistance	$R_I$	Note 3		G $\Omega$
	Contact Voltage Drop	$V_D$	Note 3		V
	Coil Resistance	$R_B$	Note 3		$\Omega$
	Operate Time	$t_E$	Note 3		ms
	Release Time	$t_D$	Note 3		ms
Bounce Time	$t_B$	Note 3		ms	
Intermediate Current	<u>During Monitoring</u>				
	Contact Voltage Drop	$V_D$	-	300	mV
	<u>Final Measurements</u>				
	Insulation Resistance	$R_I$	5000	-	M $\Omega$
	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		$\Omega$
	Contact Voltage Drop	$V_D$	-	0.2 x $I_{TEST}$	V

Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
			Min	Max	
Overload	<u>During Monitoring</u>				
	Contact Voltage Drop	$V_D$	-	1.4	V
	<u>Final Measurements</u>				
	Contact Voltage Drop	$V_D$	-	$0.2 \times I_{TEST}$	V
	Insulation Resistance	$R_I$	5000	-	$M\Omega$
	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		$\Omega$	

**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 High and Low Temperatures Electrical Measurements, as applicable to the same test temperature, shall apply.
3. The limits specified in Room Temperature Electrical Measurements 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 REL STPI (F)**

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
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.