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# RELAY, ELECTROMAGNETIC, NON-LATCHING, 28VDC, 10A, 2PDT

ESCC Detail Specification No. 3601/001

Joseph G	September 2024
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# ESCC Detail Specification

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# **DOCUMENTATION CHANGE NOTICE**

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

DCR No.	CHANGE DESCRIPTION
1656	Specification updated to incorporate changes per DCR.



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# 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 <u>APPLICABLE DOCUMENTS</u>

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: 36010010328V

Detail Specification Reference: 3601001

Component Type Variant Number: 03 (as required)

• Characteristic code: Rated Coil Voltage (28Vdc): 28V (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
28	28V
12	12V



# 1.4.2 <u>Component Type Variants and Range of Components</u>

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

Variant Number	Case and Terminal Description (Note 1)	Rated Coil Voltage (Vdc)	Weight max (g)
03	Raised Vertical Flange Mount Solder Pin Terminals with Polarizing Pin	28, 12	41
04	Raised Vertical Flange Mount Solder Hook Terminals	28, 12	41
05	Horizontal Flange Mount Solder Pin Terminals with Polarizing Pin	28, 12	41
06	Horizontal Flange Mount Solder Hook Terminals	28, 12	41

#### **NOTES:**

1. See Para. 1.6.

#### 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 <sub>CR</sub>	26.5 to 32 11 to 14.8	Vdc	Rated Coil Voltage: 28Vdc Rated Coil Voltage: 12Vdc
Rated Resistive Load Contact Current	Icr	10	A	28Vdc resistive Note 1
Rated Inductive Load Contact Current	I <sub>CL</sub>	8	А	28Vdc inductive Note 1
Overload Current	Ioverload	40	Α	28Vdc resistive
Operating Temperature Range	Тор	-65 to +125	°C	T <sub>amb</sub>
Storage Temperature Range	T <sub>stg</sub>	-65 to +125	°C	T <sub>amb</sub>
Soldering Temperature	T <sub>sol</sub>	+260	°C	Note 2

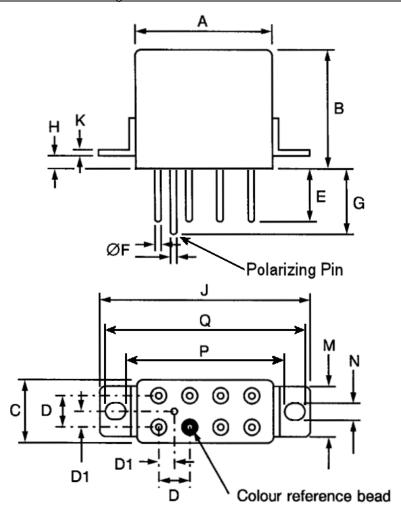
# NOTES:

- 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 Raised Vertical Flange Mount and Solder Pin Terminals with Polarizing Pin (Variant 03)



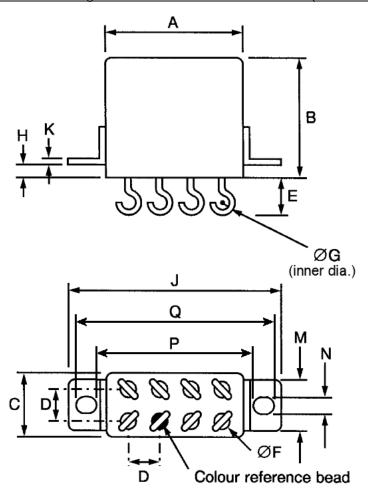
Symbols	Dimensions (mm)		Cymholo	Dimensions (mm)		
	Min	Max	Symbols	Min	Max	
Α	-	26	Н	3.8	4.2	
В	-	25.7	J	-	43.6	
С	-	13.3	K	0.9	1.1	
D	4.88	5.28	М	-	12.3	
D1	2.44	2.64	N	3.7	3.9	
Е	6.7	7.1	Р	31.15	32.15	
ØF	1.55	1.62	Q	40	41	
G	7.4	8				

#### NOTES

Terminal identification is specified by reference to the colour reference bead and the position of the polarizing pin. See Para. 1.7.



#### 1.6.2 Raised Vertical Flange Mount and Solder Hook Terminals (Variant 04)

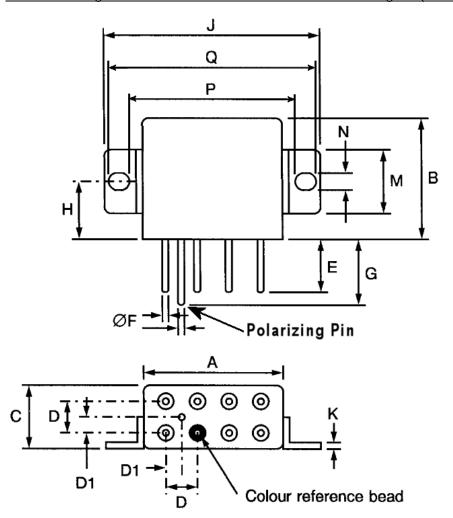


Cymbolo	Dimensions (mm)		Symbols	Dimensions (mm)	
Symbols	Min	Max		Min	Max
Α	-	26	Н	3.8	4.2
В	-	25.7	J	-	43.6
С	-	13.3	K	0.9	1.1
D	4.88	5.28	М	1	12.3
E	-	8	N	3.7	3.9
ØF	1.52	1.62	Р	31.15	32.15
ØG	1.75	2.25	Q	40	41

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



# 1.6.3 Horizontal Flange Mount and Solder Pin Terminals with Polarizing Pin (Variant 05)



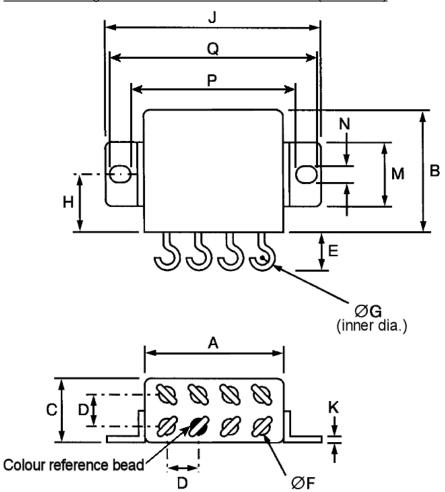
Symbols	Dimensions (mm)		Symbolo	Dimensions (mm)		
Symbols	Min	Max	Symbols	Min	Max	
Α	-	26	Н	12.5	12.9	
В	-	25.7	J	-	43.6	
С	-	13.3	K	0.9	1.1	
D	4.88	5.28	М	-	12.3	
D1	2.44	2.64	N	3.7	3.9	
Е	6.7	7.1	Р	31.15	32.15	
ØF	1.55	1.62	Q	40	41	
G	7.4	8				

#### NOTES:

1. Terminal identification is specified by reference to the colour reference bead and the position of the polarizing pin. See Para. 1.7.



# 1.6.4 <u>Horizontal Flange Mount and Solder Hook Terminals (Variant 06)</u>



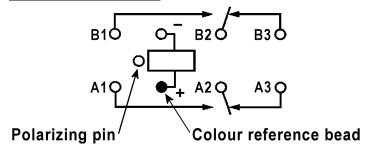
Cymbolo	Dimensions (mm)		Symbols	Dimensions (mm)	
Symbols	Min	Max		Min	Max
Α	-	26	Н	12.5	12.9
В	-	25.7	J	-	43.6
С	-	13.3	K	0.9	1.1
D	4.88	5.28	М	-	12.3
Е	-	8	N	3.7	3.9
ØF	1.52	1.62	Р	31.15	32.15
ØG	1.75	2.25	Q	40	41

#### NOTES:

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



#### 1.7 <u>FUNCTIONAL DIAGRAM</u>



#### NOTES:

- 1. As viewed from the terminal side with coil de-energised.
- 2. Individual terminal designations are for reference purposes only.
- 3. The polarizing pin is connected to the case (Variants 03, 05 only).

#### 1.8 <u>MATERIALS AND FINISHES</u>

#### 1.8.1 <u>Case</u>

Copper nickel, tin-lead alloy plated, hermetically sealed.

#### 1.8.2 Terminals

The lead material and finish shall by type H3, H4 or H19 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 <u>Deviations from the Generic Specification</u>

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 <u>TERMINAL STRENGTH</u>

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: 50N

# 2.4 <u>ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES</u>

Electrical measurements shall be performed at room, high and low temperatures.

# 2.4.1 Room Temperature Electrical Measurements

The measurements shall be performed at  $T_{amb} = +22 \pm 3$ °C.

Characteristics	Symbols	Test Method and	Rated Coil	L	Limits	
		Conditions	Voltage (Vdc)	Min	Max	
Pick-up Voltage	Uc	ESCC No. 3601				V
			28	-	13.5	
			12	-	6.5	
Drop-out Voltage	U <sub>D</sub>	ESCC No. 3601				V
			28	2.3	5.5	
			12	0.75	3.3	
Operate Time	t⊨	ESCC No. 3601	All	-	15	ms
Release Time	t <sub>D</sub>	ESCC No. 3601	All	-	15	ms
Bounce Time	t <sub>B</sub>	ESCC No. 3601	All	ı	1	ms
Insulation	Rı	ESCC No. 3601	All	100	-	МΩ
Resistance		V <sub>TEST</sub> = 500Vdc				
Voltage Proof	VP	ESCC No. 3601	All	1250	-	Vrms
(Test Voltage)		Maximum Leakage Current I <sub>LVP</sub> = 1mA		1000 (1)	-	
Voltage Proof	I <sub>LVP</sub>	ESCC No. 3601	All	-	1	mA
Leakage Current		Note 2				
Contact Voltage	$V_D$	ESCC No. 3601	All	-	0.015 x I <sub>TEST</sub>	V
Drop		$100\text{mA} \le I_{\text{TEST}} \le 10\text{A}$				
Coil Resistance	R <sub>B</sub>	ESCC No. 3601				Ω
			28	290	350	
			12	72	88	

#### **NOTES:**

- Between coil and case.
- 2. Measured during Voltage Proof test.



#### 2.4.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and	Rated Coil		Limits	Units
		Conditions	Voltage (Vdc)	Min	Max	
Pick-up Voltage	Uc	ESCC No. 3601				V
		$T_{amb} = +125(+0.5)^{\circ}C$	28	-	19.8	
		and -65 (+5 -0)°C	12	-	9.9	
Drop-out Voltage	U <sub>D</sub>	ESCC No. 3601				V
		$T_{amb}$ = +125(+0 -5)°C and -65 (+5 -0)°C	28	1.5	7	
			12	0.5	4.5	
Operate Time	t⊨	ESCC No. 3601	All	-	15	ms
		T <sub>amb</sub> = +125(+0 -5)°C and -65 (+5 -0)°C				
Release Time	t <sub>D</sub>	ESCC No. 3601	All	-	15	ms
		T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C				
Bounce Time	t <sub>B</sub>	ESCC No. 3601	All	-	1	ms
		T <sub>amb</sub> = +125 (+0 -5)°C and -65 (+5 -0)°C				
Insulation	Rı	ESCC No. 3601	All	50	-	МΩ
Resistance		$T_{amb} = +125 (+0 -5)^{\circ}C$				
		V <sub>TEST</sub> = 500Vdc				
Contact Voltage	$V_D$	ESCC No. 3601	All	-	0.015 x I <sub>TEST</sub>	V
Drop		$T_{amb} = +125 (+0.5)^{\circ}C$				
		and -65 (+5 -0)°C				
		100mA ≤ I <sub>TEST</sub> ≤ 10A				

#### 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	Absolute		
		Δ	Min	Max	
Pick-up Voltage	Uc	Note 1	Note 2	Note 2	V
Drop-out Voltage	U <sub>D</sub>	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 Para. 2.4.1 shall apply.



# 2.6 <u>INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS</u>

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	Lir	Limits	
ESCC No. 3001			Min	Max	
Thermal Shock	During 5th Cycle				
	Pick-up Voltage	ge Uc Note 2		V	
	Drop-out Voltage	$U_D$	No	te 2	V
	Operate Time	t⊨	Note 2		ms
	Release Time	t₀	Note 2		ms
	Final Measurements				
	Voltage Proof	VP	No	te 3	Vrms
	Voltage Proof Leakage Current	$I_{LVP}$	Note 3		mA
Low Level Sine	Final Measurements				
Vibration	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔU <sub>C</sub> /U <sub>C</sub>	Note 1		%
	Drop-out Voltage	U <sub>D</sub>	No	te 3	V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	No	te 1	%
High Level Sine	Final Measurements				
Vibration	Pick-up Voltage	Uc	No	te 3	V
	Pick-up Voltage Drift	ΔUc/Uc	No	te 1	%
	Drop-out Voltage	U <sub>D</sub>	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	No	te 1	%
Low Level	Final Measurements				
Mechanical Shock	Contact Voltage Drop	V <sub>D</sub>	No	te 3	V
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔUc/Uc	Note 1		%
	Drop-out Voltage	$U_D$	No	te 3	V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>	No	te 3	mA
High Level	Final Measurements				
Mechanical Shock	Contact Voltage Drop	$V_D$	No	te 3	V
	Pick-up Voltage	Uc	No	te 3	V
	Pick-up Voltage Drift	∆Uc/Uc	No	te 1	%
	Drop-out Voltage	U <sub>D</sub>	No	te 3	V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	No	te 1	%
	Voltage Proof VP Note 3		Vrms		
	Voltage Proof Leakage Current	I <sub>LVP</sub>	No	te 3	mA





Test Reference per ESCC No. 3601	Characteristics	Symbols	Limits		Units
E3CC No. 3001			Min	Max	-
Resistance to	Final Measurements				
Soldering Heat	Insulation Resistance	Rı	No	ote 3	МΩ
	Contact Voltage Drop	$V_D$	Note 3		V
	Pick-up Voltage	Uc	Note 3 Note 3 Note 3		V
	Drop-out Voltage	U <sub>D</sub>			V
	Coil Resistance	R <sub>B</sub>			Ω
Inductive Life	During Monitoring				
	Contact Voltage Drop	V <sub>D</sub>	-	2.8	V
	Final Measurements				
	Contact Voltage Drop	V <sub>D</sub>	-	0.0175 х І <sub>теsт</sub>	V
	Insulation Resistance	Rı	50	-	ΜΩ
	Voltage Proof	VP	1000	-	Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>		ote 3	mA
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔUc/Uc	Note 1		%
	Drop-out Voltage	U <sub>D</sub>	Note 3		V
	Drop-out Voltage Drift	ΔU <sub>D</sub> /U <sub>D</sub>	No	ote 1	%
	Operate Time $t_E$		Note 3		ms
	Release Time	t <sub>D</sub> Note 3		ms	
	Bounce Time	t <sub>B</sub>	Note 3 Note 3		ms
	Coil Resistance	R <sub>B</sub>			Ω
Resistive Life	During Monitoring				
	Contact Voltage Drop	VD	-	2.8	V
	<u>Final Measurements</u>			ı	
	Contact Voltage Drop	V <sub>D</sub>	-	0.0175 x I <sub>TEST</sub>	V
	Insulation Resistance	Rı	50	-	МΩ
	Voltage Proof	VP	1000	-	Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>	Note 3		mA
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔUc/Uc	No	Note 1	
	Drop-out Voltage	U <sub>D</sub>	Note 3		V
	Drop-out Voltage Drift	$\Delta U_D/U_D$	Note 1		%
	Operate Time	t⊨	Note 3		ms
	Release Time	t <sub>D</sub>	No	ote 3	ms
	Bounce Time	t <sub>B</sub> Note 3		ote 3	ms
	Coil Resistance	R <sub>B</sub>	No	ote 3	Ω





Test Reference per ESCC No. 3601	Characteristics	Symbols Limits		mits	Units
ESCC No. 3001			Min	Max	
Coil Life	During Step 1 of each Cycle				
	Contact Voltage Drop	V <sub>D</sub>	Note 3		V
	Coil Resistance	R <sub>B</sub>	No	ote 3	Ω
	During Step 3 of 1st Cycle				
	Contact Voltage Drop	$V_{D}$	No	ote 2	V
	Operate Time	t <sub>E</sub>		ote 2	ms
	Release Time	t <sub>D</sub>		ote 2	ms
	Treleade Time		140	7.0 2	1110
	During Steps 4 & 5 of 4th Cycle				
	Pick-up Voltage	Uc	Note 2		V
	Drop-out Voltage	U <sub>D</sub>	Note 2		V
	Final Measurements				
	Voltage Proof	VP	No	ote 3	Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>	No	ote 3	mA
	Insulation Resistance	Rı	No	ote 3	МΩ
	Contact Voltage Drop	$V_D$	No	ote 3	V
	Coil Resistance	R <sub>B</sub>	Note 3 Note 3 Note 3 Note 3		Ω
	Operate Time	t⊨			ms
	Release Time	$t_D$			ms
	Bounce Time	t <sub>B</sub>			ms
Intermediate	During Monitoring				
Current	Contact Voltage Drop:	$V_D$			mV
	Pole 1; Group 1, 2, 3 (10A)		-	175	
	Pole 2; Group 1 (0.5A)		-	30	
	Pole 2; Group 2 (0.3A)		-	18	
	Pole 2; Group 3 (0.1A)		-	6	
	Final Measurements			l	
	Insulation Resistance	Rı	50	_	МΩ
	Voltage Proof	VP		i ote 3	Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>	Note 3		mA
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔUc/Uc	U <sub>C</sub> Note 1 Note 3		%
	Drop-out Voltage	U <sub>D</sub>			V
	Drop-out Voltage Drift	ΔU <sub>D</sub> /U <sub>D</sub>			%
	Operate Time			ote 3	ms
	Release Time	t <sub>D</sub>	Note 3		ms
	Bounce Time	t <sub>B</sub>			ms
	Coil Resistance	R <sub>B</sub>	Note 3		Ω
	Contact Voltage Drop	V <sub>D</sub>	-	0.0175	V
				x I <sub>TEST</sub>	



No. 3601/001

Test Reference per	Characteristics	Symbols	Limits		Units
ESCC No. 3601			Min	Max	
Mechanical Life	Final Measurements				
	Contact Voltage Drop	V <sub>D</sub>	-	0.0175 x I <sub>TEST</sub>	V
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔU <sub>C</sub> /U <sub>C</sub>	No	ote 1	%
	Drop-out Voltage	U <sub>D</sub>	No	ote 3	V
	Drop-out Voltage Drift	ΔU <sub>D</sub> /U <sub>D</sub>	Note 1		%
	Operate Time	t⊨	No	ote 3	ms
	Release Time	t <sub>D</sub>	No	ote 3	ms
	Bounce Time	t <sub>B</sub>	Note 3		ms
	Coil Resistance	R <sub>B</sub>	Note 3		Ω
Overload	During Monitoring				
	Contact Voltage Drop	V <sub>D</sub>	-	2.8	V
	Final Measurements			I	
	Contact Voltage Drop	V <sub>D</sub>	-	0.0175 x I <sub>TEST</sub>	V
	Insulation Resistance	Rı	50	-	МΩ
	Voltage Proof	VP	1000	_	Vrms
	Voltage Proof Leakage Current	I <sub>LVP</sub>	Note 3		mA
	Pick-up Voltage	Uc	Note 3		V
	Pick-up Voltage Drift	ΔU <sub>C</sub> /U <sub>C</sub>	Note 1		%
	Drop-out Voltage	U <sub>D</sub>	Note 3		V
	Drop-out Voltage Drift	ΔU <sub>D</sub> /U <sub>D</sub>	Note 1		%
	Operate Time	t⊨	Note 3		ms
	Release Time	t₀	Note 3		ms
	Bounce Time	t <sub>B</sub>		ote 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.