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

ESCC Detail Specification No. 3602/002

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DOCUMENTATION CHANGE NOTICE

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

DCR No.	CHANGE DESCRIPTION
1168	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. 3602.

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: 36020020126V

- Detail Specification Reference: 3602002
- 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	Coil Circuit Description (Note 1)	Minimum Lead Length L (mm) (Note 2)	Rated Coil Voltage (Vdc)	Weight max (g)
01	Independent Latch and Reset Coils	38	26.5, 18, 12, 9, 6, 5	2
02	Independent Latch and Reset Coils	4.75	26.5, 18, 12, 9, 6, 5	1.5
03	Independent Latch and Reset Coils	3.2	26.5, 18, 12, 9, 6, 5	1.5
04	Latch and Reset Coils with Common Negative Terminal	38	26.5, 18, 12, 9, 6, 5	2
05	Latch and Reset Coils with Common Negative Terminal	4.75	26.5, 18, 12, 9, 6, 5	1.5
06	Latch and Reset Coils with Common Negative Terminal	3.2	26.5, 18, 12, 9, 6, 5	1.5

NOTES:

1. See Para. 1.7 Functional Diagram.
2. See Para. 1.6 Physical Dimensions and Terminal Identification

1.5 MAXIMUM RATINGS

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

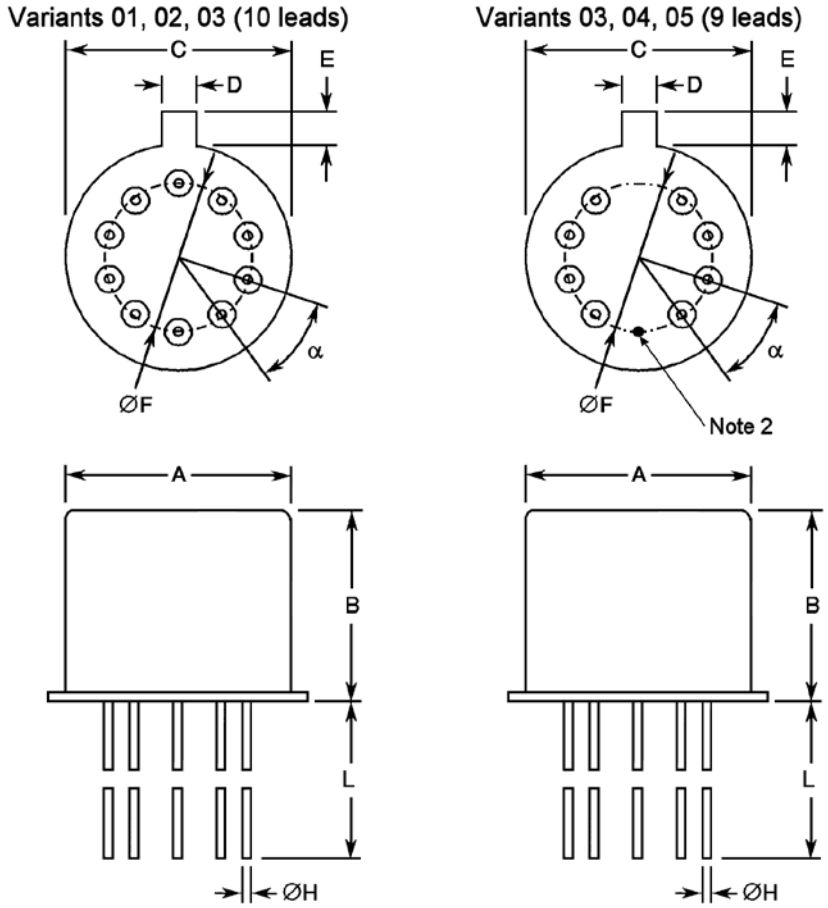
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

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 6	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

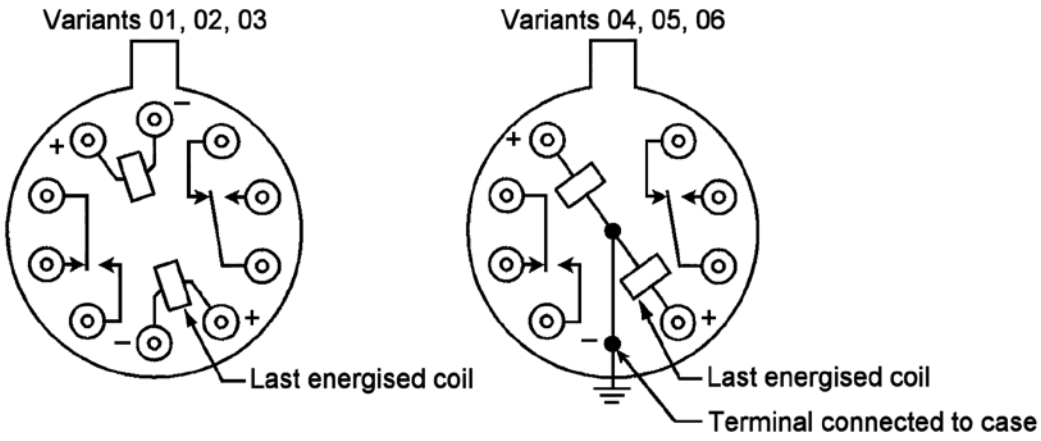


Symbols	Dimensions (mm)		Remarks
	Min	Max	
A	-	8.5	
B	-	7	
C	-	9.4	
D	0.7	0.9	Note 1
E	0.8	1	Note 1
ØF	4.83	5.33	
ØH	0.41	0.48	
L	Note 3	-	
α	36° BSC		

NOTES:

1. Terminal identification is determined by reference to the tab position. See Para. 1.7 Functional Diagram.
2. This lead is connected to the case. All other leads are electrically insulated from the case. See Para. 1.7 Functional Diagram.
3. See Para. 1.4.2 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 except for the coil common negative terminal of Variants 04, 05, 06, which is connected to the case.

1.8 MATERIALS AND FINISHES

1.8.1 Case

Nickel, hermetically sealed.

1.8.2 Leads

The lead material and finish shall by type D2 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 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. Consolidated notes are given in Para. 2.4.3 after the tables.

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	
Latch Voltage	U_L	ESCC No. 3602 Note 1	 26.5 18 12 9 6 5	 9.5 6.9 4.6 3.5 2.3 1.6	 14.2 10.5 7 5.3 3.5 2.8	V
Reset Voltage	U_R	ESCC No. 3602 Note 1	 26.5 18 12 9 6 5	 9.5 6.9 4.6 3.5 2.3 1.6	 14.2 10.5 7 5.3 3.5 2.8	V
Latch Time	t_L	ESCC No. 3602	All	-	1.5	ms
Reset Time	t_R	ESCC No. 3602	All	-	1.5	ms
Bounce Time	t_B	ESCC No. 3602	All	-	2	ms
Insulation Resistance	R_I	ESCC No. 3602 V_{TEST} = 100Vdc	All	10	-	GΩ

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Voltage Proof (Test Voltage)	VP	ESCC No. 3602 Maximum Leakage Current I_{LVP} = 1mA	All	500	-	Vrms
Voltage Proof Leakage Current	I_{LVP}	ESCC No. 3602 Note 2	All	-	1	mA
Contact Voltage Drop	V_D	ESCC No. 3602 I_{TEST} = 100mA max	All	-	0.1 x I_{TEST}	V
Coil Resistance	R_B	ESCC No. 3602 Both coils	 26.5 18 12 9 6 5	 1800 1017 450 252 108 55	 2200 1243 550 308 132 67	Ω

2.4.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method and Conditions	Rated Coil Voltage (Vdc)	Limits		Units
				Min	Max	
Latch Voltage	U_L	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C Note 1	 26.5 18 12 9 6 5	 - - - - - -	 18 13.5 9 6.8 4.5 3.5	V
Reset Voltage	U_R	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C Note 1	 26.5 18 12 9 6 5	 - - - - - -	 18 13.5 9 6.8 4.5 3.5	V
Latch Time	t_L	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	1.5	ms
Reset Time	t_R	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	1.5	ms
Bounce Time	t_B	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C	All	-	2	ms
Insulation Resistance	R_I	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C V_{TEST} = 100Vdc	All	100	-	MΩ
Contact Voltage Drop	V_D	ESCC No. 3602 T_{amb} = +125 (+0 -5)°C and -65 (+5 -0)°C I_{TEST} = 100mA max	All	-	0.1 x I_{TEST}	V

2.4.3 Notes to Electrical Measurements Tables

1. The coil voltage rise time shall be less than $0.1t_L$ or $0.1t_R$. The coil voltage shall be maintained for a minimum duration of $10t_L$ or $10t_R$.
2. Measured during Voltage Proof test.

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	
Latch Voltage	U_L	Note 1	Note 2	Note 2	V
Reset Voltage	U_R	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 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 ±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. 3602	Characteristics	Symbols	Limits		Units
			Min	Max	
Thermal Shock	During 5th Cycle				
	Latch Voltage	U_L	Note 2		V
	Reset Voltage	U_R	Note 2		V
	Latch Time	t_L	Note 2		ms
	Reset Time	t_R	Note 2		ms
	Final Measurements				
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA

Test Reference per ESCC No. 3602	Characteristics	Symbols	Limits		Units
			Min	Max	
Low Level Sine Vibration	Final Measurements				
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
Random Vibration	Final Measurements				
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
High Level Sine Vibration	Final Measurements				
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
Low Level Mechanical Shock	Final Measurements				
	Contact Voltage Drop	V_D	Note 3		V
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
High Level Mechanical Shock	Final Measurements				
	Contact Voltage Drop	V_D	Note 3		V
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	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
	Latch Voltage	U_L	Note 3		V
	Reset Voltage	U_R	Note 3		V
	Coil Resistance	R_B	Note 3		Ω

Test Reference per ESCC No. 3602	Characteristics	Symbols	Limits		Units
			Min	Max	
Low Level Life	Final Measurements				
	Contact Voltage Drop	V_D	-	0.2 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
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
	Latch Time	t_L	Note 3		ms
	Reset Time	t_R	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω
Resistive Life	During Monitoring				
	Contact Voltage Drop	V_D	-	2.8	V
	Final Measurements				
	Contact Voltage Drop	V_D	-	0.2 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
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
	Latch Time	t_L	Note 3		ms
	Reset Time	t_R	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω

Test Reference per ESCC No. 3602	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		Ω
	<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 & 5 of 4th Cycle</u>				
	Latch Voltage	U_L	Note 2		V
	Reset Voltage	U_R	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		GΩ
	Contact Voltage Drop	V_D	Note 3		V
	Coil Resistance	R_B	Note 3		Ω
	Latch Time	t_L	Note 3		ms
	Reset Time	t_R	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	-	MΩ
	Voltage Proof	VP	Note 3		Vrms
	Voltage Proof Leakage Current	I_{LVP}	Note 3		mA
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
	Latch Time	t_L	Note 3		ms
	Reset Time	t_R	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω
	Contact Voltage Drop	V_D	-	0.2 x I_{TEST}	V

Test Reference per ESCC No. 3602	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	-	0.4 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
	Latch Voltage	U_L	Note 3		V
	Latch Voltage Drift	$\Delta U_L/U_L$	Note 1		%
	Reset Voltage	U_R	Note 3		V
	Reset Voltage Drift	$\Delta U_R/U_R$	Note 1		%
	Latch Time	t_L	Note 3		ms
	Reset Time	t_R	Note 3		ms
	Bounce Time	t_B	Note 3		ms
	Coil Resistance	R_B	Note 3		Ω

<u>NOTES:</u>

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 High and Low Temperatures Electrical Measurements, as applicable to the same test temperature, shall apply.
3. The limits specified in Para. 2.4.1 Room Temperature Electrical Measurements shall apply.

2.7 <u>RUN-IN CONDITIONS</u>

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
Para. 2.1.1, Deviations from the Generic Specification: Production Control – Chart F2	Special In-Process Controls: Thermal Shock shall be replaced by the following: Thermal Shock in accordance with MIL-STD-202, Test Method 107, Test Condition B (5 Cycles) except that the exposure time at each temperature extreme shall be 1 hour. Data Points: Coil Resistance shall be monitored continuously during testing as specified in Room Temperature Electrical Measurements. As a minimum, the minimum and maximum Coil Resistance measurements during testing shall be recorded against component serial number.
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.