DOCUMENT CHANGE REQUEST

DCR number 746	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2012/06/21	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

Title:	Relays Electromagnetic Non-Latching 28Vdc 25A 3PDT		
Number:	3601/009	Issue:	2

Other documents affected:

Page:

Total reformat/re-write of ESCC 3601/009 issue 2 as part of the ongoing conversion to the ESCC format.
The changes incorporated into 3601/009 include the following:
• editorial & technical changes that reflect the content of Generic specification No.3601 issue 3 (per DCR672).
• technical changes per approved DCRs 157, 291, 340, 341, 344, 369.
• technical changes in accordance with the still relevant content of pending DCRs 289, 346, 348, 351, 353, 355, 357, 359, 360 (as applicable).
• additional editorial and technical changes as detailed herein.

Paragraph:

see below

Original wording:

see ESCC 3601/009 issue 2

Proposed wording:

Total reformat of this Detail Specification (from the range of various ESCC Detail Specifications, 3601/xxx, for relays under Generic Specification No. 3601) as part of the ongoing conversion of ESA/SCC legacy Detail specifications to the ESCC format, as well as amendments resulting from the changes to the Generic specification No.3601 per DCR672.
Note: The proposed technical content of ESCC3601/009 issue 3 is based on the current content of ESCC3601/009 issue 2 plus amendments discussed by ESA and CNES since 2006. Many of the amendments have already been proposed in other DCRs (those already approved: DCRs 157, 291, 340, 341, 344, 369)(those still open or intended to be withdrawn: DCRs 289, 346, 348, 351, 353, 355, 357, 359, 360). This DCR details all changes including the applicable changes from all these other DCRs.

See below for summary of changes proposed by this DCR.

Also see the attached proposed 3601/009 Issue 3 Draft A which incorporates all amendments proposed per this DCR.

Note: known support for active procurement against this specification includes the following Manufacturer:
- REL-STPI/F (is willing to support procurement of variants 02, 03, 04 with the 28V coil voltage option).
- Leach (Esterline)/F (is willing to support procurement of all variants with the 28V & 12V coil voltage options)

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Summary of changes to the current format, layout and content is as follows:
1) General
Rewording and restructure of various sections and paragraphs of the specification, plus other editorial changes based on the layout and editorial content of other Detail Specifications already converted to ESCC format.

2) Para 2, Reference to MIL-STD-202 is deleted (as it is not actually referenced)

3) Table 1(a) & Figure 2.
Delete unsupported/obsolete Variants 01, 05, 06 (ref. DCR291)
Add new Variant 07, Case with Vertical Brackets and Plug-in Terminals (in spite of DCR291; at the specific request of Leach/F who states that such a design is procured by their customers for space applications, and therefore dispute the case put in DCR291 that such a design is a bad solution for mounting)

4) Table 1(a),
Amend terminology used for description of Variants 02, 03, 04 (i.e. use the term bracket instead of flange mount, for consistency purposes)

5) Table 1(b) Maximum Ratings.
6V coil voltage option is deleted (also in Table 2 & Table 3)(due to not being supported by any Manufacturer)
Contact Resistance is deleted (as Contact Resistance is not a rating; Contact Voltage Drop is specified in Room Temperature Electrical Measurements)
Storage Temperature ratings are added (these standard ESCC ratings were missing).
Note 3 on Coil voltage rise time and required applied duration is moved to be a note to Table 2 & 3 (Para 2.4.3 in 3602/006 draft 3A)

6) Figure 2(a) 2(b) 2(c),
Implement DCR369 to amend dimensions DD & EE.
Unspecified Dimension BB is deleted from Figure 2(c)
Note - There is possibly some disparity between some dimensions for similar packages in other ESCC Detail specifications. Accordingly Manufacturers are requested to specifically review all the dimension limits and advise corrected values as applicable.

7) Figure 3, Circuit schematic & notes are amended to clarify terminals & connections.

8) Para 4.2, Deviations from the generic spec are removed (no longer needed as the detail spec is now compliant with the generic spec)

9) Para 4.2.4 & 4.2.5, Deviation to Resistive Life is added to amend the number of operations from 100000 to 50000 (ref. DCR355)

10) Para 4.4.1, Case description is amended (to be consistent with other ESCC relay Detail specs). 2nd sentence, Neither electro-deposited tin nor any paint shall be used, is deleted (as it is considered redundant).

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11) Para 4.5.1, Marking, item (a) & Para 4.5.2, Terminal Identification is deleted from the list of mandatory marking items (Terminal identification is actually specified by use of colour reference beads & the terminal configuration, as specified in Paras 1.6.1 to 1.6.4).
Note - The Manufacture is still permitted to mark a circuit schematic on the body of the relay, if space permits, under the Marking category of 'Manufacturer's Own Marking'.

12) Para 4.5.4, nominal coil resistance values are deleted (as redundant information)

13) Para 4.7.1 & Table 4, Miss Test is renamed 'Run-in' and Table 4 is used to specify Parameter Drift Values.
Miss Test Contact Resistance limit is deleted from Table 4 and replaced by Pick-up Voltage & Drop-out Voltage drift values (+/-15%)

14) Table 2 & Table 6, Voltage Proof Leakage Current test is added whenever Voltage Proof is tested (ref DCR340; note that the Voltage Proof test is retained)

15) Table 2, Contact Voltage Drop test current is amended to be 25A (=Rated Resistive Load Contact Current)(was 100mA per the default condition specified in the generic spec).

16) Table 3, Pick-up Voltage & Drop-out Voltage:
• For Pick-up Voltage the max limits only apply to the high temperature test. No test is required at low temperature.
• For Drop-out Voltage the max limits only apply to the high temperature test, and the minimum limits only apply to the low temperature test.

17) Table 3, Contact Voltage Drop test is added (to be consistent with other ESCC relay details specs).

18) Figure 4, Figure 5(a), Figure 5(b) are deleted (not applicable)

19) Table 5(a), the 3 high, low and room temperature conditions for Run-in (= "Miss Test") are replaced by a single test temperature of 22C.

20) Table 5(b) is deleted (Generic Spec No.3601 default test conditions apply).

21) Table 6, tests that do not include electrical measurements are removed from the table (i.e. Terminal Strength). Only specific electrical measurement tests called up by the generic spec are included in the Table (i.e. references to contact monitoring, fuse continuity & visual examination are removed from the Table).

22) Table 6, Salt Spray test is deleted (ref. DCR341; Note that Solderability is not added to this table)

23) Table 6, some Contact Voltage Drop limits are amended.
i.e.
• Overload: 300mV during monitoring (was 2.8V)
• Intermediate Current: 175mV, 30mV, 30mV (as applicable to Poles 1, 2, 3 per the generic spec) during monitoring (was 200mV for all 3 poles)); 175mV during final measurements (per DCR157)

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• Operating Life Resistive (= Resistive Life): 150mV during monitoring (was 2.8V)
• Inductive Life: 72mV during monitoring (was 2.8V)

24) Table 6, Coil Life, High Level Sine Vibration & High Level Mechanical Shock electrical measurement requirements are added (to be consistent with the Generic Specification per DCR672)

25) Table 6, Addition of drift values (for Pick-up Voltage & Drop-out Voltage, +/-15%) during the following tests:
• Vibration (= Low Level Sine Vibration)
• Mechanical Shock (= Low Level Mechanical Shock)
• Overload
• Intermediate Current
• Operating Life Resistive (= Resistive Life)
• Inductive Life
• Mechanical Life
• High Level Sine Vibration (new test)
• High Level Mechanical Shock (new test)
Note 1 is added to permit an additional measurement (of drift parameters) prior to the test in question in order to facilitate the drift calculation.

26) Table 6, Note 2 is deleted (the generic spec test method already implies measurement after reading stabilisation)(Ref. DCR344)

Justification:

a) Part of the ongoing activity of conversion of legacy ESA/SCC specifications to the ESCC format. Amendments are made to the format and editorial content in order to be consistent with various other ESCC Detail Specifications.

b) To make the detail spec fully consistent with the requirements and content of the ESCC Generic spec 3601 issue 3 (per DCR672).

c) To incorporate specific technical changes as detailed in the relevant change item above. All changes are for the purposes of technical improvement and have been previously discussed with CNES/ESA.

d) Implement drift measurement limits for Pick-up Voltage & Drop-out Voltage during Screening (over Run-in) and during Qualification and Periodic Testing on specific tests (see items 13 & 25 above).
Note - This change item has not yet been agreed with the 2 supporting Manufacturers: REL-STPI/F, Leach (Esterline)/F.

Attachments:

3601009_draft_3d_in_review.pdf, null

Modifications:

DCR contents are modified as follows in order to incorporate the latest comments and agreements made by the Manufacturers (LEACH & REL STPI) and CNES.

The DCR attachment is changed to be 3601/009 draft 3D which includes all the changes in the final version of this DCR.

Note: This DCR now also implements the use of alternate publishing software for this specification (was: GlobalView; is now: WORD2010).

Item 4) Table 1(a), Figure 2
Delete item and replace with the following:
The description of package & terminals for all Variants is amended as follows (to be consistent with MIL terminology):
• “Horizontal Flange Mount” changed to “Raised Vertical Flange Mount”
• “Vertical Flange Mount” changed to “Horizontal Flange Mount”
• “Plug-in Terminals” changed to “Solder Pin Terminals”
• “Solderable Hook-end Terminals” changed to “Solder Hook Terminals”
• Polarizing pin is added to the description for Variants 03 & 05

Item 6) Figures 2(a) 2(b) 2(c)
Delete item and replace with the following:
Dimensions as follows are amended (as requested by Leach) (see attachment for details)(see also DCR369):
Variant 02: DD EE FF F J
Variant 03: DD EE FF F J S
Variant 04: DD EE FF F J

BB is deleted in figure 2c
Dia.T & Dia.U clarified to be the inner diameters in figure 2a, 2c

Item 9) Para 4.2.4 & 4.2.5
Add the following additional deviation to the generic spec:
Inductive Life: Number of Cycles of Operation shall be 10000 minimum (was 20000) (as requested by Leach)

Item 10) Para 4.4.1
Add the following new 2nd sentence: “Tin-lead alloy plating may be used.”

Item 13) Para 4.7.1 & Table 4
Delete item and replace with the following:
Miss Test is renamed ‘Run-in’ and Table 4 is used to specify Parameter Drift Values.
Miss Test Contact Resistance limit is deleted from Table 4 and replaced by Pick-up Voltage & Drop-out Voltage drift values. Drift value limits are not specified at this time. Drift values are to be recorded for information purposes only in order to amass data so that suitable drift value limits can be specified at a later date (in a later revision).

Item 15) Table 2 & Table 3
Delete item and replace with the following:
Contact Voltage Drop test current is specified (= 100mA minimum to 25A maximum to be consistent with the generic spec). The VD max limit is specified as 0.006 x ITEST (based on 6mOhm value from Table 1(b) for contact resistance and the test

current of 100mA to 25A).

Item 16) Deleted from this DCR

Item 23) Table 6
Delete item and replace with the following:
The following Contact Voltage Drop limits are amended or clarified:
• Overload: 2.8V maximum during monitoring (clarification only; no actual change); 0.007 x ITEST (= 175mV) maximum during final measurements (clarification only; no actual change).

• Intermediate Current: 200mV during monitoring (clarification only; no actual change); 0.007 x ITEST (= 175mV) maximum during final measurements (clarification only; no actual change).

• Operating Life Resistive (= Resistive Life): 2.8V maximum during monitoring (clarification only; no actual change); 0.007 x ITEST (= 175mV) maximum during final measurements (clarification only; no actual change).

• Inductive Life: 2.8V maximum during monitoring (clarification only; no actual change); 0.007 x ITEST (= 175mV) maximum during final measurements (clarification only; no actual change).

• Mechanical Life: 0.007 x ITEST (= 175mV) maximum during final measurements (clarification only; no actual change).

Item 25) Table 6
Add the following note to this item and delete reference to +/-15%:
Note - Drift value limits are not specified in the table at this time. Drift values are to be recorded for information purposes only in order to amass data so that suitable drift value limits can be specified at a later date (in a later revision). Note 1 is added to clarify this position.

Add New Item 27) Table 3
For Pick-up voltage, the maximum limit for UR=12V is amended to be 9.9V (was 9.0V respectively) (as requested by Leach)

Add New Item 28) Appendix A for Leach International Europe
Add Appendix to detail the following deviations:
• Deviation to Materials & Finishes – Terminals: To specify a different terminal material for Leach relays: Iron-Cobolt (was type H); plus to allow a modification to finish type 3 such that: tin-lead plating shall have a composition of 85 to 95% tin (remainder lead) (was 30 to 70% tin (remainder lead)) (as requested by Leach).

• Deviations to Chart F4 High Level Sine Vibration & High Level Mechanical Shock tests which shall be not applicable for Leach (as requested by Leach due to the increased level in the Generic spec not yet having been fully assessed).

• Deviations to 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 (as confirmed by Leach)

Add New Item 29) Appendix B for REL STPI
Add Appendix to detail the following deviations:
• Deviations to Chart F4 High Level Sine Vibration & High Level Mechanical Shock tests which shall be not applicable for

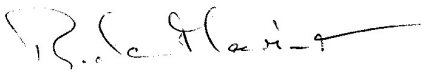
REL STPI (as requested by REL STPI due to the increased level in the Generic spec not yet having been fully assessed on non-QPL relays).

• Deviations to 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 (as requested by REL STPI)

In the Justification section:

Item d) Delete item and replace with the following:
d) Implement drift measurement for Pick-up Voltage & Drop-out Voltage during Screening (over Run-in) and during Qualification and Periodic Testing on specific tests (see items 13 & 25 above). Limits have not been specified at this time due to lack of applicable performance data. Measurements will now be recorded for information purposes so that suitable drift value limits can be specified at a later date in a further revision of this specification.

Approval signature:



Date signed:

2013-12-05