DOCUMENT CHANGE REQUEST

DCR number 710	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2012/02/16	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

Title:	Relays Electromagnetic Latching 28Vdc 15A 4PDT		
Number:	3602/004	Issue:	2

Other documents affected:

Page:

Total reformat/re-write of ESCC 3602/004 issue 2 as part of the ongoing conversion to the ESCC format.

The changes incorporated into 3602/003 include the following:
• editorial & technical changes that reflect the content of Generic specification No.3602 issue 3 (per DCR673).
• technical changes per approved DCRs 157, 291, 340, 341, 344, 369, 424.
• technical changes in accordance with the still relevant content of pending DCRs 289, 348, 351, 353, 355, 357, 358, 359, 360 (as applicable).
• additional editorial and technical changes as detailed herein.

Paragraph:

See below

Original wording:

See 3602/004 issue 2

Proposed wording:

Total reformat of this Detail Specification (from the range of various ESCC Detail Specifications, 3602/xxx, for relays under Generic Specification No. 3602) 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.3602 per DCR673.

Note: The proposed technical content of ESCC3602/004 issue 3 is based on the current content of ESCC3602/004 issue 2 plus amendments discussed and agreed 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in other DCRs (those already approved: DCRs 157, 291, 340, 341, 344, 369, 424)(those still open or intended to be withdrawn: DCRs 289, 348, 351, 353, 355, 357, 358, 359, 360).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 3602/003 Issue 3 Draft A which incorporates all amendments proposed per this DCR.

Note: known support for active procurement against this specification includes the following Manufacturers:
- REL-STPI/F (is willing to support procurement of variants 04, 06, 09, 14, 16, 19 and is ESCC qualified for these variants).

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- STPI/F (is willing to support procurement of variants 04, 06, 09, 14, 16, 19 and is ESCC qualified for these variants).
- Leach (Esterline)/F (is willing to support procurement; currently is not ESCC qualified).

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, 02, 03, 05, 07, 08, 11, 12, 13, 15, 17, 18, (ref. DCR291)

4) Table 1(a),
Amend terminology used for description of Variants 04, 06, 09, 14, 16, 19
i.e. use the following terms, for consistency/clarification purposes:
- bracket instead of flange mount
- 'Plug-in' instead of 'Straight'
- 'Solderable Hook-end' instead of 'Hook'

5) Table 1(b) Maximum Ratings.
• 6V coil voltage option is deleted (also in Para 4.5.4, Table 2 & Table 3)(ref. DCR424).
• 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 3602/004 draft 3A)

6) Figure 2(c) 2(d) 2(f),
• Implement DCR369 to amend dimensions P & Q.

Note - DCR624 raised on ESCC3601/007 to amend related Dimensions C, E & M (C equates to A in 3602/004), has not yet been approved. All Manufacturers (REL-STPI/F, STPI/F, Leach (Esterline)/F) are requested to specifically review the limits applicable to these Dimensions and advise corrected values if necessary.

7) Figure 2(c)
• Delete Dimensions G & W (for polarizing pin)

8) Figure 3, Circuit schematic is redrawn to clarify terminals & connections.

9) Para 4.2.3, 4.2.4 & 4.2.5, All deviations from the generic spec are removed (no longer needed as the detail spec is now compliant with the generic spec).

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

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 a colour reference bead, as specified in Paras 1.6.1 to 1.6.3).
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 Latch Voltage & Reset 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 3
• For Latch Voltage the max limits only apply to the high temperature test and the min limits only apply to the low temperature test.
• For Reset Voltage the max limits only apply to the high temperature test and the min limits only apply to the low temperature test.

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

17) Table 3, Note 2 is deleted. The low temperature tests are performed at -65C (instead of -55C). Switching Time tests (tL tR tB) are performed at both high & low temperatures.

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" / Screening) are replaced by a single test temperature of 22C.

20) Table 5(b) is deleted (Generic Spec No.3602 default test conditions apply).

21) Table 6, tests that do not include electrical measurements are removed from the table (i.e. Terminal Strength). Only relevant electrical tests per the applicable test in the Generic specification are included in the Table (e.g. references to fuse continuity, visual examination are removed from the Table).

22) Table 6, Addition of drift values (for Latch Voltage & Reset Voltage, +/-15%) during the following tests:
• Vibration (= Low Level Sine Vibration)
• Mechanical Shock (= Low Level Mechanical Shock)
• Overload

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• 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.

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

24) Table 6, some Contact Voltage Drop limits are amended.
i.e.
• Overload: 600mV during monitoring (was 2.8V)
• Intermediate Current: 10mV, 6mV, 5mV (as applicable to Poles 2, 3, 4 per the generic spec) during monitoring (was 30mV 18mV 6mV respectively); 175mV during final measurements (per DCR157)
• Operating Life Resistive (= Resistive Life): 150mV during monitoring (was 2.8V)
• Inductive Life: 120mV during monitoring (was 2.8V)

25) 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 DCR673).

26) Table 6, Note 3 is deleted (the generic spec test method already implies measurement after reading stabilisation)

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 3602 issue 3 (per DCR673).

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 Latch Voltage & Reset Voltage during Screening (over Run-in) and during Qualification and Periodic Testing on specific tests (see item 24 above).
Note - This change has not yet been agreed with the ESCC QPL Manufacturers: REL-STPI/F, STPI/F, Leach (Esterline)/F.

Attachments:

3602004_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 3602/004 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”
• “Straight Terminals” changed to “Solder Pin Terminals”
• “Hook Terminals” changed to “Solder Hook Terminals”

Item 6) Figure 2(c), 2(d), 2(f)
Delete item and replace with the following:
Dimensions as follows are amended (as requested by Leach) (see attachment for details)(see also DCR369)
Variants 04, 14: P Q
Variants 06, 16: P Q
Variants 09, 19: N2 P Q

C D are new dimensions in figures 2c, 2d, 2f
B is a new dimensions in figure 2f
N2 is deleted in figure 2f
Dia.G clarified to be the inner diameter in figures 2d, 2f

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 Latch Voltage & Reset 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) Delete item and replace with the following:
For Latch Voltage & Reset Voltage delete all minimum limits. Tests are performed at both high and low (-65C) temperatures.
Note 2 is deleted.
For Latch & Reset voltage, the maximum limit for UR=28V is amended to be 18V (was 19.8V).

Item 22) 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.

Item 24) 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); 0.015 x ITEST (= 225mV) (was 175mV) maximum during final measurements.

• Intermediate Current: 175mV, 30mV, 18mV, 6mV (as applicable to the 4 Poles per the generic spec) during monitoring (clarification only; no actual change); 0.015 x ITEST (= 225mV) (was 175mV) maximum during final measurements.
• Operating Life Resistive (= Resistive Life): 2.8V maximum during monitoring (clarification only; no actual change); 0.015 x ITEST (= 225mV) (was 175mV) maximum during final measurements.

• Inductive Life: 2.8V maximum during monitoring (clarification only; no actual change); 0.015 x ITEST (= 225mV) (was 175mV) maximum during final measurements.

• Mechanical Life: 0.015 x ITEST (= 225mV) (was 175mV) maximum during final measurements.

Add New Item 27) Para 4.2.4
Add new deviation to Chart F4 Deviations from Qualification and Periodic Tests High Level Mechanical Shock as follows:
The mechanical shock test condition peak value shall be 500g (as requested by REL STPI & agreed by CNES/ESA)

Add New Item 28) Table 2
Latch Voltage and Reset Voltage minimum values is amended to be 8V (was 9.1V) (as requested by Leach).

Add New Item 29) Table 2 & Table 3
Contact Voltage Drop test current is amended (= 100mA minimum to 15A maximum, to be consistent with the generic spec). The VD max limit is specified as 0.01 x ITEST (based on 10mOhm value from Table 1(b) for contact resistance and the test current of 100mA to 15A)(as requested by Leach).

Add New Item 30) 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)

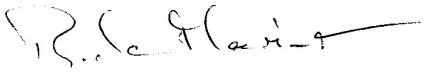
Add New Item 31) Appendix B for REL STPI
Add Appendix to detail the following deviations:
• Deviations to Chart F4: Coil Life subgroup test sequence (under Endurance Subgroup 1): Coil Life and the subsequent tests shall only be performed for Qualification. They are not required for Periodic Testing except 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 Latch Voltage & Reset Voltage during Screening (over Run-in) and during Qualification and Periodic Testing on specific tests (see items 13 & 22 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