DOCUMENT CHANGE REQUEST

DCR number 672	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2011/08/02	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

Title:	Generic Specification for Relays Electromagnetic Non-Latching		
Number:	3601	Issue:	2

Other documents affected:

Page:

all pages

Paragraph:

all paras

Original wording:

Total reformat/re-write of ESCC Generic Specification 3601 issue 2 as part of the ongoing conversion to the latest ESCC format.

Proposed wording:

The Generic Specification is proposed to be extensively amended to incorporate various policy, technical & editorial amendments & corrections in order to bring it in line with other ESCC Generic Specifications that have already been converted to the new ESCC format, as well as reflect the latest technical baseline ESCC generic specification requirements for non-latching relays.

The layout, format and general structure, and editorial content of 3601 issue 3 draft F are based closely on ESCC 5000 issue 6 per DCRs 149, 236, 286, 313 & 399 (all approved).
The proposed technical content of ESCC3601 draft 3F is based on the current content of ESCC3601 issue 2 plus amendments, discussed and agreed by ESA, CNES and various relay manufacturers since 2006, as were included within various other open DCRs. This DCR effectively replaces all those other DCRs (DCRs 287/ 345/ 346/ 347/ 350/ 352/ 354/ 356/ 358/ 359/ 360) which shall now be withdrawn.

This DCR summarises all the amendments to 3601 issue 2, plus identifies the additional editorial & technical changes to ESCC 3601 issue 2 not already generally detailed and justified by approved DCRs 149/236/286/313/399.

For full details of the proposed contents of ESCC 3601 issue 3 see the attached draft Generic specification ESCC 3601 issue 3 draft F.

Change Details:

A) Main General Changes (similar to those already incorporated into ESCC5000 issue 6):

1) The SCC testing level B has been deleted; there is still only a single ESCC testing level, equivalent to old SCC level B,

but it is not given a specific designation.

2) Qualification and Lot Acceptance Testing charts have been incorporated, with some modifications, into a single Chart F4, Qualification and Periodic Tests. Modifications include:
- Periodic testing is mandatory for ESCC qualified components with a defined testing schedule.
- Lot Acceptance Testing has been deleted but an Orderer option for similar Lot Validation Testing, for procurement, has been added. Lot Validation Testing is not mandatory and will only be done if specifically stipulated by the Orderer in their PO. The requirement for LAT level 3 as a minimum for non-qualified component procurement is removed.
- No failures are allowed during Chart F4 testing.

3) Introduction of Technology Flow Qualification per ESCC No. 25400 to the Generic spec.

4) Introduction of ESCC 23100 (ESCC Recommendations on the use of the ESCC Specification System for the Evaluation and Procurement of Unqualified Components) to the generic spec.

5) The Generic Specification has been made applicable and fully usable for procurement of unqualified components as well as for ESCC Qualified components.

6) Clarification that the term PID is specific only to ESCC qualified components.

7) The minimum required delivered documentation to the customer for procurement is a Certificate of Conformity & a Cover sheet.

8) Clarification of Customer Source inspection options for Pre-encapsulation CSI (Pre-Cap) & Final CSI (Buy-Off), where the Customer & Manufacturer mutually agree what is to be performed and how much notification is required.

9) The maximum allowed delay for Lot failure notification (provided by the Manufacturer) is now 5 working days (was 2).

10) Para 5 & Chart F2, Production Control/Special In-Process Controls, replaces Paras 5 & 6 and Chart II.

11) The General Flow Chart I is replaced by Chart F1; It clarifies the flow of components for Procurement.

12) Chart II Screening and Electrical Measurements, has been replaced by Chart F3, Screening Tests.

13) When using the ESCC System to procure components from an unqualified source and marking the parts with the ESCC component number, the Manufacturer should possess a manufacturing and quality assurance system that is compatible with space application. As such, the user expectation should be that parts would be compatible with passing the testing requirements of Chart F4. Accordingly the requirement placed on qualified sources to not knowingly supply components that cannot meet the Chart F4 testing is extended to unqualified sources.

14) Material outgassing reference document is corrected to be ECSS-Q-ST-70-02.

15) Para 9.23 & Chart II, Dimension Check is performed on 3 samples instead of 5.

.....

B) Other Editorial and/or Technical Changes (specific to ESCC3601):

16) Para 2.2, Reference documents that are not actually referenced in 3601 are removed.
i.e. MIL-STD-105, MIL-STD-414

17) Para 7.2.1, Parameter Drift Values during Screening
The requirement for testing of Parameter Drift Values (over Run-in) during screening is added but only when specified as being applicable to a particular component in the relevant detail specification; otherwise they should be considered as not required. When they are applicable, Parameter Drift Values failures shall not count towards Lot Failure.
Paras affected in 3601 draft 3F:
6.2.2, 8.3.2, Chart F3

18) Para 8.1.2 and Chart IV & Chart V
The sample size and test requirements for Qualification Testing and Lot Acceptance testing has been changed (See 3601 Draft 3F Chart F4 for details). Specific changes include the following details:
- The various test sequences of charts IV & V have been amended to form specific test subgroups in Chart F4.
i.e. an Environmental/Mechanical Subgroup, two Endurance Subgroups and an Assembly Capability Subgroup.
- Additional tests have been incorporated into Chart F4 Environmental/Mechanical Subgroup.
i.e. Random Vibration (for Relays <5A), High Level Sine Vibration, High Level Mechanical Shock (see also the attached 3601 issue 3 draft F Paras 8.8.2, 8.8.3 & 8.9.2 for full details):

19) Para 9.2 & Chart II, Temperature Cycling is renamed as Thermal Shock.

20) Para 9.3, Electrical Measurements
Add a caution that delivery lot relays shall not switch anything greater than 6V, 10mA during any testing prior to delivery (see the attached 3601 issue 3 draft F Para 8.3.1 for full details)

21) Para 9.3.1, Pick-up Voltage
Amend 1st and 2nd sentences to read as follows (see the attached 3601 issue 3 draft F Para 8.3.1.1 for full details)::
The Coil Voltage shall be gradually increased from zero until the relay switches, within a period of up to 3 seconds maximum.

22) Para 9.3.3, Contact Resistance.
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.3.1.3 for full details):
- Amend title of Para to be: Contact Voltage Drop (Contact Resistance)
- Delete AC method option.
- Amend test current to be as specified in the detail specification (within specified limits)
- Amend Test voltage to be a maximum value (6V max)

DCR number 672	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2011/08/02	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

23) Para 9.3.4, Operate, Release and Bounce Times
Test method is amended (see the attached 3601 issue 3 draft F Para 8.3.1.4 for full details). Definition of Contact Bounce is added.
Delete figure I

24) Para 9.4.1, Seal Test Gross Leak
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.4.2 for full details):
- Test condition D is added as an option
- For test condition B, Water temperature and pressure values are specified (25C & <8465Pa, respectively)

25) Para 9.4.2, Seal Test Fine Leak
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.4.1 for full details):
- Pressure value is specified (400kPa)
- Recovery period is amended to be 30minutes
- During Charts F2 & F3 testing, duration of pressurisation and recovery is amended to be 2 hours and 30 minutes respectively.
- During Chart F4 testing, the measured leak rate shall be recorded against component serial number.

26) Para 9.6, Vibration Scan
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.6 for full details):
- Maximum vibration frequency is amended to be 3000Hz.

27) Para 9.7, Electrical Measurements at High & Low temperatures
The specific 1 hour soak requirement before measurements is amended to be a general requirement for stabilisation.

28) Para 9.8 & Chart III, Low Level Test
The Low Level Test performed at High, Low and Room temperatures is renamed as Run-in and the test temperature(s) is as specified in the applicable Detail specifications. The maximum contact resistance allowed during the test is fixed at 100ohm, unless otherwise specified in the Detail Specification.

29) Para 9.9 & Chart III, Internal Moisture test is deleted.

30) Para 9.10, Vibration
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.8.1 for full details):
- test is renamed as Low Level Sine Vibration
- Maximum vibration frequency is amended to be 3000Hz.
- After the test electrical measurements shall be performed as specified in the detail specification including the drift values if specified.

DCR number 672	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2011/08/02	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

31) Para 9.11, Mechanical Shock
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.9.1 for full details):
- test is renamed as Low Level Mechanical Shock
- Test condition is fixed at test condition C (100g, 6ms half-sine) (was as specified in the detail specification)
- After the test electrical measurements shall be performed as specified in the detail specification including the drift values if specified.

32) Para 9.12.1, Overload (for Relays <5A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.16.1 for full details):
- Contact overload current shall be as specified in the detail specification (was fixed at 2xRated Resistive Current).
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 5% of applied voltage)
- The Voltage Drop shall be monitored for 40% minimum of each ON and OFF period during the switching cycle (was 50%)

33) Para 9.12.2, Overload (for Relays 5A to 20A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft E Para 8.16.2 for full details):
- Contact overload current shall be as specified in the detail specification (was fixed at 4xRated Resistive Current).
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 10% of applied voltage)

34) Para 9.12.3, Overload (for Relays >20A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.16.3 for full details):
- Contact overload current shall be as specified in the detail specification (was fixed at 2xRated Resistive Current).
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 10% of applied voltage)
- The Voltage Drop shall be monitored for 40% minimum of each ON and OFF period during the switching cycle (was 50%)

35) Para 9.13, Thermal Shock
Measurement of Insulation resistance during the 5th cycle (at each temperature extreme) is deleted. Final electrical measurements as specified in the detail specification are added.

36) Para 9.16.1, Intermediate Current (for Relays <5A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.13.1 for full details):
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 300mV maximum)

37) Para 9.16.2, Intermediate Current (for Relays 5A to 20A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.13.2 for full details):
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was per Table in Para 9.16.2)
- The number of cycles of operation applied during the test shall be 5000 (was 50000)

38) Para 9.16.3, Intermediate Current (for Relays >20A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.13.3 for full details):
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 200mV maximum)
- The number of cycles of operation applied during the test shall be 5000 (was 50000)

39) Para 9.19.1, Resistive Life
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.11.3 for full details):
- The test current (Contact Load) condition is fixed at Rated Resistive Load Contact Current as specified in the Detail Specification (reference to Table 5(b) is deleted)
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 10% of applied voltage)

40) Para 9.19.2, Low Level Load and Mechanical Life (Relays <5A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.11.1 for full details):
- Test is renamed Low Level Life
- The test temperature shall be room ambient (was a mixture of both Maximum Operating temperature and room ambient temperature).

41) Para 9.19.3, Inductive Life (Relays >=5A)
Test method is amended including the following main changes (see the attached 3601 issue 3 draft F Para 8.11.2 for full details):
- The Voltage Drop across closed contacts shall be as specified in the Detail Specification (was 10% of applied voltage)

42) Para 9.20, Coil Life
Figure II is replaced by equivalent descriptive text (see the attached 3601 issue 3 draft F Para 8.12 for full details)

43) Para 9.22, Encapsulation is deleted.

44) Para 10.8 & 10.9, Data for Qualification Tests & LAT
The measured leak rate results from Chart F4 tests shall be recorded against component serial number and provided (see the attached 3601 issue 3 draft F Paras 9.7.1, 9.7.2 & 9.7.3 for details).

45) Para 7.4.1 Lot Failure During 100% Testing
Only electrical parameter limit failures during Room Temperature Electrical Measurements & High and Low Temperatures Electrical Measurements during Screening Tests shall count towards percent defective lot failure (i.e. excluding other failures per Para 7.2.3).

46) Para 10.6. Final Production Test Data (Chart II)

DOCUMENT CHANGE REQUEST

DCR number 672	Changes required for: General	Originator: Steve Thacker
Date: 2013/12/05	Date sent: 2011/08/02	Organisation: ESCC Executive Secretariat
Status: IMPLEMENTED		

Room Temperature Electrical Measurements (during Special In-Process Controls in 3601 issue 3 draft F Chart F2), shall be read & record against serial number.

Justification:

All changes have been defined and included to serve the purposes of technical improvement, clarification, accuracy, completeness, simplification, harmonisation and consistency. The aim is to simplify and improve the content and interpretation of the specification and its requirements whilst maintaining an efficient and acceptable technical baseline.

Additional mechanical tests (i.e. Random Vibration, High Level Sine Vibration, High Level Mechanical Shock) have been introduced into Chart F4 to answer the requirements of new space launchers.

All technical changes have been defined and agreed by ESA and CNES.

ESCC 3601 issue 3 draft E is written to closely follow the layout, format and content of the latest ESCC 5000 issue 6. The justifications for the related policy and editorial changes given in all other previous DCRs related to ESCC 5000 issue 6 (i.e. DCRs 149, 236, 286, 313, 399) also apply to this DCR.

Note – All ESCC Detail specifications for non-latching relays (3601/xxx) will need to be converted to make them consistent with the contents of ESCC Generic Specification 3601 issue 3 per this DCR. The main technical changes to be implemented into each Detail specification resulting from the changes in this DCR are as follows:

• Implementation of ‘Run-in’ (replacing ‘Miss Test’); affecting Table 4 & Table 5(a).
• Implementation of Drift Parameters during Screening (over ‘Run-in’)(i.e. Pick-up Voltage & Drop-out Voltage drift values), as applicable to each Detail Spec; affecting Table 4.
• Specification of test current for measurement of contact resistance; affecting Table 2.
• Implementation of addition environmental & Mechanical test requirements (i.e. Random Vibration, High Level Sine Vibration & High Level Mechanical Shock); affecting Table 6.
• Implementation of Drift Parameters during Qualification and Periodic tests (i.e. Pick-up Voltage & Drop-out Voltage drift values) for the following tests, as applicable to each Detail Spec:
o Vibration
o Mechanical Shock
o Overload
o Intermediate Current
o Operating Life Resistive (= Resistive Life)
o Operating Life Low Level Load and Mechanical Shock (= Low Level Life)
o Random Vibration (new test)
o High Level Sine Vibration (new test)
o High Level Mechanical Shock (new test)

Attachments:
3601DraftG.pdf, null
Modifications:
3601 Draft G shall apply.
Approval signature:

Date signed:
2013-12-05