

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Low-Voltage Switchgear and Controlgear – Part 4-1: Contactors and Motor-Starters – Electromechanical Contactors and Motor-Starters, UL 60947-4-1, are being proposed:

1. Harmonization of endurance test cycle rates for contactors, starters, manual motor controllers, manual motor controllers used as a disconnecting means and manual motor controllers used as tap conductor protection as a U.S. only national difference.

2. Harmonization of endurance test cycle rates for manual motor controller and manual self-protected combination motor controller as a U.S. only difference.

STP BALLOTS AND ALL COMMENTS DUE: September 25, 2017

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If you are interested in applying for STP 60947-4 membership or are aware of potential candidates for this STP, please contact the STP Project Manager, Casey.Granata@ul.com.

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Harmonization of endurance test cycle rates for contactors, starters, manual motor controllers, manual motor controllers used as a disconnecting means and manual motor controllers used as tap conductor protection as a U.S. only national difference.

RATIONALE

Proposal submitted by: Conrad Weiden, Schneider Electric

For contactors and starters, Section 8.2.4.2DV of UL 60947-4-1 allows for two options when making the horsepower rated equipment endurance test sequence. The first option allows for the "UL 508" method according to clause 8.2.4.2DV.1. The second option allows for the "IEC 60947-4-1" method according to clause 8.2.4.2DV1.1.

*8.2.4.2DV.1 Endurance test performance – Equipment with horsepower, kW, capacitive switching or elevator control ratings shall close and open a test circuit having the current and power factor as described in **Table 8.2.4.2DV.1.1**. It shall be tested according to Clause*

9.3.3.6DV.1. Equipment having a rating with an equivalent utilization category (see Table 5.4.1DV.1.1) and/or an AC-4 utilization category shall be tested in accordance with the conditions in Table 8 and according to Clause 9.3.3.5.

*8.2.4.2DV.1.1 Endurance test performance – Equipment with horsepower ratings may be tested in accordance with the requirements for AC3 utilization category per **Clause 8.2.4.2** in lieu of testing per Clause 8.2.4.2DV.1. The test current values for the associated horsepower ratings shall be based on Table G.1.*

The “UL 508” test cycle rate for Across-the-Line a.c. Motor Starting in **Table 8.2.4.2DV.1.1** references note c. Note c states that “the test cycle shall be as indicated in Table 9.3.3.6DV.1.” For nonreversing controllers less than 200 Amperes, **Table 9.3.3.6DV.1** shows a time on of 0.5 seconds and a maximum time off of 0.5 seconds.

The “IEC 60947-4-1” test cycle rate in **Clause 8.2.4.2** references Tables 10. Table 10 specifies the making and breaking conditions according to the utilization category. For the AC-3 utilization category, the on-time is shown as 0.05 seconds and the off-time references note c. Note c references **Table 8** which specifies an off-time of 10 seconds maximum for a current broken I_c of 100 Amps or less.

For **manual motor controllers**, a different clause is used to reference the endurance test cycle rates but the same two options are available. The general test sequence requirements for manual motor controllers are shown in **Table DVC.4.2.1.1.1** which specifies **9.3.3.6DV.1** for the endurance testing requirements and 9.3.3.6DV.2 specifies the test cycle times.

*9.3.3.6DV.2 The equipment shall close and open a test circuit having the applicable current and power factor. The number of test cycles and the test cycle times shall be as specified in **Table 8.2.4.2DV.1.1** or **Table 8**, as appropriate. The closed circuit test voltage shall be 100 to 110 percent of the required test voltage specified in Table 28DV of Part 1.*

For **manual motor controllers used as a disconnecting means** and **manual motor controllers used as tap conductor protection**, the endurance test cycles are specified in **Table DVC.5.1.3.1.1**. **Table DVC.5.1.3.1.1 note c** states that the first 1000 cycles of electrical endurance are to be made per **Table 8.2.4.2DV.1.1**. This table only allows for the “UL 508” type test cycle rate of 0.5 seconds on, 0.5 seconds off for nonreversing controllers less than 200 Amperes.

While we have not been able to determine the actual origin of the 0.5 seconds on, 0.5 seconds off “UL 508” cycle rate, we can assume that it was meant to simulate either jogging duty or low coil voltage contact chatter. Contact chatter would not be an issue with a manual device. With the introduction of the AC-3 Utilization Category and the definition of limited jogging duty in 60947-4-1, **Table 1, note a**, there should be little concern about jogging duty on an AC-3 rated manual motor controller. While investigating the origin of the cycle rates, we did find a note in the 1983 edition of NEMA ICS2 Part ICS2-321.22 for limited jogging duty that was almost identical to the 60947-4-1 Table 1 note a.

So as to allow the same **contactor, starter** and **manual motor controller** endurance testing cycle rate options to be used on **manual motor controllers used as a disconnecting means** and **manual motor controllers used as tap conductor protection**, we propose to change **Table DVC 5.1.3.1.1, Note c** as modified in the proposed text. In addition, so that it reads like the other endurance sections, we would also proposed to modify the text in **9.3.3.6DV.2** as noted in the proposed text.

It is the opinion of the proposal submitter that this proposal contains a test requirement revision or clarification.