



WSDOT Test Method T 423

Test Method for NEMA Type Traffic Controller Cabinet, 300 Series (Type 170/2070) Traffic Controller Cabinet, and Advanced Transportation Controller (ATC) Cabinet Conflict Monitor Testing

1. Scope

The purpose of this test method is to evaluate the operation of the Conflict Monitor Unit (CMU) which is supplied with each Traffic Controller Cabinet. This test method may also be used to test Conflict Monitor Units submitted for testing as piece parts upon request. To provide harmonization within this document, the nomenclatures “Conflict Monitor”, “Signal Conflict Monitor”, “Malfunction Management Unit”, “Monitor Unit”, and “Conflict Monitor Unit” used in the reference documents are synonyms and will be referred to in this document as “CMU”.

2. Reference Documents

- WSDOT *Standard Specifications* 9-29.13
- AASHTO/ITE/NEMA Publication ATC 5301, Advanced Transportation Controller (ATC) Cabinet Standard
- Caltrans Transportation Electrical Equipment Specifications
- FHWA-IP-78-16, Type 170 Traffic Signal Controller System Hardware Specification
- NEMA Standards Publication TS-1, Traffic Control Systems
- NEMA Standards Publication TS-2, Traffic Controller Assemblies with NTCIP Requirements

3. Safety

Voltages up to 135 V_{ac} may be present on the test apparatus when energized. Caution should be exercised when operating the test apparatus. Only the interface of the CMU (buttons and switches) shall be touched while energized. Electro-Static Discharge (ESD) Wrist Straps Shall be removed prior to energizing circuits.

4. Apparatus

An Electro-Static Discharge (ESD) Wrist Strap with cord and alligator clip shall be worn when handling de-energized Circuit Card Assemblies (CCA's) to prevent ESD damage. The Wrist Strap shall be connected via the cord to the Traffic Controller Cabinet chassis ground or the ESD mat in the testing area in order to maintain the card handler at the same electrical potential as chassis ground. The Wrist Strap shall be removed prior to energizing circuits.

Metalized, static shielding bag to protect the CMU from Electro-Static Discharge (ESD) while transporting it between the Traffic Controller Cabinet and the testing area.

Electro-Static Discharge (ESD) Mat connected to earth ground for queuing of the CMU to test.

Conflict Monitor Tester, or device capable of simulating supply voltage failures and conflicting field output circuit “ON” conditions.

5. Procedure

5.1 Removal and Test Apparatus Installation

For CMU's supplied with a Traffic Controller Cabinet: Ensure the Traffic Controller Cabinet is off prior to removing the CMU. Attach one end of the ESD Wrist Strap to a convenient wrist, and the other end to a convenient chassis ground point of the Traffic Controller Cabinet. Disconnect the Red Interface Cable if equipped. Disconnect any RS-232 or Ethernet cable connections from the front of the CMU, if equipped. Remove the CMU from the Traffic Controller Cabinet and place in a static shielding bag for transport to the test area. Disconnect the ESD Wrist Strap from the chassis ground point of the Traffic Controller Cabinet.

For CMU's submitted for testing as piece parts: Open packaging at the testing area. If the CMU is not in a static-shielding bag, place it in one at this time.

Proceed to move the CMU to the testing area if not already done. Connect one end of the ESD Wrist Strap to the ESD Mat of the testing area. Ensure the Conflict Monitor Tester is off. Connect the CMU to the Conflict Monitor Tester. Take off the ESD Wrist Strap and leave the other end connected to the ESD Mat.

5.2 Setup

Remove the vendor supplied Conflict Programming Card and replace it with a complete diode-equipped Lab Test Card. Power up the Conflict Monitor Tester and open the control program from the PC connected to the tester. Select the Conflict Monitor Unit type for the Unit Under Test (UUT). Select the manufacturer, model number, and enter the serial number for the UUT.

Select the correct test type and optional tests for the configuration of the CMU to be tested. Options vary from configuration to configuration and cannot be covered here. The only consistent option is the type of test to be run, which is "Certification" as we are certifying the CMU.

5.3 Test Execution

Once all identifying information has been entered, click on the appropriate control program button to start the test. Follow all prompts to test completion.

5.4 Test Completion

Upon successful completion of all tests, note the test results. If there are any deficiencies, print out the test report to refer to later. Close the control program and power down the Conflict Monitor Tester. Remove the Lab Test Card and re-install the vendor supplied Conflict Programming Card. Put on the ESD Wrist Strap, remove the CMU from the Conflict Monitor Tester, and place it in a static shielding bag. Return all test equipment to their proper storage location.

5.5 Re-Installation and Power-Up

For CMU's supplied with a Traffic Controller Cabinet: Transport the CMU from the testing area to the Traffic Controller Cabinet under test. Ensure the Traffic Controller Cabinet is off. Attach one end of the ESD Wrist Strap to a convenient wrist, and the other end to a convenient chassis ground point of the Traffic Controller Cabinet. Remove the CMU from the static shielding bag and re-install into the Traffic Controller Cabinet. Remove the ESD Wrist Strap from chassis ground and the wrist. Power up the Traffic Controller Cabinet and ensure that the CMU is functioning properly. Depending on the model, it may need a configuration reset.

For CMU's submitted for testing as piece parts: Properly package the CMU for shipment to its final destination.

6. Report

Record any deficiency that results in a "FAIL" on the test report in MATS. Verification tests shall be recorded in MATS as "As Received" if sufficient, and "As Shipped" if deficient but corrected. Verification tests that do not apply shall have neither option checked. The overall test results shall be recorded as a "Pass" or "Fail" for test T 423 in MATS.

Performance Exam Checklist

WSDOT Test Method T 423

Test Method for NEMA Type Traffic Controller Cabinet, 300 Series (Type 170/2070) Traffic Controller Cabinet, and Advanced Transportation Controller (ATC) Cabinet Conflict Monitor Testing

Participant Name: _____ Exam Date: _____

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

Procedure Element	Trial 1	Trial 2
1. Removal and Test Apparatus Installation	_____	_____
2. Setup	_____	_____
3. Test Execution	_____	_____
4. Test Completion	_____	_____
5. Re-Installation and Power-Up	_____	_____
6. Report	_____	_____

Comments: First Attempt: Pass _____ Fail _____ Second Attempt: Pass _____ Fail _____

Examiner Signature: _____ WAQTC #: _____

