

Certificate No. 2500/20/021

Date: 23th September 2020

Certificate of Design Verification

Product: 380V-480V/1000V/6kV ($U_n = U_e/U_i/U_{imp}$) 50/60Hz, Power Switchgear and controlgear Variable Speed Drive Units. Utilizing 140MG Motor Circuit Protectors and Powerflex 523, Powerflex 525, Powerflex 753 or Powerflex 755 Variable Speed Drives For Installation in Allen Bradley Centerline 2500 Motor Control Centers.

Designation: Allen Bradley Centerline 2500 Motor Control Center Units

Manufacturer: Rockwell Automation Inc. 1201 South Second Street, Milwaukee, WI 53204. USA

Test Location: Rockwell Automation Test Laboratories. 1201 South Second Street, Milwaukee, WI 53204. USA

NVLAP Accreditation Lab Code: 500060-0



UL CTDTP and CSA SMT-C to ISO/IEC 17025; Dekra IECEE CB Scheme CT Stage 3 laboratory

Type of Test: A. Type Test / Design Verification
B. Testing for Arc Fault Containment

Test Specifications Applied:

- A. IEC 61439-2: Edition 2.0 2011-08 Verifications with reference to the tests listed in Annex D of IEC 61439-1.
- B. IEC/TR 61641, Edition 3.0 2014-09 and AS/NZS 3439.1:2002 Annex ZD

Tests Conducted (A) :

10.2 Strength of Materials and Parts; 10.3 Degree of Protection;
10.4 Clearances and Creepage; 10.5 Effectiveness of Protective Circuit;
10.9 Dielectric Properties; 10.10 Temperature Rise Limits;
10.12 Electromagnetic Compatibility; 10.13 Mechanical Operation.

Refer to Table 1. Page 3-6 for test details and ratings.

Comparison with a reference design (A)

10.11 Short-circuit withstand strength

Refer to Table 2. Page 7 for reference test details and ratings

Assessment (A)

10.6 Incorporation of switching; 10.7 Internal electrical circuits and connections;
10.8 Terminals for external conductors

Tests Conducted (B) :

The product is tested for personnel protection according to IEC/TR 61641 Edition 3.0 Arcing Class A for restricted access and AS/NZS 3439.1:2002 Annex ZD. Additional assembly protection is tested for outgoing units only; these are tested for conditional short-circuit current under arcing conditions. (Arcing Class C for restricted access). For testing the most onerous conditions of either IEC/TR 61641 and/or AS/NZS 3439.1:2002 Annex ZD have been used.

Refer to Table 3. Page 7-8 for test details and Ratings.

Test Results: All requirements of the design verification (A) & (B) are met.

Remarks: **Certificate Issued 23th September 2020**

Signatures:

Diego Wilches

Product Manager – Centerline 2500 Motor Control Centers

Test Summary

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Product: 380V-480V/1000V/6kV ($U_n = U_e/U_i/U_{imp}$) 50/60Hz, Power Switchgear and controlgear Variable Speed Drive Units. Utilizing 140M/MG Motor Circuit Protectors, 100-C/D Type Contactors and Powerflex 523, Powerflex 525, Powerflex 753 or Powerflex 755 Variable Speed Drives For Installation in Allen Bradley Centerline 2500 Motor Control Centers.

Designation: Allen Bradley Centerline 2500 Motor Control Center Units

Manufacturer: Rockwell Automation Inc. 1201 South Second Street, Milwaukee, WI 53204. USA

Test Location: Rockwell Automation Test Laboratories. 1201 South Second Street, Milwaukee, WI 53204. USA

Table 1.

Clause	Test	Test Report ⁽¹⁾	Rating
10.2	Strength of Material and Parts	06E-024, 08E-001	Verified
10.3	Degree of Protection	06E-024, 07E-043	External up to IP54 Internal up to IP2X
10.4	Clearances and Creepage	15E-009	Verified
10.5	Effectiveness of Protective Circuit	15E-010	Verified
- 10.5.2	Unit Ground Resistance Test – 2 Module Unit and above	15E-010	10A (<0.1 ohm)
- 10.5.3	Unit Ground Withstand Test – 2Module Unit and above	15E-010	39kA I _{cw} (60% of 65kA)
10.9	Dielectric Properties	15E-011	6kV U _{imp} 690V U _i
10.10	Temperature Rise Limits		
	2 Module Unit IP54 – Powerflex 523/525 Fr A	15E-037	2.2kW (6A)
	4 Module Unit IP54 – Powerflex 523/525 Fr B	15E-037	4kW (10.5A)
	4 Module Unit IP54 – Powerflex 523/525 Fr C	15E-037	7.5kW (17A)
	6 Module Unit IP54– Powerflex 523/525 Fr D	15E-037	15kW (30A)
	8 Module Unit IP54– Powerflex 523/525 Fr E	15E-037	22kW (43A)

Test Summary Cont.

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Table 1.

Clause	Test	Test Report ⁽¹⁾	Rating
10.10	4 Module Unit IP54 – Powerflex 523/525 Fr A c/w EMC Filter Line and Load Reactor	15E-037	2.2kW (6A)
	4 Module Unit IP54 – Powerflex 523/525 Fr B c/w EMC Filter Line and Load Reactor	15E-037	4kW (10.5A)
	6 Module Unit IP54 – Powerflex 523/525 Fr C c/w EMC Filter Line and Load Reactor	15E-037	7.5kW (17A)
	6 Module Unit IP54– Powerflex 523/525 Fr D c/w EMC Filter Line and Load Reactor	15E-037	15kW (30A)
	10 Module Unit IP54– Powerflex 523/525 Fr E c/w EMC Filter Line and Load Reactor	15E-037	22kW (43A)
	2 Module Unit ArcShield IP54 – Powerflex 523/525 Fr A	17E-037 ⁽²⁾	2.2kW (6A)
	4 Module Unit ArcShield IP54 – Powerflex 523/525 Fr B	17E-037 ⁽²⁾	4kW (10.5A)
	4 Module Unit ArcShield IP54 – Powerflex 523/525 Fr C	17E-037 ⁽²⁾	7.5kW (17A)
	6 Module Unit ArcShield IP54– Powerflex 523/525 Fr D	17E-037 ⁽²⁾	15kW (30A)
	8 Module Unit ArcShield IP54– Powerflex 523/525 Fr E	17E-037 ⁽²⁾	22kW (43A)
	4 Module Unit ArcShield IP54 – Powerflex 523/525 Fr A c/w EMC Filter Line and Load Reactor	17E-037 ⁽²⁾	2.2kW (6A)
	4 Module Unit ArcShield IP54 – Powerflex 523/525 Fr B c/w EMC Filter Line and Load Reactor	17E-037	4kW (10.5A)
	6 Module Unit ArcShield IP54 – Powerflex 523/525 Fr C c/w EMC Filter Line and Load Reactor	17E-037	7.5kW (17A)
	6 Module Unit ArcShield IP54– Powerflex 523/525 Fr D c/w EMC Filter Line and Load Reactor	17E-037	15kW (30A)
	10 Module Unit ArcShield IP54– Powerflex 523/525 Fr E c/w EMC Filter Line and Load Reactor	17E-037	22kW (43A)
	8 Module Unit IP54 – Powerflex 753/755 Fr 1	15E-037	7.5kW (14A)

Test Summary Cont.

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Table 1.

Clause	Test	Test Report ⁽¹⁾	Rating
10.10	8 Module Unit IP54 – Powerflex 753/755 Fr 2	15E-037	11kW (22A)
	10 Module Unit IP54 – Powerflex 753/755 Fr 3	15E-037	22kW (43A)
	12 Module Unit IP54– Powerflex 753/755 Fr 4	15E-037	37kW (72A)
	16 Module Unit IP54– Powerflex 753/755 Fr 5	15E-037	55kW (104A)
	24 Module Unit IP54– Powerflex 753/755 Fr 6	15E-037 ⁽²⁾	90kW (156A)
	24 Module Unit IP54– Powerflex 753/755 Fr 6	15E-037	132kW (248A)
	8 Module Unit IP54 – Powerflex 753/755 Fr 1 c/w EMC Filter Line and Load Reactor	15E-037	7.5kW (14A)
	8 Module Unit IP54 – Powerflex 753/755 Fr 2 c/w EMC Filter Line and Load Reactor	15E-037	11kW (22A)
	12 Module Unit IP54 – Powerflex 753/755 Fr 3 c/w EMC Filter Line and Load Reactor	15E-037	22kW (43A)
	24 Module Unit IP54– Powerflex 753/755 Fr 4 c/w EMC Filter Line and Load Reactor	15E-037	37kW (72A)
	24 Module Unit IP54– Powerflex 753/755 Fr 5 c/w EMC Filter Line and Load Reactor	15E-037	55kW (104A)
	24 Module Unit IP54– Powerflex 753/755 Fr 6 c/w EMC Filter Line and Load Reactor	15E-037 ⁽²⁾	90kW (156A)
	24 Module Unit IP54– Powerflex 753/755 Fr 6 c/w EMC Filter Line and Load Reactor	15E-037	132kW (248A)
	8 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 1	17E-037 ⁽²⁾	7.5kW (14A)
	8 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 2	17E-037 ⁽²⁾	11kW (22A)
	10 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 3	17E-037 ⁽²⁾	22kW (43A)
	12 Module Unit ArcShield IP54– Powerflex 753/755 Fr 4	17E-037 ⁽²⁾	37kW (72A)
	16 Module Unit ArcShield IP54– Powerflex 753/755 Fr 5	17E-037 ⁽²⁾	55kW (104A)

Test Summary Cont.

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Table 1.

Clause	Test	Test Report ⁽¹⁾	Rating
10.10	24 Module Unit ArcShield IP54– Powerflex 753/755 Fr 6	17E-037 ⁽²⁾	90kW (156A)
	24 Module Unit ArcShield IP54– Powerflex 753/755 Fr 6	17E-037 ⁽²⁾	132kW (248A)
	8 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 2 c/w EMC Filter Line and Load Reactor	17E-037	11kW (22A)
	10 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 3 c/w EMC Filter Line and Load Reactor	17E-037	18kW (34A)
	12 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 3 c/w EMC Filter Line and Load Reactor	17E-037	22kW (43A)
	12 Module Unit ArcShield IP54 – Powerflex 753/755 Fr 4 c/w EMC Filter Line and Load Reactor	17E-037 ⁽²⁾	37kW (72A)
	16 Module Unit ArcShield IP54– Powerflex 753/755 Fr 5 c	17E-037	55kW (96A)
	24 Module Unit ArcShield IP54– Powerflex 753/755 Fr 6 c/w EMC Filter Line and Load Reactor	17E-037	90kW (156A)
	24 Module Unit ArcShield IP54– Powerflex 753/755 Fr 6 c/w EMC Filter Line and Load Reactor	17E-037 ⁽²⁾	132kW (248A)
	10.12	Electromagnetic Compatibility	Installed in accordance with DRIVES-IN001 Installation requirements
10.13	Mechanical Operation – Minimum Insertion and Removal Operations	14E-043	Verified – 600 Operations
	Mechanical Operation – Minimum Operations of Rotary Operating Handle and Interlock	14E-024	Verified – 25000 Operations

⁽¹⁾Tests Ref 15E-09, 10, 11 and 37 were 3rd Party witnessed by DEKRA (Test Certificate) Ref 2181593.02

⁽²⁾ Comparison with a reference design

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Table 2.

Clause	Test	Test Report ⁽³⁾	Rating
10.11	Short Circuit Withstand Strength		
	2 Module Unit & above – 140-G G-Frame	15E-013	65kA Icc 415V, 65kA Icc 480V
	2 Module Unit & above– 140-G H-Frame	15E-013	100kA Icc 415V, 100kA Icc 480V
	2 Module Unit & above – 140-G J Frame	15E-013	100kA Icc 415V, 100kA Icc 480V
	4 Module Unit & above – 140G J Frame	15E-013	100kA Icc 415V, 100kA Icc 480V
		18E-092	65kA Icc 690V (J15)
4 Module Unit & above – 140-G K Frame	15E-013	100kA Icc 415V 100kA Icc 480V	
	18E-092	65kA Icc 690V	

⁽³⁾Tests Ref 15E-013 was 3rd Party witnessed by DEKRA (Test Certificate) Ref 2181593.02

Table 3.

Clause	Test	Test Report ⁽⁴⁾	Rating
Internal arc fault tests on load side of outgoing units according to IEC/TR 61641 Edition 3.0 Arcing Class C for restricted access and AS/NZS 3439.1 Annex ZD* Cont			
Variable Speed Drive Units	Powerflex Variable Speed Drive unit with 140M Protective device in 2 Module Unit*	15E-014	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140M Protective device in 4,6,8 Module Unit*	15E-014	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140G Protective device in 4,6,8 Module Unit*	16E-089	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140G Protective device in 10,12,16 Module Unit*	15E-014	480V 65kA 300ms
	Powerflex 7 Series Fr 5 Variable Speed Drive unit with 140G Protective device in 24 Module Unit*	16E-089	480V 65kA 300ms
	Powerflex 7 Series Fr 6 Variable Speed Drive unit with 140G Protective device in 24 Module Unit*	16E-089	480V 65kA 300ms
	Powerflex 7 Series Fr 7 Variable Speed Drive unit with 140G Protective device in 24 Module Unit*	16E-089	480V 65kA 300ms

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Clause	Test	Test Report ⁽⁴⁾	Rating
Internal arc fault tests on supply side of incoming / outgoing units according to IEC/TR 61641 Edition 3.0 Arcing Class A for restricted access			
	Powerflex Variable Speed Drive unit with 140M Protective device in 2 Module Unit	15E-014	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140M Protective device in 4,6,8 Module Unit	15E-014	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140G Protective device in 4,6,8 Module Unit	16E-089	480V 65kA 300ms
	Powerflex Variable Speed Drive unit with 140G Protective device in 10,12,16 Module Unit	16E-089	480V 65kA 300ms
	Powerflex 7 Series Fr 5 Variable Speed Drive unit with 140G Protective device in 24 Module	16E-089	480V 65kA 300ms
	Powerflex 7 Series Fr 6 Variable Speed Drive unit with 140G Protective device in 24 Module Unit	16E-089	480V 65kA 300ms
	Powerflex 7 Series Fr 7 Variable Speed Drive unit with 140G Protective device in 24 Module Unit*	19E-003	480V 65kA 300ms

⁽⁴⁾Tests Ref 15E-014 were 3rd Party witnessed by DEKRA (Test Certificate) Ref 2181593.01A,

Tests Ref 16E-089 were carried out at Rockwell Automation AG Test Laboratory Aarau,

Switzerland.