

Test Report issued under the responsibility of: Thomas Heinzlmann

SIEMENS Aktiengesellschaft
Digital Industry
Motion Control
General Motion Control

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TEST REPORT SIMOTICS 1FW68

EN 60034-1:2010+AC:2010

*Rotating electrical machines –
Part 1: Rating and performance*

EN 60204-1:2006+A1:2009+AC:2010

*Safety of machinery. Electrical equipment of machines.
Specification for general requirements*

EN IEC 63000:2018

*Technical documentation for the assessment of electrical and
electronic products with respect to the restriction of hazardous substances*

EN 61800-5-1:2007

*Adjustable speed electrical power drive systems
Part 5-1: Safety requirements – Electrical, thermal and energy*

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Test Laboratory

Name: Siemens DI MC TTI T&E 10
Address: Otto-Hahn-Ring 6
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Germany

Applicant

Name: Siemens DI MC GMC R&D PDM
Address: Frauenaauracher Straße 80
91056 Erlangen, Germany

Test specification

Standard: EN 60034-1:2010+AC:2010
EN 60204-1:2006+A1:2009+AC:2010
EN IEC 63000:2018
EN 61800-5-1:2007

Test result: The EUT has passed the tests applied and recorded in this report.

Comment: The test results presented in this report relate only to the items listed below.

Equipment under test (EUT)

Description: SIMOTICS build in torque motor
Production Site: Siemens DI MC GMC MF-EWN,
Bad Neustadt, Germany
Trade Mark: Siemens AG

Motor Type:	Framesize SH [mm]	Rating M ₀ [Nm]	Purchase order number (MLFB):
			1FW68x ¹ x ² - x ³ x ⁴ xx ⁵ x - xxx ⁶ x ⁷)
1FW68 Segmented Motor	400	768	1FW6804-0Sxxx-xxxx
		1540	1FW6804-1Sxxx-xxxx
		2300	1FW6804-2Sxxx-xxxx
		3070	1FW6804-3Sxxx-xxxx
		3840	1FW6804-4Sxxx-xxxx
		4610	1FW6804-5Sxxx-xxxx
1FW68 Segmented Motor	500	960	1FW6805-0Sxxx-xxxx
		1920	1FW6805-1Sxxx-xxxx
		2880	1FW6805-2Sxxx-xxxx
		3840	1FW6805-3Sxxx-xxxx
		4800	1FW6805-4Sxxx-xxxx
		5760	1FW6805-5Sxxx-xxxx
1FW68 Segmented Motor	600	1150	1FW6806-0Sxxx-xxxx
		2300	1FW6806-1Sxxx-xxxx
		3450	1FW6806-2Sxxx-xxxx
		4600	1FW6806-3Sxxx-xxxx
		5760	1FW6806-4Sxxx-xxxx
		6910	1FW6806-5Sxxx-xxxx
1FW68 Segmented Motor	700	1340	1FW6807-0Sxxx-xxxx
		2690	1FW6807-1Sxxx-xxxx
		4030	1FW6807-2Sxxx-xxxx
		5370	1FW6807-3Sxxx-xxxx
		6720	1FW6807-4Sxxx-xxxx
		8060	1FW6807-5Sxxx-xxxx
1FW68 Segmented Motor	800	1540	1FW6808-0Sxxx-xxxx
		3070	1FW6808-1Sxxx-xxxx
		4610	1FW6808-2Sxxx-xxxx
		6140	1FW6808-3Sxxx-xxxx
		7680	1FW6808-4Sxxx-xxxx
		9210	1FW6808-5Sxxx-xxxx
1FW68 Segmented Motor	900	1730	1FW6809-0Sxxx-xxxx
		3450	1FW6809-1Sxxx-xxxx
		5180	1FW6809-2Sxxx-xxxx
		6910	1FW6809-3Sxxx-xxxx
		8640	1FW6809-4Sxxx-xxxx
		10400	1FW6809-5Sxxx-xxxx
1FW68 Segmented Motor	1000	1920	1FW6810-0Sxxx-xxxx
		3840	1FW6810-1Sxxx-xxxx
		5760	1FW6810-2Sxxx-xxxx
		7680	1FW6810-3Sxxx-xxxx
		9590	1FW6810-4Sxxx-xxxx
		11500	1FW6810-5Sxxx-xxxx
1FW68 Segmented Motor	1100	2110	1FW6811-0Sxxx-xxxx
		4220	1FW6811-1Sxxx-xxxx
		6330	1FW6811-2Sxxx-xxxx
		8440	1FW6811-3Sxxx-xxxx
		10600	1FW6811-4Sxxx-xxxx
		12700	1FW6811-5Sxxx-xxxx

Motor Type:	Framesize SH [mm]	Rating M ₀ [Nm]	Purchase order number (MLFB):
			1FW68x ¹ x ² - x ³ x ⁴ xx ⁵ x - xxx ⁶ x ⁷)
1FW68 Segmented Motor	1200	2300	1FW6812-0Sxxx-xxxx
		4610	1FW6812-1Sxxx-xxxx
		6910	1FW6812-2Sxxx-xxxx
		9210	1FW6812-3Sxxx-xxxx
		11500	1FW6812-4Sxxx-xxxx
		13800	1FW6812-5Sxxx-xxxx
1FW68 Segmented Motor	1300	2490	1FW6813-0Sxxx-xxxx
		4990	1FW6813-1Sxxx-xxxx
		7480	1FW6813-2Sxxx-xxxx
		9980	1FW6813-3Sxxx-xxxx
		12500	1FW6813-4Sxxx-xxxx
		15000	1FW6813-5Sxxx-xxxx
1FW68 Segmented Motor	1400	2690	1FW6814-0Sxxx-xxxx
		5370	1FW6814-1Sxxx-xxxx
		8060	1FW6814-2Sxxx-xxxx
		10700	1FW6814-3Sxxx-xxxx
		13400	1FW6814-4Sxxx-xxxx
		16100	1FW6814-5Sxxx-xxxx
1FW68 Segmented Motor	1600	2880	1FW6816-0Sxxx-xxxx
		5760	1FW6816-1Sxxx-xxxx
		8640	1FW6816-2Sxxx-xxxx
		11500	1FW6816-3Sxxx-xxxx
		14400	1FW6816-4Sxxx-xxxx
		17300	1FW6816-5Sxxx-xxxx
1FW68 Segmented Motor	1700	3070	1FW6817-0Sxxx-xxxx
		6140	1FW6817-1Sxxx-xxxx
		9210	1FW6817-2Sxxx-xxxx
		12300	1FW6817-3Sxxx-xxxx
		15400	1FW6817-4Sxxx-xxxx
		18400	1FW6817-5Sxxx-xxxx
1FW68 Segmented Motor	1800	3260	1FW6818-0Sxxx-xxxx
		6520	1FW6818-1Sxxx-xxxx
		9790	1FW6818-2Sxxx-xxxx
		13000	1FW6818-3Sxxx-xxxx
		16300	1FW6818-4Sxxx-xxxx
		19600	1FW6818-5Sxxx-xxxx
1FW68 Segmented Motor	1900	3450	1FW6819-0Sxxx-xxxx
		6910	1FW6819-1Sxxx-xxxx
		10400	1FW6819-2Sxxx-xxxx
		13800	1FW6819-3Sxxx-xxxx
		17300	1FW6819-4Sxxx-xxxx
		20700	1FW6819-5Sxxx-xxxx
1FW68 Segmented Motor	2000	3650	1FW6820-0Sxxx-xxxx
		7290	1FW6820-1Sxxx-xxxx
		10900	1FW6820-2Sxxx-xxxx
		14600	1FW6820-3Sxxx-xxxx
		18200	1FW6820-4Sxxx-xxxx
		21900	1FW6820-5Sxxx-xxxx

Motor Type:	Framesize SH [mm]	Rating M ₀ [Nm]	Purchase order number (MLFB):
			1FW68x ¹ x ² - x ³ x ⁴ xx ⁵ x - xxx ⁶ x ⁷)
1FW68 Segmented Motor	2100	3840	1FW6821-0Sxxx-xxxx
		7680	1FW6821-1Sxxx-xxxx
		11500	1FW6821-2Sxxx-xxxx
		15400	1FW6821-3Sxxx-xxxx
		19200	1FW6821-4Sxxx-xxxx
		23000	1FW6821-5Sxxx-xxxx
1FW68 Segmented Motor	14000	157000	1FW6899-5Sxxx-xxxx G2A

- 1) frame size (possible characters: 0 - 9)
- 2) frame size (possible characters: 0 - 9)
- 3) Components (possible characters: S, R, C)
- 4) Active part length
- 5) Speed (possible characters: A – Z, 0-9)
- 6) Connection type (possible characters: A – Z)
- 7) Temperature sensors (possible characters: 0-9)

EUT characteristics

Mains supply overvoltage category (OVC):	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
Supply grounding system [V]:	<input checked="" type="checkbox"/> TN-S, TN-C, TN-CS, TT (not corner grounded) <input checked="" type="checkbox"/> TN-C (middle point grounded) <input type="checkbox"/> TN-S, TT (corner grounded, unfiltered variants only) <input checked="" type="checkbox"/> IT (not corner grounded, unfiltered variants only) <input type="checkbox"/> IT (corner grounded, unfiltered variants only) <input type="checkbox"/> other:
System voltage (for insulation requirements):	480V
DC-Link Voltage (for insulation requirements):	720 V max.
Pollution degree (PD):	<input type="checkbox"/> PD1 <input checked="" type="checkbox"/> PD2 <input type="checkbox"/> PD3 <input type="checkbox"/> PD4
IP protection class(es):	Min. IP23

Ambient conditions

Ambient temperature during operation [°C]	-5°C to 40°C without derating
Max. operation altitude (m):	2000m; > 2000m with derating acc. to HIM
Altitude of test laboratory (m):	520 m
Other characteristics:	---

Test conditions:

Ambient temperature [°C]	15°C - 35°C
Relative humidity:	25 – 75 %
Air pressure refer to MSL:	860 – 1060 hPa

Possible test results

Test case does not apply to the test object:	N/A
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)

Test Result**I. Test Specification:**

Test items in compliance with the requirements of the following standards:

EN 60034-1:2010+AC:2010
EN 60204-1:2006+A1:2009+AC:2010
EN IEC 63000:2018
EN 61800-5-1:2007

II. Test Conditions:

All tests were conducted with all relevant unit configurations.

Only specified frequency converter systems were used.

Tests conducted with Siemens test equipment. Calibration Records considered.

III. General:

The motors are used within industrial and commercial areas and can only be operated with frequency converters.

The following short terms are used within this form:

- Within this form the Hardware-Installation-Manual (service-, installation- and maintenance- manual) has the short term "HIM"
 - Within this form the shaft height of a motor has the short term "SH"
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Test Result

EN 60034-1:2010+AC:2010; EN 60204-1:2006+A1:2009+AC:2010; EN IEC 63000:2018; EN 61800-5-1:2007			
	Requirement – Test	Result - Remark	Result
1	Visual inspection		
1.1	<i>Name plate information</i>	Reference: IEC 60034-1 Statement 10. Name plate Information complete and correct	P
1.2	<i>Terminal markings</i>	Reference: IEC 60034-8 marking correct	P
1.3	<i>Hot surface</i>	Reference: DIN EN ISO 13732-1 marked by pictogram	P
2	Mechanical Tests		
2.1	Clearance and creepage distances	Reference: EN 61800-5-1 distances for single phase 230 V networks: <ul style="list-style-type: none"> • Clearance 1.5 mm • Creepage distance 1.75 mm distances for three phase 480 V networks: <ul style="list-style-type: none"> • Clearance 3.0 mm • Creepage distance 5.4 mm 	P
2.2	Enclosure integrity	Min. IP 23	P
2.3	Shaft/flange axial eccentricity	Reference: IEC 60072-1 <i>Routine test, Shaft/flange axial eccentricity Measurement of axial runout on flange</i>	N/A
2.4	Shaft/flange radial eccentricity	Reference: IEC 60072-1 <i>Routine test, Shaft/flange radial eccentricity Measurement of radial runout on flange</i>	N/A
2.5	Concentricity of shaft/centering edge	Reference: IEC 60072-1 <i>Routine test, Concentricity measurement of shaft/centering edge</i>	N/A

EN 60034-1:2010+AC:2010; EN 60204-1:2006+A1:2009+AC:2010; EN IEC 63000:2018; EN 61800-5-1:2007			
	Requirement – Test	Result - Remark	Result
2.6	Vibration severity	<p>Reference: IEC 60034-14</p> <p>Measurement of vibration limit values according to IEC 60034-14 Level A or B</p>	N/A
3	Electrical Tests		
3.1	Clearance and creepage distances	<p>Reference: EN 60664</p> <p>Observation of winding clearances and creepage distances</p> <ul style="list-style-type: none"> • Surge pulse test 2,9 kV (230V) • Surge pulse test 4,8 kV (400V) • <50V not relevant 	N/A
3.2	Surge pulse	<p>Reference: IEC 61800-5-1, IEC 60664-1</p> <p>Safety isolation at interfaces (protective electrical separation)</p> <ul style="list-style-type: none"> • Surge pulse test 4,8 kV (230V) • Surge pulse test 7,3 kV (400V) • Surge pulse test 9,65 kV (690V) <50V not relevant 	N/A
3.3	Winding high voltage	<p>Reference: EN 60034-1 Pkt. 9.29</p> <p>Voltage withstand test 50 Hz, 1s</p> <p>$U_p = 660V$ (24V)</p> <p>$U_p = 1920V$ (230V)</p> <p>$U_p = 2640V$ (400V)</p>	P
3.4	Winding partial discharge inception voltage	<p>Reference: IEC 60034-18-41 Pkt.9, Anh.A</p> <p>Partial discharge inception voltage</p> <p>478V < 5s (+382V < 15s) (230V)</p> <p>1,09kV < 5s (+0,87kV < 15s) (400V)</p> <p>< 50V N/A</p>	P

EN 60034-1:2010+AC:2010; EN 60204-1:2006+A1:2009+AC:2010; EN IEC 63000:2018; EN 61800-5-1:2007			
	Requirement – Test	Result - Remark	Result
3.5	Voltage withstand	<p>Reference: IEC 61800-5-1, IEC 60664-1</p> <p>Safety isolation at interfaces (protective electrical separation) Voltage withstand test 50 Hz, 1s U_p = 3kV (230V) U_p = 3kV (400V) U_p = 3,6kV (690V)</p>	N/A
3.6	Partial discharge extinction voltage	<p>Reference: IEC 61800-5-1, IEC 60664-1</p> <p>Safety isolation at interfaces (protective electrical separation) 597V < 5s (+ 478V < 15s) (230V) 1,36kV < 5s (+1,09kV < 15s) (400V) 1,91kV < 5s (+1,53kV < 15s) (690V) < 50V N/A</p>	N/A
3.7	Grounding- / earth wire	<p>Reference: IEC 61800-5-1</p> <p>routine test, at > 10A/50Hz < 20 mOhm</p>	P
3.8	Resistance of windings	<p>Reference: EN 60034-1</p> <p>routine test</p>	P
3.9	Direction of rotation	<p>Reference: EN 60034-1</p> <p>routine test</p>	N/A
3.10	EMC immunity	<p>Reference: EN 60034-1-13.2</p> <p>optional test</p>	N/A
3.11	EMC emission	<p>Reference: EN 60034-1-13.3 EN 61800-5-1</p> <p>radiated emission; conducted emission on a.c. or d.c. power supply terminals</p>	P

EN 60034-1:2010+AC:2010; EN 60204-1:2006+A1:2009+AC:2010; EN IEC 63000:2018; EN 61800-5-1:2007			
	Requirement – Test	Result - Remark	Result
4.	Abnormal Operation		
4.1	<i>Thermal motor protection</i>	Reference: IEC 60034-1 , IEC 60034-11 Resistance testing PT1000 Resistance testing KTY84 Resistance testing PTC drilling	P
4.2	<i>Rotor over speed</i>	Reference: IEC 60034-1 9.7 Rotor over speed: 1,2x maximum speed	P
5	Environmental Tests		
5.1	<i>Vibration operation - resonance frequencies</i>	Reference: IEC 60068-2-6 Sweep testing (continuous changes in frequency), radial and axial, motor not in operation	P
5.2	<i>Continuous shock</i>	Reference: IEC 60068-2-27 Continuous shock measurement , motor not in operation	P
5.3	<i>Individual shock</i>	Reference: IEC 60068-2-27 Individual shock measurement , motor not in operation	P
5.4	<i>Continuous vibration stability - vibration operation</i>	Reference: IEC 60068-2-6 Continuous vibration stability at resonance point; measurement with resonance dwell	N/A
5.5	<i>Degree of protection IP <u>XX</u> (water)</i>	Reference: IEC 60034-5 Degree of protection IP <u>XX</u> (water) corresponding to name plate	P
5.6	<i>Degree of protection IP <u>XX</u> (dust)</i>	Reference: IEC 60034-5 Degree of protection IP <u>XX</u> (dust) corresponding to name plate	P

EN 60034-1:2010+AC:2010; EN 60204-1:2006+A1:2009+AC:2010; EN IEC 63000:2018; EN 61800-5-1:2007			
	Requirement – Test	Result - Remark	Result
6	Hazardous Substances		
6.1	<i>supplier's declaration</i>	Reference: EN 63000 4.3.3 a)	P
6.2	<i>material declaration</i>	Reference: EN 63000 4.3.3 b)	P
6.3	<i>analytical test results</i>	Reference: EN 63000 4.3.3 c)	N/A
7	Functional Safety		N/A
8	Explosive atmospheres		N/A