Type Test Certificate

Nidec Control Techniques Ltd
The Gro
Newtown
Powys
SY16 3BE
UK

This certificate is issued under the sole responsibility of the manufacturer. The certificate applies to the variable speed drive products shown below:

Model No.	Interpretation	Nomenclature aaaa - bbc ddddde
aaaa	Basic series	M100, M101, M200, M201, M300, M400, M600, M700, M701, M702, M708, M709, M750, M751, M753, M754, F300, F600, H300, E200, E300, HS30, HS70, HS71, HS72, M000, RECT, C200, C300
bb	Frame Size	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12
c	Voltage Rating	1 = 100V, 2 = 200V, 4 = 400V, 5 = 575V, 6 = 690V
ddddd	Current Rating	Example 01000 = 100A
e	Drive Format	A = 6P Rectifier + Inverter with internal choke, D = Inverter, E = 6P Rectifier + Inverter, T = 12P Rectifier + Inverter

The model number may be followed by other characters that do not affect the ratings.

The variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1:2007 + A11: 2021	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-2:2015	Adjustable speed electrical power drive systems Part 2: General requirements — Rating specifications for low voltage adjustable speed AC power drive systems
EN 61800-3: 2018	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 61000-6-2: 2019	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4: 2019	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 61000-3-2:2014[1]	Electromagnetic compatibility (EMC) - Part 3-2: Limits for harmonic current emissions (equipment input current ≤16 A per phase)
EN 61000-3-3:2013	Electromagnetic compatibility (EMC) - Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker in public, low voltage supply systems, for equipment with rated current ≤16A per phase and not subject to conditional connection

Type tests for safety (electrical, thermal and energy)

Test	Result, Comments	
	EN 61800-5-1	**Result**
Visual inspection	5.2.1	Pass
Mechanical tests	5.2.2	
Clearances & creepage distances	5.2.2.1	Pass
PWB short circuit	5.2.2.2	Not applicable[2]
Non-accessibility	5.2.2.3	Pass[3]
Enclosure integrity	5.2.2.4	Verification of IP rating. Pass[4]
Deformation tests	5.2.2.5	
Deflection	5.2.2.5.2	Pass[3]
Impact	5.2.2.5.3	Pass[3]
Electrical tests	5.2.3	
Impulse voltage	5.2.3.1	Pass[5]
AC or DC voltage	5.2.3.2	Pass
Partial discharge	5.2.3.3	Not applicable[6]
Protective impedance	5.2.3.4	Not applicable[7]

[1] Applicable where input current < 16A. No limits apply for professional equipment where input power ≥1kW.
[2] Test not required if all spacings meet clause 4.3.6.7
[3] Applies to Enclosed Power Drive System (PDS)
[4] Applies to Enclosed PDS. Dust and water ingress tests carried out at UKAS laboratory.
[5] Used to ensure that Limiting Devices are able to reduce the overvoltage.
[6] Not applicable if voltage stress is less than 1kV/mm.
[7] Protective impedances are not used.

Test	Result, Comments	
	EN 61800-5-1	Result
Touch current	5.2.3.5	Not applicable[8]
Short circuit tests	5.2.3.6.3	Pass
Breakdown of components	5.2.3.6.4	Pass
Capacitor discharge	5.2.3.7	Pass[9]
Temperature rise	5.2.3.8	Pass
Protective bonding	5.2.3.9	Pass
Abnormal operation tests	5.2.4	
Loss of phase	5.2.4.4	Pass
Inoperative blower	5.2.4.5.2	Pass
Clogged filter	5.2.4.5.3	Pass
Loss of coolant	5.2.4.5.4	Not applicable[10]
Material tests	5.2.5	
High current arcing ignition	5.2.5.1	Not applicable[11]
Glow wire	5.2.5.2	Insulating material manufacturers data used to demonstrate compliance
Hot wire ignition	5.2.5.3	Insulating material manufacturers data used to demonstrate compliance
Flammability	5.2.5.4	Insulating material manufacturers data used to demonstrate compliance
Environmental tests		
Dry heat	5.2.3.6.1	Pass
Damp heat	5.2.3.6.2	Pass
Vibration	5.2.6.4	Pass[12]
Hydrostatic pressure	5.2.7	Not applicable[9]
UL specific tests		
Contactor overload	5.2.4.5.5DV[13]	Pass
Current limiting control	5.2.4.5.6DV[13]	Pass
Solid state motor overload protection test	5.2.8.DV.1[13]	Pass
Thermal memory retention (Shutdown)	5.2.8DV.2[13]	Pass
Thermal memory retention (Loss of Power)	5.2.8DV.3[13]	Pass
Speed sensitivity	5.2.8DV.4[13]	Pass
Circuit Functionality Evaluation Test	5.2.9DV.1[13]	Routine test. Pass
Clamped joint test	5.2.13DV[13]	Not applicable. No clamped joints used.
Secondary circuits test	DVC.2[13]	
Limited voltage/ current secondary test	DVC.2.2[13]	Pass
Limited energy secondary test	DVC.2.3[13]	Pass
Limited impedance test	DVC.2.4[13]	Pass
Limited voltage secondary test	DVC.2.5[13]	Pass
Isolated power supply capacity test	DVC.2.6[13]	Pass

Type tests for Electromagnetic Compatibility (EMC)

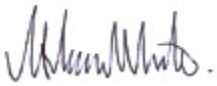
Test	Clause	Referenced standard	Result
Harmonic distortion immunity	5.2.2.1	EN/ IEC 61000-4-13 class 3	Pass (by calculation)
Voltage deviation immunity	5.2.3.1	EN/ IEC 61000-2-4 class 2	Pass
Voltage dip immunity	5.2.3.1	EN/ IEC 61000-4-11 class 3	Pass [14]
Voltage interruption immunity	5.2.3.1	EN/ IEC 61000-4-11 class 3	Pass [15]
Voltage unbalance immunity	5.2.4.1	EN/ IEC 61000-2-4 class 3	Pass (by calculation)
Supply frequency variation immunity	5.2.4.1	EN/ IEC 61000-2-4 class 3	Pass (by calculation)
Electrostatic discharge immunity[16]	5.3.3	EN/ IEC 61000-4-2	Pass

[8] A permanent Earth connection or an Industrial connector must be used as per clause 4.3.5.5.2
[9] Discharge time exceeds 5s. A warning is provided in the manual
[10] Liquid cooling not used
[11] The drives do not contain switching contacts
[12] Vibration test carried out at UKAS laboratory.
[13] Tested to UL 61800-5-1
[14] Voltage dip behaviour is specified by parameter settings, please see the user guide.
[15] Voltage interruption behaviour is specified by parameter settings, please see the user guide.
[16] The immunity tests of clause 5.3.3 are for the Industrial environment. They equal or exceed the requirements for the Residential and Commercial environments, which are therefore also met.

CONTROL TECHNIQUES

Type Test Certificate

Test	Clause	Referenced standard	Result
Radio frequency field immunity	5.3.3	EN/ IEC 61000-4-3	Pass
Fast transient burst immunity to power terminals and control terminals	5.3.3	EN/ IEC 61000-4-4	Pass
Surge immunity to power terminals and control terminals	5.3.3	EN/ IEC 61000-4-5	Pass
Common mode radio frequency immunity to power terminals and control terminals	5.3.3	EN/ IEC 61000-4-6	Pass
Emission of commutation notches	6.2.2	EN/ IEC 60146-1-1	AC: not applicable DC: Pass (by calculation)[17]
Emission of harmonics and inter-harmonics	6.2.3	EN/ IEC 61000-3-2 EN/ IEC 61000-3-4 EN/ IEC 61000-3-12	Pass (by test and calculation.) Please see EMC data.
Emission of voltage fluctuations	6.2.4	EN/ IEC 61000-3-3 EN/ IEC 61000-3-11	Pass (by calculation)[18]
Conducted radio frequency emissions	6.3.1.2	IEC 61000-6-4 CISPR11, CISPR16-1	Pass. Please see EMC data for details
Radiated radio frequency emissions	6.3.1.3	IEC 61000-6-4 CISPR11, CISPR16-1	



Jon Holman-White
Vice President Research and Development

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These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drives must be installed only by professional installers who are familiar with requirements for safety and EMC. Refer to the Product Documentation. An EMC data sheet is available giving detailed information. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used.

[17] Please see the user guide for recommendations on suitable line chokes to control voltage notches.
[18] The product meets the requirements when connected to a constant load. Fluctuations and flicker may occur if the mechanical load fluctuates.