



## Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

<b>Manufacturer</b>	<b>Danfoss Drives AS</b>
<b>Address</b>	Ulsnæs 1, Gråsten, 6300, Denmark
<b>Place of Production</b>	Harju Elekter UAB Tinklu g. 35R, Panevezys, LT-35115, Lithuania
<b>Place of Production</b>	VEO Oy Runsorintie 5, Vaasa, 65380, Finland
<b>Place of Production</b>	Danfoss Drives, LLC 12 TW Alexander Drive, Bldg 200A, Durham, North Carolina, 27709, United States
<b>Type</b>	Electronic Frequency Convertor
<b>Description</b>	Active Front End and Diode Front End
<b>Trade Name</b>	VACON 3000 HV AC Drives
<b>Application</b>	For use in environmental categories ENV1, ENV2, ENV3 as defined in Lloyd's Register Test Specification No. 1, December 2019
<b>Specified Standard</b>	Lloyds Register Rules and Regulation for the Classification of Ships, July 2022 Lloyds Register Test Specification Number 1 December 2019

**Matthew Partyka**

Electrical & Control - Lead Specialist to  
Lloyd's Register Canada Limited  
A member of the Lloyd's Register group

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IEC 61800-5-1  
UL 347A  
CSA C22.2 no 274

**Ratings** See Appendix

**Other Conditions** Installation of this equipment for marine applications is to be in accordance with current Lloyd's Register Rules and Regulations.

Converter 100kW and over where intended for use for essential and emergency services, are to be surveyed by the Surveyors during manufacture and testing.

Radiated and conducted emissions meet the requirement for equipment in general power distribution zones.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register Canada Limited of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document LR23268843TA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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**Appendix**

TYPE	<p>AFE Drives:            VACON3000-ED-4Q-0340-04+xxxx            VACON3000-ED-4Q-0425-03+xxxx            VACON3000-ED-4Q-0510-04+xxxx            VACON3000-ED-4Q-0640-03+xxxx            VACON3000-ED-4Q-0650-04+xxxx            VACON3000-ED-4Q-0820-03+xxxx            VACON3000-ED-4Q-0980-04+xxxx            VACON3000-ED-4Q-1230-03+xxxx</p> <p>DFE Drives:            VACON3000-ED-12-0340-04+xxxx            VACON3000-ED-12-0425-03+xxxx            VACON3000-ED-12-0510-04+xxxx            VACON3000-ED-12-0640-03+xxxx            VACON3000-ED-12-0650-04+xxxx            VACON3000-ED-12-0820-03+xxxx            VACON3000-ED-12-0980-04+xxxx            VACON3000-ED-12-1230-03+xxxx</p> <p>xxxx – options available from Danfoss:</p> <p>INPUT FREQUENCY            +LS50 - 50 Hz            +LS60 - 60 Hz</p> <p>INPUT FILTER            +PI00 - None            +PILC - LC filter            +PICM - LCL with common mode filter</p> <p>OUTPUT FILTER            +POA0- None            +PODU - dU/dt filter            +POSI -Sine-wave filter</p>
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	<p>OUTPUT COMMON MODE FILTER</p> <ul style="list-style-type: none"><li>+POB0 - None</li><li>+POCM - Output common mode filter</li></ul> <p>BRAKE CHOPPER OPTION</p> <ul style="list-style-type: none"><li>+DB00 - None</li><li>+DBC0 - Included</li></ul> <p>AFE GRID OPTIONS</p> <ul style="list-style-type: none"><li>+PNSI - Not applicable</li><li>+PSSI - Small Source Impedance</li><li>+PHSI - High Source Impedance</li></ul> <p>FILTER CHOKES</p> <ul style="list-style-type: none"><li>+PFCH - Included</li></ul> <p>C- SLOT OPTION BOARD</p> <ul style="list-style-type: none"><li>+SC00 - No board</li><li>+SCB1 - 6 programmable DI/DO</li><li>+SCB2 - 1RO(NO/NC),1RO(NO),therm</li><li>+SCB4 - AI,2AO(mA,isol),+24V/EXT</li><li>+SCB5 - 3RO(NO)</li><li>+SCB9 - 1RO(NO),5pcs of 41-240VAC</li><li>+SCBF - 1AO, 1DO, 1RO</li><li>+SCBH - 3 temp meas channels</li></ul> <p>D-SLOT OPTION BOARD</p> <ul style="list-style-type: none"><li>+SD00 - No board</li><li>+SDB1 - 6 programmable DI/DO</li><li>+SDB2 - 1RO(NO/NC),1RO(NO),therm</li><li>+SDB4 - AI,2AO(mA,isol),+24V/EXT</li><li>+SDB5 - 3RO(NO)</li><li>+SDB9 - 1RO(NO),5pcs of 41-240VAC</li><li>+SDBF - 1AO, 1DO, 1RO</li><li>+SDBH - 3 temp meas channels</li><li>+SDD3 - RS232 adapt(no isol.)</li><li>+SDE3 - PROFIBUS DP</li><li>+SDE5 - PROFIBUS DP with Sub-D9</li><li>+SDE6 - CANopen</li></ul>
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	<ul style="list-style-type: none"><li>+SDE7 - DeviceNet</li><li>+SDE9 - 2-port ethernet</li><li>+SDEA - Advanced 2-port ethernet</li><li>+SDEC - EtherCAT</li><li>E-SLOT OPTION BOARD</li><li>+SE00 - No board</li><li>+SEB1 - 6 programmable DI/DO</li><li>+SEB2 - 1RO(NO/NC),1RO(NO),therm</li><li>+SEB4 - AI,2AO(mA,isol),+24V/EXT</li><li>+SEB5 - 3RO(NO)</li><li>+SEB9 - 1RO(NO),5pcs of 41-240VAC</li><li>+SEBF - 1AO, 1DO, 1RO</li><li>+SEBH - 3 temp meas channels</li><li>+SED3 - RS232 adapt(no isol.)</li><li>+SEE3 - PROFIBUS DP</li><li>+SEE5 - PROFIBUS DP with Sub-D9</li><li>+SEE6 - CANopen</li><li>+SEE7 - DeviceNet</li><li>+SEE9 - 2-port ethernet</li><li>+SEEA - Advanced 2-port ethernet</li><li>+SEEC - EtherCAT</li><li>KEYPAD OPTION</li><li>+HMGR - Graphical Keypad MK01</li><li>ISOLATED AUX TRANSFORMER</li><li>+QAIT – Included</li><li>+QAIS - Included, extra XFMR STO circuit</li><li>GROUNDING SWITCH</li><li>+QGSW – Included</li><li>+QGSK - Included with kirk key interlock</li><li>POTENTIAL TRANSFORMER</li><li>+QP00 - None</li><li>STO/SS1</li><li>+QS00 - None</li><li>+QSTO - Included</li></ul>
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	<p>SURGE PROTECTION DEVICE</p> <ul style="list-style-type: none"><li>+QS01 - None</li><li>+QSPD - Included</li></ul> <p>MOUNTING RACK</p> <ul style="list-style-type: none"><li>+PM00 - None</li></ul> <p>MODULES SEALING</p> <ul style="list-style-type: none"><li>+HG00 - None</li><li>+HGAS - Gasket sealing</li></ul> <p>CONTROL &amp; FAN VOLTAGE</p> <ul style="list-style-type: none"><li>+QFV1 115 V</li><li>+QFV2 230 V</li></ul> <p>DC CAP OPTIONS</p> <ul style="list-style-type: none"><li>+PD00 - No additional</li><li>+PDC1 - One additional DC cap</li><li>+PDC2 - Two additional DC caps</li></ul> <p>LIQUID COOLING OPTION</p> <ul style="list-style-type: none"><li>+PLIN- Industrial water, grounded heat</li></ul> <p>DC GROUNDING RESISTOR</p> <ul style="list-style-type: none"><li>+PGDR - DC N-to-GND R-connected</li><li>+PGDN - DC N-to-GND R-disconnected</li></ul> <p>SHORT CIRCUIT CURRENT RATING</p> <ul style="list-style-type: none"><li>+PUFD - 11 kA, for 100 ms</li><li>+PUF0 - 25 kA, for 100 ms</li><li>+PUFE - 40 kA, for 100 ms</li></ul> <p>COMMON MODE CAP TO GROUND</p> <ul style="list-style-type: none"><li>+PGCG - Standard 25<math>\mu</math>F cap</li><li>+PGCA - Alternative 4<math>\mu</math>F cap</li></ul> <p>VIBRATION DAMPERS</p> <ul style="list-style-type: none"><li>+QV00 - None</li><li>+QVIB - Included</li></ul> <p>COOLANT INPUT SIDE</p> <ul style="list-style-type: none"><li>+PLCT - From top</li><li>+PLCL - Lateral</li></ul> <p>HEAT EXCHANGER OPTION</p>
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	<p>+PHEX- Liquid/liquid HEX included +PHET- Titanium Liquid/liquid HEX included +PH00 - Liquid/liquid HEX not included</p> <p>PRECHARGE INPUT VOLTAGE</p> <p>+QP24 - 240V +QP40 - 400V +QP48 - 480V</p> <p>UL/CUL APPROVAL</p> <p>+GAUL - Included +GNUL - None</p> <p>CE APPROVAL</p> <p>+GACE - Included +GNCE - None</p> <p>MARINE APPROVAL</p> <p>+GALR - Lloyd's Register</p> <p>SHIPPING PACKAGE</p> <p>+GSPV - Pallet with plastic wrap +GSSE - Seaworthy Wooden box</p> <p>CUSTOMIZATION</p> <p>+BM26 - VACON 3000</p> <p>REGION CODE</p> <p>-R00) - International -R02) - North America</p> <p>HMI UNIT FOR MEASURE</p> <p>+LSSI - International SI units +LSUS - US customary units</p> <p>DOCUMENTATION LEVEL</p> <p>+DNOT - No paper manuals</p> <p>DOCS LANGUAGE PREFERENCES</p> <p>+DLUS - English language manuals</p> <p>INTERNAL FB SELECTION</p> <p>+FBIE - ProfinetIO, EthernetIP</p> <p>SYSTEM FIRMWARE</p> <p>+F3000 - Vacon3000 SW pack</p>
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	FIRMWARE LANGUAGE PACK +FL01- UK, DE, FI, SE, IT, FR lang APPLICATION +AYYYY - VACON 3000 default app PARAMETER SET +L0000 - No appl. parameter set SOFTWARE LICENSE +PGC0 – None +PGC1 - Shore supply converter +PGC2- Grid converter
<b>RATINGS</b>	As per manufacturer specification.