Certificate number: 39762/C0 BV
File number: AP4599
Product code: 2592I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

CG Drives & Automation Sweden AB

Helsingborg - SWEDEN

for the type of product

FREQUENCY CONVERTERS (Power 50kW and over)

Emotron Drives FDU & VFX.

Requirements:
Bureau Veritas Rules for the Classification of Steel Ships.

IEC 61800-3 (2022)
IEC 61800-5-1 (2022)

EC Code: 21

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 27 May 2031

For Bureau Veritas Marine & Offshore,
At BV GOTHENBURG, on 27 May 2026,
Hans-Erik Ericsson

This certificate was created electronically and is valid without signature

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

The Emotron drives FDU series are frequency converters commonly used to control and protect pumps and fans applications.
The Emotron drives VFX series are frequency converters intended to control speed and torque for three phased asynchronous motors.

1.1 - Specifications:

Supply voltage range:	480/690V at 50/60Hz
Frequency range:	45 to 65Hz
Output frequency:	0 to 400Hz
Protection's degree:	IP20/54

1.2 - Approval's range:

1.2.1 - VFX 480V:

Models	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)			Heavy duty (150%, 1 min. every 10 min.)			IP Rating
		Power @ 400V [kW]	Power @ 460V [hp]	Rated current [A]	Power @ 400V [kW]	Power @ 460V[hp]	Rated current [A]	
VFX48-109	131	55	75	109	45	60	87	IP54 wall mounted
VFX48-146	175	75	100	146	55	75	117	
VFX48-175	210	90	125	175	75	100	140	
VFX48-210	252	110	150	210	90	125	168	
VFX48-228	300	110	200	228	90	150	182	
VFX48-250	300	132	200	250	110	150	200	
VFX48-295	354	160	250	295	132	200	236	
VFX48-300	360	160	250	300	132	200	240	
VFX48-365	438	200	300	365	160	250	292	
VFX48-375	450	200	300	375	160	250	300	IP20
VFX48-430	516	220	350	430	200	250	344	
VFX48-500	600	250	400	500	220	350	400	
VFX48-590	708	315	500	590	250	400	472	
VFX48-600	720	315	500	600	250	400	480	
VFX48-660	792	355	550	660	250	450	528	
VFX48-730	876	400	600	730	315	500	584	
VFX48-650	780	355	550	650	315	400	520	
VFX48-750	900	400	600	750	355	500	600	
VFX48-810	972	450	700	810	355	550	648	
VFX48-860	1032	450	700	860	400	550	688	
VFX48-885	1062	500	750	885	400	600	708	
VFX48-1000	1200	560	800	1000	450	650	800	
VFX48-1010	1212	560	800	1010	450	700	808	
VFX48-1100	1320	630	900	1100	500	750	880	
VFX48-1150	1380	630	900	1150	500	750	920	
VFX48-1250	1500	710	1000	1250	560	800	1000	
VFX48-1300	1560	710	1100	1300	560	800	1040	
VFX48-1350	1620	710	1100	1350	600	900	1080	
VFX48-1460	1752	800	1250	1460	630	1000	1168	
VFX48-1500	1800	800	1250	1500	630	1000	1200	
VFX48-1710	2052	900	1500	1710	750	1200	1368	
VFX48-1750	2100	900	1500	1750	800	1200	1400	
VFX48-1820	2184	1000	1600	1820	800	1250	1456	
VFX48-2000	2400	1120	1700	2000	900	1300	1600	
VFX48-2190	2628	1200	1900	2190	1000	1500	1752	
VFX48-2250	2700	1250	1900	2250	1000	1500	1800	
VFX48-2500	3000	1400	2100	2500	1120	1700	2000	
VFX48-2550	3060	1400	2100	2550	1120	1700	2040	
VFX48-2920	3504	1600	2500	2920	1300	2000	2336	

*available during limited time and as long as allowed by drive temperature

-Liquid cooled models will be marked with “L” in the last in model name. For example VFX48-1100L

1.2.2 - VFX 690V:

Models	Max output current [A]*	Normal duty (120%, 1 min. every 10 min.)			Heavy duty (150%, 1 min. every 10 min.)			IP Rating
		Power @ 575V [hp]	Power @ 690V [kW]	Rated current [A]	Power @ 575 V[hp]	Power @ 690V [kW]	Rated current [A]	
VFX69-058	93	60	55	58	40	45	46	IP54 wall mounted
VFX69-082	98	75	75	82	60	55	66	
VFX69-090	108	75	90	90	60	75	72	
VFX69-109	131	100	110	109	75	90	87	
VFX69-146	175	125	132	146	100	110	117	
VFX69-175	210	150	160	175	125	132	140	
VFX69-200	240	200	200	200	150	160	160	
VFX69-250	300	250	250	250	200	200	200	IP20
VFX69-300	360	300	315	300	250	250	240	
VFX69-375	450	350	355	375	300	315	300	
VFX69-400	480	400	400	400	300	315	320	
VFX69-430	516	400	450	430	350	315	344	
VFX69-500	600	500	500	500	400	355	400	
VFX69-595	720	600	600	600	500	450	480	
VFX69-650	780	650	630	650	550	500	520	
VFX69-720	864	750	710	720	600	560	576	
VFX69-800	960	850	800	800	650	630	640	
VFX69-905	1080	950	900	900	750	710	720	
VFX69-995	1200	1000	1000	1000	850	800	800	
VFX69-1K2	1440	1200	1200	1200	1000	900	960	
VFX69-1K4	1680	1500	1400	1400	1200	1120	1120	
VFX69-1K6	1920	1700	1600	1600	1300	1250	1280	
VFX69-1K8	2160	1900	1800	1800	1500	1400	1440	
VFX69-2K0	2400	2100	2000	2000	1700	1600	1600	
VFX69-2K2	2640	2300	2200	2200	1800	1700	1760	
VFX69-2K4	2880	2500	2400	2400	2000	1900	1920	
VFX69-2K6	3120	2700	2600	2600	2200	2000	2080	
VFX69-2K8	3360	3000	2800	2800	2400	2200	2240	
VFX69-3K0	3600	3200	3000	3000	2500	2400	2400	

*available during limited time and as long as allowed by drive temperature
-Liquid cooled models will be marked with “L” in the last in model name.

1.2.3 - FDU 480V:

Models	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min)		Heavy duty (150%, 1 min every 10 min)		IP Rating
		Power 400 V [kW]	Rated current [A]	Power 400 V [kW]	Rated current [A]	
FDU48-109	131	55	109	45	87	IP54 wall mounted
FDU48-146	175	75	146	55	117	
FDU48-175	210	90	175	75	140	
FDU48-210	252	110	210	90	168	
FDU48-228	300	110	228	90	182	
FDU48-250	300	132	250	110	200	
FDU48-295	354	160	295	132	236	
FDU48-365	438	200	365	160	293	
FDU48-300	360	160	300	132	240	
FDU48-375	450	200	375	160	300	
FDU48-430	516	220	430	200	344	
FDU48-500	600	250	500	220	400	
FDU48-590	708	315	590	250	472	
FDU48-600	720	315	600	250	480	
FDU48-650	780	355	650	250	520	
FDU48-660	792	355	660	250	528	
FDU48-730	876	400	730	315	584	
FDU48-750	900	400	750	355	600	
FDU48-810	972	450	810	355	648	

FDU48-860	1032	450	860	400	688	IP20
FDU48-885	1062	500	885	400	708	
FDU48-1K0	1200	560	1000	450	800	
FDU48-1010	1212	560	1010	450	808	
FDU48-1100	1320	630	1100	500	880	
FDU48-1K15	1380	630	1150	500	920	
FDU48-1K25	1500	710	1250	560	1000	
FDU48-1300	1560	710	1300	560	1040	
FDU48-1K35	1620	710	1350	600	1080	
FDU48-1460	1752	800	1460	630	1168	
FDU48-1K5	1800	800	1500	630	1200	
FDU48-1710	2052	900	1710	750	1368	
FDU48-1K75	2100	900	1750	800	1400	
FDU48-1820	2184	1000	1820	800	1456	
FDU48-2K0	2400	1120	2000	900	1600	
FDU48-2190	2628	1200	2190	1000	1752	
FDU48-2K25	2700	1250	2250	1000	1800	
FDU48-2k5	3000	1400	2500	1120	2000	
FDU48-2550	3060	1400	2550	1120	2040	
FDU48-2920	3504	1600	2920	1300	2336	

*available during limited time and as long as allowed by drive temperature
-Liquid cooled models will be marked with “L” in the last in model name.

1.2.4 - FDU 690V:

Models	**Max. output current [A]***	**Normal duty (120%, 1 min. every 10 min)**		**Heavy duty (150%, 1 min every 10 min)**		**IP Rating**
		Power 690 V [kW]	**Rated current [A]**	**Power 690 V [kW]**	**Rated current [A]**	
FDU69-058	93	55	58	45	46	IP54 wall mounted
FDU69-082	98	75	82	55	66	
FDU69-090	108	90	90	75	72	
FDU69-109	131	110	109	90	87	
FDU69-146	175	132	146	110	117	
FDU69-175	210	160	175	132	140	
FDU69-200	240	200	200	160	160	
FDU69-250	300	250	250	200	200	IP20
FDU69-300	360	315	300	250	240	
FDU69-375	450	355	375	315	300	
FDU69-400	480	400	400	315	320	
FDU69-430	516	450	430	315	344	
FDU69-500	600	500	500	355	400	
FDU69-595	720	600	600	450	480	
FDU69-650	780	630	650	500	520	
FDU69-720	864	710	720	560	576	
FDU69-800	960	800	800	630	640	
FDU69-905	1080	900	900	710	720	
FDU69-995	1200	1000	1000	800	800	
FDU69-1K2	1440	1200	1200	900	960	
FDU69-1K4	1680	1400	1400	1120	1120	
FDU69-1K6	1920	1600	1600	1250	1280	
FDU69-1K8	2160	1800	1800	1400	1440	
FDU69-2K0	2400	2000	2000	1600	1600	
FDU69-2K2	2640	2200	2200	1700	1760	
FDU69-2K4	2880	2400	2400	1900	1920	
FDU69-2K6	3120	2600	2600	2000	2080	
FDU69-2K8	3360	2800	2800	2200	2240	
FDU69-3K0	3600	3000	3000	2400	2400	

*available during limited time and as long as allowed by drive temperature
-Liquid cooled models will be marked with “L” in the last in model name.

2. DOCUMENTS AND DRAWINGS :

- Instruction manuals ref. 01-5325-01r5, 01-5326-01r5, 01-7491-01r1, 01-7492-01r0 and 01-7848-01r0
- Technical catalogue AC Drives EMOTRON VFX/FDU 2.1 No. 01-5263-01, dated Mar. 2022.

3. TEST REPORTS :

DELTA:

- Tests report No. T210249, dated 14.Apr.2015.
- Test report No. A506587, dated 15.Dec.2009.
- Tests report No. A506316, dated 26.Aug.2009.

DECTRON:

- Tests report No. 06047, dated 15.Mar.2006.
- Tests report No. 07019, dated 02.Feb.2007.
- Tests report No. 07020, dated 20.Feb.2007.
- Tests report No. 07275, dated 18.Dec.2007.
- Tests report No. 07276, dated 19.Dec.2007.

Sebert Trillingstechniek B.V.:

- Test report No. M10-001-2010-7017, dated 26.Jan.2010.

EMP TRONIC AB:

- Test report No. 082701, dated 01.Jul.2008.

KEMA:

- Test report No. 2097658.01-QUA/INC, dated 17.Oct.2006.

FORCE:

- Test report No. 124-27212-1, dated 13-02-2025.

CG Drives & Automation:

- AC or DC Voltage test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- AC or DC Voltage test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Breakdown of Components test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 24-02-2026.
- Breakdown of Components test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 24-02-2026.
- Capacitor discharge test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 04-02-2026.
- Capacitor discharge test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 05-02-2026.
- Electronic motor overload protection test VFX-FDU48-885-3x295A PEBB unit-R00, witnessed on 04-02-2026.
- Electronic motor overload protection test VFX-FDU48-1100-3x365A PEBB unit-R00, witnessed on 04-02-2026.
- Hydrostatic pressure test VFX-FDU48-1100L-3x365A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Inoperative blower motor test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 04-02-2026.
- Inoperative blower motor test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 04-02-2026.
- Loss of coolant test VFX-FDU48-1100L-3x365A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Loss of phase test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 04-02-2026.
- Loss of phase test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 04-02-2026.
- Output Short circuit test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 24-02-2026.
- Output Short circuit test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 23-02-2026.
- Protective bonding test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Protective bonding test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Temperature rise test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed by BV surveyor on 03-02-2026.
- Temperature rise test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed by BV surveyor on 06-02-2026.
- Touch current measurement test VFX-FDU48-885-3x295A PEBB unit - R00, witnessed on 06-02-2026.
- Touch current measurement test VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed on 06-02-2026.
- Testing & Inspection as per BV rules VFX-FDU48-885-3x295A PEBB unit - R00, witnessed on 04-02-2026.
- Testing & Inspection as per BV rules VFX-FDU48-1100-3x365A PEBB unit - R00, witnessed on 04-02-2026.
- Temperature rise test VFX-FDU48-1100L-3x365A PEBB unit - R00, witnessed by BV surveyor on 28-04-2026.
- Clogged filter test VFX-FDU48-885-3x295A PEBB unit - R0, witnessed by BV surveyor on 04-02-2026.
- Clogged filter test VFX-FDU48-1100-3x365A PEBB unit - R0, witnessed by BV surveyor on 04-02-2026.

4. APPLICATION / LIMITATION :

4.1 - BUREAU VERITAS Rules for the Classification of Steel Ships.
4.2 - BUREAU VERITAS Environmental Category, EC Code: 2**1.**
4.3 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**
4.4 - Converters EMC classed C3 according to IEC 61800-3 can be installed in "special distribution zone" and "general power distribution zone" in accordance with IEC 60533 provided precautions are taken to attenuate these effects on the distribution system.
4.5 - The installation shall comply with the Manufacturer's recommendation described in the above-referenced documentation.
4.6 - The **Emotron Drives FDU & VFX series** use derating factors as follow: Max Temps. 45°C, Possible derating 1%/°C to max +10°C (55°C).
4.7 - Equipment covered by this Type Approval certificate has been tested according to requirements of IACS UR E10 rev 9.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The **Emotron Drives FDU & VFX series** are to be supplied by **CG Drives & Automation Sweden AB** in compliance with the type and the requirements described in this certificate.
5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
5.3 - BV product certificate is required.
5.4 - For information, **CG Drives & Automation Sweden AB** has declared to Bureau Veritas the following production site(s):

CG Drives & Automation Sweden AB
Mörsaregatan 12
254 66 Helsingborg
SWEDEN

CG Power And Industrial Solutions Limited Drives & Automation - India
Plot No:9, MPAKVN Phase-2
New Industrial Area
MP Mandideep - 462046
INDIA

6. MARKING OF PRODUCT :

6.1 - Trade name.
6.2 - Date of manufacture and serial number.
6.3 - Equipment type or model identification under which it was type-tested.
6.4 - Bureau Veritas's marking

7. OTHERS :

7.1 - It is **CG Drives & Automation Sweden AB** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.
7.2 - This certificate supersedes the Type Approval Certificate N° 39762/B0 BV issued by the Society.

***** END OF CERTIFICATE *****