VACON

DRIVEN BY DRIVES

VACON NXP COMMON DC BUS PRODUCTS

PROVIDING ULTIMATE FLEXIBILITY

MODULAR DRIVE SOLUTIONS

Vacon offers a comprehensive range of Common DC bus drive products comprising front-end units, inverter units and brake chopper units in the entire power range and voltages from 380 V to 690 V . The drive components are built on proven VACON NX technology and provide the ideal energy sharing solution for a multitude of power systems.

RELIABLE. ROBUST. PROVEN.

When your goal is to ensure that all AC drives share energy within your industrial system, and that all energy is effectively utilized and redistributed, then VACON Common DC bus drive solutions are the right choice. Our Common DC bus components are used in a multitude of combinations across a wide spectrum of high-power process industries from the pulp & paper, steel, metal & mining and marine cranes to smaller machines and production lines, which also demand cost-effective solutions.

DC bus systems comprise two main categories: regenerative and non-regenerative. In a regenerative DC bus system the front-end unit is capable of generating power back to the mains network. This kind of system is suitable for processes where braking is needed often and the braking power is relatively high. In a non-regenerative system the braking power is redistributed to the other drives in the system via the common DC bus, and possible excess power can be dissipated as heat using an optional brake chopper unit and brake resistors. In small production lines or small paper machines where braking is needed less often, a non-regenerative common DC bus system is a cost-efficient solution. In high power applications, it is possible to parallel multiple front-end units.

In addition to the welcome cost savings, you'll also benefit from reduced power cabling and installation time and reduced overall footprint of your drive system. Your drive line-up tolerance to voltage dips/sags will be improved and the harmonic distortions your drive system will be minimized.

IN HARMONY WITH THE ENVIRONMENT

Vacon is committed to being an environmentally responsible company and our energy saving products and solutions are a good example of that. Our Common DC bus portfolio fulfills key international standards and global requirements, including safety and EMC & Harmonics approvals. Likewise, we continue to develop innovative solutions utilizing ie. regenerative energy and smart grid technology to help customers effectively monitor and control energy use and costs.

VACON AT YOUR SERVICE

Vacon AC drives are sold in over 100 countries, with production and R&D on 3 continents, sales offices in 27 countries and approximately 90 service centers in over 50 locations worldwide.

Whether you are an original equipment manufacturer (OEM), system integrator, brand label customer, distributor or end user, Vacon provides services to help you meet your business targets. Our global service solutions are available 24/7 throughout the product lifecycle with the intent to minimize the total cost of ownership and environmental load.

PURE PERFORMANCE

Speed and torque control must be just right when manufacturing top-class stainless steel products. Vacon AC drives have been succesfully implemented in various applications in the demanding metal processing industry.

AIR COOLED DRIVE MODULES WITHIN THE VACON NXP COMMON DC BUS PRODUCT RANGE

WHAT'S IN IT FOR YOU

VACON NXP COMMON DC BUS

Typical segments	Key features	Benefits
• Metal • Pulp & paper • Crane systems • Mining & minerals • Marine	Full power(0.55 to 2.2 MW) and voltage (380 to 690V) range for both induction and permanent magnet motors.	Same software tool, same control option boards allowing the maximum utilization of NXP features over a wide power range.
	Five built-in expansion slots for additional I/O, fieldbus and functional safety boards.	No additional modules required. Option boards are compact and easy to install at any time.
	Low harmonic regenerative front end. Cost effective non-regenerative front end.	Optimized drive system configurations enabling minimized overall investment cost. Excessive braking energy can be fed back to network saving energy costs.
	Compact drive modules and easy integration to cabinets.	Optimized module design reduces need for additional engineering and saves in cabinet space reducing overall costs.

TYPICAL APPLICATIONS

- Continuous web systems
- Metal lines eg. roller table systems
- Winders & unwinders
- Crane systems eg. main hoists, gantry & trolley drives
- Centrifuges
- Winches
- Conveyors
- Excavators

THE COMPLETE RANGE

Vacon's common DC bus product portfolio meets all the requirements with a flexible architecture, comprising a selection of active front-ends, non-regenerative front ends, inverters and brake choppers in the entire power range and voltages from 380 V to 690 V.

FLEXIBLE CONFIGURATION, CUSTOMIZED SOLUTIONS

Common DC bus components can be used in a multitude of combinations. In a typical DC bus configuration, the drives that are generating can transfer the energy directly to the drives in motoring mode. Common DC bus drive systems have different kinds of front-end units to meet the requirements of the electricity network and the process where the drives are used. With the right configuration, the drive system can achieve optimal performance and significant energy savings can be made when braking energy is utilized to its full potential.

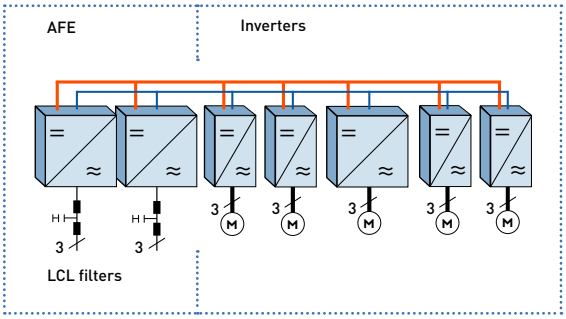
FRONT-END UNITS

The front-end units convert a mains AC voltage and current into a DC voltage and current. The power is transferred from the mains to a common DC bus and, in certain cases, vice versa.

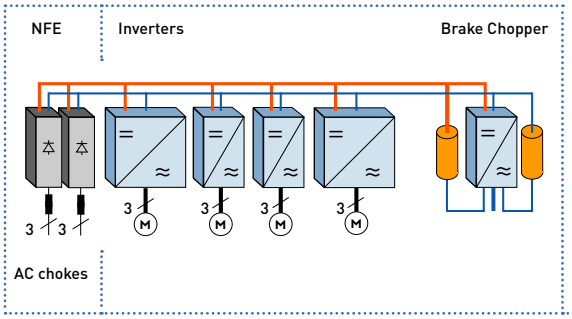
ACTIVE FRONT-END (AFE)

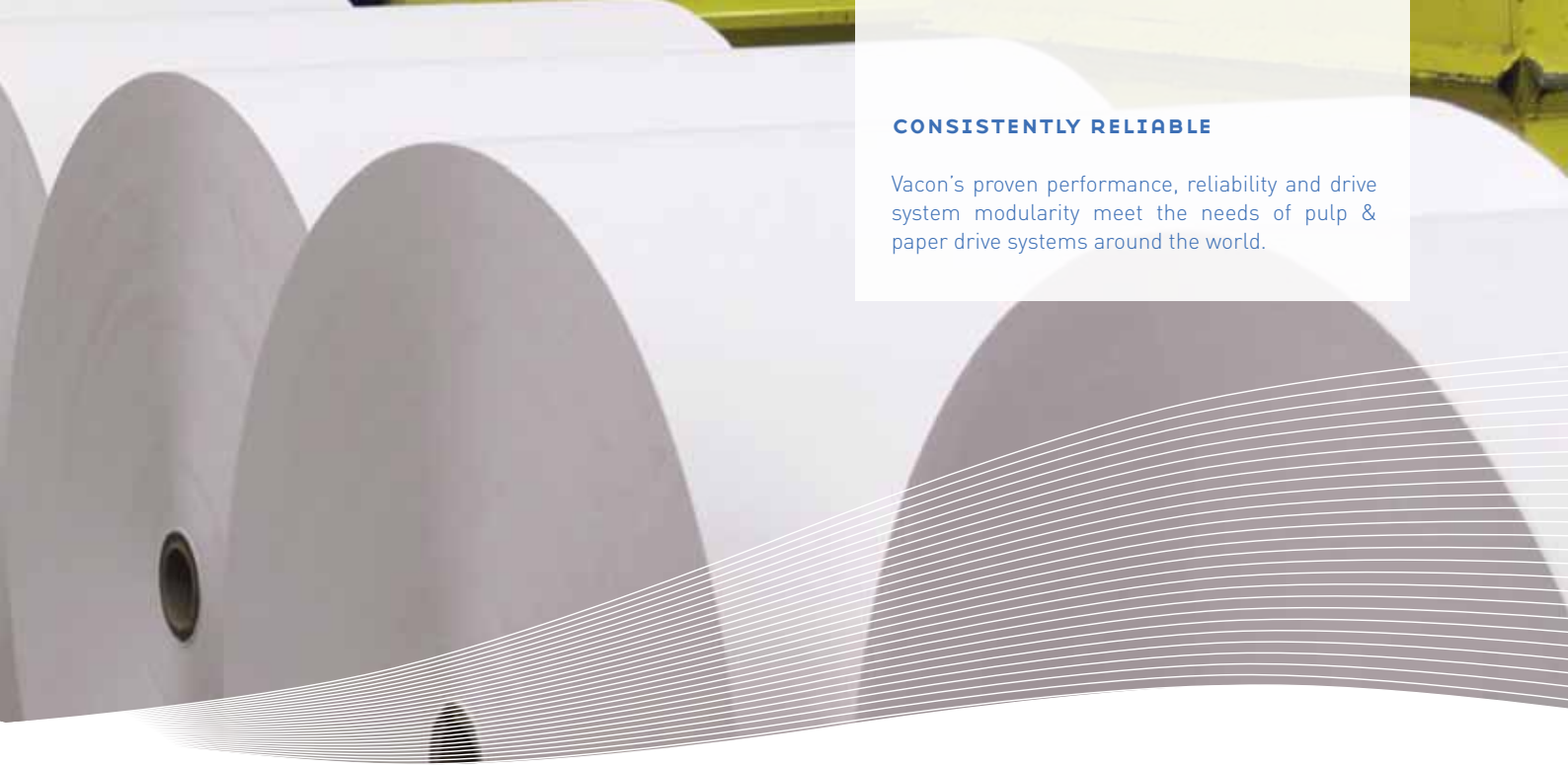
The AFE unit is a bidirectional (regenerative) power converter for the front-end of a common DC bus drive line-up. An external LCL filter is used at the input. This unit is suitable in applications where low mains harmonics are required. AFE is able to boost DC link voltage (default +10%) higher than nominal DC link voltage (1,35x UN). AFE needs an external pre-charging circuit. However, AFE does not need any external grid side measurements to operate. AFE units can operate in parallel to provide increased power and/or redundancy without any drive to drive communication between the units. AFE units can also be connected to the same fieldbus with inverters, and controlled and monitored via fieldbus.

A regenerative common DC bus system



A non-regenerative common DC bus system

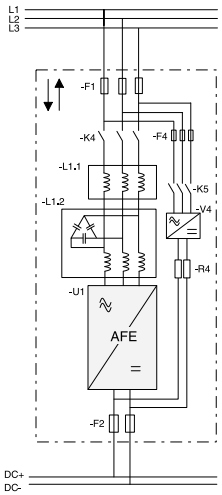




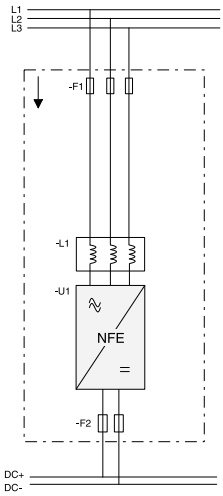
CONSISTENTLY RELIABLE

Vacon's proven performance, reliability and drive system modularity meet the needs of pulp & paper drive systems around the world.

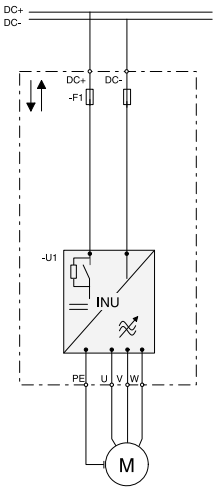
TYPICAL DEVICE CONFIGURATIONS



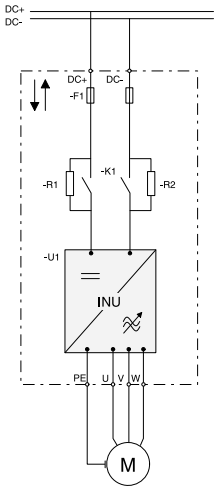
Active front-end



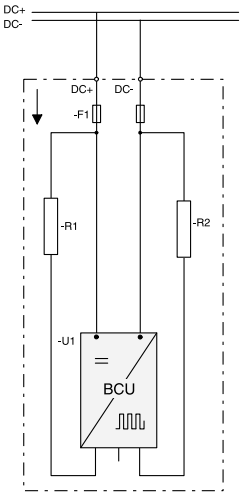
Non-regenerative front-end



Inverter Unit (FR4-FR8)



Inverter Unit (FI9-FI14)



Brake chopper unit

NON-REGENERATIVE FRONT-END (NFE)

The NFE unit is an unidirectional (motoring) power converter for the front-end of a common DC bus drive line-up. The NFE is a device that operates as a diode bridge using diode/thyristor components. A dedicated external choke is used at the input. The NFE unit has the capacity to charge a common DC bus, thus no external pre-charging is needed. This unit is suitable as a rectifying device when a normal level of harmonics is accepted and no regeneration to the mains is required. NFE units can be paralleled to increase power without any drive to drive communincation between the units.

A common DC bus system consists of one or more front-end modules and inverter modules connected together by a DC bus

INVERTER UNIT

The INU (Inverter unit) is a bidirectional DC-fed power inverter for the supply and control of AC motors. The INU is supplied from a common DC bus drive line-up. A charging circuit is needed in case the connection possibility to a live DC bus is required. The DC side charging circuit is integrated for powers up to 75 kW (FR4-FR8) and externally located for higher power ratings (FI9-FI14).

BRAKE CHOPPER UNIT

The BCU (Brake chopper unit) is a unidirectional power converter for the supply of excessive energy from a common DC bus drive line-up to resistors where the energy is dissipated as heat. External resistors are needed. By using two brake resistors, the braking power of the brake chopper is doubled.

MULTIPLE OPTIONS

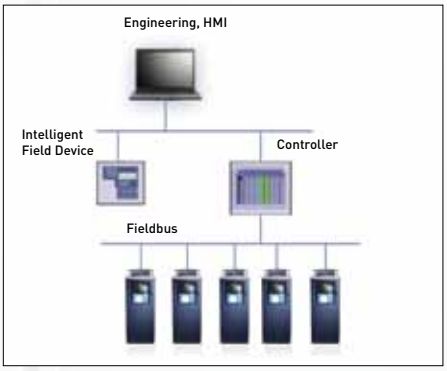
VACON NXP CONTROL

VACON NXP offers a high-performance control platform for all demanding drive applications. The micro controller provides both exceptional prosessing and calculation power. The VACON NXP supports both induction and permanent magnet motors in open and closed loop control modes. The VACON NXP features built-in PLC functionality without the need for any additional hardware. VACON NC61131-3 Engineering can be used to improve performance and create cost savings by integrating customer-specific functionality into the drive. The same control board is used in all NXP drives, allowing the maximum utilization of NXP control features over a wide power and voltage range.

OPTION BOARDS

Our NXP Control provides exceptional modularity by offering five (A, B, C, D and E) plug-in extension slots. Fieldbus boards, encoder boards as well as wide range of IO boards can simply be plugged-in at any time without the need to remove any other components.

A listing of all options boards is provided on page 13



FIELDBUS OPTIONS

Your VACON NXP is easily integrated into a plant's automation system by using plug-in fieldbus option boards including Profibus DP, Modbus RTU, DeviceNet and CANopen. Fieldbus technology ensures increased control and monitoring of the process equipment with reduced cabling - ideal for industries where the need to ensure that products are produced under the right conditions is of paramount importance. An external +24 V supply option enables communication with the control unit even if the main supply is switched off. Fast drive-to-drive communication is possible using Vacon's fast SystemBus fiber optic communication.

Profibus DP • DeviceNet • Modbus RTU • CANopen

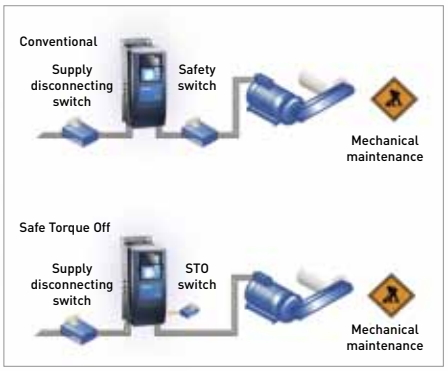
ETHERNET CONNECTIVITY

VACON NXP is the smart drive of choice, as there is no need to purchase additional communication tools. Ethernet connectivity allows remote drive access for monitoring, configuring and troubleshooting. Vacon's Ethernet protocols such as Profinet IO, Ethernet IP and Modbus/TCP are available for all NXP drives. New Ethernet protocols are being continuously developed.

Modbus/TCP • Profinet IO • Ethernet I/P

SAFE TORQUE OFF, SAFE STOP 1

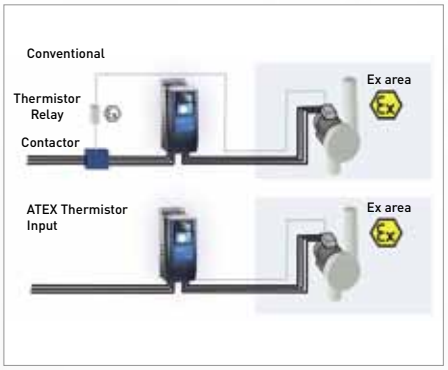
Safe Torque Off (STO) is available for all NXP drives. It prevents the drive from generating torque on the motor shaft and prevents unintentional start-ups. The function also corresponds to an uncontrolled stop in accordance with stop category 0, EN60204-1.
Safe Stop 1 (SS1) initiates the motor deceleration and initiates the STO function after an application specific time delay. The function also corresponds to a controlled stop in accordance with stop category 1, EN 60204-1.
The advantage of the integrated STO and SS1 safety options compared to standard safety technology using electromechanical switchgear is the elimination of separate components and the effort required to wire and service them, while still maintaining the required level of safety at work.



ATEX CERTIFIED THERMISTOR INPUT

Vacon has developed an ATEX approved thermistor input, as an integrated option. Certified and compliant with the European ATEX directive 94/9/EC, the integrated thermistor input is specially designed for the temperature supervision of motors that are placed in areas in which potentially explosive gas, vapor, mist or air mixtures are present and areas with combustible dust. Typical industries requiring such supervision include chemical, petrochemical, marine, metal, mechanical, mining, and oil drilling.

If over-heating is detected, the drive immediately stops feeding energy to the motor. As no external components are needed, the cabling is minimized, improving reliability and saving on both space and costs.



DC COOLING FANS

VACON NXP high-performance air-cooled products are equipped with DC fans. This significantly increases the reliability and lifetime of the fan also fulfilling the ERP2015 directive on decreasing fan losses. Likewise, the DC-DC supply board component ratings fulfill industrial requirement levels.

CONFORMAL COATING

To increase performance and durability, conformally coated printed circuit boards (PCB's, also known as varnished boards) are provided as standard for power modules (FR7 - FI14).

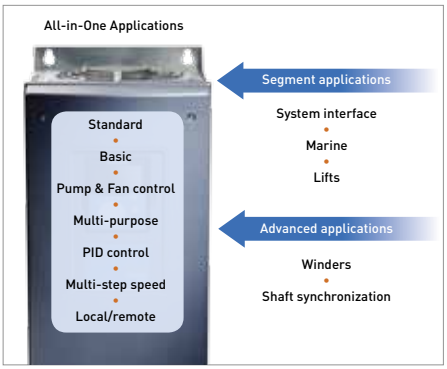
The upgraded PCB's offer reliable protection against dust and moisture and extend the lifetime of the drive and critical components.

COMMISSIONING MADE EASY

USER-FRIENDLY KEYPAD

Vacon has ensured that the user interface is intuitive to use. You will enjoy the keypad's well-structured menu system that allows for fast commissioning and trouble-free operation.

- Removable panel with plug-in connection
- Graphical and text keypad with multiple language support
- Text display multi-monitoring function
- Parameter backup and copy function with the panel's internal memory
- Vacon's Startup Wizard ensures a hassle-free set up. Choose the language, application type and main parameters during the first power-up.

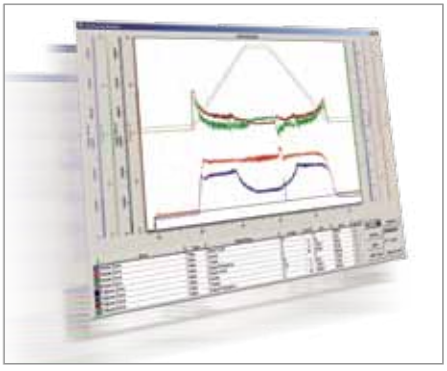


SOFTWARE MODULARITY

Vacon's handy All-in-One application package has seven built-in software applications, which can be selected with one parameter.

In addition to the All-in-One package, Vacon offers several segment specific and advanced applications such as System Interface, Marine, Lift and Shaft Synchronisation for more demanding uses.

VACON NXP applications can be downloaded from www.vacon.com



VACON NCDRIVE

Vacon NCDrive is used for setting, copying, storing, printing, monitoring and controlling parameters. The Vacon NCDrive communicates with the drive via the following interfaces: RS-232, Ethernet TCP/IP, CAN (fast multiple drive monitoring), CAN@Net (remote monitoring).

Vacon NCDrive also includes a handy Datalogger function, which offers you the possibilty to track failure modes and perform root cause analysis.

Vacon PC-tools can be downloaded from www.vacon.com

INDEPENDENT PARALLELING

Benefit from Vacon's patented independent paralleling configuration of (AFE) front-end units.

- High redundancy
- No drive-to-drive communication needed
- Automatic load sharing
- NFE units can also be independently paralleled

380-500 VAC INVERTER MODULES

Type	Unit		Low overload (AC current)		High overload (AC current)		I_{max}
	Code	Frame	$I_{L\text{-}cont}$ [A]	I_{1min} [A]	$I_{H\text{-}cont}$ [A]	I_{1min} [A]	I_{2s} [A]
INU	NXI_0004 5 A2T0CSS	FR4	4.3	4.7	3.3	5.0	6.2
	NXI_0009 5 A2T0CSS	FR4	9	9.9	7.6	11.4	14
	NXI_0012 5 A2T0CSS	FR4	12	13.2	9	13.5	18
	NXI_0016 5 A2T0CSS	FR6	16	17.6	12	18	24
	NXI_0022 5 A2T0CSS	FR6	23	25.3	16	24	32
	NXI_0031 5 A2T0CSS	FR6	31	34	23	35	46
	NXI_0038 5 A2T0CSS	FR6	38	42	31	47	62
	NXI_0045 5 A2T0CSS	FR6	46	51	38	57	76
	NXI_0072 5 A2T0CSS	FR7	72	79	61	92	122
	NXI_0087 5 A2T0CSS	FR7	87	96	72	108	144
	NXI_0105 5 A2T0CSS	FR7	105	116	87	131	174
	NXI_0140 5 A0T0CSS	FR8	140	154	105	158	210
	NXI_0168 5 A0T0ISF	FI9	170	187	140	210	280
	NXI_0205 5 A0T0ISF	FI9	205	226	170	255	336
	NXI_0261 5 A0T0ISF	FI9	261	287	205	308	349
	NXI_0300 5 A0T0ISF	FI9	300	330	245	368	444
	NXI_0385 5 A0T0ISF	FI10	385	424	300	450	540
	NXI_0460 5 A0T0ISF	FI10	460	506	385	578	693
	NXI_0520 5 A0T0ISF	FI10	520	572	460	690	828
	NXI_0590 5 A0T0ISF	FI12	590	649	520	780	936
	NXI_0650 5 A0T0ISF	FI12	650	715	590	885	1062
	NXI_0730 5 A0T0ISF	FI12	730	803	650	975	1170
	NXI_0820 5 A0T0ISF	FI12	820	902	730	1095	1314
	NXI_0920 5 A0T0ISF	FI12	920	1012	820	1230	1476
	NXI_1030 5 A0T0ISF	FI12	1030	1133	920	1380	1656
	NXI_1150 5 A0T0ISF	FI13	1150	1265	1030	1545	1854
	NXI_1300 5 A0T0ISF	FI13	1300	1430	1150	1725	2070
	NXI_1450 5 A0T0ISF	FI13	1450	1595	1300	1950	2340
	NXI_1770 5 A0T0ISF	FI14	1770	1947	1600	2400	2880
	NXI_2150 5 A0T0ISF	FI14	2150	2365	1940	2910	3492
	NXI_2700 5 A0T0ISF	FI14	2700	2970	2300	3278	3933

525-690 VAC INVERTER MODULES

Type	Unit		Low overload (AC current)		High overload (AC current)		I_{max}
	Code	Frame	$I_{L\text{-}cont}$ [A]	I_{1min} [A]	$I_{H\text{-}cont}$ [A]	I_{1min} [A]	I_{2s} [A]
INU	NXI_0004 6 A2T0CSS	FR6	4.5	5	3.2	5	6.4
	NXI_0005 6 A2T0CSS	FR6	5.5	6	4.5	7	9
	NXI_0007 6 A2T0CSS	FR6	7.5	8	5.5	8	11
	NXI_0010 6 A2T0CSS	FR6	10	11	7.5	11	15
	NXI_0013 6 A2T0CSS	FR6	13.5	15	10	15	20
	NXI_0018 6 A2T0CSS	FR6	18	20	13.5	20	27
	NXI_0022 6 A2T0CSS	FR6	22	24	18	27	36
	NXI_0027 6 A2T0CSS	FR6	27	30	22	33	44
	NXI_0034 6 A2T0CSS	FR6	34	37	27	41	54
	NXI_0041 6 A2T0CSS	FR7	41	45	34	51	68
	NXI_0052 6 A2T0CSS	FR7	52	57	41	62	82
	NXI_0062 6 A0T0CSS	FR8	62	68	52	78	104
	NXI_0080 6 A0T0CSS	FR8	80	88	62	93	124
	NXI_0100 6 A0T0CSS	FR8	100	110	80	120	160
	NXI_0125 6 A0T0ISF	FI9	125	138	100	150	200
	NXI_0144 6 A0T0ISF	FI9	144	158	125	188	213
	NXI_0170 6 A0T0ISF	FI9	170	187	144	216	245
	NXI_0208 6 A0T0ISF	FI9	208	229	170	255	289
	NXI_0261 6 A0T0ISF	FI10	261	287	208	312	375
	NXI_0325 6 A0T0ISF	FI10	325	358	261	392	470
	NXI_0385 6 A0T0ISF	FI10	385	424	325	488	585
	NXI_0416 6 A0T0ISF	FI10	416	458	325	488	585
	NXI_0460 6 A0T0ISF	FI12	460	506	385	578	693
	NXI_0502 6 A0T0ISF	FI12	502	552	460	690	828
	NXI_0590 6 A0T0ISF	FI12	590	649	502	753	904
	NXI_0650 6 A0T0ISF	FI12	650	715	590	885	1062
	NXI_0750 6 A0T0ISF	FI12	750	825	650	975	1170
	NXI_0820 6 A0T0ISF	FI12	820	902	650	975	1170
	NXI_0920 6 A0T0ISF	FI13	920	1012	820	1230	1476
	NXI_1030 6 A0T0ISF	FI13	1030	1133	920	1380	1656
	NXI_1180 6 A0T0ISF	FI13	1180	1298	1030	1464	1755
	NXI_1500 6 A0T0ISF	FI14	1500	1650	1300	1950	2340
	NXI_1900 6 A0T0ISF	FI14	1900	2090	1500	2250	2700
	NXI_2250 6 A0T0ISF	FI14	2250	2475	1900	2782	3335

ELECTRICAL RATINGS

380-500 VAC FRONT-END MODULES

Type	Unit		Low overload (AC current)		High overload (AC current)		DC Power *	
	Code	Frame	$I_{L\text{-}cont}$ [A]	I_{1min} [A]	$I_{H\text{-}cont}$ [A]	I_{1min} [A]	400 V mains $P_{L\text{-}cont}$ (kW)	500 V mains $P_{L\text{-}cont}$ (kW)
AFE	1 x NXA_0261 5 A0T02SF	1 x FI9	261	287	205	308	176	220
	1 x NXA_0460 5 A0T02SF	1 x FI10	460	506	385	578	310	388
	2 x NXA_0460 5 A0T02SF	2 x FI10	875	962	732	1100	587	735
	1 x NXA_1300 5 A0T02SF	1 x FI13	1300	1430	1150	1725	876	1092
	2 x NXA_1300 5 A0T02SF	2 x FI13	2470	2717	2185	3278	1660	2075
	3 x NXA_1300 5 A0T02SF	3 x FI13	3705	4076	3278	4916	2490	3115
	4 x NXA_1300 5 A0T02SF	4 x FI13	4940	5434	4370	6550	3320	4140
NFE	1 x NXN_0650 6 X0T0SSV	1 x FI9	650	715	507	793	410	513
	2 x NXN_0650 6 X0T0SSV	2 x FI9	1235	1359	963	1507	780	975
	3 x NXN_0650 6 X0T0SSV	3 x FI9	1853	2038	1445	2260	1170	1462
	4 x NXN_0650 6 X0T0SSV	4 x FI9	2470	2717	1927	3013	1560	1950
	5 x NXN_0650 6 X0T0SSV	5 x FI9	3088	3396	2408	3767	1950	2437
	6 x NXN_0650 6 X0T0SSV	6 x FI9	3705	4076	2890	4520	2340	2924

*** In case you need to recalculate the power, please use the following formulas:**

$$P_{H\text{-}cont} = P_{L\text{-}cont} \times \frac{I_{H\text{-}cont}}{I_{L\text{-}cont}}$$

$P_{1min} = P_{L\text{-}cont}$ x 1.1 (Low overload)

$P_{1min} = P_{H\text{-}cont}$ x 1.5 (High overload)

$$P_{L\text{-}cont} \times \frac{U_x}{400\ V}$$

525 - 690 VAC FRONT-END MODULES

Type	Unit		Low overload (AC current)		High overload (AC current)		DC Power *
	Code	Frame	$I_{L\text{-}cont}$ [A]	I_{1min} [A]	$I_{H\text{-}cont}$ [A]	I_{1min} [A]	690 V mains $P_{L\text{-}cont}$ (kW)
AFE	1 x NXA_0170 6 A0T02SF	1 x FI9	170	187	144	216	198
	1 x NXA_0325 6 A0T02SF	1 x FI10	325	358	261	392	378
	2 x NXA_0325 6 A0T02SF	2 x FI10	634	698	509	764	716
	1 x NXA_1030 6 A0T02SF	1 x FI13	1030	1133	920	1380	1195
	2 x NXA_1030 6 A0T02SF	2 x FI13	2008	2209	1794	2691	2270
	3 x NXA_1030 6 A0T02SF	3 x FI13	2987	3286	2668	4002	3405
	4 x NXA_1030 6 A0T02SF	4 x FI13	3965	4362	3542	5313	4538
NFE	1 x NXN_0650 6X0T0SSV	1 x FI9	650	715	507	793	708
	2 x NXN_0650 6X0T0SSV	2 x FI9	1235	1359	963	1507	1345
	3 x NXN_0650 6X0T0SSV	3 x FI9	1853	2038	1445	2260	2018
	4 x NXN_0650 6X0T0SSV	4 x FI9	2470	2717	1927	3013	2690
	5 x NXN_0650 6X0T0SSV	5 x FI9	3088	3396	2408	3767	3363
	6 x NXN_0650 6X0T0SSV	6 x FI9	3705	4076	2890	4520	4036

*** In case you need to recalculate the power, please use the following formulas:**

$$P_{H\text{-}cont} = P_{L\text{-}cont} \times \frac{I_{H\text{-}cont}}{I_{L\text{-}cont}}$$

$P_{1min} = P_{L\text{-}cont}$ x 1.1 (Low overload)

$P_{1min} = P_{H\text{-}cont}$ x 1.5 (High overload)

$$P_{L\text{-}cont} \times \frac{U_x}{690\ V}$$

DIMENSIONS & WEIGHTS

Type	Frame	H (mm)	W (mm)	D (mm)	Weight (kg)
Power Module	FR4	292	128	190	5
	FR6	519	195	237	16
	FR7	591	237	257	29
	FR8	758	289	344	48
	FI9	1030	239	372	67
	FI10	1032	239	552	100
	FI12	1032	478	552	204
	FI13	1032	708	553	306
	FI14*	1032	2*708	553	612

*** only as inverter unit**

Type	Suitability	H (mm)	W (mm)	D (mm)	Weight (kg) 500 / 690 V
LCL-filter	AFE FI9	1775	291	515	241 / 245 *
	AFE FI10	1775	291	515	263 / 304 *
	AFE FI13	1442	494	525	477 / 473 *
AC-Choke	NFE	449	497	249	130

*** weight is different for 500 / 690 V versions, other dimensions are identical for both voltage classes**

380-500 VAC BRAKE-CHOPPER MODULES

Type	Unit		Braking current	Min. Braking resistor (Per resistor)		Continuous braking power	
	Code	Frame	$I_{L\text{-}cont}$* [A]	540 VDC [Ω]	675 VDC [Ω]	540 VDC [kW]	675 VDC P [kW]
BCU	NXB_0004 5 A2T08SS	FR4	8	159.30	199.13	5	6
	NXB_0009 5 A2T08SS	FR4	18	70.80	88.50	11	14
	NXB_0012 5 A2T08SS	FR4	24	53.10	66.38	15	19
	NXB_0016 5 A2T08SS	FR6	32	39.83	49.78	20	25
	NXB_0022 5 A2T08SS	FR6	44	28.96	36.20	28	35
	NXB_0031 5 A2T08SS	FR6	62	20.55	25.69	40	49
	NXB_0038 5 A2T08SS	FR6	76	16.77	20.96	48	61
	NXB_0045 5 A2T08SS	FR6	90	14.16	17.70	57	72
	NXB_0061 5 A2T08SS	FR7	122	10.45	13.06	78	97
	NXB_0072 5 A2T08SS	FR7	148	8.61	10.76	94	118
	NXB_0087 5 A2T08SS	FR7	174	7.32	9.16	111	139
	NXB_0105 5 A2T08SS	FR7	210	6.07	7.59	134	167
	NXB_0140 5 A0T08SS	FR8	280	4.55	5.69	178	223
	NXB_0168 5 A0T08SF	FI9	336	3.79	4.74	214	268
	NXB_0205 5 A0T08SF	FI9	410	3.11	3.89	261	327
	NXB_0261 5 A0T08SF	FI9	522	2.44	3.05	333	416
	NXB_0300 5 A0T08SF	FI9	600	2.12	2.66	382	478
	NXB_0385 5 A0T08SF	FI10	770	1.66	2.07	491	613
	NXB_0460 5 A0T08SF	FI10	920	1.39	1.73	586	733
	NXB_0520 5 A0T08SF	FI10	1040	1.23	1.53	663	828
	NXB_1150 5 A0T08SF	FI13	2300	0.55	0.69	1466	1832
	NXB_1300 5 A0T08SF	FI13	2600	0.49	0.61	1657	2071
	NXB_1450 5 A0T08SF	FI13	2900	0.44	0.55	1848	2310

525 - 690 VAC BRAKE CHOPPER MODULES

Type	Unit		Braking current	Min. Braking resistor (Per resistor)		Continuous braking power	
	Code	Frame	$I_{L\text{-}cont}$* [A]	708 VDC [Ω]	931 VDC [Ω]	708 VDC P [kW]	931 VDC P [kW]
BCU	NXB_0004 6 A2T08SS	FR6	8	238.36	274.65	6.7	9
	NXB_0005 6 A2T08SS	FR6	10	190.69	219.72	8	11
	NXB_0007 6 A2T08SS	FR6	14	136.21	156.94	12	15
	NXB_0010 6 A2T08SS	FR6	20	95.34	109.86	17	22
	NXB_0013 6 A2T08SS	FR6	26	73.34	84.51	22	29
	NXB_0018 6 A2T08SS	FR6	36	52.97	61.03	30	40
	NXB_0022 6 A2T08SS	FR6	44	43.34	49.94	37	48
	NXB_0027 6 A2T08SS	FR6	54	35.31	40.69	45	59
	NXB_0034 6 A2T08SS	FR6	68	28.04	32.31	57	75
	NXB_0041 6 A2T08SS	FR7	82	23.25	26.79	69	90
	NXB_0052 6 A2T08SS	FR7	104	18.34	21.13	87	114
	NXB_0062 6 A0T08SS	FR8	124	15.38	17.72	104	136
	NXB_0080 6 A0T08SS	FR8	160	11.92	13.73	134	176
	NXB_0100 6 A0T08SS	FR8	200	9.53	10.99	167	220
	NXB_0125 6 A0T08SF	FI9	250	7.63	8.79	209	275
	NXB_0144 6 A0T08SF	FI9	288	6.62	7.63	241	316
	NXB_0170 6 A0T08SF	FI9	340	5.61	6.46	284	374
	NXB_0208 6 A0T08SF	FI9	416	4.58	5.28	348	457
	NXB_0261 6 A0T08SF	FI10	522	3.65	4.21	436	573
	NXB_0325 6 A0T08SF	FI10	650	2.93	3.38	543	714
	NXB_0385 6 A0T08SF	FI10	770	2.48	2.85	643	846
	NXB_0416 6 A0T08SF	FI10	832	2.29	2.64	695	914
	NXB_0920 6 A0T08SF	FI13	1840	1.04	1.19	1537	2021
	NXB_1030 6 A0T08SF	FI13	2060	0.93	1.07	1721	2263
	NXB_1180 6 A0T08SF	FI13	2360	0.81	0.93	1972	2593

* total braking current

TECHNICAL DATA

Supply connection	Input voltage U_{in} (AC) Front-end modules	380-500 VAC / 525-690 VAC -10%...+10%
	Input voltage U_{in} (DC) Inverter and brake chopper modules	465...800 VDC / 640...1100 VDC. The voltage ripple of the inverter supply voltage, formed in rectification of the electric network's alternating voltage in basic frequency, must be less than 50 V peak-to-peak
	Output voltage U_{out} (AC) Inverter	3~ 0...U_{in} / 1.4
	Output voltage U_{out} (DC) Active front-end module	1.10 x 1.35 x U_{in} (Factory default)
	Output voltage U_{out} (DC) non-regenerative front-end module	1.35 x U_{in}
Control characteristics	Control performance	Open loop vector control (5-150% of base speed): speed control 0.5%, dynamic 0.3%sec, torque lin. <2%, torque rise time ~5 ms Closed loop vector control (entire speed range): speed control 0.01%, dynamic 0.2% sec, torque lin. <2%, torque rise time ~2 ms
	Switching frequency	NX_5: 1...16 kHz; Factory default 10 kHz From NX_0072: 1...6 kHz; Factory default 3.6 kHz NX_6: 1...6 kHz; Factory default 1.5 kHz
	Field weakening point	8...320 Hz
	Acceleration time	0...3000 sec
	Deceleration time	0...3000 sec
	Braking	DC brake: 30% of T_N (without brake resistor), flux braking
Ambient conditions	Ambient operating temperature	–10°C (no frost)...+40°C: I_H –10°C (no frost)...+40°C: I_L 1.5% derating for each 1°C above 40°C Max. ambient temperature +50°C
	Storage temperature	–40°C...+70°C
	Relative humidity	0 to 95% RH, non-condensing, non-corrosive, no dripping water
	Air quality: - chemical vapours - mechanical particles	IEC 60721-3-3, unit in operation, class 3C3 (tested in accordance with IEC60068-2-60, Method I, H_2S and SO_2) IEC 60721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity (no derating) up to 1000 m 1.5% derating for each 100 m above 1000 m Max. altitudes: NX_5: 3000 m; NX_6: 2000 m
	Vibration EN50178/EN60068-2-6	FR4 - FR8: Displacement amplitude 1 mm (peak) at 5...15.8 Hz Max acceleration 1 G at 15.8...150 Hz
		FI9 - FI13: Displacement amplitude 0.25 mm (peak) at 5...31 Hz Max acceleration 1 G at 31...150 Hz
	Shock EN50178, EN60068-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Cooling capacity required	approximately 2%
	Cooling air required	FR4 70 m^3/h, FR6 425 m^3/h, FR7 425 m^3/h, FR8 650 m^3/h FI9 1150 m^3/h, FI10 1400 m^3/h, FI12 2800 m^3/h, FI13 4200 m^3/h
	Unit enclosure class	FR8, FI9 - 14 (IP00); FR4 - 7 (IP21)
EMC (at default settings)	Immunity	Fulfils all EMC immunity requirements, level T
Safety		CE, UL, CUL, EN 61800-5-1 (2003), see unit nameplate for more detailed approvals
Functional safety *	STO	EN/IEC 61800-5-2 Safe Torque Off (STO) SIL2, EN ISO 13849-1 PL"d" Category 3, EN 62061: SILCL2, IEC 61508: SIL2.
	SS1	EN /IEC 61800-5-2 Safe Stop 1 (SS1) SIL2, EN ISO 13849-1 PL"d" Category 3, EN /IEC62061: SILCL2, IEC 61508: SIL2.
	ATEX Thermistor input	94/9/EC, CE 0537 Ex 11 (2) GD
Control connections	Analogue input voltage	0...+10 V, R_i = 200 kΩ, (–10 V...+10 V joystick control) Resolution 0.1%, accuracy ±1%
	Analogue input current	0(4)...20 mA, R_i = 250 Ω differential
	Digital inputs	6, positive or negative logic; 18...30 VDC
	Auxiliary voltage	+24 V, ±15%, max. 250 mA
	Output reference voltage	+10 V, +3%, max. load 10 mA
	Analogue output	0(4)...20 mA; R_L max. 500 Ω; resolution 10 bits Accuracy ±2%
	Digital outputs	Open collector output, 50 mA / 48 V
	Relay outputs	2 programmable change-over relay outputs Switching capacity: 24 VDC / 8 A, 250 VAC / 8 A, 125 VDC / 0.4 A Min. switching load: 5 V / 10 mA
Protections	Overvoltage protection	NX_5: 911 VDC; NX_6: 1200 VDC
	Undervoltage protection	NX_5: 333 VDC; NX_6: 460 VDC
	Earth fault protection	Yes
	Motor phase supervision	Trips if any of the output phases is missing
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
	Short-circuit protection of +24 V and +10 V reference voltages	Yes

* with OPT-AF board

Standard features						INU			AFE	NFE	BCU		
						NXI AAAA V			NXA AAAA V	NXN AAAA V	NXB AAAA V		
						FR4, 6, 7	FR8	FI9 - FI14	FI9 - FI13	FI9	FR4, 6, 7	FR8	FI9 - FI13
IP00							●	●	●	●		●	●
IP21						●					●		
IP54						o					o		
Air cooling						●	●	●	●	●	●	●	●
Standard board						●	●	●	●		●	●	●
Varnished board										●			
Alphanumeric keypad						●	●	●	●		●	●	●
EMC class T (EN 61800-3 for IT networks)						●	●	●	●	●	●	●	●
Safety CE / UL						●	●	●	●	●	●	●	●
Line reactor, external (required)										o			
LCL filter, external (required)									o				
No integrated charging								●	●				●
Integrated charging (DC side)						●	●			●	●	●	
Diode/thyristor rectifier										●			
IGBT						●	●	●	●		●	●	●
Basic I/O	Card slot												
	A	B	C	D	E	Number of I/O channels							
OPT-A1 Binary input (24 VDC)						6	6	6	6	n/a	6	6	6
OPT-A1 Binary output (24 VDC)						1	1	1	1	n/a	1	1	1
OPT-A1 Analog input						2	2	2	2	n/a	2	2	2
OPT-A1 Analog output						1	1	1	1	n/a	1	1	1
OPT-D7 Voltage measurement						-	-	-	z	n/a	-	-	-
OPT-A2 Relay output (NO/NC)						2	2	2	2	2 (NO)	2	2	2
Options													
Optional I/O cards													
OPT-A3 Relay output + Thermistor input						o	o	o	o	n/a	o	o	o
OPT-A4 Encoder TTL type						o	o	o	-	n/a	-	-	-
OPT-A5 Encoder HTL type						o	o	o	-	n/a	-	-	-
OPT-A7 Double encoder HTL type						o	o	o	-	n/a	-	-	-
OPT-A8 I/O as OPT-A1 (galvanic isolation)						o	o	o	o	n/a	o	o	o
OPT-A9 I/O as OPT-A1 (2.5 mm^2 terminals)						o	o	o	o	n/a	o	o	o
OPT-AE Encoder HTL type (Divider + direction)						o	o	o	-	n/a	-	-	-
OPT-AK (Sine/Cos/Marker)						o	o	o	o	n/a	-	-	-
OPT-AF						o	o	o	-	n/a	-	-	-
I/O expander cards (OPT-B)													
OPT-B1 Selectable I/O						o	o	o	o	n/a	o	o	o
OPT-B2 Relay output						o	o	o	o	n/a	o	o	o
OPT-B4 Analog input/output						o	o	o	o	n/a	o	o	o
OPT-B5 Relay output						o	o	o	o	n/a	o	o	o
OPT-B8 PT100						o	o	o	o	n/a	o	o	o
OPT-B9 Binary input + RO						o	o	o	o	n/a	o	o	o
OPT-BH (3xpt1000, 3xNi1000, 3xKTY84)						o	o	o	o	n/a	o	o	o
OPT-BB + EnDat + Sin/Cos 1 Vp-p						o	o	o	-	n/a	-	-	-
OPT-BC Encoder out = Resolver simulation						o	o	o	-	n/a	-	-	-
Fieldbus cards (OPT-C)													
OPT-C2 RS-485 (Multiprotocol)						o	o	o	o	n/a	o	o	o
OPT-C3 Profibus DP						o	o	o	o	n/a	o	o	o
OPT-C4 LonWorks						o	o	o	o	n/a	o	o	o
OPT-C5 Profibus DP (D9-type connector)						o	o	o	o	n/a	o	o	o
OPT-C6 CANopen (slave)						o	o	o	o	n/a	o	o	o
OPT-C7 DeviceNet						o	o	o	o	n/a	o	o	o
OPT-C8 RS-485 (Multiprotocol, D9-type connector)						o	o	o	o	n/a	o	o	o
OPT-CG SELMA 2 protocol (SAMI)						o	o	o	o	n/a	o	o	o
OPT-CI Modbus / TCP (Ethernet)						o	o	o	o	n/a	o	o	o
OPT-CP Profinet I/O (Ethernet)						o	o	o	o	n/a	o	o	o
OPT-CQ Ethernet I/P (Ethernet)						o	o	o	o	n/a	o	o	o
Communication cards (OPT-D)													
OPT-D1 System Bus adapter (2 x fiber optic pairs)						o	o	o	o	n/a	o	o	o
OPT-D2 System Bus adapter (1 x fiber optic pair) & CAN-bus adapter (galvanically decoupled)						o	o	o	o	n/a	o	o	o
OPT-D3 RS232 adapter card (galvanically decoupled), used mainly for application engineering to connect another keypad						o	o	o	o	n/a	o	o	o
OPT-D6 CAN-bus adapter (galvanically decoupled)						o	o	o	o	n/a	o	o	o
OPT-D7 Voltage measurement card						o	o	o	o	n/a	-	-	-

● = included o = optional

TYPE CODE KEYS

VACON NX INVERTER

NX	I	AAAA	V	A	2	T	0	C	S	S	A1 A2 00 00 00

NX — **Product generation**

I — **Module type**
I = INU Inverter

AAAA — **Nominal current** (low overload)
eg. 0004 =4 A, 0520 = 520 A, etc.

V — **Nominal supply voltage**
5 = 380-500 VAC / 465-800 VDC
6= 525-690 VAC / 640-1100 VDC

A — **Control keypad**
A=standard (alpha numeric)

2 — **Enclosure class**
5 = IP54, FR4-7 **2** = IP21, FR4-7
0 = IP00, FR8, FI9-14

T — **EMC emission level**
T = IT networks (EN61800-3)

0 — **0** = N/A (no brake chopper)

C — **C** = INU - with integrated charging circuit, FR4-FR8
I = INU - no charging circuit, FI9-FI14

S — **S** = Standard air cooled drive
U = Standard air cooled power unit external supply for main fan (FR8 - FI14)

S — **Hardware modifications; module type - S Boards**
S = Direct connection, standard boards, FR4-8
V = Direct connection, varnished boards, FR4-8
F = Fiber connection, standard boards, FI9-FI14
G = Fiber connection, varnished boards, FI9-FI14
If OPT-AF option board is used
N = IP54 control box, fiber connection, standard boards, FI9-FI14
O = IP54 control box, fiber connection, varnished boards, FI9-FI14

A1 A2 00 00 00 — **Option boards; each slot is represented by two characters:**
A = Basic I/O board **B** = Expander I/O board
C = Fieldbus board **D** = Special board

VACON NX ACTIVE FRONT-END

NX	A	AAAA	V	A	0	T	0	2	S	F	A1 A2 00 00 00

NX — **Product generation**

A — **Module type**
A = AFE Active Front-End

AAAA — **Nominal current** (low overload)
eg. 0261 = 261 A, 1030 = 1030 A, etc.

V — **Nominal supply voltage**
5 = 380-500 VAC / 465-800 VDC
6 = 525-690 VAC / 640-1100 VDC

A — **Control keypad**
A = standard (alpha numeric)

0 — **Enclosure class**
0 =IP00, FI9-13

T — **EMC emission level**
T = IT networks (EN61800-3)

0 — **Internal brake chopper**
0 = N/A (no brake chopper)

2 — **Delivery include**
2 = AFE module

S — **S** = Standard air cooled drive
U = Standard air cooled power unit - external supply for main fan

F — **Hardware modifications; module type - S Boards**
F = Fiber connection, standard boards, FI9-FI13
G = Fiber connection, varnished boards, FI9-FI13

A1 A2 00 00 00 — **Option boards; each slot is represented by two characters:**
A = Basic I/O board **B** = Expander I/O board
C = Fieldbus board **D** = Special board

VACON LCL FILTERS FOR AFE

VACON	LCL	AAAA	V	A	0	R	0	1	1	T

LCL — **Product range**
LCL = LCL filter for AFE

AAAA — **Nominal current**
0261 5
0460 5
1300 5
0170 6
0325 6
1030 6
eg. 0460 = 460 A, 1300 = 1300 A

V — **Voltage Class**
5 = 380-500 VAC
6 = 525-690 VAC

A — **Version** (hardware)
A = DC fan without DC/DC power supply
B = DC fan with integrated DC/DC power supply

0 — **Enclosure class:**
0 =IP00

R — **Reserve**

0 — **Reserve**

1 — **Reserve**

1 — **Cooling fan type**
1 = DC fan

T — **Manufacturer**
T = Trafotek

VACON NX NON-REGENERATIVE FRONT-END

NX	N	0650	6	X	0	T	0	S	S	V	00 00 00 00 00

NX — **Product generation**

N — **Module type**
N = NFE Non-Regenerative Front-End

0650 — **Nominal current** (low overload)
eg. 0650 = 650 A only

6 — **Nominal supply voltage**
6 = 380-690 VAC / 513-931 VDC

X — **Control keypad**
X = standard (alpha numeric)

0 — **Enclosure class**
0 =IP00, FI9

T — **EMC emission level**
T = IT networks (EN61800-3)

0 — **Internal brake chopper**
0 = N/A (no brake chopper)

S — **Delivery include**
N = NFE module **S** = NFE module + AC choke

S — **S** = Standard air cooled drive
U = Standard air cooled power unit - external supply for main fan

V — **Hardware modifications; module type - S Boards**
V = Direct connection, varnished boards

00 00 00 00 00 — **Option boards; each slot is represented by two characters:**
No option board possible

VACON NX BRAKE CHOPPER UNIT

NX	B	AAAA	V	A	2	T	0	8	S	S	A1 A2 00 00 00

NX — **Product generation**

B — **Module type**
B = BCU Brake Chopper Unit

AAAA — **Nominal current** (low overload)
eg. 0004 = 4 A, 0520 = 520 A, etc.

V — **Nominal supply voltage**
5 = 380-500 VAC / 465-800 VDC
6 = 525-690 VAC / 640-1100 VDC

A — **Control keypad**
A = standard (alpha numeric)

2 — **Enclosure class**
5 = IP54, FR4...7 **2** = IP21, FR4-7
0 =IP00, FR8, FI9-13

T — **EMC emission level**
T = IT networks (EN61800-3)

0 — **0** = N/A (no brake chopper)

8 — **8** = BCU - with integrated charging circuit. FR4-FR8

S — **S** = Standard air cooled drive
U = Standard air cooled power unit - external supply for main fan

S — **Hardware modifications; module type - S Boards**
S = Direct connection, standard boards, FR4-8
V = Direct connection, varnished boards, FR4-8
F = Fiber connection, standard boards, FI9-FI13
G = Fiber connection, varnished boards, FI9-FI13

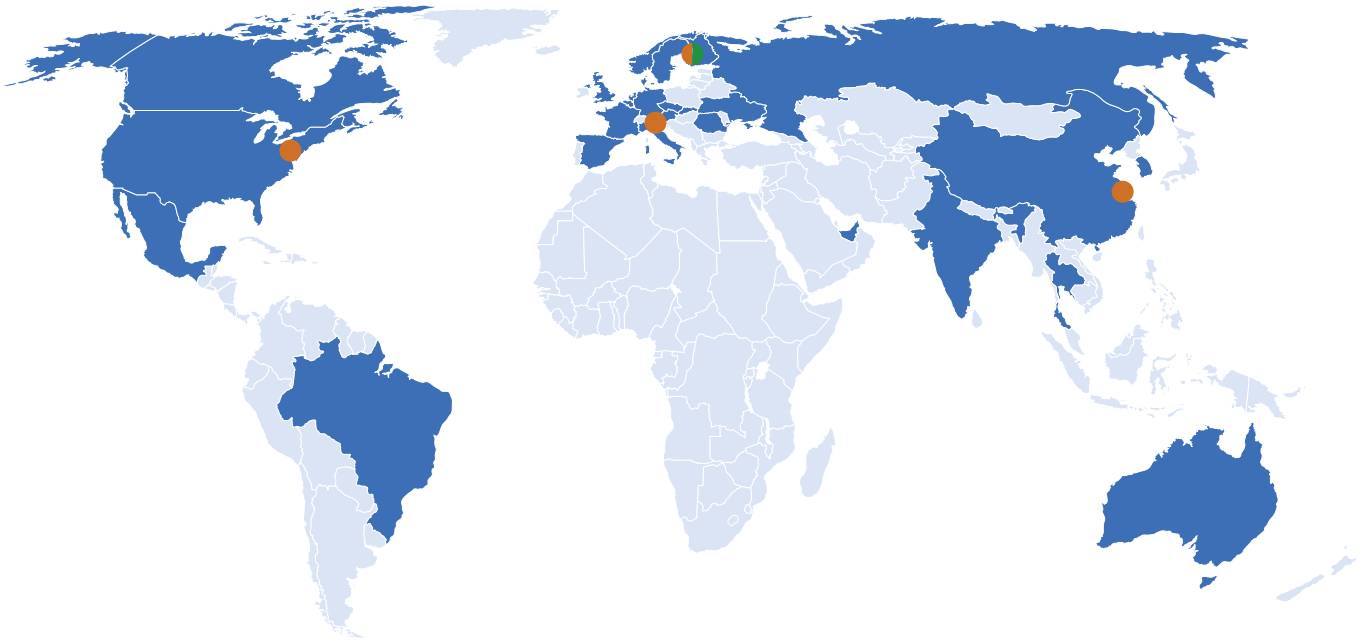
A1 A2 00 00 00 — **Option boards; each slot is represented by two characters:**
A = Basic I/O board **B** = Expander I/O board
C = Fieldbus board **D** = Special board

NOTES

VACON AT YOUR SERVICE

Vacon is driven by a passion to develop, manufacture and sell the best AC drives and inverters in the world — and to provide efficient life-cycle services for its customers. Our AC drives offer optimum process control and energy efficiency for electric motors. Vacon inverters are a key component in producing energy from renewable sources. We have R&D and production units in Finland, the USA, China and Italy, and sales & service offices in 27 countries. In 2011, Vacon had revenues of EUR 380.9 million and globally employed 1,500 people. The shares of Vacon Plc (VAC1V) are quoted on the main list of the Helsinki stock exchange.

VACON — TRULY GLOBAL



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MANUFACTURING
and R&D on 3 continents

VACON SALES
and services in 27 countries

SERVICE CENTERS
in 52 countries (including partners)

VACON
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