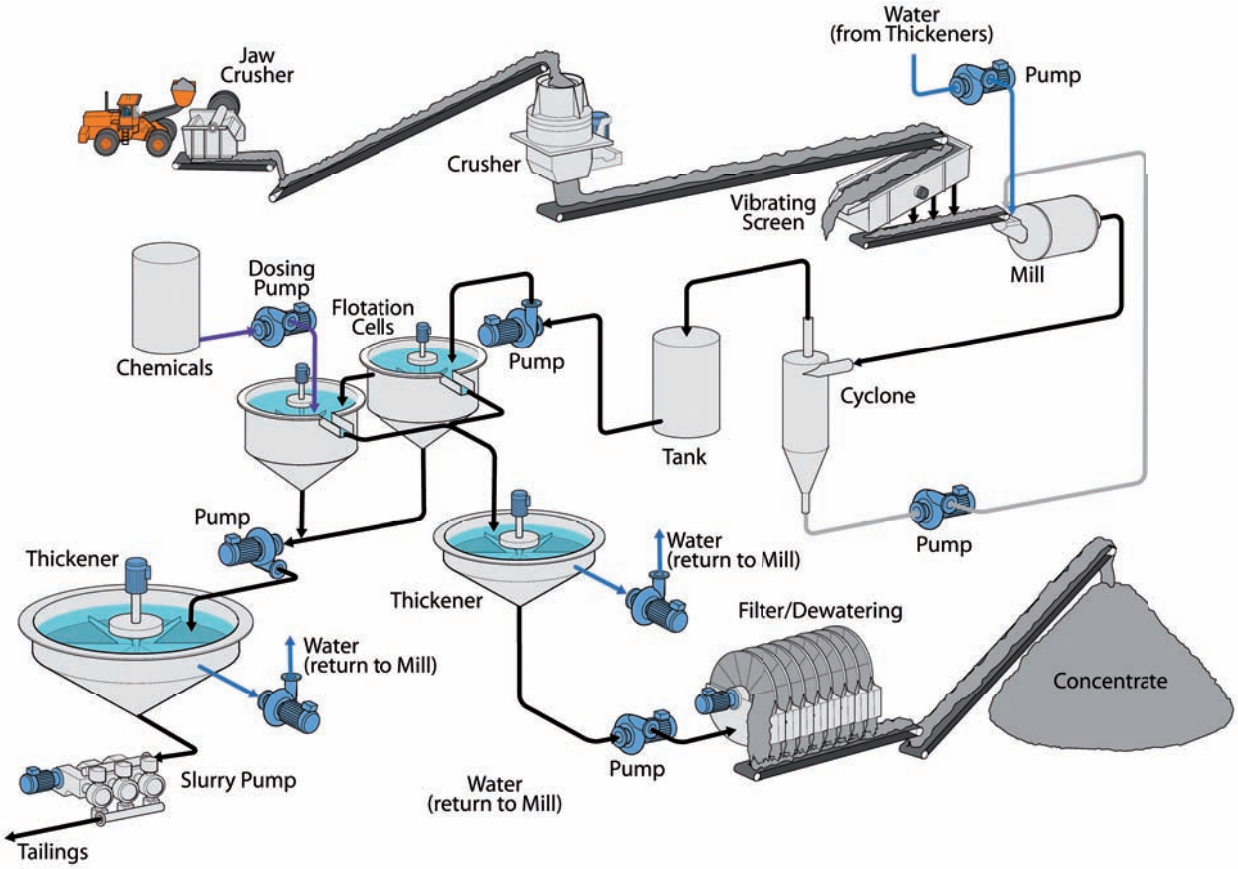
VACON AC DRIVES FOR MINING & MINERALS

VACON

DRIVEN BY DRIVES

VACON AC DRIVES BOOST PROCESS PERFORMANCE



All processes must be controlled in order to optimize their performance under varying input conditions and with varying demand. The best way to achieve this is to control the speed of the motor driving the process.

In the field of mining and minerals handling the following applications are suitable for speed control:

- Conveyors
- Ventilation
- Pumps
- Flotation cells
- Fans / blowers / compressors
- Wash down plants
- Fresh and waste water applications
- Vertical and horizontal movement
- Crushers
- Ball mills
- Tunnel boring / drilling
- Acid generating and pumping
- Agitators

The use of speed control not only improves process control – it also saves energy and reduces the wear on the equipment, thus reducing maintenance needs. Vacon AC drives can also supervise the driven machine and give indications if load characteristics change over time.

Ventilation

In ventilation, electric drives offer the possibility for the stepless control of the air flow in different areas – depending on the number of vehicles present or on exhaust gases that result from blasting. In a typical fan application the energy saved in running the process can amount to 50 % compared to systems that use damper valves - depending on the amount of air required over time.

Pumping

Pumps should also always be speed controlled as the energy savings can be substantial (because the pumps are rarely run at their rated speed). Increasing the rated speed of dewatering pumps - for example from 50 to 60 Hz - decreases their diameter and hence the hole that needs to be drilled decreases as well, making it faster and cheaper to drill the hole.

Conveyors

The controlled torque available at machine start -up when using with AC drives appreciably reduces the mechanical strain on the power transmission components. The torque can be limited to a desired value, reducing the risk of belt slip and gearbox failure. The controlled acceleration ramp also reduces the strain of the starting system. If more power is required, for redundancy or due to space consideration, it is easy to have multiple drives running multiple motors on the same load. Coordinating the drives at the head and the tail is also easily done. In downhill conveyors the use of active front end drives (AFEs) feeds the braking energy back into the mains, giving you a free source of the energy. Reducing the speed of the conveyor also saves on maintenance – a 20 % reduction in speed can more than double the maintenance interval.

Mills

The speed of mills can be changed according to the material being ground and to the time it has spent inside, thus optimizing the energy usage of the mill. The controlled torque during start-up also means that it is possible to detect material that has stuck to the bottom of a stopped mill and to proceed loosen it, reducing the risk of its mechanical failure. The possibility to change speeds also makes the process start-up faster, ensuring the correct grinding size is reached quicker.

Fewer generators needed

By using AFEs the harmonic distortion on the grid can be eliminated, reducing the thermal stress on transformers and generators. The non-existing starting stress also means that fewer generators are needed. The use of AC drives also optimizes fuel consumption for diesel generators, as no reactive power is required.

The choice of motor

Normally the manufacturer of a machine has chosen a motor that is sufficient for the duty expected of it. The choice of drive is based on the voltage and current of the motor as well as the required overload. The I_h current of the drive has to be equal to or greater than the rated current of the motor.

Large-size (over 2 MW) motors can be built using several sets of windings that have a zero-degree phase shift. These sets require galvanic isolation so that each winding must have a separate AC drive. The drive topology can consist of 1, 2, 3 or 4 drives running the same motor, sharing the same load. There are redundancy benefits as the motor can be partially loaded with one or several drives disconnected, as well. Permanent-magnet motors are about to penetrate the motor market and Vacon has proven technology for these applications as well.

The choice of drive

Once the motor has been chosen the drive can be selected. If the application requires overloadability (for conveyers, mills, crushers etc.), the drive is selected so that its I_h current is greater or equal to the motor rated current. If the load characteristics are such that no overload is possible (pumps, fans, compressors) a selection based on the I_i current can be done. For high ambient temperatures and work at high altitudes derating factors apply.

THE DYNAMIC CHOICE

The Vacon NX range is a state-of-art AC drive for use in all applications where reliability, dynamic performance, precision and power are required.

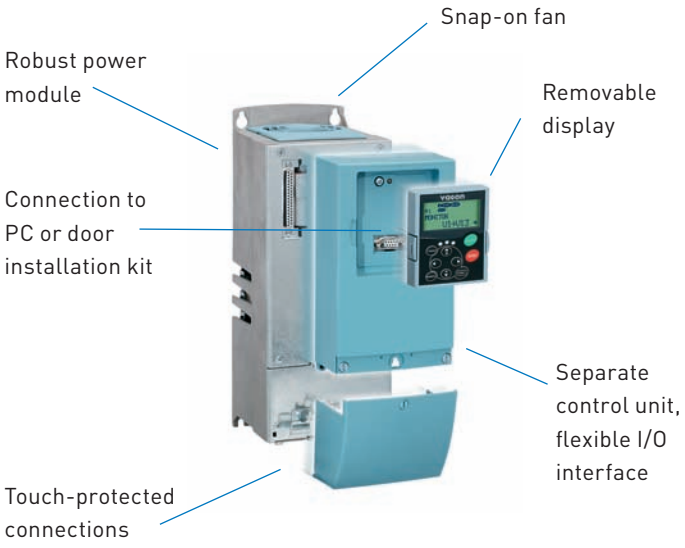
The quality and reliability of a machine or process is, in most cases, the result of the precise, dynamic control of AC motors. The Vacon NX range has been designed to provide the best possible control under all circumstances, ensuring high operational quality and availability for the entire lifetime of a system.

A forerunner in designing and manufacturing AC drives, Vacon has developed innovative solutions and leading-edge technology for demanding applications and high power ranges.

By bringing these solutions to customers, the Vacon NX range opens up new opportunities and helps them create the best and most highly innovative products, which are capable of achieving the most challenging targets.

Features

- Full power and voltage range
- High number of options
- Wide set of applications can adapt the Vacon NX range to virtually any need
- Controls induction and permanent magnet motors
- Dynamic open and closed loop vector control
- Complete range of communications and I/O options
- Fast drive-to-drive communication



VACON NXS AND NXP FR4-FR9

OUTSTANDING FLEXIBILITY

The Vacon NX range offers, in addition to its control characteristics, a wide choice of products and cabinets for the varying needs of the high-power range.

Three models are available to meet various customer needs:

- Vacon NX IP21/IP54 wall-mounted or standalone drives for installation wherever there is space available
- Vacon NXP high-power IP00 drive modules for installation in a customer's cabinet
- Vacon NXC IP21/IP54 robust cabinet drive with maximum flexibility and a wide range of options

VACON NXP
DRIVE MODULES

VACON NXS AND NXP
STANDALONE DRIVES

VACON NXC
CABINET DRIVES

STRONG EXPERIENCE IN MINING & MINERALS

Total plant automation, improved control, reliability and the ability to save energy are the requirements behind the Vacon AC drives products for mining and material handling. We are passionate about the AC drive industry and dedicated to our work. Our products and services are targeted towards people who do not settle for conventional solutions and appreciate the benefit offered by AC drives. Our offering ranges from 0.25 kW to 5 MW at voltages up to 690 V.

Vacon's strong experience – Mining & Minerals

The smooth control of various processes requires the use of AC drives in the highly competitive mining and mineral processing sector. For years, Vacon has been establishing strong partnerships with leading system integrators in the field. The Vacon AC drives range is robustly designed in order to handle the demanding environment and its requirements. We can offer solutions for all your applications, from simple ventilation to the most demanding load sharing in high-power conveyor and mill systems. Vacon's long and extensive experience of AC drives guarantees that you will get your desired results and much more.

Speed control benefits

The use of AC drives to control the speed of the motor driving your process gives you several benefits:

- The start-up is without mechanical strain, reducing the strain on the gearboxes and other power transmission equipment.
- The start-up occurs without electrical strain, allowing you to start your motors on weak grids without risk of voltage dips or the need to start additional generators.
- The control over the process is also improved, as controlling the speed of the motors is often the best way to achieve process control.
- Energy is saved compared to other control schemes, for pumps and fans the energy savings can be up to 50 %, depending on the drive train sizing and the actual demand.
- The use of AC drives with large motors optimizes the diesel fuel use.

MEETING YOUR REQUIREMENTS

The requirements in mining and mineral processing arise from the harsh ambient conditions on most sites. In many cases the supply network of the site is weak, either because of long transmission distances or because of local diesel generators. For the latter the use of Vacon AC drives helps to save fuel and reduce the number of generators that have to be run. Thousands of Vacon AC drives from 0.25 kW to 5 MW are operating equipment from dosing pumps to complex mill drives within an variety of different mining and minerals processes. And all of them are built to last.

Quality and reliability

- Unique modularity and robust construction
- Each drive tested at maximum temperature and at full motor load prior to shipment
- All drives made of high-quality components for a long lifetime
- Varnished PCBs available as an option for better protection in harsh environments
- Comprehensive run-time self-supervision and alarm system for enhanced reliability and safety
- Motor flux optimization for reduced energy consumption during low-load hours
- Load monitoring (overload, underload)
- Wide range of special application software available, e.g.
  - Integrated PID
  - Multiple pump and fan PFC solutions
  - Load sharing solutions for multiple motors
  - Conveyor control and mill control
- Flexibility in communication via multiple optional fieldbuses
- A large selection of I/O cards available for different applications
- Operation of several motors with one drive

Plug and play for easy installation, commissioning and service

- Integrated RFI filters for all environments
- An integrated AC choke for maximum protection and reduced harmonics
- Compact, the IP54 and IP21 are the same dimensions
- Start-up wizard for easy commissioning
- Dedicated preset parameters
- Parameter back up
- Separated power and control for fast service
- Easily changeable cooling fan
- Fault logger with fault time monitoring data
- Versatile PC tools for loading, setting and comparing parameters and calculating energy savings
- Professional worldwide service and support available 24/7
- Active front-end (AFE) drives available for cases where energy can be fed back to the mains (downhill conveyers) or where the harmonic distortion of the supply must be minimized

WALL-MOUNTED VACON NXS & NXP

Mains voltage 380—500 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+50°C)		Maximum current I_S	400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NX_ 0003 5 A 2 H 1 SSS	3.3	3.6	2.2	3.3	4.4	1.1	0.75	FR4	128*292*190/ 5
NX_ 0004 5 A 2 H 1 SSS	4.3	4.7	3.3	5	6.2	1.5	1.1	FR4	128*292*190/ 5
NX_ 0005 5 A 2 H 1 SSS	5.6	6.2	4.3	6.5	8.6	2.2	1.5	FR4	128*292*190/ 5
NX_ 0007 5 A 2 H 1 SSS	7.6	8.4	5.6	8.4	10.8	3	2.2	FR4	128*292*190/ 5
NX_ 0009 5 A 2 H 1 SSS	9	9.9	7.6	11.4	14	4	3	FR4	128*292*190/ 5
NX_ 0012 5 A 2 H 1 SSS	12	13.2	9	13.5	18	5.5	4	FR4	128*292*190/ 5
NX_ 0016 5 A 2 H 1 SSS	16	17.6	12	18	24	7.5	5.5	FR5	144*391*214/ 8.1
NX_ 0022 5 A 2 H 1 SSS	23	25.3	16	24	32	11	7.5	FR5	144*391*214/ 8.1
NX_ 0031 5 A 2 H 1 SSS	31	34	23	35	46	15	11	FR5	144*391*214/ 8.1
NX_ 0038 5 A 2 H 1 SSS	38	42	31	47	62	18.5	15	FR6	195*519*237/ 18.5
NX_ 0045 5 A 2 H 1 SSS	46	51	38	57	76	22	18.5	FR6	195*519*237/ 18.5
NX_ 0061 5 A 2 H 1 SSS	61	67	46	69	92	30	22	FR6	195*519*237/ 18.5
NX_ 0072 5 A 2 H 0 SSS	72	79	61	92	122	37	30	FR7	237*591*257/ 35
NX_ 0087 5 A 2 H 0 SSS	87	96	72	108	144	45	37	FR7	237*591*257/ 35
NX_ 0105 5 A 2 H 0 SSS	105	116	87	131	174	55	45	FR7	237*591*257/ 35
NX_ 0140 5 A 2 H 0 SSS	140	154	105	158	210	75	55	FR8	291*758*344 / 58
NX_ 0168 5 A 2 H 0 SSS	170	187	140	210	280	90	75	FR8	291*758*344 / 58
NX_ 0205 5 A 2 H 0 SSS	205	226	170	255	336	110	90	FR8	291*758*344 / 58
NX_ 0261 5 A 2 H 0 SSF	261	287	205	308	349	132	110	FR9	480*1150*362/ 146
NX_ 0300 5 A 2 H 0 SSF	300	330	245	368	444	160	132	FR9	480*1150*362/ 146

Mains voltage 500—690 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+50°C)		Maximum current I_S	690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NX_ 0004 6 A 2 L 0 SSS	4.5	5	3.2	4.8	6.4	3	2.2	FR6	195*519*237/ 18.5
NX_ 0005 6 A 2 L 0SSS	5.5	6.1	4.5	6.8	9.0	4	3	FR6	195*519*237/ 18.5
NX_ 0007 6 A 2 L 0 SSS	7.5	8.3	5.5	8.3	11	5.5	4	FR6	195*519*237/ 18.5
NX_ 0010 6 A 2 L 0 SSS	10	11	7.5	11.3	15	7.5	5.5	FR6	195*519*237/ 18.5
NX_ 0013 6 A 2 L 0 SSS	13.5	14.9	10	15	20	11	7.5	FR6	195*519*237/ 18.5
NX_ 0018 6 A 2 L 0 SSS	18	19.8	13.5	20.3	27	15	11	FR6	195*519*237/ 18.5
NX_ 0022 6 A 2 L 0 SSS	22	24.2	18	27	36	18.5	15	FR6	195*519*237/ 18.5
NX_ 0027 6 A 2 L 0 SSS	27	29.7	22	33	44	22	18.5	FR6	195*519*237/ 18.5
NX_ 0034 6 A 2 L 0 SSS	34	37	27	41	54	30	22	FR6	195*519*237/ 18.5
NX_ 0041 6 A 2 L 0 SSS	41	45	34	51	68	37.5	30	FR7	237*591*257/ 35
NX_ 0052 6 A 2 L 0 SSS	52	57	41	62	82	45	37.5	FR7	237*591*257/ 35
NX_ 0062 6 A 2 L 0 SSS	62	68	52	78	104	55	45	FR8	291*758*344 / 58
NX_ 0080 6 A 2 L 0 SSS	80	88	62	93	124	75	55	FR8	291*758*344 / 58
NX_ 0100 6 A 2 L 0 SSS	100	110	80	120	160	90	75	FR8	291*758*344 / 58
NX_ 0125 6 A 2 L 0 SSF	125	138	100	150	200	110	90	FR9	480*1150*362/ 146
NX_ 0144 6 A 2 L 0 SSF	144	158	125	188	213	132	110	FR9	480*1150*362/ 146
NX_ 0170 6 A 2 L 0 SSF	170	187	144	216	245	160	132	FR9	480*1150*362/ 146
NX_ 0208 6 A 2 L 0 SSF	208	229	170	255	289	200	160	FR9	480*1150*362/ 146

High-power Vacon NXS/NXP drives are also available in a compact standalone IP21 or IP54 enclosure. These units are designed for use in applications where the drive has to be compact and easy to install.

The Vacon NXS and NXP standalone drives are fully enclosed at the factory and are ready for immediate installation. The drive has integrated fuses as standard and no extra protection is required by the drive. It is also possible to equip the drive with an optional integrated load switch, which further simplifies handling in the field.

Mains voltage 380—500 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NX_ 0385 5 A 2 L 0 SSA	385	424	300	450	540	200	160	FR10	595*2020*602/ 340
NX_ 0460 5 A 2 L 0 SSA	460	506	385	578	693	250	200	FR10	595*2020*602/ 340
NX_ 0520 5 A 2 L 0 SSA	520	572	460	690	828	250	250	FR10	595*2020*602/ 340
NX_ 0590 5 A 2 L 0 SSA	590	649	520	780	936	315	250	FR11	794*2020*602/ 470
NX_ 0650 5 A 2 L 0 SSA	650	715	590	885	1062	355	315	FR11	794*2020*602/ 470
NX_ 0730 5 A 2 L 0 SSA	730	803	650	975	1170	400	355	FR11	794*2020*602/ 470

Mains voltage 500—690 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NX_ 0261 6 A 2 L 0 SSA	261	287	208	312	375	250	200	FR10	595*2020*602/ 340
NX_ 0325 6 A 2 L 0 SSA	325	358	261	392	470	315	250	FR10	595*2020*602/ 340
NX_ 0385 6 A 2 L 0 SSA	385	424	325	488	585	355	315	FR10	595*2020*602/ 340
NX_ 0416 6 A 2 L 0 SSA#	416	458	325	488	585	400	315	FR10	595*2020*602/ 340
NX_ 0460 6 A 2 L 0 SSA	460	506	385	578	693	450	355	FR11	794*2020*602/ 400
NX_ 0502 6 A 2 L 0 SSA	502	552	460	690	828	500	450	FR11	794*2020*602/ 400
NX_ 0590 6 A 2 L 0 SSA#	590	649	502	753	904	560	500	FR11	794*2020*602/ 470

max. ambient temperature of +35°C

HARDWARE CONFIGURATIONS

FUNCTION	AVAILABILITY
IP21	Standard
IP54 (FR10 only)	Optional
Integrated fuses	Standard
Load switch	Optional
EMC filtering L	Standard
EMC filtering T	Optional
Brake chopper (cabling top entry)	Optional (H: +122 mm)

VACON NXC, COMPACT AND FLEXIBLE

The Vacon NXC cabinet drive is compact and well tested, fully utilizing the flexibility of the Vacon NXP drive. The Vacon NXC is designed to meet the most demanding requirements for flexibility, robustness, compactness and service-friendliness. It is a safe choice for any application.

Easy ordering

The Vacon NXC contains the AC drive itself and optional items such as the main switch, contactor, control options and output filtering in one compact unit that is easy to install and service. Ordering is made easy by integrating the Vacon NXC enclosure options into the typecode, to which they are appended with "+" codes.

User-friendly

In the Vacon NXC, the control unit is mounted in a separate compartment at an easily accessible height together with all control options. Ample space around the power terminals allows easy installation and the connection of power cables. Bottom plates and earthing clamps for the 360-degree earthing of motor cable shields are provided as standard.

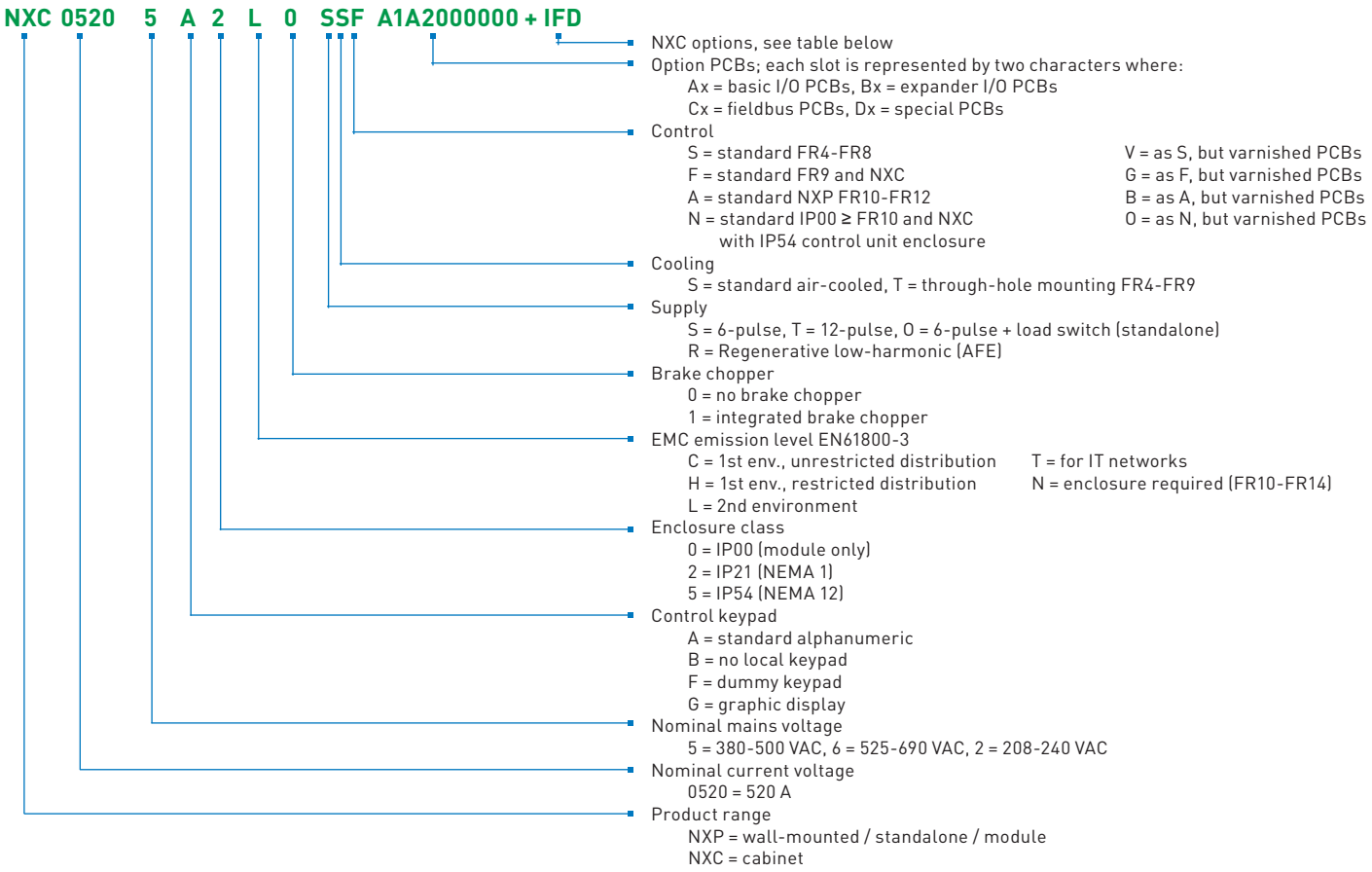
Well tested

Vacon NXC drives are the result of more than 20 years of experience in enclosure design, which has created a well tested and proven solution. The good thermal handling of the enclosure guarantees a long lifetime for the AC drive and trouble-free operation even in the most demanding environments. Approved EMC solutions ensure the reliable operation of the converter without disturbing other electrical equipment.

Service-friendly

The Vacon NXC enclosures are designed to fully utilize the new and innovative installation features of the high-power Vacon NXP. The Vacon NXP power units are mounted on rails that are extendable with a pull-out jig. The jig can be used for pulling the power unit out of the enclosure for service.

VACON NX TYPE DESIGNATION CODE



VACON NXC OPTIONS

Control terminal options (T group)	
+TIO	Basic I/O wired to external single-tier terminals
+TID	Basic I/O wired to external two-tier terminals + additional terminals
+TUP	Terminals for 230 VAC control voltage
Input device options (I group)	
+ILS	Load switch
+IFD	Switch fuse and fuses
+ICB	Circuit breaker (MCCB)
+ICO	Input contactor
+IFU	Input fuses
Main circuit options (M group)	
+MDC	Terminals in cabinet for DC / brake chopper
Output filter options (O group)	
+OCM	Common mode filters
+ODU	du/dt filter
+OSI	Sine wave filter
Protection devices (P group)	
+PTR	External thermistor relay
+PES	Emergency stop (cat 0)
+PED	Emergency stop (cat 1)
+PAP	Arc protection
+PIF	Insulation fault sensor
General options (G group)	
+G40	400 mm empty cabinet
+G60	600 mm empty cabinet
+G80	800 mm empty cabinet
+GPL	100 mm base
+GPH	200 mm base
Cabling options (C group)	
+CIT	Input (mains) cabling from top
+COT	Output (motor) cabling from top

Auxiliary equipment (A group)	
+AMF	Motor fan control
+AMH	Motor heater feeder
+AMB	Mechanical brake control
+AMO	Motor operator for +ICB
+ACH	Cabinet heater
+ACL	Cabinet light
+ACR	Control relay
+AAI	Analogue signal isolator
+AAA	Auxiliary contact (control voltage devices)
+AAC	Auxiliary contact (input device)
+AT1	Auxiliary voltage transformer 200 VA
+AT2	Auxiliary voltage transformer 750 VA
+AT3	Auxiliary voltage transformer 2500 VA
+AT4	Auxiliary voltage transformer 4000 VA
+ADC	Power supply 24 VDC 2.5 A
+ACS	230 VAC customer socket
Door-mounted options (D group)	
+DLV	Pilot light (Control voltage on)
+DLD	Pilot light (DO1)
+DLF	Pilot light (FLT)
+DLR	Pilot light (RUN)
+DCO	Main contactor operation switch
+DRO	Local / Remote operation switch
+DEP	Emergency stop push-button
+DRP	Reset push-button
+DAM	Analogue meter (AO1)
+DAR	Potentiometer for reference
+DCM	Analogue meter + current trafo
+DVM	Analogue voltage meter with selection switch

VACON NXC, 6-PULSE SUPPLY

Mains voltage 380—500 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NXC 0261 5 A 2 H 0 SSF	261	287	205	308	349	132	110	FR9	606*2275*605/ 371
NXC 0300 5 A 2 H 0 SSF	300	330	245	368	444	160	132	FR9	606*2275*605/ 371
NXC 0385 5 A 2 L 0 SSF	385	424	300	450	540	200	160	FR10	606*2275*605/ 371
NXC 0460 5 A 2 L 0 SSF	460	506	385	578	693	250	200	FR10	606*2275*605/ 403
NXC 0520 5 A 2 L 0 SSF	520	572	460	690	828	250	250	FR10	606*2275*605/ 403
NXC 0590 5 A 2 L 0 SSF	590	649	520	780	936	315	250	FR11	806*2275*605/ 577
NXC 0650 5 A 2 L 0 SSF	650	715	590	885	1062	355	315	FR11	806*2275*605/ 577
NXC 0730 5 A 2 L 0 SSF	730	803	650	975	1170	400	355	FR11	806*2275*605 / 577
NXC 0820 5 A 2 L 0 SSF	820	902	730	1095	1314	450	400	FR12	1206*2275*605/ 810
NXC 0920 5 A 2 L 0 SSF	920	1012	820	1230	1476	500	450	FR12	1206*2275*605/ 810
NXC 1030 5 A 2 L 0 SSF	1030	1133	920	1380	1656	560	500	FR12	1206*2275*605/ 810
NXC 1150 5 A 2 L 0 SSF	1150	1265	1030	1545	1854	630	560	FR13	1406*2275*605/ 1000
NXC 1300 5 A 2 L 0 SSF	1300	1430	1150	1725	2070	710	630	FR13	1606*2275*605/ 1100
NXC 1450 5 A 2 L 0 SSF	1450	1595	1300	1950	2340	800	710	FR13	1606*2275*605/ 1100
NXC 1770 5 A 2 L 0 SSF	1770	1947	1600	2400	2880	1000	900	FR14	2806*2275*605/ 2440
NXC 2150 5 A 2 L 0 SSF	2150	2365	1940	2910	3492	1200	1100	FR14	2806*2275*605/ 2500

Mains voltage 500—690 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NXC 0125 6 A 2 L 0 SSF	125	138	100	150	200	110	90	FR9	606*2275*605/ 371
NXC 0144 6 A 2 L 0 SSF	144	158	125	188	213	132	110	FR9	606*2275*605/ 371
NXC 0170 6 A 2 L 0 SSF	170	187	144	216	245	160	132	FR9	606*2275*605/ 371
NXC 0208 6 A 2 L 0 SSF	208	229	170	255	289	200	160	FR9	606*2275*605/ 371
NXC 0261 6 A 2 L 0 SSF	261	287	208	312	375	250	200	FR10	606*2275*605/ 341
NXC 0325 6 A 2 L 0 SSF	325	358	261	392	470	315	250	FR10	606*2275*605/ 371
NXC 0385 6 A 2 L 0 SSF	385	424	325	488	585	355	315	FR10	606*2275*605/ 371
NXC 0416 6 A 2 L 0 SSF#	416	458	325	488	585	400	315	FR10	606*2275*605/ 371
NXC 0460 6 A 2 L 0 SSF	460	506	385	578	693	450	355	FR11	806*2275*605/ 524
NXC 0502 6 A 2 L 0 SSF	502	552	460	690	828	500	450	FR11	806*2275*605/ 524
NXC 0590 6 A 2 L 0 SSF#	590	649	502	753	904	560	500	FR11	806*2275*605/ 577
NXC 0650 6 A 2 L 0 SSF	650	715	590	885	1062	630	560	FR12	1206*2275*605/ 745
NXC 0750 6 A 2 L 0 SSF	750	825	650	975	1170	710	630	FR12	1206*2275*605/ 745
NXC 0820 6 A 2 L 0 SSF#	820	902	650	975	1170	800	630	FR12	1206*2275*605/ 745
NXC 0920 6 A 2 L 0 SSF	920	1012	820	1230	1410	900	800	FR13	1406*2275*605/ 1000
NXC 1030 6 A 2 L 0 SSF	1030	1133	920	1380	1755	1000	900	FR13	1406*2275*605/ 1000
NXC 1180 6 A 2 L 0 SSF#	1180	1298	1030	1463	1755	1150	1000	FR13	1406*2275*605/ 1000
NXC 1500 6 A 2 L 0 SSF	1500	1650	1300	1950	2340	1500	1300	FR14	2406*2275*605/ 2350
NXC 1900 6 A 2 L 0 SSF	1900	2090	1500	2250	2700	1800	1500	FR14	2806*2275*605/ 2440
NXC 2250 6 A 2 L 0 SSF#	2250	2475	1900	2782	3335	2000	1800	FR14	2806*2275*605/ 2500

max. ambient temperature of +35°C

HARDWARE CONFIGURATIONS

6-pulse	Enclosure		EMC			Brake chopper	Cabling		Input device					Output filters		
								Top	Fuses	Load Sw.	Sw.-fuse	Contactor	MCCB	Cmn Mode	du/dt	Sine wave
380-500 V	IP21	IP54	L	T	H		Bottom	+CIT/+COT	+IFU	+ILS	+IFD	+ICO	+ICB	+OCM	+ODU	+OSI
FR9	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600)
FR10	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600)
FR11	S	O (H: +130)*	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600)
FR12	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +1200)
FR13	S	O (H: +170)	S	O	-	1)	S	O (W: +400)	-	-	S	-	O	O	O	O(W: +800)
FR14	S	O (H: +170)	S	O	-	1)	S	O (W: +600)	-	-	-	-	S	O	S	O(W: +1600)
500-690 V																
FR9	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O	O(W: +600)
FR10	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600)
FR11	S	O (H: +130)*	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600-800)
FR12	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +1200)
FR13	S	O (H: +170)	S	O	-	1)	S	O (W: +400)	-	-	S	-	O	O	O	O(W: +800)
FR14	S	O (H: +170)	S	O	-	1)	S	O (W: +600)	-	-	-	-	S	O	S	O(W: +1600)

S = Standard O = Optional 1) (W: +400) = Contact factory *) NXC07305 and NXC05906, H: +170 mm

VACON NXC, 12-PULSE SUPPLY

Mains voltage 380—500 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NXC 0385 5 A 2 L 0 TSF	385	424	300	450	540	200	160	FR10	606*2275*605/ 371
NXC 0460 5 A 2 L 0 TSF	460	506	385	578	693	250	200	FR10	606*2275*605/ 403
NXC 0520 5 A 2 L 0 TSF	520	572	460	690	828	250	250	FR10	606*2275*605/ 403
NXC 0590 5 A 2 L 0 TSF	590	649	520	780	936	315	250	FR11	806*2275*605/ 577
NXC 0650 5 A 2 L 0 TSF	650	715	590	885	1062	355	315	FR11	806*2275*605/ 577
NXC 0730 5 A 2 L 0 TSF	730	803	650	975	1170	400	355	FR11	806*2275*605/ 577
NXC 0820 5 A 2 L 0 TSF	820	902	730	1095	1314	450	400	FR12	1206*2275*605/ 810
NXC 0920 5 A 2 L 0 TSF	920	1012	820	1230	1476	500	450	FR12	1206*2275*605/ 810
NXC 1030 5 A 2 L 0 TSF	1030	1133	920	1380	1656	560	500	FR12	1206*2275*605/ 810
NXC 1150 5 A 2 L 0 TSF	1150	1265	1030	1545	1854	630	560	FR13	1406*2275*605/ 1000
NXC 1300 5 A 2 L 0 TSF	1300	1430	1150	1725	2070	710	630	FR13	2006*2275*605/ 1100
NXC 1450 5 A 2 L 0 TSF	1450	1595	1300	1950	2340	800	710	FR13	2006*2275*605/ 1100
NXC 1770 5 A 2 L 0 TSF	1770	1947	1600	2400	2880	1000	900	FR14	2806*2275*605/ 2440
NXC 2150 5 A 2 L 0 TSF	2150	2365	1940	2910	3492	1200	1100	FR14	2806*2275*605/ 2500

Mains voltage 500—690 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
NXC 0261 6 A 2 L 0 TSF	261	287	208	312	375	250	200	FR10	606*2275*605/ 341
NXC 0325 6 A 2 L 0 TSF	325	358	261	392	470	315	250	FR10	606*2275*605/ 371
NXC 0385 6 A 2 L 0 TSF	385	424	325	488	585	355	315	FR10	606*2275*605/ 371
NXC 0416 6 A 2 L 0 TSF#	416	458	325	488	585	400	315	FR10	606*2275*605/ 403
NXC 0460 6 A 2 L 0 TSF	460	506	385	578	693	450	355	FR11	806*2275*605/ 524
NXC 0502 6 A 2 L 0 TSF	502	552	460	690	828	500	450	FR11	806*2275*605/ 524
NXC 0590 6 A 2 L 0 TSF#	590	649	502	753	904	560	500	FR11	806*2275*605/ 577
NXC 0650 6 A 2 L 0 TSF	650	715	590	885	1062	630	560	FR12	1206*2275*605/ 745
NXC 0750 6 A 2 L 0 TSF	750	825	650	975	1170	710	630	FR12	1206*2275*605/ 745
NXC 0820 6 A 2 L 0 TSF#	820	902	650	975	1170	800	630	FR12	1206*2275*605/ 745
NXC 0920 6 A 2 L 0 TSF	920	1012	820	1230	1410	900	800	FR13	1406*2275*605/ 1000
NXC 1030 6 A 2 L 0 TSF	1030	1133	920	1380	1755	1000	900	FR13	1406*2275*605/ 1000
NXC 1180 6 A 2 L 0 TSF#	1180	1298	1030	1463	1755	1150	1000	FR13	1406*2275*605/ 1000
NXC 1500 6 A 2 L 0 TSF	1500	1650	1300	1950	2340	1500	1300	FR14	2806*2275*605/ 2440
NXC 1900 6 A 2 L 0 TSF	1900	2090	1500	2250	2700	1800	1500	FR14	2806*2275*605/ 2440
NXC 2250 6 A 2 L 0 TSF#	2250	2475	1900	2782	3335	2000	1800	FR14	2806*2275*605/ 2500

max. ambient temperature of +35°C

HARDWARE CONFIGURATIONS

12-pulse	Enclosure		EMC			Brake chopper	Cabling		Input device					Output filters		
								Top	Fuses	Load Sw.	Sw.-fuse	Contactor	MCCB	Cmn Mode	du/dt	Sine wave
380-500 V	IP21	IP54	L	T	H		Bottom	+CIT/+COT	+IFU	+ILS	+IFD	+ICO	+ICB	+OCM	+ODU	+OSI
FR10	S	O (H: +130)	S	O	-	-	S	O (W: +400)	O	-	-	-	O	O	O (W: +400)	O(W: +600)
FR11	S	O (H: +130)*	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600)
FR12	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +1200)
FR13	S	O (H: +170)	S	O	-	[1]	S	O (W: +400)	-	-	-	-	S	O	O	O(W: +800)
FR14	S	O (H: +170)	S	O	-	[1]	S	O (W: +800)	-	-	-	-	S	O	S	O(W: +1600)
500-690 V																
FR10	S	O (H: +130)	S	O	-	-	S	O (W: +400)	O	-	-	-	O	O	O (W: +400)	O(W: +600)
FR11	S	O (H: +130)*	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +600-800)
FR12	S	O (H: +130)	S	O	-	O	S	O (W: +400)	O	O	O	O	O	O	O (W: +400)	O(W: +1200)
FR13	S	O (H: +170)	S	O	-	[1]	S	O (W: +400)	-	-	-	-	S	O	O	O(W: +800)
FR14	S	O (H: +170)	S	O	-	[1]	S	O (W: +800)	-	-	-	-	S	O	S	O(W: +1600)

S = Standard O = Optional [1] (W: +400) = Contact factory *) NXC07305 and NXC05906, H: +170 mm

VACON NXC, REGENERATIVE LOW-HARMONIC DRIVE

The Vacon NXC regenerative low-harmonic drive brings savings in applications in which either regenerative functions or low-harmonics are required.

The Vacon NXC regenerative and low-harmonic cabinet drives are a perfect choice for applications where low harmonics are required or where energy is fed back to the mains.

Clean power saves on costs

The regenerative low-harmonic cabinet drive offers an excellent total solution to meet even the most demanding power quality requirements. The drive complies with the IEEE-519, G5/4 harmonic standards, when correctly installed. The low current THDi reduces supply currents and allows supply transformers, protection devices and power cables to be smaller. It brings savings for new and retrofit projects because there is no need to invest in expensive 12- or 18-pulse transformers when new or old existing 6-pulse transformers can be used.

Regenerative functionality saves energy

The regenerative function makes it possible to feed energy back to the mains in energy generation applications or to improve the efficiency of the system when the braking power can be fed back to the mains. An additional advantage is simplified installation work and savings on space when no brake resistors are needed.

Power factor control improves the supply

The power factor of the active supply unit can be set in a wide range that makes it possible to minimize the required reactive power of the system.

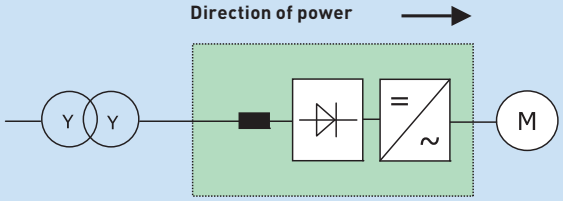
Main features

- Clean power with total current harmonics less than 5%
- The regenerative function creates savings
- Power factor control
- This compact solution with a wide range of standard options available makes it easy to configure the drive

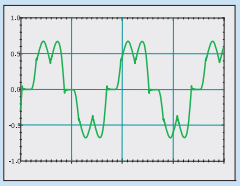
CURRENT HARMONIC MITIGATION

6-pulse rectifier with choke

Cost-effective transformer and simple power cabling with high current distortion. Oversizing of transformers needed due to high THDi.

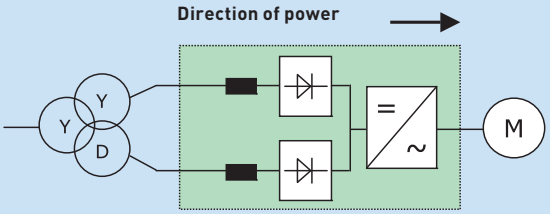


Current distortion (THDi) > 35 %

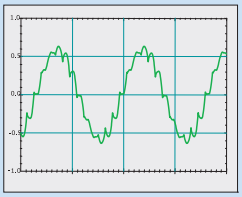


12-pulse rectifier with choke

Higher transformer and power cabling cost. Low current distortion on the primary side of the transformer.

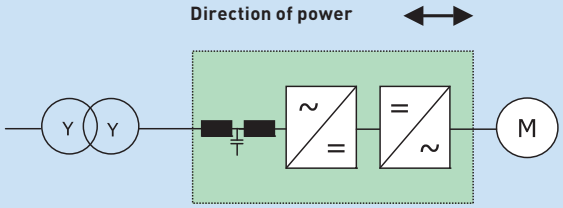


Current distortion (THDi) > 12 %

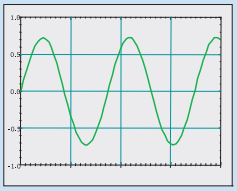


Active front-end with LCL filter

Cost effective transformer and power cabling with very low current distortion. No oversizing of the transformer is needed.



Current distortion (THDi) < 5 %



VACON NXC OPTIONS

Vacon NXC options give greater flexibility and make it easy to extend the range of functions. Options are available in different categories and can be combined to meet almost any requirements.

Auxiliary equipment (A group)

+AMF	Motor fan control
+AMH	Motor heater feeder
+AMB	Mechanical brake control
+ACH	Cabinet heater
+ACL	Cabinet light
+ACR	Control relay
+AAI	Analog signal isolator
+AAA	Aux. contact (ctrl voltage)
+AAC	Aux. contact (input device)
+AT3	Aux. voltage transformer 2500 VA
+AT4	Aux. voltage transformer 4000 VA
+ADS	230 VAC customer socket

Door-mounted options (D group)

+DLV	Pilot light (control voltage on)
+DLD	Pilot light (DO1)
+DLF	Pilot light (FLT)
+DLR	Pilot light (RUN)
+DEP	Emergency stop push-button
+DRP	Reset push-button
+DAM	Analogue meter (AO1)
+DAR	Potentiometer for reference
+DCM	Analogue meter current trafo
+DVM	Analogue voltage meter switch

Output filter options (O group)

+OCM	Common mode filters
+ODU	du/dt filter
+OSI	Sine wave filter

Protection devices (P group)

+PTR	External thermistor relay
+PES	Emergency stop (cat 0)
+PED	Emergency stop (cat 1)
+PAP	Arc protection
+PIF	Insulation fault sensor

Control terminal options (T group)

+TIO	Basic I/O wired to external single-tier terminals
+TID	Basic I/O wired to external two-tier terminals + additional terminals

General options (G group)

+G40	400 mm empty cabinet
+G60	600 mm empty cabinet
+G80	800 mm empty cabinet
+GPL	100 mm base
+GPL	200 mm base

Cabling options (C group)

+CIT	Input (mains) cabling from top
+COT	Output (motor) cabling from top

VACON NXC, REGENERATIVE LOW-HARMONIC DRIVE

Mains voltage 380–500 V, 50/60 Hz, 3~

Regenerative low-harmonic drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)			400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)	Maximum current I_S (A)	10% overload P (kW)	50% overload P (kW)		
NXC 0261 5 A 2 L 0 RSF	261	287	205	308	349	132	110	FI9 + FI9	1006*2275*605/680
NXC 0300 5 A 2 L 0 RSF	300	330	245	368	444	160	132	FI9 + FI9	1006*2275*605/680
NXC 0385 5 A 2 L 0 RSF	385	424	300	450	540	200	160	FI10 + FI10	1006*2275*605/700
NXC 0460 5 A 2 L 0 RSF	460	506	385	578	693	250	200	FI10 + FI10	1006*2275*605/700
NXC 0520 5 A 2 L 0 RSF	520	572	460	690	828	250	250	FI10 + FI10	1006*2275*605/700
NXC 0650 5 A 2 L 0 RSF	650	715	590	885	1062	355	315	2xFI10 + FI12	2006*2275*605/1400
NXC 0730 5 A 2 L 0 RSF	730	803	650	975	1170	400	355	2xFI10 + FI12	2006*2275*605/1400
NXC 0820 5 A 2 L 0 RSF	820	902	730	1095	1314	450	400	2xFI10 + FI12	2006*2275*605/1400
NXC 0920 5 A 2 L 0 RSF	920	1012	820	1230	1476	500	450	2xFI10 + FI12	2006*2275*605/1400
NXC 1030 5 A 2 L 0 RSF	1030	1133	920	1380	1656	560	500	2xFI10 + FI12	2006*2275*605/1400
NXC 1150 5 A 2 L 0 RSF	1150	1265	1030	1545	1854	630	560	FI13 + FI13	2206*2275*605/1950
NXC 1300 5 A 2 L 0 RSF	1300	1430	1150	1725	2070	710	630	FI13 + FI13	2206*2275*605/1950
NXC 1450 5 A 2 L 0 RSF	1450	1595	1300	1950	2340	800	710	FI13 + FI13	2206*2275*605/1950
NXC 1770 5 A 2 L 0 RSF	1770	1947	1600	2400	2880	1000	900	2xFI13 + FI14	4406*2275*605/3900
NXC 2150 5 A 2 L 0 RSF	2150	2365	1940	2910	3492	1200	1100	2xFI13 + FI14	4406*2275*605/3900
NXC 2700 5 A 2 L 0 RSF	2700	2970	2300	3278	3933	1500	1200	2xFI13 + FI14	4406*2275*605/3900

Mains voltage 525–690 V, 50/60 Hz, 3~

Regenerative low-harmonic drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)			690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)	Maximum current I_S (A)	10% overload P (kW)	50% overload P (kW)		
NXC 0125 6 A 2 L 0 RSF	125	138	100	150	200	110	90	FI9 + FI9	1006*2275*605/680
NXC 0144 6 A 2 L 0 RSF	144	158	125	188	213	132	110	FI9 + FI9	1006*2275*605/680
NXC 0170 6 A 2 L 0 RSF	170	187	144	216	245	160	132	FI9 + FI9	1006*2275*605/680
NXC 0208 6 A 2 L 0 RSF#	208	229	170	255	289	200	160	FI9 + FI9	1006*2275*605/680
NXC 0261 6 A 2 L 0 RSF	261	287	208	312	375	250	200	FI10 + FI10	1006*2275*605/700
NXC 0325 6 A 2 L 0 RSF	325	358	261	392	470	315	250	FI10 + FI10	1006*2275*605/700
NXC 0385 6 A 2 L 0 RSF	385	424	325	488	585	355	315	FI10 + FI10	1006*2275*605/700
NXC 0416 6 A 2 L 0 RSF#	416	416	325	488	585	400	315	FI10 + FI10	1006*2275*605/700
NXC 0460 6 A 2 L 0 RSF	460	506	385	578	693	450	355	2xFI10 + FI12	2006*2275*605/1400
NXC 0502 6 A 2 L 0 RSF	502	552	460	690	828	500	450	2xFI10 + FI12	2006*2275*605/1400
NXC 0590 6 A 2 L 0 RSF	590	649	502	753	904	560	500	2xFI10 + FI12	2006*2275*605/1400
NXC 0650 6 A 2 L 0 RSF	650	715	590	885	1062	630	560	2xFI10 + FI12	2006*2275*605/1400
NXC 0750 6 A 2 L 0 RSF	750	825	650	975	1170	710	630	2xFI10 + FI12	2006*2275*605/1400
NXC 0820 6 A 2 L 0 RSF#	820	902	650	975	1170	800	630	2xFI10 + FI12	2006*2275*605/1400
NXC 0920 6 A 2 L 0 RSF	920	1012	820	1230	1476	900	800	FI13 + FI13	2206*2275*605/1950
NXC 1030 6 A 2 L 0 RSF	1030	1133	920	1380	1656	1000	900	FI13 + FI13	2206*2275*605/1950
NXC 1180 6 A 2 L 0 RSF#	1180	1298	1030	1463	1755	1150	1000	FI13 + FI13	2206*2275*605/1950
NXC 1500 6 A 2 L 0 RSF	1500	1650	1300	1950	2340	1500	1300	2xFI13 + FI14	4406*2275*605/3900
NXC 1900 6 A 2 L 0 RSF	1900	2090	1500	2250	2700	1800	1500	2xFI13 + FI14	4406*2275*605/3900
NXC 2250 6 A 2 L 0 RSF#	2250	2475	1900	2782	3335	2000	1800	2xFI13 + FI14	4406*2275*605/3900

max. ambient temperature of 35°C

HARDWARE CONFIGURATIONS

Active front-end	Enclosure		EMC		Brake chopper	Cabling		Input device	Output filters		
380-500 V	IP21	IP54	L	T		Bottom	Top +CIT/+COT	Load Sw. & MCCB +ILS & +ICB	Cmn Mode +OCM	du/dt +ODU	Sinewave +OSI
FI9+FI9	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +600)
FI10+FI10	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +600)
2 x FI10+FI12	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +1200)
FI13+FI13	S	O (H: +170)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O	O (W: +800)
2 x FI13+FI14	S	O (H: +170)	S	O	1) (W: +400)	S	O (W: +600)	S	O	S	O (W: +1600)
525-690 V											
FI9+FI9	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +600)
FI10+FI10	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +600)
2 x FI10+FI12	S	O (H: +130)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O (W:+400)	O (W: +1200)
FI13+FI13	S	O (H: +170)	S	O	1) (W: +400)	S	O (W: +400)	S	O	O	O (W: +800)
2 x FI13+FI14	S	O (H: +170)	S	O	1) (W: +400)	S	O (W: +600)	S	O	S	O (W: +1600)

1) Contact factory S = Standard O = Optional

IP00 VACON NXP MODULES

The Vacon NXP high-power IP00 drive modules are intended for installation in a separate enclosure. Thanks to the robust, square-shaped design of the module, enclosure design is easy and straightforward.

Mains voltage 380—500 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Module W*H*D (mm)/ kg	Chokes W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	400 V supply				
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)			
NXP 0385 5 A 0 N 0 SSA	385	424	300	450	540	200	160	FR10	500*1165*506/ 120	350*383*262/ 84 [1]
NXP 0460 5 A 0 N 0 SSA	460	506	385	578	693	250	200	FR10	500*1165*506/ 120	497*399*244/ 115 [1]
NXP 0520 5 A 0 N 0 SSA	520	572	460	690	828	250	250	FR10	500*1165*506/ 120	497*399*244/ 115 [1]
NXP 0590 5 A 0 N 0 SSA	590	649	520	780	936	315	250	FR11	709*1206*506/ 210	2x(350*383*262/ 84)
NXP 0650 5 A 0 N 0 SSA	650	715	590	885	1062	355	315	FR11	709*1206*506/ 210	2x(350*383*262/ 84)
NXP 0730 5 A 0 N 0 SSA	730	803	650	975	1170	400	355	FR11	709*1206*506/ 210	2x(350*383*262/ 84)
NXP 0820 5 A 0 N 0 SSA	820	902	730	1095	1314	450	400	FR12	2x(500*1165*506/ 120)	2x(497*399*244/ 115)
NXP 0920 5 A 0 N 0 SSA	920	1012	820	1230	1476	500	450	FR12	2x(500*1165*506/ 120)	2x(497*399*244/ 115)
NXP 1030 5 A 0 N 0 SSA	1030	1133	920	1380	1656	560	500	FR12	2x(500*1165*506/ 120)	2x(497*399*244/ 115)

1) 12-pulse units, 2x(354*319*230/ 53 kg)

Mains voltage 500—690 V, 50/60 Hz, 3~

AC drive type	Loadability					Motor shaft power		Frame size	Module W*H*D (mm)/ kg	Chokes W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S	690 V supply				
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)			
NXP 0261 6 A 0 N 0 SSA	261	287	208	312	375	250	200	FR10	500*1165*506/ 120	354*319*230/ 53 [1]
NXP 0325 6 A 0 N 0 SSA	325	358	261	392	470	315	250	FR10	500*1165*506/ 120	350*383*262/ 84 [1]
NXP 0385 6 A 0 N 0 SSA	385	424	325	488	585	355	315	FR10	500*1165*506/ 120	350*383*262/ 84 [1]
NXP 0416 6 A 0 N 0 SSA#	416	458	325	488	585	400	315	FR10	500*1165*506/ 120	350*383*262/ 84 [1]
NXP 0460 6 A 0 N 0 SSA	460	506	385	578	693	450	355	FR11	709*1206*506/ 210	497*399*244/ 115 [2]
NXP 0502 6 A 0 N 0 SSA	502	552	460	690	828	500	450	FR11	709*1206*506/ 210	497*399*244/ 115 [2]
NXP 0590 6 A 0 N 0 SSA#	590	649	502	753	904	560	500	FR11	709*1206*506/ 210	2x(350*383*262/ 84)
NXP 0650 6 A 0 N 0 SSA	650	715	590	885	1062	630	560	FR12	2x(500*1165*506/ 120)	2x(350*383*262/ 84)
NXP 0750 6 A 0 N 0 SSA	750	825	650	975	1170	710	630	FR12	2x(500*1165*506/ 120)	2x(350*383*262/ 84)
NXP 0820 6 A 0 N 0 SSA#	820	902	650	975	1170	800	630	FR12	2x(500*1165*506/ 120)	2x(350*383*262/ 84)

max. ambient temperature of +35°C 1) 12-pulse units, 2x(354*319*230/ 53 kg) 2) 12-pulse units, 2x(350*383*262/ 84 kg)

Bigger units are available on request.

HARDWARE CONFIGURATIONS

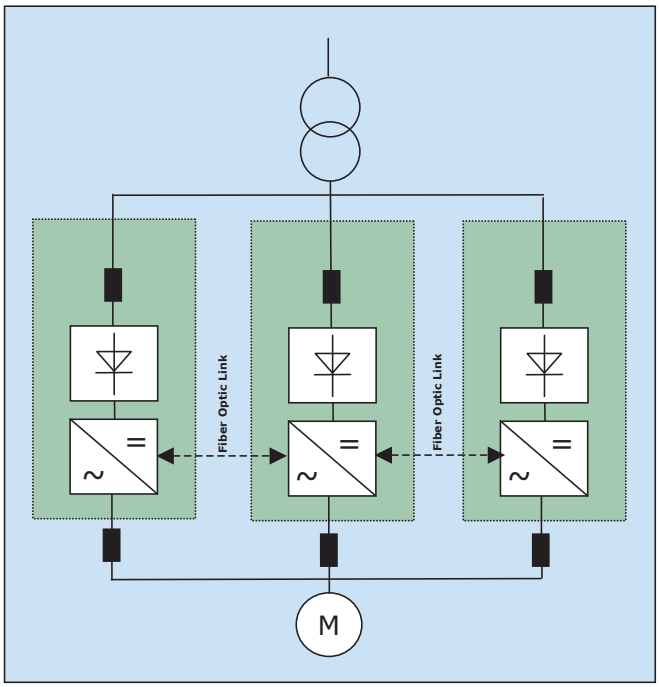
FUNCTION	AVAILABILITY
Integrated control unit	Standard
External control unit	Optional
Integrated brake chopper	Optional
6-pulse supply	Standard
12-pulse supply	Optional
EMC filtering N	Standard
EMC filtering T	Optional

VACON DRIVESYNCH

The Vacon DriveSynch is a new, innovative control concept for running standard drives in parallel in order to control high-power AC motors. This concept suits high-power single or multiple winding motors typically above 1 MW.

High-power AC drives up to 5 MW can be built using standard drive components and have the following benefits:

- The system is modular and easy to extend
- High total power can be obtained by combining smaller drives
- The redundancy of the system is higher than in a conventional drive because each unit can be run independently
- The small size of the individual drive makes it easy to maintain and service
- Identical individual units reduce the required amount of spare parts and costs
- No special skills are required for the engineering, installation, commissioning and maintenance of high-power drives as they are made from standard low-power modules.
- The du/dt filter at the output of each individual unit ensures load balancing
- They can also run multiple winding motors with a phase shift between the windings



Mains voltage 380—500 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S (A)	400 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
2 x NXC 1150 5 A 2 L 0 SSF	2150	2365	1940	2910	3492	1200	1100	2 x FR13	2x(1406*2275*605/1250)
2 x NXC 1300 5 A 2 L 0 SSF	2470	2717	2185	3278	3933	1350	1100	2 x FR13	2x(1606*2275*605/1350)
2 x NXC 1450 5 A 2 L 0 SSF	2755	3031	2470	3705	4446	1500	1350	2 x FR13	2x(1606*2275*605/1350)
3 x NXC 1150 5 A 2 L 0 SSF	3278	3605	2936	4403	5284	1800	1500	3 x FR13	3x(1406*2275*605/1250)
3 x NXC 1300 5 A 2 L 0 SSF	3705	4076	3278	4916	5900	2000	1800	3 x FR13	3x(1606*2275*605/1350)
3 x NXC 1450 5 A 2 L 0 SSF	4133	4546	3705	5558	6669	2250	2000	3 x FR13	3x(1606*2275*605/1350)

Mains voltage 500—690 V, 50/60 Hz

AC drive type	Loadability					Motor shaft power		Frame size	Dimensions and weight W*H*D (mm)/ kg
	Low (+40°C)		High (+40°C)		Maximum current I_S (A)	690 V supply			
	Rated continuous current I_L (A)	10% overload current (A)	Rated continuous current I_H (A)	50% overload current (A)		10% overload P (kW)	50% overload P (kW)		
2 x NXC 0920 6 A 2 L 0 SSF	1748	1923	1558	2337	2679	1700	1400	2 x FR13	2x(1406*2275*605/1250)
2 x NXC 1030 6 A 2 L 0 SSF	1900	2090	1500	2250	2700	1800	1500	2 x FR13	2x(1406*2275*605/1250)
2 x NXC 1180 6 A 2 L 0 SSF#	2250	2475	1900	2782	3335	2000	1800	2 x FR13	2x(1406*2275*605/1250)
3 x NXC 0920 6 A 2 L 0 SSF	2622	2884	2337	3506	4019	2500	2000	3 x FR13	3x(1406*2275*605/1250)
3 x NXC 1030 6 A 2 L 0 SSF	2936	3229	2622	3933	5002	2800	2500	3 x FR13	3x(1406*2275*605/1250)
3 x NXC 1180 6 A 2 L 0 SSF#	3363	3699	2936	4170	5002	3200	2800	3 x FR13	3x(1406*2275*605/1250)

max. ambient temperature of 35°C

REDUNDANCY

Equipment failure, especially failure in critical units can be made less painful through the use of redundancy.

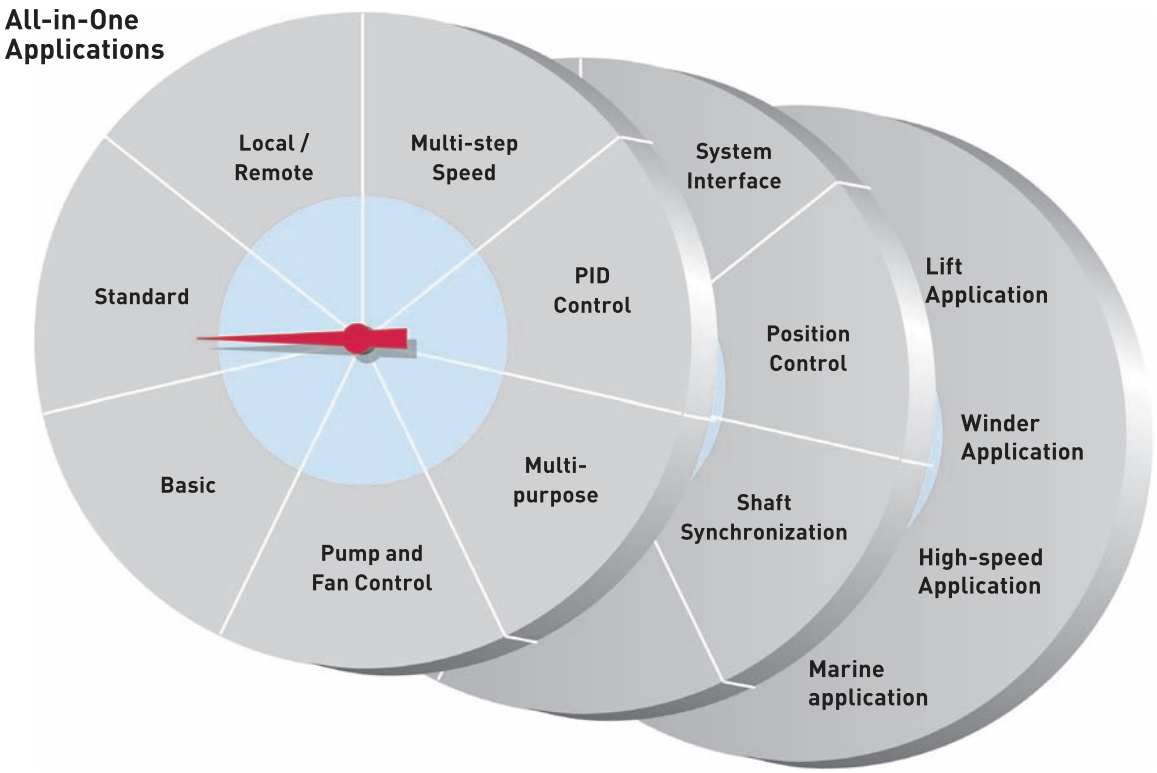
Software and hardware redundancy

For a drive system redundancy generally means that a single failure in the electronics does not totally cause the motor to stop. The motor (motors, if they are doubled for redundancy purposes) will continue to run, albeit at a lower power level. For dual motors, the power will be reduced by 50 %. This is usually sufficient to allow the process to continue (emptying a reactor) or to allow the process to be stopped in a controlled manner and thereby ensuring that no solidifying material is left inside the stopped machines. No expensive cleaning is thus required.

The Vacon DriveSynch concept coupled with the modular drive approach of all Vacon drives lends itself easily to creating redundant systems. The concept is based on controlling two, or more, power units that in parallel run the motor(s). As the basic concept is a pure control based one, it can be used for all sizes of drives with equal ease. In the system, which is based on the NXP drives, one unit functions as the master unit and controls one to three slave units. From the user's point of view, the whole system behaves as a single drive system. An external 24 V supply is required to maintain power to the control units.

The system requires the use of switches or disconnects so that the failed unit can be taken out of service and repaired while the process is still running.

SOFTWARE MODULARITY



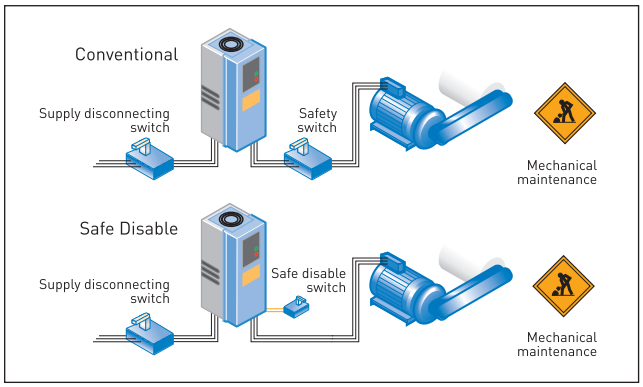
The All-in-One application package has seven built-in software applications (=default settings and the functionality of control inputs and outputs), which can be selected with one parameter.

The Start-up Wizard asks which software application to use at the first power-up. With this single setting, the drive can be programmed, for example, for two external control places or pressure control with an integrated PID controller.

FUNCTIONAL SAFETY INTEGRATED

Safe torque off (STO)

The safety function is intended for use where there is a need to ensure that the motor will not be driven by the drive (safe standstill) for example, when there is a need to perform mechanical maintenance on a machine. In such installations the function may be used to replace mechanical power switches. The function is certified in accordance with EN 61800-5-2 Safe torque off (SIL2), EN ISO 13849-1: 2006 (LP.d) and EN62061: 2005 (SILCL2).



ATEX-certified motor thermal supervision

The ATEX-certified thermistor input of the Vacon NXP is certified for use in supervising the temperature of Ex motors located in potentially explosive areas. The integrated safety function offers cost savings compared to conventional solutions with external thermistor relays and contactors. The thermal supervision input is certified to be compliant with the ATEX 94/9/EC directive.

Safe stop 1 (SS1)

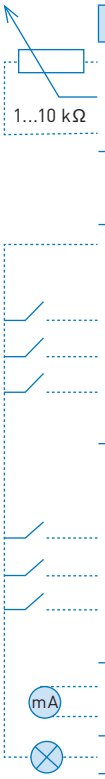
The safety function is intended for use where there is a need to decelerate the motor and initiate safe torque off safety function after a time delay set by the user. The safety function is certified in accordance with EN 61800-5-2 Safe stop 1 (SIL2), EN ISO 13849-1: 2006 (PL.d) and EN 62061: 2005 (SILCL2).

OPTION BOARDS

Type	Card slot					I / O signal																				
	A	B	C	D	E	DI	DO	DI DO	AI (mA/ V/±V)	AI (mA) isolated	AO (mA/V)	AO (mA) isolated	RO (NO/ NC)	RO (NO)	+10V$_{ref}$	Therm	+24V/ EXT +24V	pt100	42-240 VAC input	DI/DO ⊓⊔ (10...24V)	DI/DO ⊓⊔ (RS422)	DI ~ 1Vp-p	Resolver	Out +5V/ +15V/ +24V	Out +15V/ +24V	Out +5V/ +12V/ +15V	Note
Basic I/O cards (OPT-A)																										
OPT-A1						6	1		2		1				1		2										
OPT-A2													2														
OPT-A3													1	1		1											
OPT-A4						2															3/0			1			
OPT-A5						2														3/0					1		
OPT-A7																				6/2					1		2 enc. input + 1 enc. output
OPT-A8						6	1		2		1				1		2										1)
OPT-A9						6	1		2		1				1		2										2.5 mm^2 terminals
OPT-AE							2													3/0					1		DO = Divider+Direction
OPT-AF						2							2			1											EN954-1, cat 3 / ATEX therm.
OPT-AK																						3			1		Sin/Cos/ Marker
I/O expander cards (OPT-B)																											
OPT-B1								6									1										Selectable DI/DO
OPT-B2													1	1		1											
OPT-B4										1		2					1										2)
OPT-B5														3													
OPT-B8																	1	3									
OPT-B9						2								1					5								
OPT-BB						2															0/2	2				1	Sin/Cos + EnDat
OPT-BC																				3/3			1				Encoder out = Resolver simulation
OPT-BE																											EnDat/SSI
Fieldbus cards (OPT-C)																											
OPT-C2						RS-485 (Multiprotocol)																					Modbus, N2
OPT-C3						Profibus DP																					
OPT-C4						LonWorks																					
OPT-C5						Profibus DP (D9-type connector)																					
OPT-C6						CANopen (slave)																					
OPT-C7						DeviceNet																					
OPT-C8						RS-485 (Multiprotocol, D9-type connector)																					Modbus, N2
OPT-CF						CAN / Euromap																					
OPT-CG						SELMA 2 protocol																					
OPT-CI						Modbus/TCP (Ethernet)																					
OPT-CJ						BACNet, RS-485																					
Communication cards (OPT-D)																											
OPT-D1						System Bus adapter (2 x fiber optic pairs)																					
OPT-D2						System Bus adapter (1 x fiber optic pair) & CAN-bus adapter (galvanically decoupled)																					
OPT-D3						RS232 adapter card (galvanically decoupled), used mainly for application engineering to connect another keypad																					
OPT-D6						CAN-bus adapter (galvanically decoupled)																					
OPT-D7						Line voltage measurement																					

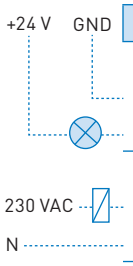
Allowed slots for the board are marked in blue. 1) analogue signals galvanically isolated as a group. 2) analogue signals galvanically isolated separately

OPT-A1



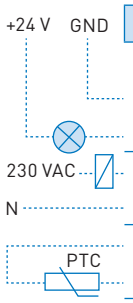
Terminal		Default settings	Programmable
1	+10V	Reference voltage	
2	AI1+	Frequency reference 0–10 V	-10–+10 V, 0/4–20 mA
3	AI1-	AI common (GND)	Differential
4	AI2+	Frequency reference 4–20 mA	0–20mA, 0/-10 V–10 V
5	AI2-	AI common (differential)	GND
6	+24V	Control supply (bidirectional)	
7	GND	I/O Ground	
8	DIN1	Start forward	Many possibilities
9	DIN2	Start reverse	Many possibilities
10	DIN3	External fault input	Many possibilities
11	CMA	Common for DIN1 - DIN3 (GND)	Floating
12	+24V	Control supply (bidirectional)	
13	GND	I/O Ground	
14	DIN4	Multi-step speed select 1	Many possibilities
15	DIN5	Multi-step speed select 2	Many possibilities
16	DIN6	Fault reset	Many possibilities
17	CMB	Common for DIN4 - DIN6 (GND)	Floating
18	AO1+	Output frequency (0–20 mA)	Many possibilities
19	AO1-	AO common (GND)	4–20 mA, 0–10 V
20	DO1	READY, I ≤ 50 mA, U ≤ 48 VDC	Many possibilities

OPT-A2



Terminal		Default settings	Programmable
21	R01	RUN	Many possibilities
22	R01		
23	R01		
24	R02	FAULT	Many possibilities
25	R02		
26	R02		

OPT-A3 (alternative)

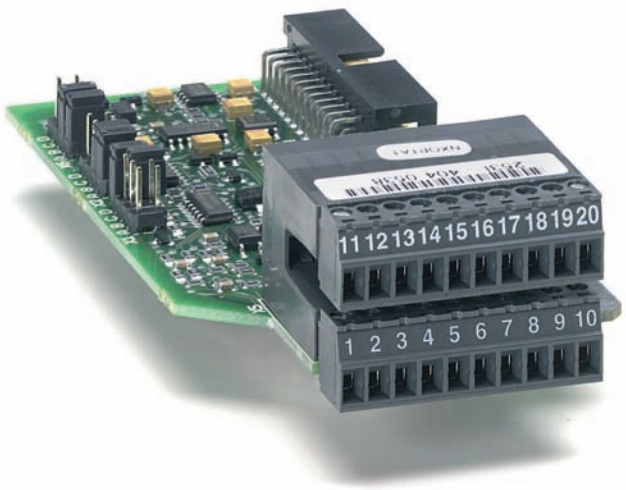


Terminal		Default settings	Programmable
21	R01	RUN	Many possibilities
22	R01		
23	R01		
25	R02	FAULT	Many possibilities
26	R02		
28	TI1+	Thermistor	Warning
29	TI1-	input FAULT	No response

Default settings of OPT-A1, OPT-A2 and OPT-A3 for the Basic and Standard Applications.

OPT-A4 (encoder input example)

Terminal		Technical information
1	DIC1A+	Pulse input A
2	DIC1A-	
3	DIC2B+	Pulse input B; Phase shift of 90 degrees compared to pulse input A
4	DIC2B-	
5	DIC3Z+	Pulse input Z; one pulse per revolution
6	DIC3Z-	
7	ENC1Q	Qualifier input
8	DIC4	Fast DI
9	GND	Ground for control and inputs ENC1Q and DIC4
10	+5V/+15V/+24V	Control voltage (auxiliary voltage) output to encoder: Output voltage selectable with jumper X4.

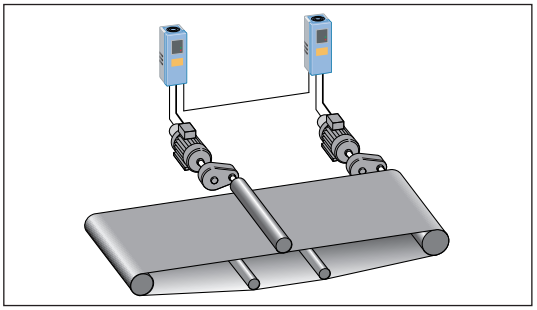


TECHNICAL DATA

Mains connection	Input voltage U_{in}	208...240 V; 380...500 V; 500...690 V; –10%...+10% NXC regenerative low-harmonic drive 525-690 V; -10%...+10%
	Input frequency	45...66 Hz
	Connection to mains	Once per minute or less (normal case)
Motor connection	Output voltage	0—U_{in}
	Continuous output current	High overloadability: I_H, ambient temperature max. +50°C (≥FR10 + 40°C) Low overloadability: I_L, ambient temperature max. +40°C
	Overloadability	High: 1.5 x I_H (1 min/10 min), Low: 1.1 x I_L (1 min/10 min)
	Max. starting current	I_s for 2 s every 20 s
	Output frequency	0...320 Hz; up to 7200 Hz with special software
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_2/ NX_5: Up to and including NX_0061: 1...16 kHz; Factory default 10 kHz From NX_0072: 1...10 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% * T_N (without brake resistor), flux braking
Ambient conditions	Ambient operating temperature	–10°C (no frost)...+50°C: I_H (≥FR10 + 40°C) –10°C (no frost)...+40°C: I_L
	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 60-721-3-3, unit in operation, class 3C2 IEC 60-721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity (no derating) up to 1000 m 1% derating for each 100 m above 1000 m; max. 3000 m (690 V max. 2000 m)
	Vibration EN50178/EN60068-2-6	5...150 Hz: Displacement amplitude 1 mm (peak) at 5...15.8 Hz (≥FR10: 0.25 mm (peak) at 5...31 Hz) Max acceleration amplitude 1 G at 15.8...150 Hz (≥FR10: 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)
EMC	Immunity	Fulfils all EMC immunity requirements
	Emissions	**EMC level C**: EN61800-3, category C1 **EMC level H**: EN61800-3, category C2 **EMC level L**: EN61800-3, category C3 **EMC level T**: Low earth-current solution is suitable for IT networks, EN61800-3, category C4 (can be modified from L/H-level units)
Safety		EN 50178, EN 60204-1, IEC 61800-5-1, CE, UL, CUL; (see unit nameplate for more detailed approvals)
Control connections (OPT-A1, -A2 or OPT-A1, -A3)	Analogue input voltage	0...+10 V (–10 V...+10 V joystick control), R_i = 200 kΩ, resolution 0.1%, accuracy ±1%
	Analogue input current	0(4)...20 mA, R_i = 250 Ω differential, resolution 0.1%, accuracy ±1%
	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 bit, accuracy ±2%
	Digital output	Open collector output, 50 mA/48 V
	Relay outputs	2 programmable change-over (NO/NC) relay outputs (OPT-A3: NO/NC+NO) Switching capacity: 24 VDC/8 A, 250 VAC/8 A, 125 VDC/0.4 A. Min. switching load: 5 V/10 mA
	Thermistor input (OPT-A3)	Galvanically isolated, R_{trip} = 4.7 kΩ
Protections		Overvoltage, undervoltage, earth fault, mains supervision, motor phase supervision, overcurrent, unit overtemperature, motor overload, motor stall, motor underload, short-circuit of +24 V and +10 V reference voltages

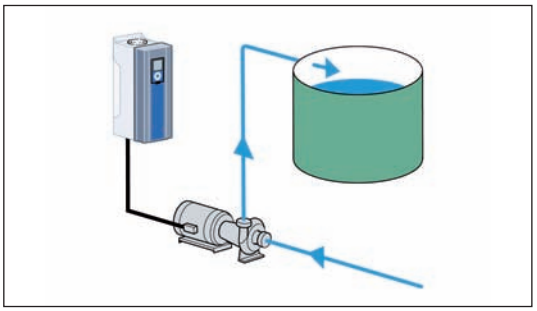
Ore Transportation - Conveyors

- Controlled smooth ramp-up to eliminate the over stretching of the belts
- Feed control into mills or hoppers
- PID control in conjunction with a conveyor weight meter
- Energy capture for downhill conveyors



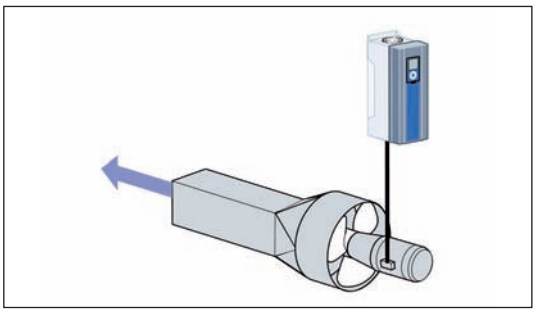
Fluid Pumping - Dosing, Slurry, Water, etc.

- Flow and pressure process control
- Elimination of pipe hammer
- Inbuilt PID control and multifollower control programme, no PLC required.
- Torque limiting to decrease the wearing of the pumps internal liners



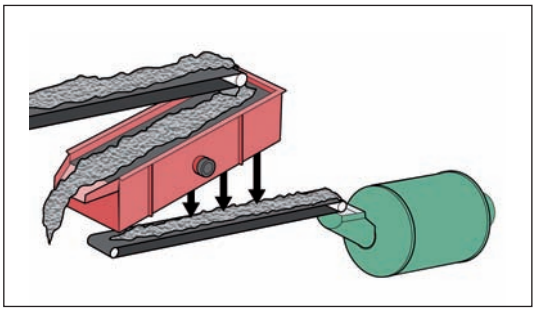
Air Handling - Compressors, Blowers, Ventilation Fans, etc.

- Energy savings while in standby mode
- Controlled smooth ramping for start and stopping
- Enhancement of equipment reliability
- Inbuilt PID control programme



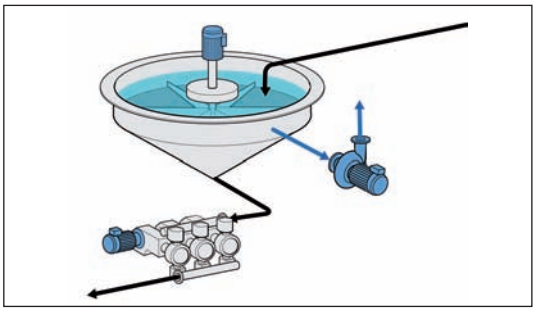
Material Sizing - Crushing, Screening, Milling

- Protection torque limiting in order to decrease wearing and damage to the grinding media
- Decreased high starting currents and mechanical stress
- Fine tuning rotational speeds for changing ore bodies characteristics
- The quicker deceleration time eliminates excessive resonating vibration



Mixers - Agitators, Floatation, Thickeners, Scrubbers

- Decreases mixing blade deformation
- Smaller motors can be used with the Torque Controlled Closed Loop programme
- Variable control speeds for changing the characteristics of ore bodies
- The fine tuning of mixing rates



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