ENGINEERING
TOMORROW

Selection Guide | VACON® NXP Liquid Cooled | 90 kW – 5.3 MW

# **Robust, silent** and **space-saving** control for all drive needs in **demanding applications**


Up to
**25%**
savings in total life cycle costs compared to air cooled solutions

drives.danfoss.com | VACON®

# Quiet. Compact. Cool.

VACON® NXP Liquid Cooled AC drives are the ultimate in space-saving, high power density AC drives. These drives are tried and tested over decades with proven reliability in thousands of installations, perfectly optimizing performance and efficiency in any motor drive or power conversion system.

The robust, modular design makes VACON® NXP a suitable platform for demanding applications. Meet any need, with power range from 90 kW to 5.3 MW, 380-690 VAC supply voltage range, and a comprehensive range of cooling options.

## Power packed

As no air ducts are required, liquid cooled drives are extremely compact and suitable for a wide variety of heavy industries with harsh operating conditions such as marine & offshore, pulp & paper, renewable energy and mining & metal.

Thanks to the high degree of protection achieved with these drives, they can be installed almost anywhere in the plant or vessel. This reduces the load on the air-conditioning system in the electrical rooms – an important cost and space consideration in many retrofit applications. And since liquid cooled drives do not require large cooling fans, they are also among the most silent AC drives on the market.

We are committed to providing you with the ultimate in high power density. VACON® NXP liquid cooled products have one of the best power/size ratios on the market. For example, our compact 12 pulse, 1.5 MW drive includes a built-in rectifier, inverter and optional brake all in the same package, and all this can be mounted in an 800 mm wide enclosure.

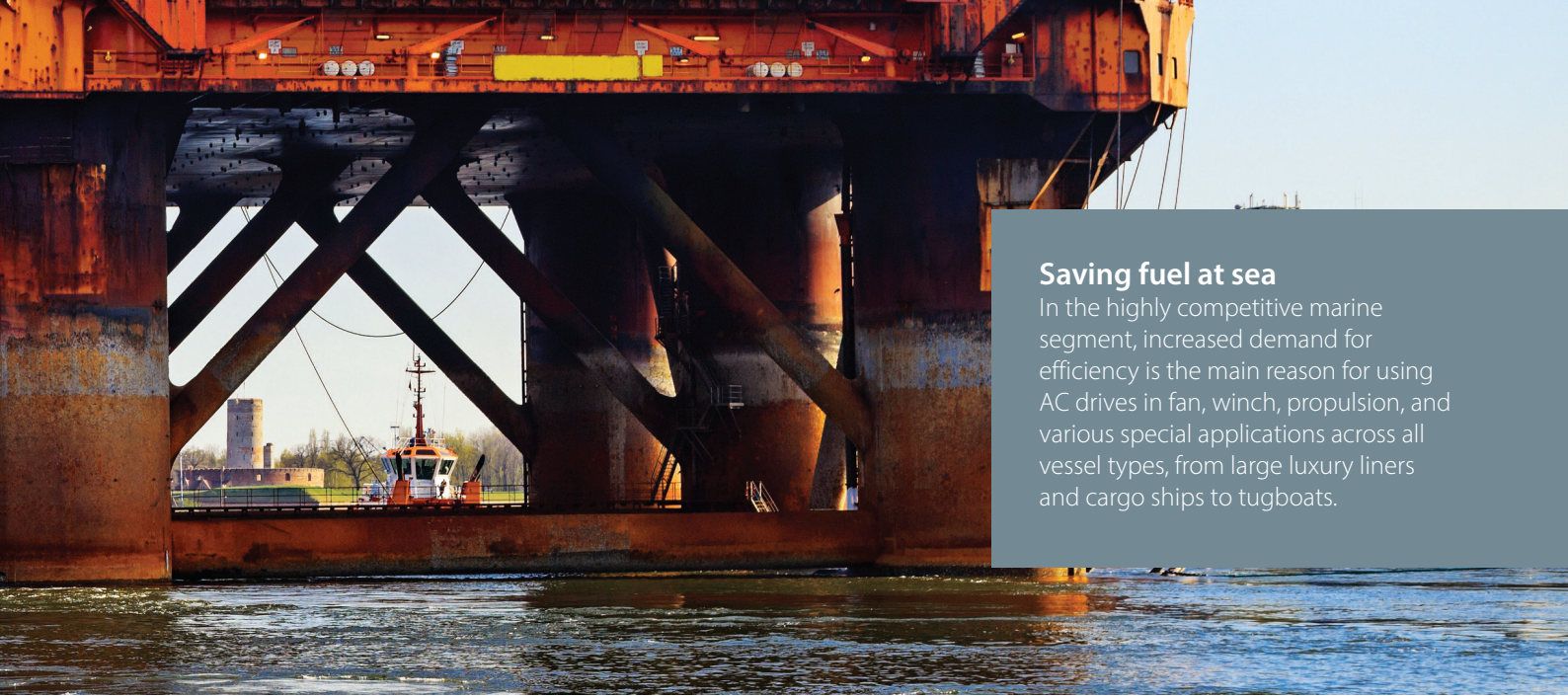
Our liquid cooled range offers the ultimate in motor control, for both induction and permanent magnet motors, gearless drive applications and paralleling solutions for high power motors.

## Certification and grid expertize

Our VACON® NXP liquid cooled portfolio fulfills all relevant international standards and global requirements, including marine, safety and EMC & Harmonics approvals. VACON® NXP liquid cooled AC drives can be used in regenerative energy and smart grid applications, which ensures customers can effectively monitor and control energy use and costs.

## Typical segments

- Marine and offshore
- Renewable energy
- Mining and metals
- Water and wastewater
- Energy management
- Pulp and paper
- Oil and gas
- Machine building
- Energy storage
- Power-to-X



**Saving fuel at sea**
In the highly competitive marine segment, increased demand for efficiency is the main reason for using AC drives in fan, winch, propulsion, and various special applications across all vessel types, from large luxury liners and cargo ships to tugboats.

# What's in it for you

Minimizes investment and operation costs

Saves floor space and infrastructure needs

Saves time and money

Compact and easy to install

Virtually silent operation

## Benefits

- Compact size and high power density
- No large air conditioning systems needed as state-of-the-art liquid cooled AC drive design allows heat loss to be transferred to the most convenient place with no need for vast amounts of filtered air
- Easy to adapt to various uses due to ready-to-use applications
- Flexible and scalable system for additional I/O, fieldbus and functional safety boards with five built-in expansion slots
- Silent operation due to eliminated need for large cooling fans
- Use VACON® NXP in dedicated applications to perfectly optimize electric and hybrid systems, including DC/DC Converter, Grid Converter and DCGuard.
- Industrial IoT-ready
- Grid code compliance for smart grid applications, such as energy storage

## Typical applications

- Propeller and thrusters systems
- Compressors
- Wind turbines
- Extruders
- Pumps and fans
- Test bench systems
- Cranes and winch systems
- Power conversion systems
- Production lines
- Oil rigs
- Crushers
- Conveyors
- Battery energy storage
- Shore supply
- Wind power
- Vessel charging
- Fast DC selectivity in common DC power systems for marine (DCGuard)

# The liquid way to stay cool

VACON® NXP Liquid Cooled AC drives have been pioneering for more than a decade in demanding industries with a proven track record of highly reliable products. We have succesfully mitigated the common risks of leakage and reliability in our product design.

## Climate considerations

When comparing cooling technology solutions, it is important to understand the effects on the infrastructure of the electrical room, and the room's requirements. Additional comparison parameters are the geographical location, relevant industry and process.

In warm climates it is extremely important to observe the amount of heat load transferred to the electrical room because of its indirect effect on electrical energy consumption.

The type-tested switchgears standard EN 60439-1 specifies that the electrical room's 24-hour average temperature should be below +35 °C and the maximum temporary temperature cannot exceed +40 °C. As a result, the cooling system in electrical rooms is typically comprised of air conditioning chillers, which are dimensioned according to the maximum heat load, the temperature inside the electrical room and the maximum temperature outdoors. The typical electrical energy consumption of air conditioning is approx. 25-33% of the cooling power.

## The higher the power, the greater the savings

In many cases liquid cooled drives are the most cost-effective option, simply due to the fact that there is no need for additional air conditioning capacity or extra ventilation for the areas in which they are used. The related savings enable shorter payback times and the higher the power, the greater the savings potential.

The continuously growing cost of energy certainly supports a wider use of liquid cooled drives technology, and the number of installations is growing rapidly.

**A driving force in wind energy**
VACON® AC drives are designed to provide proven performance in demanding environments. Our drives are serving the wind energy industry globally with a combined installed capacity of almost one gigawatt.

# Exclusively designed for liquid cooling

Many other liquid cooled drives on the market are based on modifications of an air cooled drive, rather than exclusively designed for the purpose. The VACON® NXP Liquid Cooled dissipates only 0.1 -0.15% of its heat losses to air.* A state-of-the-art cooling heatsink enables the cooling efficiency of the components to be higher than ever.

## Cooling technology advantages

Up to **25%** savings in total life cycle costs compared to air cooled solutions

**20dBA**
less noise than air cooled drive

**25%** smaller unit can deliver the same or better performance

*400 kW, 690 VAC liquid cooled drive

# Extensive portfolio of liquid cooled drive modules

Significant energy savings and optimal performance can be achieved with the right configuration. Liquid cooled AC drives can be used in a multitude of combinations – from a single dedicated frequency converter to large-scale Common DC bus systems.

## Dedicated frequency converter

The VACON® NXP Liquid Cooled drives are available as 6- or 12-pulse frequency converters. In addition, our largest unit, the CH74, can also be used as an 18-pulse converter. The AC drive consists of a power unit, control unit and possibly one or more input chokes.

An internal brake chopper is available as an option for enclosure sizes CH72 (6-pulse only) and CH74. For all other enclosure sizes, the brake chopper is available as an option installed externally.

## 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 bi-directional (regenerative) power converter (supply unit) for the front-end of a common liquid cooled DC bus drive line-up. An external LCL filter is used at the input. This unit is suitable for applications where a low level of mains harmonics and high power factor are required. 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. Fuses, LCL filters, pre-charging rectifiers and resistors can be specified and ordered separately.

The LCL filter guarantees that harmonics are not an issue in any network. With a power factor > 0.99 and low harmonics, the supply chain transformers, generators, etc. can be sized very accurately without reserving margins for the reactive power. This can mean a saving of 10% in supply chain investments. Likewise the payback time is faster as regenerative energy is fed back to the grid.

Use the AFE hardware and Grid Converter application for more advanced AC/DC power conversion applications, such as energy storage or micro grid control.

## 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. A dedicated external choke is used at the input. This unit is suitable as a 6 or 12 pulse 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.

### Inverter unit (INU)

The INU 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 a connection to a live DC bus is required. The DC-side charging circuit is external for inverter types.

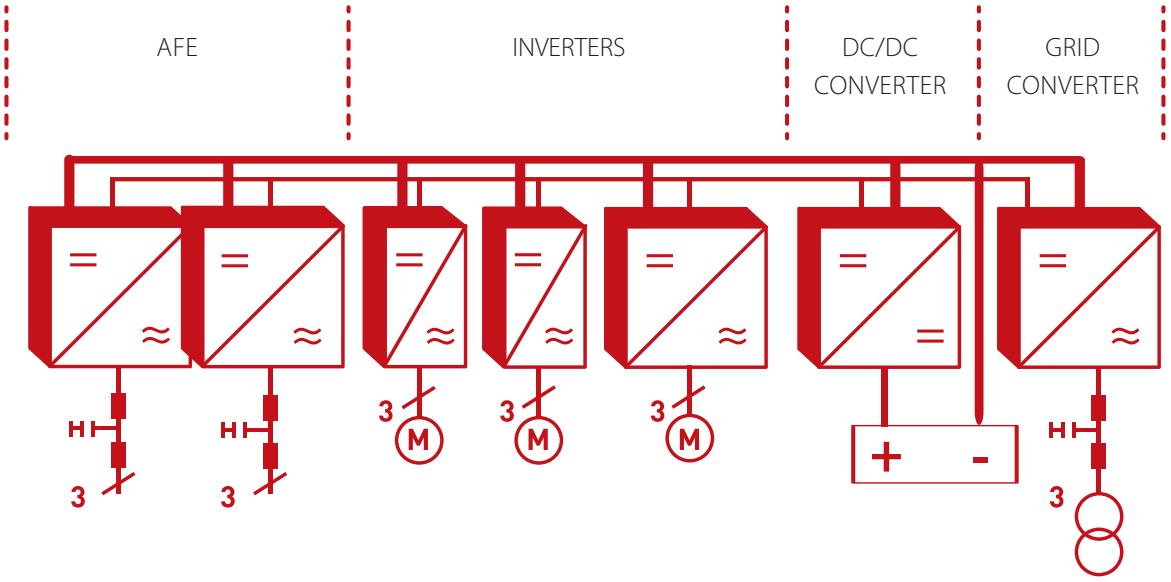
Pre-charging resistors and switches or fuses are not included in an INU delivery and must be specified and ordered separately.

### Brake chopper unit (BCU)

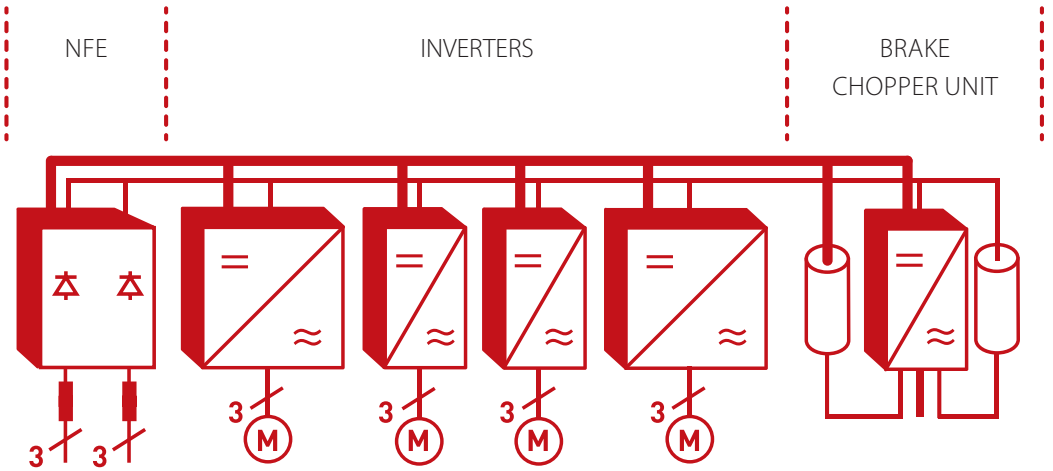
The BCU is a unidirectional power converter for the supply of excessive energy from a common DC bus drive line-up or big AC drive to resistors where the energy is dissipated as heat. External resistors are required. However, resistors or fuses are not included in a BCU delivery and can be specified and ordered separately.

BCU's improve a drive's dynamic performance in a regenerative operating point and protect common DC bus voltage level from overvoltage. In some cases they also reduce the need for AFE investments.

## A regenerative common DC bus system




## A non-regenerative common DC bus system



## DC/DC Converter (DC/DC)

The DC/DC converter is a bi-directional power converter which can flexibly convert power between different levels of DC-voltage. The DC/DC converter is based on the same inverter hardware and filter chokes, together with an advanced power conversion application.

A typical use case is to connect batteries or other energy storage to a common DC-link drive system. The advantage of the DC/DC converter is its wide input voltage range which enables connection of any battery in the system. Bi-directional power conversion enables peak shaving in hybrid propulsion systems onboard marine vessels.

***Discover more***

## VACON® NXP Grid Converter

This dedicated application provides advanced bi-directional AC/DC power conversion, with advanced load sharing and droop control. Ideal for battery energy storage, micro grid forming, black-out prevention, shore supply, shaft generator and marine energy management applications.

***Discover more:*** VACON® NXP Grid Converter Selection Guide

## Benefits

- Fuel savings with hybridization and peak shaving
- Flexible power management with multiple control and reference options
- Patented independent paralleling, eliminating the need for drive-to-drive communication

## VACON® DCGuard

This semiconductor protection device enables fast disconnection and full selectivity between DC grids for all VACON® NXP series drives.

VACON® NXP DCGuard™ maintains the stability of the DC grid by detecting and cutting off any faulty DC currents, fast. It isolates the faulty part of the system within 5 microseconds, protecting the surrounding equipment and ensuring uninterrupted operation.

***Discover more:*** VACON® NXP DCGuard™ fact sheet

# Dedicated applications

## Intelligent system interfaces for heavy industries

VACON® System Interface Application (SIA) provides a flexible and extensive interface for use in coordinated drives, which have an overriding control system. VACON® SIA utilizes the most advanced functions of our VACON® NXP motor control software and is suitable for demanding drive systems such as those in the pulp & paper and metal industries, processing lines as well as many other standard applications.

### Benefits

- Power extension with VACON® DriveSynch
- Master Follower functions for torque sharing
- Freely configurable PLC logic

## Dedicated marine application

Our Marine Application provides flexibility and performance across all marine segment applications. VACON® Liquid Cooled drives bring many benefits to this segment in particular such as energy efficiency, improved process availability due to high redundancy, better process quality and control, as well as silent operation and substantially reduced emissions.

### Benefits

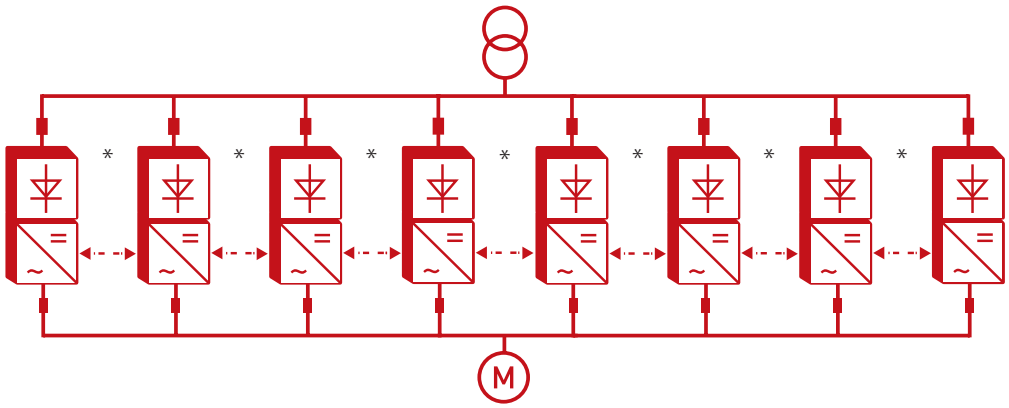
- Black-out prevention logic
- Cost savings in electric propulsion system
- State-of-the-art load sharing and load drooping

## High power and improved redundancy

VACON® DriveSynch is a patented control concept for running standard drives in parallel to control high-power AC motors or increase the redundancy of a system. This concept suits high power single or multiple winding motors, typically above 1 MW. High power AC drives above 5 MW can be built using standard drive components.

### Benefits

- System redundancy is higher than in a conventional drive because each unit can run independently
- Identical units and standard modules reduce overall costs by reducing need for spares and specialist skills in engineering, installation,commissioning and maintenance




* Fiber optic link


# VACON® NXP Liquid Cooled Enclosed drive

The low harmonic and regenerative VACON® NXP Liquid Cooled Enclosed Drives range has been developed especially with ease of use in mind. Packed full of features, these fully standardized, compact and robust AC drives with a full power range help maximize the utilization of space while minimizing overall costs.

These enclosed drives are the ideal solution for applications and locations where space is at a premium. The sturdy cabinet makes it ideal for harsh environments. See technical ratings and dimensions for further information.

## High power density

VACON® NXP Liquid Cooled Enclosed Drive can be used with AC motors in power sizes from 800–1550 kW. However, using the patented VACON® DriveSynch control concept, four enclosed drives can be run in parallel taking the power range up to an outstanding 5 MW.

## Fast installation

VACON® NXP Liquid Cooled Enclosed Drives are pre-designed and engineered. That means they're good to go as soon as you receive them. Simply connect to the cooling system and the power and motor supplies. Being liquid cooled, the product is virtually silent and you'll have greater flexibility with where to put it. You don't have to worry about leaving space for air flow, and you'll save on air-conditioning energy costs.

## Packed with cool performance

The enclosed unit comes equipped with the same advantages of efficient and quiet cooling performance as the rest of the VACON® NXP product family. When we say that this product is liquid cooled, we are talking about the entire product. The modules and also all its main components, such as LCL and dU/dt filters, are liquid cooled as standard. The reliable heat exchanger is offered as an option to provide a worry-free life cycle for the product.

You can also enjoy the same fast commissioning with the aid of the easy to use Startup Wizard. The slide-out racks provide easy access for maintenance. Leakage indicators alert the operator to any potential issues in the cooling system.

## A solution for all your needs

We provide enclosed solutions to any segment and application. And while we focus on the drives, you can concentrate on your performance.

### Eliminate production disturbances

Continuous energy supply is important to ensure your processes are optimized. Distortions in the energy supply, caused by the presence of harmonic currents and voltages, can trigger equipment disturbances and create energy losses. VACON® front-end drives with low harmonic technology maintain a constant energy supply and eliminate the disruption harmonics can cause to production.

### Advanced monitoring

The VACON® NXP Liquid Cooled Enclosed Drive's built-in Fieldbus interface communicates effectively with your process automation system. This reduces the need for cabling and gives you increased monitoring and control of process equipment.

### Safety is a given

One of the most visible features of the enclosed product is the integrated main breaker switch. This simple on/off switch quickly and easily disconnects and activates the power supply as and when necessary.

### Benefits

- Saves floor space and infrastructure needs
- Saves time and money in installation
- Faster and easier servicing
- Improves safety
- Enhances reliability
- Low harmonic input
- Virtually silent operation

### Key features

- Optimized design with power range up to 5 MW
- All standard protection components included
- Silent design with no large cooling fans needed
- Slide-out feature
- Leakage detector
- AFE technology
- Pre-engineered solution with all-liquid-cooled design (including filters)
- Cooling system monitoring

# Multiple options

## VACON® NXP control

High-performance control platform for all demanding drive applications

- Excellent processing and calculation power
- Supports induction and permanent magnet motors
- Maximum utilization of control features over wide power and voltage range
- Built-in PLC functionality allows you to customize the functionality of the converter. A programmed VACON® NXP drive can even replace a simple external PLC.
- Same control interface for any VACON®NXP drive from 0.5 kW to more than 5.3 MW
- Same control interface and hardware for all applications such as motor drives, Grid Converter and DC/DC Converter.
- Integration of customer-specific functionalities
- Bumpless transfer between open loop and closed loop control

## Option boards

VACON® NXP control provides exceptional modularity

- 5 plug-in extension slots
- Fieldbus boards
- Encoder boards
- IO boards
- Easy plug-in without need to remove other components

## Fieldbus options

Easy integration with plant automation systems

- PROFIBUS DP
- DeviceNet™
- Modbus RTU
- CANopen

## Ethernet connectivity

Ethernet connectivity allows remote drive access for monitoring, configuring and troubleshooting

- Modbus/TCP
- Modbus UDP
- PROFINET IO
- EtherNet/IP™
- EtherCAT



# Functional safety and reliability SIL3, Pl e, Cat. 4

## Safe Torque Off (STO)

Available for all VACON® NXP drives

- Prevents drive from generating torque on motor shaft
- Prevents unintentional start-ups
- Corresponds to an uncontrolled stop
- In accordance with stop category 0, EN60204-1

## Safe Stop 1 (SS1)

Available for all VACON® NXP drives

- Initiates motor deceleration
- Initiates STO function after application specific time delay
- Corresponds to an uncontrolled stop
- In accordance with stop category 1, EN60204-1

## Advanced Safety Options

Support more safety functions

Safe Stop functions::

- STO – Safe Torque Off
- SS1 – Safe Stop 1
- SS2 – Safe Stop 2
- SBC – Safe Brake Control
- SQS – Safe Quick Stop

Safe Speed functions:

- SLS – Safely-limited Speed
- SSM – Safe Speed Monitor
- SSR – Safe Speed Range
- SMS – Safe Maximum Speed

## Conformal coating

- Conformal coated circuit boards as standard
- Improved performance
- Increased durability
- Reliable protection against dust and moisture
- Extended lifetime of drive and components

## ATEX- certified thermistor input

Especially designed for motor temperature supervision

- Stops feeding energy to motor in case of over-heating
- Certified and compliant with the European ATEX directive 2014/34/EU

# Commissioning made easy

## User-friendly keypad

- 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
- The startup wizard ensures a hassle-free set up

## Software modularity

All-in-One application package

- Seven built-in software applications

Several segment-specific and advanced applications such as:

- System Interface
- Marine
- DC/DC converter
- Grid converter
- and much more

## VACON® NCDrive

Includes handy Datalogger function

- Track failure modes & perform root cause analysis
- Monitor your process with a graphical view

Communicates with drive via:

- RS232
- Ethernet TCP/IP
- CAN (fast multiple drive monitoring)
- CAN@Net (remote monitoring)

## Independent paralleling

Our patented independent paralleling configuration of front-end (AFE) units:

- Offer high redundancy
- Eliminate need for drive-to-drive communication
- Enables automatic load sharing


# Achieve maximum availability of your system – with **condition-based monitoring**

Equipped with intelligent monitoring functionality, the VACON® drive enables you to use the drive as a smart sensor. It can monitor the condition of your motor and application in real time, detect when current operation status is drifting away from the defined limits, and alert the operator to changes before they impact your process.

## Condition-based monitoring

During installation, the condition-based monitoring (CBM) function establishes a baseline defining the recorded operation conditions for each monitoring element of the system, and threshold values are defined. During operation, CBM monitors motor stator windings, sensors and load-envelope conditions, all adjusted according to the actual speed of the system. When actual operation conditions exceed the defined limits, CBM sends alerts to notify personnel to take action.

The CBM function complies with relevant standards and guidelines, such as

- ISO 13373 standard for Condition Monitoring and Diagnostics of Machines
- VDMA 24582 guideline for condition monitoring
- ISO 10816/20186 standards for measurement and evaluation of mechanical vibration.

The unique embedded functionality means that the VACON® drive performs CBM monitoring inside the drive. When required, activate cloud or PLC connectivity to enable monitoring of numerous conditions or to send alerts when required.

| Feature | Benefit |
|---|---|
| Condition-based monitoring functionality embedded in the drive | - No cloud connection required: high security level and no subscription fee<br>- Reduced installation costs, since no external controller or PLC required to generate the CBM observation and notification<br>- Documentation of system stability |
| Motor-stator-winding monitoring | - More uptime due to early detection and action on faults in the motor stator winding, before the fault develops into a crippling failure and unscheduled operational stop |
| Load-envelope monitoring<br>Application baseline (run / online) | - Process optimization/maximized efficiency thanks to ability to compare actual system performance with baseline data and trigger maintenance actions |
| Sensor application monitoring (external)<br>Application baseline (run / online) | - More uptime due to early detection and action on signs of mechanical misalignment, wear-out and looseness<br>- Higher precision since sensor monitoring relates to motor speed |

*Read the white paper here*

## Motor-stator-winding condition monitoring

Motor-winding failures do not occur suddenly; they develop over time. They start with a small single-turn shortcircuit fault which causes additional heating. The damage then spreads to a level where the overcurrent protection activates, and the operation stops, causing unwanted downtime.

The unique winding condition monitoring function allows you to shift from reactively performing corrective maintenance of faulty motors, to proactively detecting motor isolation faults at an early stage and dealing with them during scheduled maintenance. In this way, you can avoid unwanted and potentially costly machine downtime caused by 'burned' motors.

## Sensor selection

One condition-based monitoring sensor input is defined by the analogue inputs. Using condition-based monitoring parameterization, you can scale the inputs to monitor the sensor signals where the vibration sensor is the most commonly used sensor type. Bearing, pressure and flow sensors could also be selected, provided that sensor selection is related to the drive speed of the system.

## Mechanical-vibration monitoring

Avoid accelerated wear of the mechanical parts of a drive system by using CBM together with an external vibration transducer, to monitor the vibration level in a motor or application, related to the actual speed or rotation of the system.

Vibration monitoring is performed using standardized methods and threshold levels given in standards such as ISO13373 for Condition Monitoring and Diagnostics of Machines or ISO10816/20816 for Measurement and Classification of Mechanical Vibration.

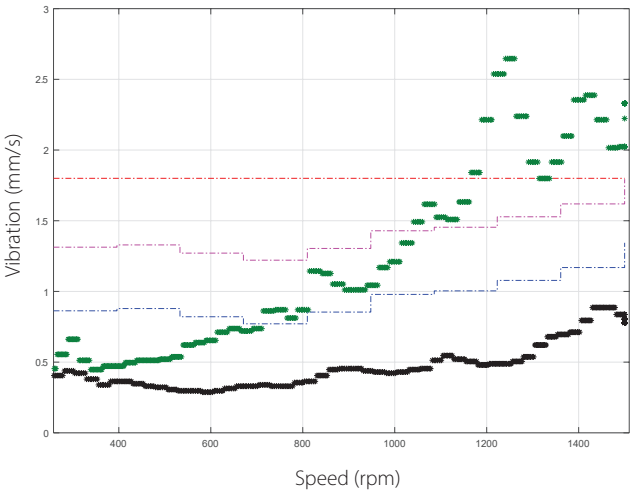
Baseline measurement of min/max and average values indicate the stability of a system at different speeds and are very useful as a hand-over test from contractor to end-user.

## Load-envelope monitoring

Use the VACON® drive to compare the actual load curve to the initial values determined during commissioning. This empowers you to detect unexpected operating conditions, such as

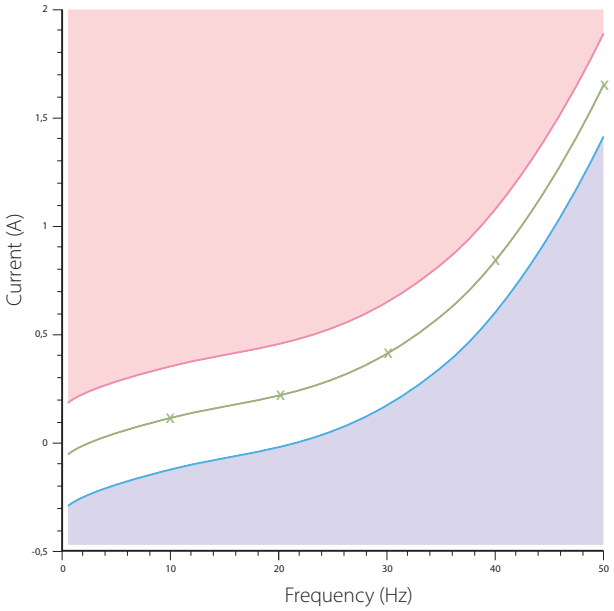
- leakage in an HVAC system. Inadequate or excessive power consumption indicates a problem, defined at individual speeds.
- pumps which have become fouled or sanded
- clogged air filters in ventilation systems

When a part has worn out, the load curve changes compared to the initial baseline, and a maintenance warning is triggered allowing you to quickly and effectively remedy the issue. Load-envelope monitoring can also help you to save energy by ensuring the equipment always runs in optimal conditions.




Application example showing changes in vibration signal

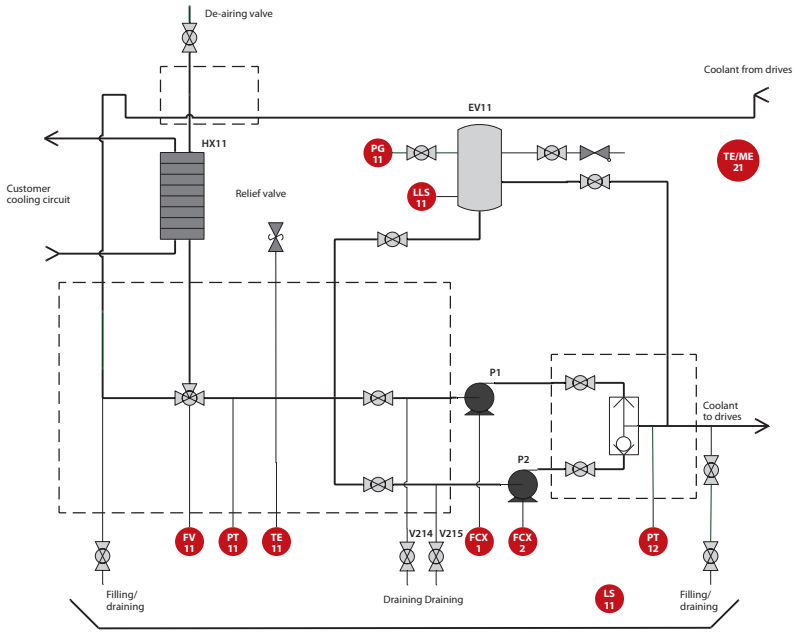
- Baseline data
- Faulty data
- Alarm Level
- Warning Stage 2 Level
- Warning Stage 1 Level




Baseline - Load envelope monitoring of energy consumption.

- Energy consumption above the limit
- Energy consumption below the limit

# Highly compact cooling unit




The liquid-cooled system modules empower you to pack a lot of power into a small space, to optimize your systems – and give you new application opportunities. At the heart of this groundbreaking technology is the cooling unit.

The cooling unit is service-friendly despite its extremely compact design, making it fast and easy to work with.

The cooling unit gives you especially easy access to the pump, as well as providing pump shut-off valves.

**What's included in the cooling unit**
- Liquid cooling temperature control with integrated 3-way valve
- Extensive sensor package with humidity and ambient temperature measurement

**Compatibility**
- Compatible with diverse Ethernet-based fieldbuses

**Type approvals (pending)**
- DNV-GL, ABS, LR, BV and CCS

# Technical information

**System pressure**
- Customer side: max 1000 kPa
- Drive side working pressure: 50-350 kPA, maximum 600 kPa

**Cooling**
- Ambient temperature: -15-55 °C
- Coolant temperature: -15-38 °C (Ith) (nominal); 38-55 °C with limited performance
- Cooling unit supply distance: 15-25 m, optionally up to 40 m
- Drive-side temperature control with 3-way valve and actuator

**Sensor measurements on the drive side**
- Pressure
- Flow (pressure sensor- based)
- Temperature
- Leakage detection
- Condensation (humidity/ambient temperature sensor-based.)

**Optional extras**
- Enclosure IP23 (without enclosure) and IP54
- Double/redundant pump
- Coolant connectors positioned on left or right side of the cooling unit

| Cooling unit [1] | | | | | |
|---|---|---|---|---|---|
| **Model code** | **Cooling power [kW]** | **Coolant flow [l/min]** | **Pump quantity** | **Dimensions IP23 enclosures W x H x D [mm]** | **Dimensions IP54 enclosures W x H x D [mm]** |
| **iC7-60SLLQxx-0076…** | 76 | 190 | 1 and 2 | 300/500 x 1900 x 550 | 408/608 x 2060 x 608 |
| **iC7-60SLLQxx-0152…** | 152 | 360 | 1 and 2 | 300/500 x 1900 x 550 | 408/608 x 2060 x 608 |

[1] *Performance data of the cooling unit is preliminary. For more information, contact your local Danfoss office or Danfoss partner*

# Ratings and dimensions

## VACON® NXP Liquid Cooled AC drives, 6-pulse and 12-pulse, mains voltage 400-500 VAC

| AC drive type 6-pulse | AC drive type 12-pulse | Drive output current | | | Motor shaft power | | Power loss c/a/T*) [kW] | Chassis | Choke type 6-pulse* | Choke type 12-pulse |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Thermal $I_{th}$ [A] | Rated cont. $I_L$ [A] | Rated cont. $I_H$ [A] | Optimum motor at $I_{th}$ (400 V) [kW] | Optimum motor at $I_{th}$ (500 V) [kW] | | | | |
| **NXP01685A0N0SWV** | | 168 | 153 | 112 | 90 | 110 | 4.0/0.4/4.4 | CH5 | CHK-0261-6-DL | |
| **NXP02055A0N0SWV** | | 205 | 186 | 137 | 110 | 132 | 5.0/0.5/5.5 | CH5 | CHK-0261-6-DL | |
| **NXP02615A0N0SWV** | | 261 | 237 | 174 | 132 | 160 | 6.0/0.5/6.5 | CH5 | CHK-0261-6-DL | |
| **NXP03005A0N0SWG** | | 300 | 273 | 200 | 160 | 200 | 4.5/0.5/5.0 | CH61 | CHK-0400-6-DL | |
| **NXP03855A0N0SWG** | | 385 | 350 | 257 | 200 | 250 | 6.0/0.5/6.5 | CH61 | CHK-0400-6-DL | |
| **NXP04605A0N0SWG** | **NXP04605A0N0TWG** | 460 | 418 | 307 | 250 | 315 | 6.5/0.5/7.0 | CH72 | CHK-0520-6-DL | 2 x CHK-0261-6-DL |
| **NXP05205A0N0SWG** | **NXP05205A0N0TWG** | 520 | 473 | 347 | 250 | 355 | 7.5/0.6/8.1 | CH72 | CHK-0520-6-DL | 2 x CHK-0261-6-DL |
| **NXP05905A0N0SWG** | **NXP05905A0N0TWG** | 590 | 536 | 393 | 315 | 400 | 9.0/0.7/9.7 | CH72 | CHK-0650-6-DL | 2 x CHK-0400-6-DL |
| **NXP06505A0N0SWG** | **NXP06505A0N0TWG** | 650 | 591 | 433 | 355 | 450 | 10.0/0.7/10.7 | CH72 | CHK-0650-6-DL | 2 x CHK-0400-6-DL |
| **NXP07305A0N0SWG** | **NXP07305A0N0TWG** | 730 | 664 | 487 | 400 | 500 | 12.0/0.8/12.8 | CH72 | CHK-0750-6-DL | 2 x CHK-0400-6-DL |
| **NXP08205A0N0SWG** | | 820 | 745 | 547 | 450 | 560 | 12.5/0.8/13.3 | CH63 | CHK-0820-6-DL | |
| **NXP09205A0N0SWG** | | 920 | 836 | 613 | 500 | 600 | 14.4/0.9/15.3 | CH63 | CHK-1030-6-DL | |
| **NXP10305A0N0SWG** | | 1030 | 936 | 687 | 560 | 700 | 16.5/1.0/17.5 | CH63 | CHK-1030-6-DL | |
| **NXP11505A0N0SWG** | | 1150 | 1045 | 766 | 600 | 750 | 18.5/1.2/19.7 | CH63 | CHK-1150-6-DL | |
| **NXP13705A0N0SWG** | **NXP13705A0N0TWG** | 1370 | 1245 | 913 | 700 | 900 | 19.0/1.2/20.2 | CH74 | 3 x CHK-0520-6-DL | 2 x CHK-0750-6-DL |
| **NXP16405A0N0SWG** | **NXP16405A0N0TWG** | 1640 | 1491 | 1093 | 900 | 1100 | 24.0/1.4/25.4 | CH74 | 3 x CHK-0650-6-DL | 2 x CHK-0820-6-DL |
| **NXP20605A0N0SWG** | **NXP20605A0N0TWG** | 2060 | 1873 | 1373 | 1100 | 1400 | 32.5/1.8/34.3 | CH74 | 3 x CHK-0750-6-DL | 2 x CHK-1030-6-DL |
| **NXP23005A0N0SWG** | | 2300 | 2091 | 1533 | 1250 | 1500 | 36.3/2.0/38.3 | CH74 | 3 x CHK-0820-6-DL | |
| **NXP24705A0N0SWG** | **NXP24705A0N0TWG** | 2470 | 2245 | 1647 | 1300 | 1600 | 38.8/2.2/41.0 | 2 x CH74 | 6 x CHK-0520-6-DL | 4 x CHK-0650-6-DL |
| **NXP29505A0N0SWG** | **NXP29505A0N0TWG** | 2950 | 2681 | 1967 | 1550 | 1950 | 46.3/2.6/48.9 | 2 x CH74 | 6 x CHK-0520-6-DL | 4 x CHK-0750-6-DL |
| **NXP37105A0N0SWG** | **NXP37105A0N0TWG** | 3710 | 3372 | 2473 | 1950 | 2450 | 58.2/3.0/61.2 | 2 x CH74 | 6 x CHK-0650-6-DL | 4 x CHK-1030-6-DL |
| **NXP41405A0N0SWG** | **NXP41405A0N0TWG** | 4140 | 3763 | 2760 | 2150 | 2700 | 65.0/3.6/68.6 | 2 x CH74 | 6 x CHK-0750-6-DL | 4 x CHK-1150-6-DL |
| **2 x NXP24705A0N0SWG** | **2 x NXP24705A0N0TWG** | 4700 | 4300 | 3100 | 2450 | 3050 | 73.7/4.2/77.9 | 4 x CH74 | 12 x CHK-0520-6-DL | 8 x CHK-0650-6-DL |
| **2 x NXP29505A0N0SWG** | **2 x NXP29505A0N0TWG** | 5600 | 5100 | 3700 | 2900 | 3600 | 88/5/93 | 4 x CH74 | 12 x CHK-0520-6-DL | 8 x CHK-0750-6-DL |
| **2 x NXP37105A0N0SWG** | **2 x NXP37105A0N0TWG** | 7000 | 6400 | 4700 | 3600 | 4500 | 110.6/5.7/116.3 | 4 x CH74 | 12 x CHK-0650-6-DL | 8 x CHK-1030-6-DL |
| **2 x NXP41405A0N0SWG** | **2 x NXP41405A0N0TWG** | 7900 | 7200 | 5300 | 4100 | 5150 | 123.5/6.9/130.4 | 4 x CH74 | 12 x CHK-0750-6-DL | 8 x CHK-1150-6-DL |

$I_{th}$ = Thermal maximum continuous RMS current. Dimensioning can be done according to this current if the process does not require any overloadability or the process does not include any load variation or margin for overloadability.

$I_L$ = Low overloadability current. Allows +10% load variation. 10% exceeding can be continuous.

$I_H$ = High overloadability current. Allows +50% load variation. 50% exceeding can be continuous.

All values with cosφ = 0,83 and efficiency = 97%

***) c** = power loss into coolant; **a** = power loss into air; **T** = total power loss; power losses of input chokes not included. All power losses obtained using max. supply voltage, Ith and switching frequency of 3.6 kHz and Closed Loop control mode. All power losses are worst case losses.

If some other mains voltage is used, apply the formula **$P = \sqrt{3} \times Un \times In \times \cos\varphi \times eff\%$** to calculate the NX Liquid-Cooled drive output power.

The enclosure class for all NX Liquid-Cooled AC drives is IP00.

If the motor is continuously run at frequencies below 5 Hz (besides start and stop ramps), please pay attention to the drive dimensioning for low frequencies, i.e. maximum $I = 0.66^* I_{th}$ or choose drive according to $I_H$. It is recommended to check the rating with your distributor or Vacon.

Drive overrating may also be necessary if the process requires high starting torque.

## VACON® NXP Liquid Cooled AC drives, 6-pulse and 12-pulse, mains voltage 525-690 VAC

| AC drive type 6-pulse | AC drive type 12-pulse | Drive output current | | | Motor shaft power | | Power loss c/a/T*) [kW] | Chassis | Choke type 6-pulse | Choke type 12-pulse |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Thermal $I_{th}$ [A] | Rated cont. $I_L$ [A] | Rated cont. $I_H$ [A] | Optimum motor at $I_{th}$ (525 V) [kW] | Optimum motor at $I_{th}$ (690 V) [kW] | | | | |
| NXP01706A0T0SWG | | 170 | 155 | 113 | 110 | 160 | 4.0/0.2/4.2 | CH61 | CHK-0261-6-DL | |
| NXP02086A0T0SWG | | 208 | 189 | 139 | 132 | 200 | 4.8/0.3/5.1 | CH61 | CHK-0261-6-DL | |
| NXP02616A0T0SWG | | 261 | 237 | 174 | 160 | 250 | 6.3/0.3/6.6 | CH61 | CHK-0261-6-DL | |
| NXP03256A0T0SWG | NXP03256A0T0TWG | 325 | 295 | 217 | 200 | 300 | 7.2/0.4/7.6 | CH72 | CHK-0400-6-DL | 2 x CHK-0261-6-DL |
| NXP03856A0T0SWG | NXP03856A0T0TWG | 385 | 350 | 257 | 250 | 355 | 8.5/0.5/9.0 | CH72 | CHK-0400-6-DL | 2 x CHK-0261-6-DL |
| NXP04166A0T0SWG | NXP04166A0T0TWG | 416 | 378 | 277 | 250 | 355 | 9.1/0.5/9.6 | CH72 | CHK-0520-6-DL | 2 x CHK-0261-6-DL |
| NXP04606A0T0SWG | NXP04606A0T0TWG | 460 | 418 | 307 | 300 | 400 | 10.0/0.5/10.5 | CH72 | CHK-0520-6-DL | 2 x CHK-0261-6-DL |
| NXP05026A0T0SWG | NXP05026A0T0TWG | 502 | 456 | 335 | 355 | 450 | 11.2/0.6/11.8 | CH72 | CHK-0520-6-DL | 2 x CHK-0261-6-DL |
| NXP05906A0T0SWG | | 590 | 536 | 393 | 400 | 560 | 12.4/0.7/13.1 | CH63 | CHK-0650-6-DL | |
| NXP06506A0T0SWG | | 650 | 591 | 433 | 450 | 600 | 14.2/0.8/15.0 | CH63 | CHK-0650-6-DL | |
| NXP07506A0T0SWG | | 750 | 682 | 500 | 500 | 700 | 16.4/0.9/17.3 | CH63 | CHK-0750-6-DL | |
| NXP08206A0T0SWG | NXP08206A0T0TWG | 820 | 745 | 547 | 560 | 800 | 17.3/1.0/18.3 | CH74 | 3 x CHK-0400-6-DL | 2 x CHK-0520-6-DL |
| NXP09206A0T0SWG | NXP09206A0T0TWG | 920 | 836 | 613 | 650 | 850 | 19.4/1.1/20.5 | CH74 | 3 x CHK-0400-6-DL | 2 x CHK-0520-6-DL |
| NXP10306A0T0SWG | NXP10306A0T0TWG | 1030 | 936 | 687 | 700 | 1000 | 21.6/1.2/22.8 | CH74 | 3 x CHK-0400-6-DL | 2 x CHK-0520-6-DL |
| NXP11806A0T0SWG | NXP11806A0T0TWG | 1180 | 1073 | 787 | 800 | 1100 | 25.0/1.3/26.3 | CH74 | 3 x CHK-0400-6-DL | 2 x CHK-0650-6-DL |
| NXP13006A0T0SWG | NXP13006A0T0TWG | 1300 | 1182 | 867 | 900 | 1200 | 27.3/1.5/28.8 | CH74 | 3 x CHK-0520-6-DL | 2 x CHK-0650-6-DL |
| NXP15006A0T0SWG | NXP15006A0T0TWG | 1500 | 1364 | 1000 | 1050 | 1400 | 32.1/1.7/33.8 | CH74 | 3 x CHK-0520-6-DL | 2 x CHK-0820-6-DL |
| NXP17006A0T0SWG | NXP17006A0T0TWG | 1700 | 1545 | 1133 | 1150 | 1550 | 36.5/1.9/38.4 | CH74 | 3 x CHK-0650-6-DL | 2 x CHK-1030-6-DL |
| NXP18506A0T0SWG | NXP18506A0T0TWG | 1850 | 1682 | 1233 | 1250 | 1650 | 39.0/2.0/41.0 | 2 x CH74 | 6 x CHK-0400-6-DL | 4 x CHK-0520-6-DL |
| NXP21206A0T0SWG | NXP21206A0T0TWG | 2120 | 1927 | 1413 | 1450 | 1900 | 44.9/2.4/47.3 | 2 x CH74 | 6 x CHK-0400-6-DL | 4 x CHK-0650-6-DL |
| NXP23406A0T0SWG | NXP23406A0T0TWG | 2340 | 2127 | 1560 | 1600 | 2100 | 49.2/2.6/51.8 | 2 x CH74 | 6 x CHK-0400-6-DL | 4 x CHK-0650-6-DL |
| NXP27006A0T0SWG | NXP27006A0T0TWG | 2700 | 2455 | 1800 | 1850 | 2450 | 57.7/3.1/60.8 | 2 x CH74 | 6 x CHK-0520-6-DL | 4 x CHK-0750-6-DL |
| NXP31006A0T0SWG | NXP31006A0T0TWG | 3100 | 2818 | 2066 | 2150 | 2800 | 65.7/3.4/69.1 | 2 x CH74 | 6 x CHK-0520-6-DL | 4 x CHK-0820-6-DL |
| 2 x NXP18506A0T0SWG | 2 x NXP18506A0T0TWG | 3500 | 3200 | 2300 | 2400 | 3150 | 74,2/3,8/77,9 | 4 x CH74 | 12 x CHK-0400-6-DL | 8 x CHK-0520-6-DL |
| 2 x NXP21206A0T0SWG | 2 x NXP21206A0T0TWG | 4000 | 3600 | 2700 | 2750 | 3600 | 85,4/4,5/89,9 | 4 x CH74 | 12 x CHK-0400-6-DL | 8 x CHK-0650-6-DL |
| 2 x NXP23406A0T0SWG | 2 x NXP23406A0T0TWG | 4400 | 4000 | 2900 | 3050 | 3950 | 93,4/5,0/98,4 | 4 x CH74 | 12 x CHK-0400-6-DL | 8 x CHK-0650-6-DL |
| 2 x NXP27006A0T0SWG | 2 x NXP27006A0T0TWG | 5100 | 4600 | 3400 | 3500 | 4600 | 109,7/5,8/115,5 | 4 x CH74 | 12 x CHK-0520-6-DL | 8 x CHK-0750-6-DL |
| 2 x NXP31006A0T0SWG | 2 x NXP31006A0T0TWG | 5900 | 5400 | 3900 | 4050 | 5300 | 124,8/6,5/131,3 | 4 x CH74 | 12 x CHK-0520-6-DL | 8 x CHK-0820-6-DL |

## Standard chokes for VACON® NX Liquid Cooled product range

| Choke type | Heat losses [W] | Dimensions W x H x D [mm] | Weight [kg] |
|---|---|---|---|
| CHK-0261-6-DL | 323 | 308 x 500 x 270 | 70 |
| CHK-0400-6-DL | 484 | 308 x 497 x 276 | 75 |
| CHK-0520-6-DL | 574 | 450 x 502 x 276 | 104 |
| CHK-0650-6-DL | 468 | 450 x 505 x 284 | 121 |
| CHK-0750-6-DL | 816 | 450 x 557 x 284 | 135 |
| CHK-0820-6-DL | 731 | 450 x 506 x 282 | 118 |
| CHK-1030-6-DL | 777 | 450 x 642 x 274 | 124 |
| CHK-1150-6-DL | 882 | 450 x 647 x 308 | 162 |

## VACON® NXP Liquid Cooled inverter units, DC bus voltage 465-800 VDC

| AC drive type | Drive output current | | | Motor shaft power | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated cont. $I_L$ [A] | Rated cont. $I_H$ [A] | Optimum motor at $I_{th}$ (540 VDC) [kW] | Optimum motor at $I_{th}$ (675 VDC) [kW] | | |
| **NXP01685A0T0IWV** | 168 | 153 | 112 | 90 | 110 | 2.5/0.3/2.8 | CH5 |
| **NXP02055A0T0IWV** | 205 | 186 | 137 | 110 | 132 | 3.0/0.4/3.4 | CH5 |
| **NXP02615A0T0IWV** | 261 | 237 | 174 | 132 | 160 | 4.0/0.4/4.4 | CH5 |
| **NXP03005A0T0IWG** | 300 | 273 | 200 | 160 | 200 | 4.5/0.4/4.9 | CH61 |
| **NXP03855A0T0IWG** | 385 | 350 | 257 | 200 | 250 | 5.5/0.5/6.0 | CH61 |
| **NXP04605A0T0IWG** | 460 | 418 | 307 | 250 | 315 | 5.5/0.5/6.0 | CH62 |
| **NXP05205A0T0IWG** | 520 | 473 | 347 | 250 | 355 | 6.5/0.5/7.0 | CH62 |
| **NXP05905A0T0IWG** | 590 | 536 | 393 | 315 | 400 | 7.5/0.6/8.1 | CH62 |
| **NXP06505A0T0IWG** | 650 | 591 | 433 | 355 | 450 | 8.5/0.6/9.1 | CH62 |
| **NXP07305A0T0IWG** | 730 | 664 | 487 | 400 | 500 | 10.0/0.7/10.7 | CH62 |
| **NXP08205A0T0IWG** | 820 | 745 | 547 | 450 | 560 | 12.5/0.8/13.3 | CH63 |
| **NXP09205A0T0IWG** | 920 | 836 | 613 | 500 | 600 | 14.4/0.9/15.3 | CH63 |
| **NXP10305A0T0IWG** | 1030 | 936 | 687 | 560 | 700 | 16.5/1.0/17.5 | CH63 |
| **NXP11505A0T0IWG** | 1150 | 1045 | 766 | 600 | 750 | 18.4/1.1/19.5 | CH63 |
| **NXP13705A0T0IWG** | 1370 | 1245 | 913 | 700 | 900 | 15.5/1.0/16.5 | CH64 |
| **NXP16405A0T0IWG** | 1640 | 1491 | 1093 | 900 | 1100 | 19.5/1.2/20.7 | CH64 |
| **NXP20605A0T0IWG** | 2060 | 1873 | 1373 | 1100 | 1400 | 26.5/1.5/28.0 | CH64 |
| **NXP23005A0T0IWG** | 2300 | 2091 | 1533 | 1250 | 1500 | 29.6/1.7/31.3 | CH64 |
| **NXP24705A0T0IWG** | 2470 | 2245 | 1647 | 1300 | 1600 | 36.0/2.0/38.0 | 2 x CH64 |
| **NXP29505A0T0IWG** | 2950 | 2681 | 1967 | 1550 | 1950 | 39.0/2.4/41.4 | 2 x CH64 |
| **NXP37105A0T0IWG** | 3710 | 3372 | 2473 | 1950 | 2450 | 48.0/2.7/50.7 | 2 x CH64 |
| **NXP41405A0T0IWG** | 4140 | 3763 | 2760 | 2150 | 2700 | 53.0/3.0/56.0 | 2 x CH64 |
| **2 x NXP24705A0T0IWG** | 4700 | 4300 | 3100 | 2450 | 3050 | 69.1/3.9/73 | 4 x CH64 |
| **2 x NXP29505A0T0IWG** | 5600 | 5100 | 3700 | 2900 | 3600 | 74.4/4.6/79 | 4 x CH64 |
| **2 x NXP37105A0T0IWG** | 7000 | 6400 | 4700 | 3600 | 4500 | 90.8/5.2/96 | 4 x CH64 |
| **2 x NXP41405A0T0IWG** | 7900 | 7200 | 5300 | 4100 | 5150 | 101.2/5.8/107 | 4 x CH64 |

**The voltage classes for the inverter units used in the tables above have been defined as follows:**

Input 540 VDC = Rectified 400 VAC supply

Input 675 VDC = Rectified 500 VAC supply

## VACON® NXP Liquid Cooled inverter units, DC bus voltage 640-1100 VDC [1)]

| AC drive type | Drive output current | | | Motor shaft power | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated cont. $I_L$ [A] | Rated cont. $I_H$ [A] | Optimum motor at $I_{th}$ (710 VDC) [kW] | Optimum motor at $I_{th}$ (930 VDC) [kW] | | |
| **NXP01706A0T0IWG** | 170 | 155 | 113 | 110 | 160 | 3.6/0.2/3.8 | CH61 |
| **NXP02086A0T0IWG** | 208 | 189 | 139 | 132 | 200 | 4.3/0.3/4.6 | CH61 |
| **NXP02616A0T0IWG** | 261 | 237 | 174 | 160 | 250 | 5.4/0.3/5.7 | CH61 |
| **NXP03256A0T0IWG** | 325 | 295 | 217 | 200 | 300 | 6.5/0.3/6.8 | CH62 |
| **NXP03856A0T0IWG** | 385 | 350 | 257 | 250 | 355 | 7.5/0.4/7.9 | CH62 |
| **NXP04166A0T0IWG** | 416 | 378 | 277 | 250 | 355 | 8.0/0.4/8.4 | CH62 |
| **NXP04606A0T0IWG** | 460 | 418 | 307 | 300 | 400 | 8.7/0.4/9.1 | CH62 |
| **NXP05026A0T0IWG** | 502 | 456 | 335 | 355 | 450 | 9.8/0.5/10.3 | CH62 |
| **NXP05906A0T0IWG** | 590 | 536 | 393 | 400 | 560 | 10.9/0.6/11.5 | CH63 |
| **NXP06506A0T0IWG** | 650 | 591 | 433 | 450 | 600 | 12.4/0.7/13.1 | CH63 |
| **NXP07506A0T0IWG** | 750 | 682 | 500 | 500 | 700 | 14.4/0.8/15.2 | CH63 |
| **NXP08206A0T0IWG** | 820 | 745 | 547 | 560 | 800 | 15.4/0.8/16.2 | CH64 |
| **NXP09206A0T0IWG** | 920 | 836 | 613 | 650 | 850 | 17.2/0.9/18.1 | CH64 |
| **NXP10306A0T0IWG** | 1030 | 936 | 687 | 700 | 1000 | 19.0/1.0/20.0 | CH64 |
| **NXP11806A0T0IWG** | 1180 | 1073 | 787 | 800 | 1100 | 21.0/1.1/22.1 | CH64 |
| **NXP13006A0T0IWG** | 1300 | 1182 | 867 | 900 | 1200 | 24.0/1.3/25.3 | CH64 |
| **NXP15006A0T0IWG** | 1500 | 1364 | 1000 | 1050 | 1400 | 28.0/1.5/29.5 | CH64 |
| **NXP17006A0T0IWG** | 1700 | 1545 | 1133 | 1150 | 1550 | 32.1/1.7/33.8 | CH64 |
| **NXP18506A0T0IWG** | 1850 | 1682 | 1233 | 1250 | 1650 | 34.2/1.8/36.0 | 2 x CH64 |
| **NXP21206A0T0IWG** | 2120 | 1927 | 1413 | 1450 | 1900 | 37.8/2.0/39.8 | 2 x CH64 |
| **NXP23406A0T0IWG** | 2340 | 2127 | 1560 | 1600 | 2100 | 43.2/2.3/45.5 | 2 x CH64 |
| **NXP27006A0T0IWG** | 2700 | 2455 | 1800 | 1850 | 2450 | 50.4/2.7/53.1 | 2 x CH64 |
| **NXP31006A0T0IWG** | 3100 | 2818 | 2066 | 2150 | 2800 | 57.7/3.1/60.8 | 2 x CH64 |
| **2 x NXP18506A0T0IWG** | 3500 | 3200 | 2300 | 2400 | 3150 | 64,9/3,5/68,4 | 4 x CH64 |
| **2 x NXP21206A0T0IWG** | 4000 | 3600 | 2700 | 2750 | 3600 | 71,8/3,8/75,6 | 4 x CH64 |
| **2 x NXP23406A0T0IWG** | 4400 | 4000 | 2900 | 3050 | 3950 | 82,1/4,4/86,5 | 4 x CH64 |
| **2 x NXP27006A0T0IWG** | 5100 | 4600 | 3400 | 3500 | 4600 | 95,8/5,1/100,9 | 4 x CH64 |
| **2 x NXP31006A0T0IWG** | 5900 | 5400 | 3900 | 4050 | 5300 | 109,7/5,8/115,5 | 4 x CH64 |

[1)] High power 525-690V AFE, INU and BCU units available as wide voltage range version (NX_8 models) with DC bus voltage 640-1200 VDC. The units are ordered with the nominal mains voltage code 8 instead of 6 as for the standard version.

**The following additional requirements applies to the wide voltage version:**

- output filter with an inductance of at least 0.7% needed
- external 24VDC supply for the control unit

**The voltage classes for the inverter units used in the tables above have been defined as follows:**

Input 710 VDC = Rectified 525 VAC supply

Input 930 VDC = Rectified 690 VAC supply

## VACON® NXP Liquid Cooled dimensions: drives consisting of one module

| Chassis | Width [mm] | Height [mm] | Depth [mm] | Weight [kg] |
|---|---|---|---|---|
| CH5 | 246 | 553 | 264 | 40 |
| CH60 | 246 | 673 | 374 | 55 |
| CH61/62 | 246 | 658 | 372 | 55 |
| CH63 | 505 | 923 | 375 | 120 |
| Ch64 | 746 | 923 | 375 | 180 |
| CH72 | 246 | 1076 | 372 | 90 |
| Ch74 | 746 | 1175 | 385 | 280 |

One-module drive dimensions (mounting base included). Please note that AC chokes are not included.

### VACON® NXN Liquid Cooled non regenerative front-end, DC bus voltage 465-800 V DC, 6/12-pulse

| AC drive type | AC current | | | DC power | | | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated $I_L$ [A] | Rated $I_H$ [A] | 400 VAC mains $I_{th}$ [kW] | 500 VAC mains $I_{th}$ [kW] | 400 VAC mains $I_L$ [kW] | 500 VAC mains $I_L$ [kW] | | |
| **NXN20006A0T0** | 2000 | 1818 | 1333 | 1282 | 1605 | 1165 | 1458 | 5.7/0.5/6.2 | CH60 |

### VACON® NXN Liquid Cooled non regenerative front-end, DC bus voltage 640-1100 V DC, 6/12-pulse

| AC drive type | AC current | | | DC power | | | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated $I_L$ [A] | Rated $I_H$ [A] | 525 VAC mains $I_{th}$ [kW] | 690 VAC mains $I_{th}$ [kW] | 525 VAC mains $I_L$ [kW] | 690 VAC mains $I_L$ [kW] | | |
| **NXN20006A0T0** | 2000 | 1818 | 1333 | 1685 | 2336 | 1531 | 2014 | 5.7/0.5/6.2 | CH60 |

### VACON® NXN Liquid Cooled non regenerative front-end line filters

| Choke type | Suitability | Power loss c/a/T*) [kW] | Dimensions 1 pc W x H x D | Total weight [kg] | Pcs for NXN | Cooling |
|---|---|---|---|---|---|---|
| **CHK-1030-6-DL** | **NXN20006A0T0WWVA1A2BHB100** | 1.18/0.5/1.68 | 506 x 676 x 302 | 237 | 2 | Liquid |

### VACON® NXA Liquid Cooled Active Front-end and Grid Converter, DC bus voltage 465-800 VDC

| AC drive type | AC current | | | DC power | | | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated $I_L$ [A] | Rated $I_H$ [A] | 400 VAC mains $I_{th}$ [kW] | 500 VAC mains $I_{th}$ [kW] | 400 VAC mains $I_L$ [kW] | 500 VAC mains $I_L$ [kW] | | |
| **NXA01685A0T02WV** | 168 | 153 | 112 | 113 | 142 | 103 | 129 | 2.5/0.3/2.8 | CH5 |
| **NXA02055A0T02WV** | 205 | 186 | 137 | 138 | 173 | 125 | 157 | 3.0/0.4/3.4 | CH5 |
| **NXA02615A0T02WV** | 261 | 237 | 174 | 176 | 220 | 160 | 200 | 4.0/0.4/4.4 | CH5 |
| **NXA03005A0T02WG** | 300 | 273 | 200 | 202 | 253 | 184 | 230 | 4.5/0.4/4.9 | CH61 |
| **NXA03855A0T02WG** | 385 | 350 | 257 | 259 | 324 | 236 | 295 | 5.5/0.5/6.0 | CH61 |
| **NXA04605A0T02WG** | 460 | 418 | 307 | 310 | 388 | 282 | 352 | 5.5/0.5/6.0 | CH62 |
| **NXA05205A0T02WG** | 520 | 473 | 347 | 350 | 438 | 319 | 398 | 6.5/0.5/7.0 | CH62 |
| **NXA05905A0T02WG** | 590 | 536 | 393 | 398 | 497 | 361 | 452 | 7.5/0.6/8.1 | CH62 |
| **NXA06505A0T02WG** | 650 | 591 | 433 | 438 | 548 | 398 | 498 | 8.5/0.6/9.1 | CH62 |
| **NXA07305A0T02WG** | 730 | 664 | 487 | 492 | 615 | 448 | 559 | 10.0/0.7/10.7 | CH62 |
| **NXA08205A0T02WG** | 820 | 745 | 547 | 553 | 691 | 502 | 628 | 10.0/0.7/10.7 | CH63 |
| **NXA09205A0T02WG** | 920 | 836 | 613 | 620 | 775 | 563 | 704 | 12.4/0.8/12.4 | CH63 |
| **NXA10305A0T02WG** | 1030 | 936 | 687 | 694 | 868 | 631 | 789 | 13.5/0.9/14.4 | CH63 |
| **NXA11505A0T02WG** | 1150 | 1045 | 767 | 775 | 969 | 704 | 880 | 16.0/1.0/17.0 | CH63 |
| **NXA13705A0T02WG** | 1370 | 1245 | 913 | 923 | 1154 | 839 | 1049 | 15.5/1.0/16.5 | CH64 |
| **NXA16405A0T02WG** | 1640 | 1491 | 1093 | 1105 | 1382 | 1005 | 1256 | 19.5/1.2/20.7 | CH64 |
| **NXA20605A0T02WG** | 2060 | 1873 | 1373 | 1388 | 1736 | 1262 | 1578 | 26.5/1.5/28.0 | CH64 |
| **NXA23005A0T02WG** | 2300 | 2091 | 1533 | 1550 | 1938 | 1409 | 1762 | 29.6/1.7/31.3 | CH64 |

## VACON® NXA Liquid Cooled Active Front-end and Grid Converter, DC bus voltage 640-1100 VDC [1)]

| AC drive type | AC current | | | DC power | | | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|---|
| | Thermal $I_{th}$ [A] | Rated $I_L$ [A] | Rated $I_H$ [A] | 525 VAC mains $I_{th}$ [kW] | 690 VAC mains $I_{th}$ [kW] | 525 VAC mains $I_L$ [kW] | 690 VAC mains $I_L$ [kW] | | |
| **NXA01706A0T02WG** | 170 | 155 | 113 | 150 | 198 | 137 | 180 | 3.6/0.2/3.8 | CH61 |
| **NXA02086A0T02WG** | 208 | 189 | 139 | 184 | 242 | 167 | 220 | 4.3/0.3/4.6 | CH61 |
| **NXA02616A0T02WG** | 261 | 237 | 174 | 231 | 303 | 210 | 276 | 5.4/0.3/5.7 | CH61 |
| **NXA03256A0T02WG** | 325 | 295 | 217 | 287 | 378 | 261 | 343 | 6.5/0.3/6.8 | CH62 |
| **NXA03856A0T02WG** | 385 | 350 | 257 | 341 | 448 | 310 | 407 | 7.5/0.4/7.9 | CH62 |
| **NXA04166A0T02WG** | 416 | 378 | 277 | 368 | 484 | 334 | 439 | 8.0/0.4/8.4 | CH62 |
| **NXA04606A0T02WG** | 460 | 418 | 307 | 407 | 535 | 370 | 486 | 8.7/0.4/9.1 | CH62 |
| **NXA05026A0T02WG** | 502 | 456 | 335 | 444 | 584 | 403 | 530 | 9.8/0.5/10.3 | CH62 |
| **NXA05906A0T02WG** | 590 | 536 | 393 | 522 | 686 | 474 | 623 | 10.9/0.6/11.5 | CH63 |
| **NXA06506A0T02WG** | 650 | 591 | 433 | 575 | 756 | 523 | 687 | 12.4/0.7/13.1 | CH63 |
| **NXA07506A0T02WG** | 750 | 682 | 500 | 663 | 872 | 603 | 793 | 14.4/0.8/15.2 | CH63 |
| **NXA08206A0T02WG** | 820 | 745 | 547 | 725 | 953 | 659 | 866 | 15.4/0.8/16.2 | CH64 |
| **NXA09206A0T02WG** | 920 | 836 | 613 | 814 | 1070 | 740 | 972 | 17.2/0.9/18.1 | CH64 |
| **NXA10306A0T02WG** | 1030 | 936 | 687 | 911 | 1197 | 828 | 1088 | 19.0/1.0/20.0 | CH64 |
| **NXA11806A0T02WG** | 1180 | 1073 | 787 | 1044 | 1372 | 949 | 1247 | 21.0/1.1/22.1 | CH64 |
| **NXA13006A0T02WG** | 1300 | 1182 | 867 | 1150 | 1511 | 1046 | 1374 | 24.0/1.3/25.3 | CH64 |
| **NXA15006A0T02WG** | 1500 | 1364 | 1000 | 1327 | 1744 | 1207 | 1586 | 28.0/1.5/29.5 | CH64 |
| **NXA17006A0T02WG** | 1700 | 1545 | 1133 | 1504 | 1976 | 1367 | 1796 | 32.1/1.7/33.8 | CH64 |

[1)] DC bus voltage 640-1200 VDC for wide range voltage version (NX_8).
* C = power loss into coolant, A = power loss into air, T = total power loss

## VACON® Liquid Cooled regenerative line filters

| LCL filter type | Suitability | Power loss c/a/T*) [kW] | Dimensions $L_{net}$ 1pcs WxHxD [mm] | Dimensions $L_{drive}$ 1pcs (total 3pcs) WxHxD [mm] | Dimensions $C_{bank}$ 1pcs WxHxD [mm] | Total weight [kg] |
|---|---|---|---|---|---|---|
| **RLC-0385-6-0** | CH62/690VAC: 325A & 385A | 2,6/0,8/3,4 | 580 x 450 x 385 | 410 x 415 x 385 | 360 x 265 x 150 | 458 |
| **RLC-0520-6-0** | CH62/500-690VAC | 2,65/0,65/3,3 | 580 x 450 x 385 | 410 x 415 x 385 | 360 x 265 x 150 | 481 |
| **RLC-0750-6-0** | CH62/500VAC, CH63/690VAC | 3,7/1/4,7 | 580 x 450 x 385 | 410 x 450 x 385 | 360 x 275 x 335 | 508 |
| **RLC-0920-6-0** | CH63/500VAC, CH64/690VAC | 4,5/1,4/5,9 | 580 x 500 x 390 | 410 x 500 x 400 | 360 x 275 x 335 | 577 |
| **RLC-1180-6-0** | CH63/500VAC, CH64/690VAC | 6,35/1,95/8,3 | 585 x 545 x 385 | 410 x 545 x 385 | 350 x 290 x 460 | 625 |
| **RLC-1640-6-0** | CH64/500-690VAC | 8,2/2,8/11 | 585 x 645 x 385 | 420 x 645 x 385 | 350 x 290 x 460 | 736 |
| **RLC-2300-5-0** | CH64/500VAC: 2060A & 2300A | 9,5/2,9/12,4 | 585 x 820 x 370 | 410 x 820 x 380 | 580 x 290 x 405 | 896 |

The RLC filter contains a 3-phase choke on the mains side, capacitors and 3pcs 1-phase chokes on the AFE side.

## VACON® NXP Liquid Cooled DC/DC Converter, DC-bus voltage 465-800 V DC

| Model code | Chassis | 750 V DC-bus voltage | | |
|---|---|---|---|---|
| | | DC bus | | DC source |
| | | $I_{DC\ bus}$ [A] | $P_{DC}$ [1] [kW] | $I_{DC}$ source [2] [A] |
| NXP01685A0T0IWV | CH5 | 195 | 146 | 336 |
| NXP02055A0T0IWV | CH5 | 238 | 179 | 410 |
| NXP02615A0T0IWV | CH5 | 306 | 230 | 522 |
| NXP03005A0T0IWG | CH61 | 352 | 264 | 600 |
| NXP03855A0T0IWG | CH61 | 456 | 342 | 770 |
| NXP04605A0T0IWG | CH62 | 545 | 409 | 920 |
| NXP05205A0T0IWG | CH62 | 616 | 462 | 1040 |
| NXP05905A0T0IWG | CH62 | 699 | 524 | 1180 |
| NXP06505A0T0IWG | CH62 | 770 | 578 | 1300 |
| NXP07305A0T0IWG | CH62 | 865 | 649 | 1460 |
| NXP08205A0T0IWG | CH63 | 972 | 729 | 1640 |
| NXP09205A0T0IWG | CH63 | 1090 | 818 | 1840 |
| NXP10305A0T0IWG | CH63 | 1221 | 916 | 2060 |
| NXP11505A0T0IWG | CH63 | 1378 | 1034 | 2200 |
| NXP13705A0T0IWG | CH64 | 1642 | 1232 | 2740 |
| NXP16405A0T0IWG | CH64 | 1965 | 1474 | 3280 |
| NXP20605A0T0IWG | CH64 | 2469 | 1852 | 4120 |
| NXP23005A0T0IWG | CH64 | 2756 | 2067 | 4200 |

[1] Maximum DC power with 750 V DC-bus voltage, limited by the DC-bus current
[2] Thermal current at 5 kHz switching frequency and 35° C coolant temperature
Further power extension available based on paralleling with droop control or master-follower

## VACON® NXP Liquid Cooled DC/DC Converter, DC-bus voltage 640-1100 V DC

| Model code | Chassis | 1025 V DC-bus voltage | | |
|---|---|---|---|---|
| | | DC bus | | DC source |
| | | $I_{DC\ bus}$ [A] | $P_{DC}$ [1] [kW] | $I_{DC}$ source [2] [A] |
| NXP01706A0T0IWG | CH61 | 199 | 204 | 340 |
| NXP02086A0T0IWG | CH61 | 244 | 250 | 416 |
| NXP02616A0T0IWG | CH61 | 309 | 317 | 500 |
| NXP03256A0T0IWG | CH62 | 385 | 395 | 650 |
| NXP03856A0T0IWG | CH62 | 456 | 467 | 770 |
| NXP04166A0T0IWG | CH62 | 493 | 505 | 832 |
| NXP04606A0T0IWG | CH62 | 545 | 559 | 920 |
| NXP05026A0T0IWG | CH62 | 595 | 610 | 975 |
| NXP05906A0T0IWG | CH63 | 699 | 716 | 1180 |
| NXP06506A0T0IWG | CH63 | 770 | 789 | 1300 |
| NXP07506A0T0IWG | CH63 | 889 | 911 | 1500 |
| NXP08206A0T0IWG | CH64 | 972 | 996 | 1640 |
| NXP09206A0T0IWG | CH64 | 1090 | 1117 | 1840 |
| NXP10306A0T0IWG | CH64 | 1221 | 1252 | 2060 |
| NXP11806A0T0IWG | CH64 | 1414 | 1449 | 2360 |
| NXP13006A0T0IWG | CH64 | 1558 | 1597 | 2600 |
| NXP15006A0T0IWG | CH64 | 1798 | 1843 | 3000 |
| NXP17006A0T0IWG | CH64 | 2040 | 2091 | 3400 |

[1] Maximum DC power with 1025 V DC-bus voltage, limited by the DC-bus current
[2] Thermal current at 5 kHz switching frequency and 35° C coolant temperature
Further power extension available based on paralleling with droop control or master-follower

## DC/DC filters

For selection of DC/DC filters, refer to the selection criteria and selection tables in the VACON® NXP DC Filters Design Guide.

## VACON® NXB Liquid Cooled external brake chopper, DC bus voltage 460-800 VDC

| AC drive type | Current | | | | Braking power | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|
| | BCU rated cont. braking current $I_{br}$ [A] | Rated min resistance 800 VDC (Ω) | Rated min resistance 600 VDC (Ω) | Rated max input current (Adc) | Rated cont. braking power 2*R 800 VDC [kW] | Rated cont. braking power 2*R 600 VDC [kW] | | |
| **NXB01685A0T08WV** | 2*168 | 4.7 | 3.6 | 336 | 267 | 203 | 2.5/0.3/2.8 | CH5 |
| **NXB02055A0T08WV** | 2*205 | 3.9 | 3.0 | 410 | 326 | 248 | 3.0/0.4/3.4 | CH5 |
| **NXB02615A0T08WV** | 2*261 | 3.1 | 2.3 | 522 | 415 | 316 | 4.0/0.4/4.4 | CH5 |
| **NXB03005A0T08WG** | 2*300 | 2.7 | 2.0 | 600 | 477 | 363 | 4.5/0.4/4.9 | CH61 |
| **NXB03855A0T08WG** | 2*385 | 2.1 | 1.6 | 770 | 613 | 466 | 5.5/0.5/6.0 | CH61 |
| **NXB04605A0T08WG** | 2*460 | 1.7 | 1.3 | 920 | 732 | 556 | 5.5/0.5/6.0 | CH62 |
| **NXB05205A0T08WG** | 2*520 | 1.5 | 1.2 | 1040 | 828 | 629 | 6.5/0.5/7.0 | CH62 |
| **NXB05905A0T08WG** | 2*590 | 1.4 | 1.1 | 1180 | 939 | 714 | 7.5/0.6/8.1 | CH62 |
| **NXB06505A0T08WG** | 2*650 | 1.2 | 1.0 | 1300 | 1035 | 786 | 8.5/0.6/9.1 | CH62 |
| **NXB07305A0T08WG** | 2*730 | 1.1 | 0.9 | 1460 | 1162 | 833 | 10.0/0.7/10.7 | CH62 |

## VACON® NXB Liquid Cooled external brake chopper, DC bus voltage 640-1100 VDC [1)]

| AC drive type | Current | | | | Braking power | | Power loss c/a/T*) [kW] | Chassis |
|---|---|---|---|---|---|---|---|---|
| | BCU rated cont. braking current $I_{br}$ [A] | Rated min resistance 1100 VDC (Ω) | Rated min resistance 840 VDC (Ω) | Rated max input current (Adc) | Rated cont. braking power 2*R 1100 VDC [kW] | Rated cont. braking power 2*R 840 VDC [kW] | | |
| **NXB01706A0T08WG** | 2*170 | 6.5 | 4.9 | 340 | 372 | 282 | 4.5/0.2/4.7 | CH61 |
| **NXB02086A0T08WG** | 2*208 | 5.3 | 4 | 416 | 456 | 346 | 5.5/0.3/5.8 | CH61 |
| **NXB02616A0T08WG** | 2*261 | 4.2 | 3.2 | 522 | 572 | 435 | 5.5/0.3/5.8 | CH61 |
| **NXB03256A0T08WG** | 2*325 | 3.4 | 2.6 | 650 | 713 | 542 | 6.5/0.3/6.8 | CH62 |
| **NXB03856A0T08WG** | 2*385 | 2.9 | 2.2 | 770 | 845 | 643 | 7.5/0.4/7.9 | CH62 |
| **NXB04166A0T08WG** | 2*416 | 2.6 | 2 | 832 | 913 | 693 | 8.1/0.4/8.4 | CH62 |
| **NXB04606A0T08WG** | 2*460 | 2.4 | 1.8 | 920 | 1010 | 767 | 8.5/0.4/8.9 | CH62 |
| **NXB05026A0T08WG** | 2*502 | 2.2 | 1.7 | 1004 | 1100 | 838 | 10.0/0.5/10.5 | CH62 |

1) DC bus voltage 640-1136 VDC for wide range voltage version (NX_8).
**NOTE:** The rated currents in given ambient (+50 °C) and coolant (+30 °C) temperatures are achieved only when the switching frequency is equal to or less than the factory default.
**NOTE:** Braking power: $P_{brake} = 2*U_{brake}^2 / R_{resistor}$ when 2 resistors are used
**NOTE:** Max input DC current: $I_{in\_max} = P_{brake\_max} / U_{brake}$

## VACON® NXP Liquid Cooled AC drive, internal brake chopper unit, braking voltage 460-800 VDC

| Converter Type | Loadability | Braking capacity 600 VDC | | Braking capacity 800 VDC | | Chassis |
|---|---|---|---|---|---|---|
| | Rated min resistance [Ω] | Rated cont. braking power [kW] | BCU rated cont. braking current, $I_{br}$ [A] | Rated cont. braking power [kW] | BCU rated cont. braking current, $I_{br}$ [A] | |
| **NX_460-730 5** [1)] | 1.3 | 276 | 461 | 492 | 615 | CH72 |
| **NX_1370-2300 5** | 1.3 | 276 | 461 | 492 | 615 | CH74 |

1) Only 6 pulse drives

## VACON® NXP Liquid Cooled AC drive, internal brake chopper unit, braking voltage 840-1100 VDC

| Converter Type | Loadability | Braking capacity 840 VDC | | Braking capacity 1100 VDC | | Chassis |
|---|---|---|---|---|---|---|
| | Rated min resistance [Ω] | Rated cont. braking power [kW] | BCU rated cont. braking current, $I_{br}$ [A] | Rated cont. braking power [kW] | BCU rated cont. braking current, $I_{br}$ [A] | |
| **NX_325-502 6** [1)] | 2.8 | 252 | 300 | 432 | 392 | CH72 |
| **NX_820-1700 6** | 2.8 | 252 | 300 | 432 | 392 | CH74 |

1) Only 6 pulse drives

The internal brake chopper can also be used in motor application where 2…4 x Ch7x drives are used for a single motor, but in this case the DC connections of the power modules must be connected together.

## VACON® external brake resistors for liquid cooled CH72 (CH74) drives – IP20

| Product code | Voltage range [VDC] | Maximum brake power [kw] | Maximum average power [kW] (1 puls/2min) | Resistance [Ω] | Maximum energy [kJ] (predefined power pulse) | Dimensions W x H x D [mm] | Weight [kg] |
|---|---|---|---|---|---|---|---|
| **BRW-0730-LD-5** [1] | 465…800 VDC | 637 [3] | 13.3 | 1.3 | 1594 | 480 x 600 x 740 | 55 |
| **BRW-0730-HD-5** [2] | 465…800 VDC | 637 [3] | 34.5 | 1.3 | 4145 | 480 x 1020 x 740 | 95 |
| **BRW-0502-LD-6** [1] | 640…1100 VDC | 516 [4] | 10.8 | 2.8 | 1290 | 480 x 760 x 530 | 40 |
| **BRW-0502-HD-6** [2] | 640…1100 VDC | 516 [4] | 28 | 2.8 | 3354 | 480 x 1020 x 740 | 85 |

NOTE: Thermal protection switch included

1) LD = Light Duty: 5s nominal torque braking from nominal speed reduced linearly to zero once per 120s
2) HD = Heavy duty: 3s nominal torque braking at nominal speed + 7s nominal torque braking from nominal speed reduced linearly to zero once per 120s.
3) at 911 VDC
4) at 1200 VDC

## VACON® NXP Liquid Cooled Enclosed drive

| AC drive type | Rated current | | | Electrical output power | | Chassis | Dimensions W x H x D W/O Cooling unit [in] |
|---|---|---|---|---|---|---|---|
| | Thermal ITH [A] | Cont. $I_L$ [A] | Cont. $I_H$ [A] | Motor at $I_{th}$ (400 VAC) [kW] | Motor at $I_{th}$ (500 VAC) [kW] | | |
| **NXP13705A5T0RWN-LIQC** | 1370 | 1245 | 913 | 700 | 900 | CH64 | 2000 x 2100 x 900 |
| **NXP16405A5T0RWN-LIQC** | 1640 | 1491 | 1093 | 900 | 1100 | CH64 | 2000 x 2100 x 900 |

| AC drive type | Rated current | | | Electrical output power | | Chassis | Dimensions W x H x D W/O Cooling unit [in] |
|---|---|---|---|---|---|---|---|
| | Thermal ITH [A] | Cont. $I_L$ [A] | Cont. $I_H$ [A] | Motor at $I_{th}$ (525 VAC) [kW] | Motor at $I_{th}$ (690 VAC) [kW] | | |
| **NXP08206A5T0RWN-LIQC** | 820 | 745 | 547 | 560 | 800 | CH64 | 2000 x 2100 x 900 |
| **NXP09206A5T0RWN-LIQC** | 920 | 836 | 613 | 650 | 850 | CH64 | 2000 x 2100 x 900 |
| **NXP10306A5T0RWN-LIQC** | 1030 | 936 | 687 | 700 | 1000 | CH64 | 2000 x 2100 x 900 |
| **NXP11806A5T0RWN-LIQC** | 1180 | 1073 | 787 | 800 | 1100 | CH64 | 2000 x 2100 x 900 |
| **NXP13006A5T0RWN-LIQC** | 1300 | 1182 | 867 | 900 | 1200 | CH64 | 2000 x 2100 x 900 |
| **NXP15006A5T0RWN-LIQC** | 1500 | 1364 | 1000 | 1000 | 1400 | CH64 | 2000 x 2100 x 900 |
| **NXP17006A5T0RWN-LIQC** | 1700 | 1545 | 1133 | 1150 | 1550 | CH64 | 2000 x 2100 x 900 |

# Technical data

| | | |
|---|---|---|
| **Mains connection** | Input voltage $U_{in}$ | NX_5: 400…500 VAC (–10%…+10%); 465…800 VDC (–0%…+0%)<br>NX_6: 525…690 VAC (–10%…+10%); 640…1100 VDC (–0%…+0%)<br>NX_8: 525…690 VAC (–10%…+10%); 640…1136 VDC (–0%…+0%)[1)]<br>NX_8: 525…690 VAC (–10%…+10%); 640…1200 VDC (–0%…+0%)[2)] |
| | Input frequency | 45…66 Hz |
| **Motor connections** | Output voltage | 0-$U_{in}$ |
| | Output frequency | 0…320 Hz |
| | Output filter | VACON® liquid cooled NX_8 unit must be equipped with a output filter with an inductance of at least 0.7%. |
| **Control characteristics** | Control method | Frequency control U/f<br>Open loop vector control (5-150% of base speed):<br>speed control 0.5%, dynamic 0.3%sec, torque lin. <2%, torque rise time ~5 ms<br>Closed loop vector control (entire speed range):<br>speed control 0.01%, dynamic 0.2% sec, torque lin. <2%, torque rise time ~2 ms |
| | Switching frequency | NX_5: 1…6 kHz; Factory default 3.6 kHz (1...10 kHz with special application)<br>NX_6/NX_8: 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 TN (without brake resistor), flux braking |
| **Ambient conditions** | Ambient operating temperature | –10 °C (no frost)…+50 °C (at $I_{th}$);<br>The NX liquid cooled drives must be used in an heated indoor controlled environment. |
| | Installation temperature | 0…+70 °C |
| | Storage temperature | –40 °C…+70 °C; no liquid in heatsink under 0 °C |
| | Relative humidity | 5 to 96% RH, non-condensing, no dripping water |
| | Air quality<br>- chemical vapours<br>- mechanical particles" | No corrosive gases<br>IEC 60721-3-3 Edition 2.2, AC drive in operation, class 3C3<br>IEC 60721-3-3 Edition 2.2, AC drive in operation, class 3S2 (no conductive dust allowed) |
| | Altitude | NX_5: (380…500 V): 3000 m ASL; in case network is not corner grounded<br>NX_6/NX_8: (525…690 V) max. 2000 m ASL. For further requirements, contact factory 100% load capacity (no derating) up to 1,000 m; above 1,000 m derating of maximum ambient operating temperature by 0,5 °C per each 100 m is required. |
| | Vibration | 5…150 Hz |
| | EN50178/EN60068-2-6 | Displacement amplitude 0.25 mm (peak) at 3…31 Hz<br>Max acceleration amplitude 1 G at 31…150 Hz |
| | Shock EN50178, EN60068-2-27 | UPS Drop Test (for applicable UPS weights)<br>Storage and shipping: max 15 G, 11 ms (in package) |
| | Enclosure class | IP00 / standard in entire kW/HP range |
| **EMC** | Immunity | Fulfils all EMC immunity requirements |
| | Emissions | EMC level N, T (IT networks) |
| **Safety** | | EN 50178, EN 60204-1,<br>IEC 61800-5-1, CE, UL, CUL; (see unit nameplate for more details) |
| **Functional safety *)** | STO | EN/IEC 61800-5-2 Safe Stop 1 (SS1) SIL3,<br>EN ISO 13849-1 PLe Category 4, EN 62061: SILCL3, IEC 61508: SIL3 |
| | SS1 | EN/IEC 61800-5-2 Safe Stop 1 (SS1) SIL3,<br>EN ISO 13849-1 PLe Category 4, EN 62061: SILCL3, IEC 61508: SIL3 |
| | ATEX Thermistor input | 2014/34/EU, CE 0537 Ex 11 (2) GD |
| | Advanced safety option | STO(+SBC), SS1, SS2, SOS, SLS, SMS, SSM, SSR |
| **Approvals** | Type tested | CE, UL |
| | Type approval | DNV, BV, Lloyd's Register (other marine societies delivery based approvals) |
| | Approvals our partners have | Ex, SIRA |
| **Liquid cooling** | Allowed cooling agents | Drinking water<br>Water-glycol mixture |
| | Temperature of cooling agent | 0…35 °C ($I_{th}$)(input);<br>35…55 °C, please see manual for further details<br>Temperature rise during circulation max. 5 °C<br>No condensation allowed |
| | System max. working pressure | 6 bar/ 30 bar peak |
| | Pressure loss (at nominal flow) | Varies according to size, please see manual for further details |
| **Protections** | | Overvoltage, undervoltage, earth fault, mains supervision, motor phase supervision, overcurrent, unitover-temperature, motor overload, motor stall, motor underload, short-circuit of +24 V and +10 V reference voltages. |

*) with OPT-AF board (SS1 requires external safety relay)
1) NX_8 drives only available as Ch6x NXB units.
2) NX_8 drives only available as Ch6x NXA/NXP units.

# Typecode key

## VACON® NXP Liquid Cooled drives

| NXP | 0000 | 5 | A | 0 | N | 1 | S | W | V | A1 A2 00 00 C3 |
|---|---|---|---|---|---|---|---|---|---|---|

**NXP**
**Product Range**
**NXP** = AC drive or inverter unit
**NXA** = Active front-end unit
**NXB** = Brake-chopper unit
**NXN** = Non Regenerative Front End (NFE)

**0000**
**Nominal current**
**0007** = 7 A
**0022** = 22 A
**0205** = 205 A etc.

**5**
**Nominal mains voltage**
**5** = 380-500 VAC
**6** = 525-690 VAC

**A**
**Control keypad**
**A** = standard alpha-numeric
**B** = no local control keypad
**F** = dummy panel
**G** = graphical keypad

**0**
**Enclosure class**
**0** = IP00
**5** = IP54

**N**
**EMC emission levels**
**N** = No EMC emission protection; to be installed on enclosures
**T** = Fulfills standard 61800-3 for IT-networks

**1**
**Brake chopper**
**0** = no brake chopper
**1** = integrated brake chopper (CH72 (6-pulse) & CH74 only)

**S**
**Hardware modifications: supply**
**I** = Inverter unit; DC-supply
**2** = Active front-end unit
**S** = 6-pulse **with A/C chokes**
**Y** = 6-pulse **with L/C chokes**
**N** = 6-pulse, **no chokes**
**T** = 12-pulse **with A/C chokes**
**U** = 12-pulse, **no chokes**
**W** = 12-pulse **with L/C chokes**
**R** = Low harmonic

**W**
**Hardware modifications: cooling**
**W** = Liquid-cooled module with aluminium heatsink
**P** = Liquid-cooled module with nickel-coated aluminium heatsink

**V**
**Hardware modifications: boards**
**G** = Fiber connection, varnished (from CH61)
**V** = Direct connection, varnished

**If OPT-AF option board is used**
**O** = IP54 control box, fiber connection, varnished boards, (from CH61)

**A1**
**A2**
**00**
**00**
**E3**
**Option boards; each slot is represented by two characters:**
**A** = basic I/O boards,
**B** = expander I/O boards
**E** = fieldbus boards
**D** = special boards

**+LCBM**
**Condition Based Monitoring**
available for MultiPurpose, SIA II and Marine applications

*) Note, the control unit of NX_8 drives need to be supplied with a external 24 Vdc power source.


## Marine approvals

Type approvals

DNV·GL

Lloyd's Register TYPE APPROVAL

BUREAU VERITAS

Delivery based approvals

ABS

KR KOREAN REGISTER

ClassNK

# Option boards

| Type | Description | 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) | +10Vref | Therm | +24V/ EXT +24 V | pt100 | KTY84 | 42-240 VAC input | DI/DO (10...24 V) | DI/DO (RS422) | DI ~ 1Vp-p | Resolver | Out +5 V/+15 V/+24 V | Out +15 V/+24 V | Out +5 V/+12 V/+15 V |
| **Basic I/O cards (OPTA)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPTA1 | DI/DO/AI/AO/ 10V/ 24V | ■ | | | | | 6 | 1 | | 2 | | 1 | | | | 1 | | 2 | | | | | | | | | | |
| OPTA2 | Relay output (NO/NC) | | ■ | | | | | | | | | | | 2 | | | | | | | | | | | | | | |
| OPTA3 | Relay output + Thermistor input | | ■ | | | | | | | | | | | 1 | 1 | | 1 | | | | | | | | | | | |
| OPTA4 | Encoder TTL type | | | ■ | | | 2 | | | | | | | | | | | | | | | | 3/0 | | | 1 | | |
| OPTA5 | Encoder HTL type | | | ■ | | | 2 | | | | | | | | | | | | | | | 3/0 | | | | | 1 | |
| OPTA7 | Double encoder HTL type | | | ■ | | | | | | | | | | | | | | | | | | 6/2 | | | | | 1 | |
| OPTA8 | "OPTA1 + Analogue signals galvanically isolated as a group" | ■ | | | | | 6 | 1 | | 2 | | 1 | | | | 1 | | 2 | | | | | | | | | | |
| OPTA9 | OPTA1 + 2,5mm² connectors | ■ | | | | | 6 | 1 | | 2 | | 1 | | | | 1 | | 2 | | | | | | | | | | |
| OPTAE | Encoder HTL type (Divider + direction) | | | ■ | | | | 2 | | | | | | | | | | | | | | 3/0 | | | | | 1 | |
| OPTAF | STO, ATEX therm | | ■ | | | | 2 | | | | | | | 1 | 1 | | 1 | | | | | | | | | | | |
| OPTAK | Sin/Cos encoder interface | | | ■ | | | | | | | | | | | | | | | | | | | | 3 | | | 1 | |
| OPTAN | DI/AI/AO | ■ | | | | | 6 | | | 2 | | 2 | | | | | | | | | | | | | | | | |
| **I/O expander cards (OPTB)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPTB1 | Programmable I/O | | ■ | ■ | ■ | ■ | | | 6 | | | | | | | | | 1 | | | | | | | | | | |
| OPTB2 | Relay output + Thermistor input | | ■ | ■ | ■ | ■ | | | | | | | | 1 | 1 | | 1 | | | | | | | | | | | |
| OPTB4 | "Analog input/output Analogue signals galvanically isolated separately" | | ■ | ■ | ■ | ■ | | | | | 1 | | 2 | | | | | 1 | | | | | | | | | | |
| OPTB5 | Relay output | | ■ | ■ | ■ | ■ | | | | | | | | | 3 | | | | | | | | | | | | | |
| OPTB8 | "Temperature Measurement option PT100" | | ■ | ■ | ■ | ■ | | | | | | | | | | | | 1 | 3 | | | | | | | | | |
| OPTB9 | DI + Relay output | | ■ | ■ | ■ | ■ | 2 | | | | | | | | 1 | | | | | | 5 | | | | | | | |
| OPTBC | Resolver, 3xDO (Wide range) | | | ■ | | | | | | | | | | | | | | | | | | 3/3 | | | 1 | | | |
| OPTBH | "Temperature Measurement option pt100, pt1000, Ni1000, KTY84" | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | 3 | 3 | | | | | | | | |
| OPTBE | EnDat/SSI/BiSS C | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | |
| OPTBL | Advanced safety option | | | ■ | ■ | ■ | 4 | 2 | | | | | | | | | | 1 | | | | | | | | | | |
| OPTBM | OPTBL+ HTL/TTL encoder | | | ■ | ■ | ■ | 4 | 2 | | | | | | | | | | 1 | | | | | | | | | | |
| OPTBN | OPTBL+ Sin/Cos encoder | | | ■ | ■ | ■ | 4 | 2 | | | | | | | | | | 1 | | | | | | | | | | |
| **Fieldbus cards (OPTC and OPTE)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPTE2 | RS485 with screw terminal | | | | ■ | ■ | RS485 with screw terminal | | | | | | | | | | | | | | | | | | | | | |
| OPTE3 | PROFIBUS DP with screw terminal | | | | ■ | ■ | PROFIBUS DP with screw terminal | | | | | | | | | | | | | | | | | | | | | |
| OPTE5 | PROFIBUS DP with D9-connector | | | | ■ | ■ | PROFIBUS DP with D9-connector | | | | | | | | | | | | | | | | | | | | | |
| OPTE6 | CANopen | | | | ■ | ■ | CANopen | | | | | | | | | | | | | | | | | | | | | |
| OPTE7 | DeviceNet | | | | ■ | ■ | DeviceNet | | | | | | | | | | | | | | | | | | | | | |
| OPTE8 | RS485 with D9-connector | | | | ■ | ■ | RS485 with D9-connector | | | | | | | | | | | | | | | | | | | | | |
| OPTE9 | Dual-port Ethernet | | | | ■ | ■ | Dual-port Ethernet, Modbus TCP, Modbus UDP, PROFINET I/O, EtherNet/IP | | | | | | | | | | | | | | | | | | | | | |
| OPTEA | Advanced Dual-port Ethernet | | | | ■ | ■ | Advanced Dual-port Ethernet, Modbus TCP, Modbus UDP, PROFINET I/O, EtherNet/IP. PROFINET system redundancy, and PROFIsafe | | | | | | | | | | | | | | | | | | | | | |
| OPTC4 | LonWorks | | | | ■ | ■ | LonWorks | | | | | | | | | | | | | | | | | | | | | |
| OPTCJ | BACnet MS/TP | | | | ■ | ■ | BACnet MS/TP | | | | | | | | | | | | | | | | | | | | | |
| OPTEC | EtherCAT | | | | ■ | ■ | EtherCAT | | | | | | | | | | | | | | | | | | | | | |
| **Communication cards (OPTD)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPT-D1 | SystemBus adapt, 2xfibre-optic | | | | ■ | ■ | System Bus adapter (2 x fiber optic pairs) | | | | | | | | | | | | | | | | | | | | | |
| OPT-D2 | SystemBus (1xfiber), isol. CAN | | | | ■ | ■ | System Bus adapter (1 x fiber optic pair) & CAN-bus adapter (galvanically decoupled) | | | | | | | | | | | | | | | | | | | | | |
| OPT-D3 | RS232 adapter (no galv.isol.) | | | | ■ | ■ | RS232 adapter card (galvanically decoupled), used mainly for application engineering to connect another keypad | | | | | | | | | | | | | | | | | | | | | |
| OPT-D6 | CAN-Bus (galv. decoupled) | | ■ | | ■ | ■ | CAN-bus adapter (galvanically decoupled) | | | | | | | | | | | | | | | | | | | | | |
| OPT-D7 | Line voltage measurement | | | ■ | | | Line voltage measurement | | | | | | | | | | | | | | | | | | | | | |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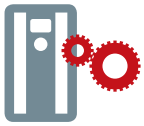

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