

Surely, even you would like
to save up to 70 % on energy

SIMPLE
SILENT
SAFE

NFO
DRIVES

Operate motors with a PURE SINE WAVE!

With the NFO Sinus® frequency inverter, you can control the speed of electric motors fitted on machines, fans and pumps etc, and thereby save up to 70 % of the energy. NFO Sinus® is based on our own unique technology which generates a pure sine wave output voltage, thus allowing you to control the motor without creating electromagnetic interference.

Saving energy with NFO Sinus® is:

SIMPLE

- No shielded cables
- No awkward installation requirements
- No limitations on distances between the motor and the inverter

SILENT

- No irritating switching noise
- No electromagnetic interference

SAFE

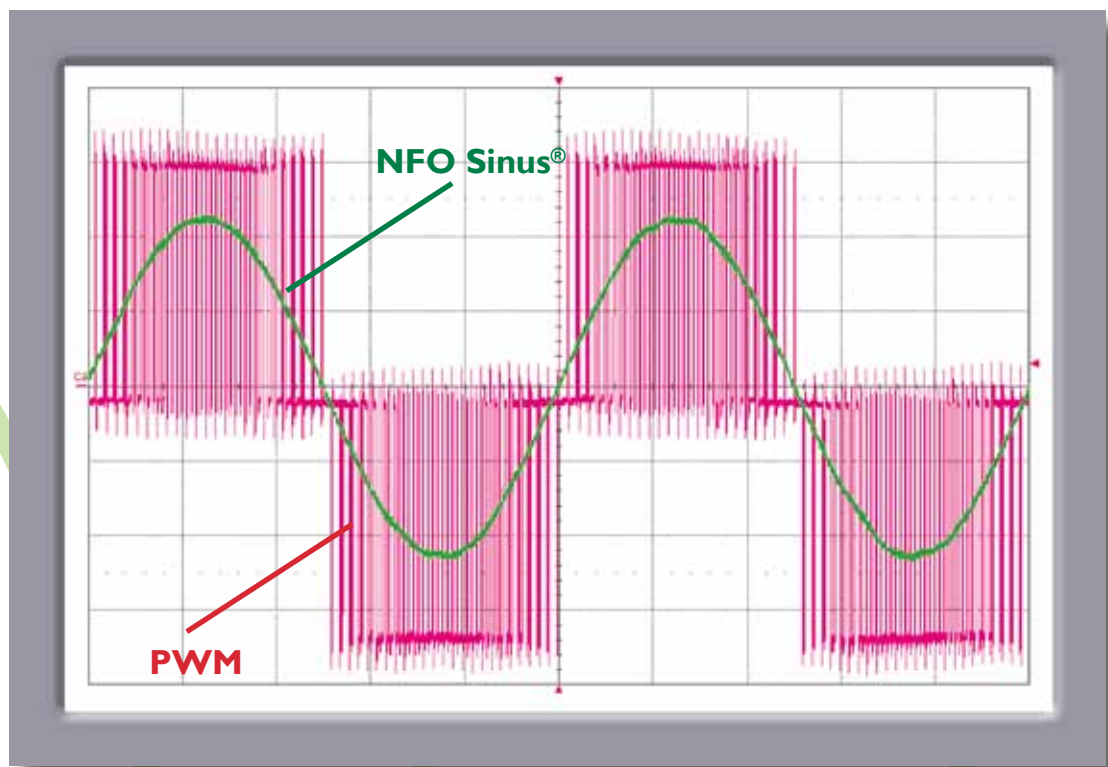
- No bearing currents
- No earth leakage currents



The NFO Sinus® interference-free frequency inverter

A PURE SINE WAVE makes all the difference!

The conventional PWM method* chops the voltage into parts, while NFO Sinus[®] supplies a pure sine wave voltage, which results in an interference-free control of electrical motors.



The difference between the conventional PWM technique* and NFO Sinus[®] can clearly be seen on an oscilloscope.

* PWM = Pulse Width Modulation

PURE SINE WAVES present unique advantages

The NFO Sinus® frequency inverter is based on a patented Swedish technology that allows you to control the speed of electric motors without generating electromagnetic interference, which in turn offers a range of unique benefits.

Thanks to the sine-wave voltage, the inverter is intrinsic EMC, i.e., it is interference-free in itself.

SIMPLE

Installation is easy and inexpensive as you do not need shielded cables, EMC filters or other EMC-classed installation accessories.

When undertaking energy efficiency projects, you can make use of the existing cables, even if they are not shielded, thus making installation work quick and easy.

The distance between the motor and the inverter can be long as the only thing limiting the length of the cable is its resistance. The inverter can thereby be located wherever you want it, even if the distance to the motor is several hundred metres. This offers new flexible solutions in difficult environments

SILENT

NFO Sinus® is interference-free and thereby does not subject any of the equipment in its vicinity to electromagnetic interference.

The inverter satisfies the most stringent demands set out in the EMC directive and can be used in every kind of environment from industrial to residential. Moreover, the product meets the requirements set out in the EMC directive concerning medical products.

With NFO Sinus® you also avoid all the disturbing switching noise in the motor, which results in a quieter environment.

SAFE

NFO Sinus® does not generate any bearing currents. The motor therefore has a longer lifespan and NFO Drives offers a five-year warranty on the bearings in new motors.

No earth leakage currents are generated, which means that residual current devices for both personal safety and fire prevention can be used. This provides a high level of electrical safety.

HIGH PRECISION

The motor speed can be very precisely controlled and with full torque right from stand-still as well as at a low speed.

The inverter furthermore has an energy-save function that allows you to conserve even more energy when running with a low load on the motor, e.g., fans, which at times run at a low speed.

The NFO Sinus® frequency inverter is the best choice for saving energy simply, silently and safely.



NFO Sinus® satisfies the highest standards in EMC Directive 2004/108/EC without filters and without shielded cables.

NFO Sinus® Frequency Inverter

OUTPUT RATING (kW)	0.37	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11.0	15.0
Motor output										
Continuous rating (A)	1.3	2.1	3.5	4.9	6.7	8.8	11.1	14.8	21.5	28.5
Maximum rating (A)	1.6	2.5	4.2	5.8	8.0	10.5	13.3	17.7	25.8	32.0
Protection Class	IP54				IP54			IP20*		
Dimensions (H x D x W)	413x280x80 mm				413x280x150 mm			365(+47)x265x203 mm		
Weight	7.0 kg				10.8 kg			14.0 kg		

Output voltage wave form	Sinus	* 7.5 kW – 15 kW is currently only available in IP20 but, as an option, it can be delivered installed in an IP54 cabinet. Contact us for more information.
Output frequency	0 – 150 Hz	
Operating mode	4 quadrant (with external brake resistance, as required)	
Inverter input		
Supply voltage	3 x 380 – 440 V ±10 %	
Frequency	50/60 Hz ±10 %	
Control inputs		
Set points	0 – 10 V, 2 – 10 V, ±10 V, 0 – 20 mA, 4 – 20 mA, ±20 mA, potentiometer 10 kΩ, 7 set frequencies, selectable from terminal with positive or negative logic	
Actual values	0 – 10 V, 2 – 10 V, ±10 V, 0 – 20 mA, 4 – 20 mA, ±20 mA	
Local mode	Keyboard: Forward, Reverse, Stop	
Acceleration time	0.2 – 500 s	
Retardation time	0.2 – 500 s	
Signal outputs		
Voltage Output	24 V supply to external sensors	
Relays	Fault relay, operating relay. Function relay**	
Voltage**	0 – 10 V	
Frequency**	0 – 32 kHz, open collector	
Control modes		
Frequency control	0 – 150 Hz	
Speed control	0 – 9000 rpm	
Torque control	1 – 200 % of nominal motor torque, depending on inverter capacity	
Process control	PI with feedback PT1000 temperature sensor for recording temperature at constant pressure control in ventilation system**	
Motor safety		
Thermistor input	PTC or Klixon	
Power monitor	Switch off if motor is loaded over rated power for a long time	
Communication	Modbus integrated. Option: Profibus, CanOpen. Others available upon request.	
PC-program	The NFO SinusManager program enables simple parameterization, commissioning and documenting settings.	
Energy saving function	Reduces the motor's magnetizing current at low load	
Ambient conditions		
Ambient temperature	-10 to +40 °C	
Storage temperature	-20 to +60 °C	
Humidity	0 – 90 %, non-condensing	
Earth currents	< 2 mA. RCDs (Residual Current Device) can be used	
EMC directive	NFO Sinus® is Intrinsic EMC and complies with the EMC directive 2004/108/EC	
EMC class	Approved for use in residential, commercial and light-industry environment (EN 61000-6-3) and in industrial environment (EN 61000-6-2). Also approved for use in hospitals (EMC-part of EN 60601-1-2, the medical directive)	
No filters	No interference suppression filters, chokes etc. needed to achieve full interference suppression as per EMC directive	
Standard cabling	No shielded cables required for full interference suppression as per EMC directive	
Cabling length (motor – inverter)	No limits other than cabling's own inherent resistance	
Ball bearing warranty	No ball bearing currents, making for operational reliability Five-year ball bearing warranty when connecting to new motor	
Noise level	No switching noise from motor, making for silent running	

**Only available together with I/O card.

What are our customers saying?

Real Estate Environment

ICA Real Estate

“We chose the NFO Sinus® both so we could use the existing unshielded cables for the fan motors, and so we could place the inverters far away from the fan motors, right where we wanted them”, says Malte Enocsson, Property Manager at ICA Real Estate.

ICA is the largest retail company in the Nordic countries.



Hospital Environment

Östergötland County Council

“The electrical network within patient care must be clean. We must be able to save energy without risking interference to our medical equipment. The safety of our patients must come first and we have therefore chosen the NFO Sinus® inverter for all council-run hospitals and patient clinics in our county”, says P-O Eliasson, Technical Developer for electricity at the Östergötland County Council.



Technical Environment

Chalmers University

“We know that conventional frequency inverters present a great number of problems with noise, electrical interference and damage to bearings in the motors. Thanks to NFO Sinus®, we now have both an operationally reliable and silent device; at the same time, we are saving a lot of energy”, says Christer Andersson, Research Engineer at the Nanofabrication Laboratory, Chalmers University of Technology



Agricultural Environment / Industry OEM

DeLaval

“Our customers can save up to 70 % on energy – all while we can guarantee them an interference-free environment. NFO Sinus® fits well into DeLaval’s product strategy”, says Tord Ringenhall, Product Manager at DeLaval International.

DeLaval is one of the world’s leading supplier of products and solutions for milk production. DeLaval is part of the Tetra Laval Group.



Water and Sewer Environment

Karlskrona Waterworks

“By installing NFO Sinus®, we were able to reduce the energy consumption of the pumps by more than 50 %. We have received a clearly improved function with a high degree of operational reliability - all while saving a lot of energy. NFO Sinus® was the only inverter we could install in this manner”, says Gunnar Pettersson, Manager of the Electricity Department at Karlskrona Waterworks.



Marine Environment

Kockums

“In the past, we were not able to use frequency inverters at all. All inverters interfered with the sensitive equipment on board and they have therefore been banned from marine environments. NFO Sinus® satisfies all our requirements for non-interference and offers a lot of value for the money”, says Karl-Axel Olsson, Manager Electrical Systems, at Kockums ThyssenKrupp Marine Systems.



Save up to 70 % on energy
with NFO Sinus[®]
SIMPLE, SILENT, SAFE



WELCOME
to an interference-free world!

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