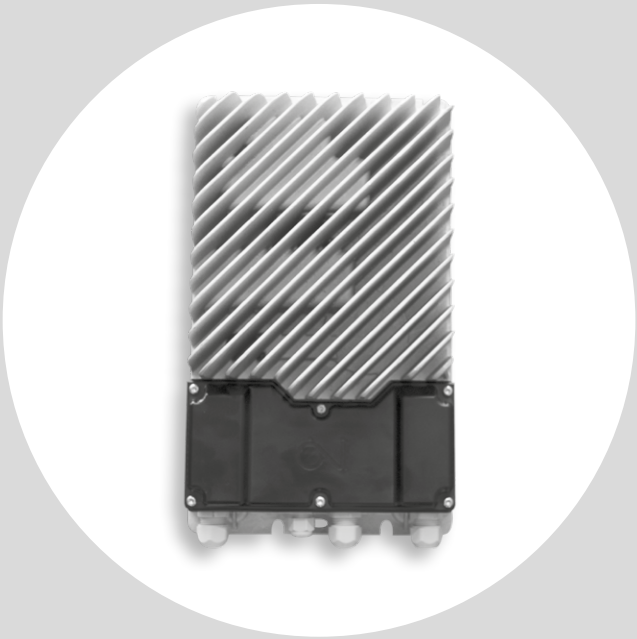
OJ Drives®



OJ-DVULH
Ultra Low Harmonic

- 3-phase active PFC
- Rated power THD(i) < 1.5%
- 10-100% power THD(i) < 3%
- Power factor > 0.99
- Efficiency > 96%
- cULus Recognised

Your compact solution to harmonic distortion

The OJ DV Ultra Low Harmonic drive lets you reduce harmonic distortion with an easy-to-install, compact solution.

The 3-phase active frontend incorporated into the drive housing eliminates the need for additional filters and cables, enabling you to create fully finished, factory-tested units that offer minimal harmonic distortion. Of course, these Ultra Low Harmonic drives comply with the strictest regulations and recommendations.

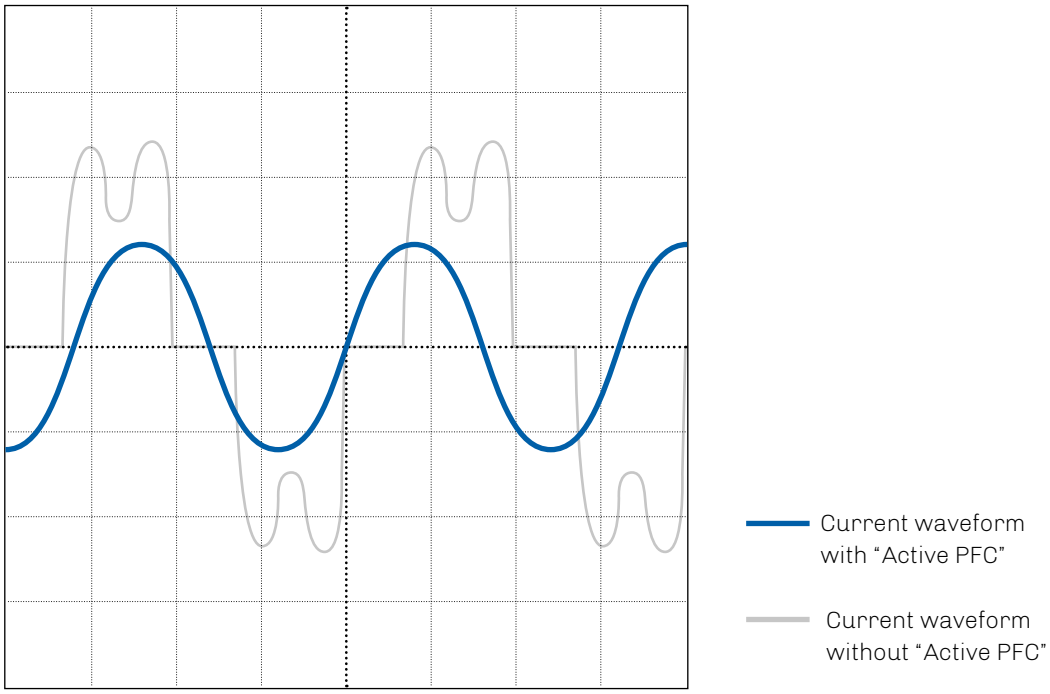
The drive you know. With distortion mitigation.
The tried-and-tested DV design has been adapted and enlarged to incorporate an active frontend. We've maintained the same connection and option module compartment, ensuring that your installation process is as easy as ever.

We've kept it very compact, too: compared to the standard DV drive, the Ultra Low Harmonic drive is just 8 cm longer and has slightly taller cooling ribs. All in all, its total size is just 25% larger in terms of volume (cm^3) – while eliminating the need for separate filters.

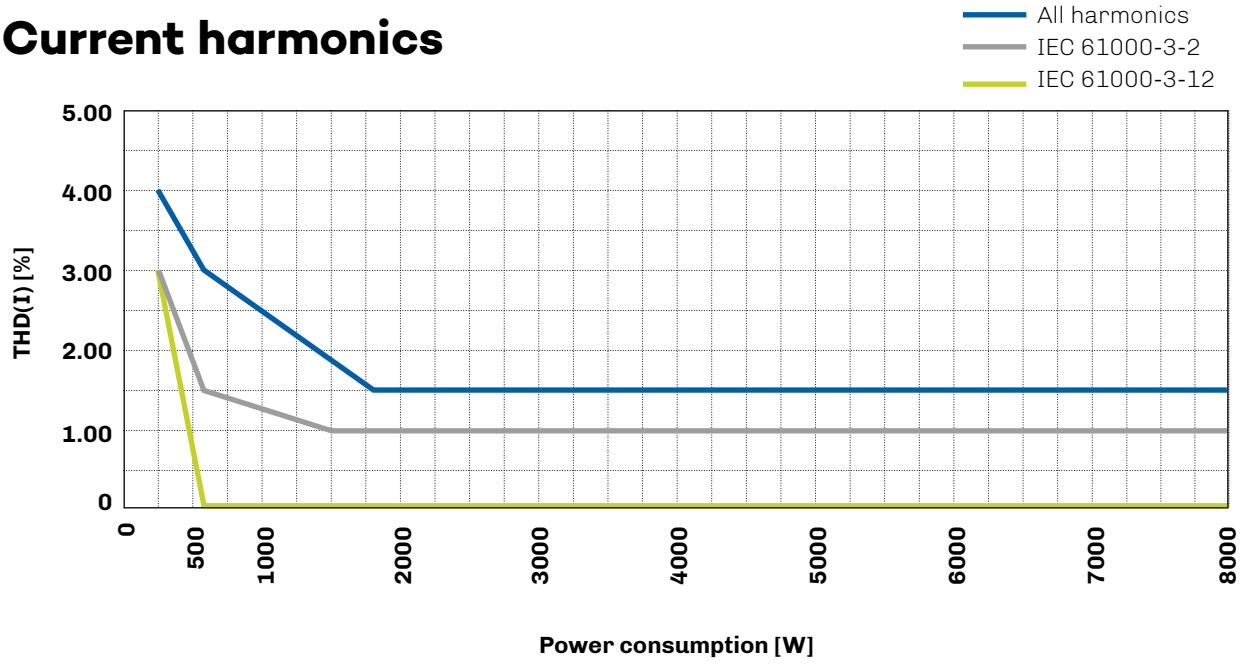
Keeps sensitive equipment safe
OJ DV Ultra Low Harmonic is your ideal choice of drive for commercial HVAC applications with sensitive electronic equipment such as computers, telecommunications networks and lighting. It fully meets the increasing demand for harmonic distortion protection at e.g. data centres, airports and hospitals – and of course, the unit complies with the strictest legal requirements. We created this to keep you, your business and your customers safe.

3-phase active PFC

Current waveform with “Active PFC”



Current harmonics



The challenges with harmonic distortion

Harmonic distortion: a growing issue
EU regulations requiring the usage of IE3 and IE4 motors have increased the need for drives to control the speed of such motors. This has certain consequences.

Short bursts cause distortions
Drives greatly help save energy, which is great for the climate, but they have the drawback of increasing harmonic disturbances by introducing harmonic currents directly into the grid.
Harmonic current is a non-sinusoidal current flow created by the input stage of the drive. To drive the motor at the desired speed and torque, the power required by the motor is transferred in a short burst, resulting in a high-peak current.Depending on the design of the drive, the level of harmonic distortion typically ranges from 35% up to 100%.

Installing larger amounts of drives in commercial HVAC applications might lead to problems if the drives are connected to the same supply grid as sensitive electronic equipment – which is often the case. The OJ Ultra Low Harmonic drive is designed to help you avoid such problems.

How drives affect grid quality
Three different values determine a drive's effect on the grid quality – and the OJ Ultra Low Harmonic drive makes a huge difference:

- **Power factor:**
  The power factor (PF) parameter is affected by the level of harmonic distortion as well as by the phase angle between current and voltage. It is defined as the ratio of the active power and the apparent power values. Essentially, it measures how efficiently the product is using power. And the right drive helps.

- **THDi:**
  The Total Harmonic Distortion of Current (THDi) indicates the amount of current distortion. The value is defined as the ratio (in %) as a result of dividing the rms sum value of the harmonic currents with the value of the fundamental frequency. A ULH drive will greatly reduce this figure.

- **TDD:**
  The parameter known as Total Demand Distortion (TDD) is widely used in North America. The TDD is measured at the point of common coupling, PCC. In contrast to the THDi, the TDD is the ratio of the measured harmonic current to the full-load fundamental current at system level, typically average values over a 15 or 30-minute measuring period. It too will be improved by a compact ULH drive, eliminating the need for external solutions.

Improving grid quality with active power factor control
The OJ-DV ULH drive is fitted with an active frontend: a 3-phase 'Active Power Factor Control'. Here, the pulsed input current is converted into a sinusoidal current drawn from the grid. Additional advantages of the 3-phase active PFC function include shifting the angle of the current curve so that it is in phase with the voltage. Your grid – and the equipment powered by it – is efficiently protected against distortion.

The values achieved by means of 3-phase Active PFC exceed the strictest requirements.
At rated power, a power factor higher than 0.99 is achieved. The THD(I) at rated power is typically less then 1,5%, and the values stays below 3% even when the rated output is down to 10%.

OJ Drives
The OJ Ultra Low Harmonic drive is designed to not only comply with the strictest regulations, but exceed them.
It complies with:
- IEC 61000-3-2, Class A
- IEC 61000-3-12
- IEEE 519, special applications

Your benefits
- A new drive that not only conserves motor energy for the good of the climate, but also reduces harmonic distortion and promotes grid quality
- Same drive topology – more variants
- Same mounting and installation as the standard DV – plug and play
- Fan units for stricked harmonic demands can be fully assembled and tested on your factory production line as standard fan units
- You no longer need to dimension and install additional external filters and cables
- Straightforward dimensioning of electrical equipment in the system (cables, fuses, switches and transformers)
- Enables you to deliver fan units that comply with the strictest technical connection requirements of grid operators
- All your drive needs covered by a single supplier – ensures maximum ease and compatibility.

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OJ ELECTRONICS
KNOW-HOW CREATES

OJ-DVULH
Ultra Low Harmonic

		OJ-DVULH-3055	OJ-DVULH-3075
Enclosure		H4x	
Power size		5.5	7.5
Horsepower		7.4	10.0
Efficiency	%	> 96% IE2	
Power supply			
Voltage	VAC	3 x 380 - 480 VAC 50/60 Hz +/-10%	
Supply current at max. load at nominel supply voltage (400V/480V)	A	11.7/9.6	16/13.1
Power factor (cos-phi) at max. load		> 0.99	
Motor output			
Nominal motor power (on shaft) *2	kW	5.5	7.5
Frequency	Hz	PM motor: 0-400	
Max. output voltage	Vrms	3 x Vin	
Max. output current	Arms	12A	17A
Protection			
Max. fuse	A	12.0	19.0
Short circuit capacity	A	3500	5000
FLA	A	12.0	16.4
Motor output		Short-circuit protected between phases	
Motor		Protected by current limit	
Overload protection		Current and temperature overload protection	
Environment			
Operating temperature	°C	-40°C to +50°C	
Starting temperature	°C	-40°C to +50°C	
Storage temperature	°C	-40°C to +50°C	
Dimensions	mm	220 x 374 x 108 mm	
Protection rating		IP 65/Type 4x	
Enclosure material		Aluminium	
Front cover		Plastic	
Weight	kg	7.0 kg	
Humidity	% rh	10-95% rh, non-condensing	
Surface		Corrosion resistant to EN/ISO 12944-2:1998 Category C4	
Air flow / cooling		Turbulent air speed of min. 3 m/s to achieve max. output power at max. ambient temperature. Turbulent air speed below 3m/s and higher ambient temperature might lead to reduced output power. (3 m/s turbulent air speed is equivalent to 6,5 m/s laminar air speed)	
Interfaces			
Modbus RTU		RS485 (baud rate: 9.6, 19.2, 38.4, 56,7 115.2 Kbaud)	
BACnet MS/TP		Baud rate: 9600, 19200, 38400, 57600, 115200 kbs MAC: 0 - 127, MAX Master: 1 - 127, Device object ID: 0 - 4194302	
Digital communication	Slave	2 x RJ12 & 2 x spring terminals	
Digital communication	Master	1 x RJ12 connection	
Analogue In1		0-10 V DC, 100% @ 9.5 V DC +/-2%	
Analogue Out1		+10 VDC	
Digital In1		Start/stop with internal pull-up	
Digital In2		Alarm reset	
Digital Out1		Tacho: 1 pulse/revolution | Alarm/running signal	
Green LED		Flashing: Active communication	
Red LED		Constantly lit: Critical alarm - stop motor	
Features			
Technology		Sinusoidal back-EMF signal controlled via FOC (Field Oriented Control)	
Flying start		Yes, < 30% of max. speed	
Ramp-up time	sec.	15-300	
Ramp-down time	sec.	15-300	
Alarm		Yes	
Alarm reset		Via digital input, MODBUS or powering down for more than 60 seconds	
Fan stop	sec.	The braking system stops the fan as quickly as possible. Braking time will depend on the inertia of the fan	
Service data log		Operating hours, alarms, loads, software version, max. temp., max. motor voltage, max. motor current, max. ripple voltage, max. ripple current	
Software updating		Yes, via serial interface	
Motor parameters		Preprogrammed by OJ or on-site configuration	
Fire mode		Nominal power for 1 hour at 70°C ambient temperature	
Field weakening		Yes	
Short-circuit protection		Yes	
Integrated EMC filters		Yes	
Harmonic distortion	THD(i)	Full load: < 1.5% / 10-100% load: < 3%	
Approvals			
EMC		EN/BS 61800-3 (C1 & C2) (First and second environment)	
SAFETY		EN/BS 61800-5-1 / UL 61800-5-1	
Product standard		EN/BS 61800 Part 2	
North America		UL -61800-5-1 / CS22.2.174	
RoHS Directive		Yes	
Product approvals		CE / cULus / UKCA	
Note: Data are valid at: nominal supply voltage, +25°C and sufficient air flow			