





AC Variable Speed Drive

PUMP CONTROL

Energy efficient pumping with **OPTIFL**○**W**[™]

ASPRE BAChet

Low Harmonic Design EN 61000-3-12 Compliant

built-in as standard

0.75kW-250kW / 1HP-350HP **200-600V** Single & 3 Phase Input



AC Variable Speed Drive

0.75 - 250kW / 1HP - 350HP **200 - 600V** Single & 3 Phase Input



Energy Efficient Pumping

When a pump or pump set is selected, it must be suitable for operation during periods of maximum flow demand. In many applications, this maximum flow level may be rarely required, and as such the pump may operate for long periods at less than maximum flow capacity. By varying the speed of the pump to match the actual flow demand, significant energy savings are possible.

Optidrive Eco Pump has been designed to maximise the energy savings potential in pumping applications, whilst also providing significant additional benefits

in reduced installation costs, maintenance costs and downtime. Throughout all this, Invertek's "Ease of Use" philosophy ensures that advanced features are simple to commission, without requiring extensive, in depth knowledge of a huge number of parameters. Optidrive Eco Pump has a simple menu structure, and provides just the right amount of parameters to allow flexibility without over complication.

Overall, this provides the perfect balance of Easy to Install, Easy to operate, Advanced Pump Control.









Save Energy

Eco vector operation, based on Invertek's advanced motor control provides the most energy efficient operation of the pump, continually optimising the output to match the required flow with minimum energy consumption.

Advanced sleep & wake functions provide maximum energy savings by switching off the pump when not required

Save Money

OPTIFL W** technology allows simple operation of multiple pump sets without the need for a PLC

Pump blockage detection and cleaning dramatically reduces pump maintenance requirements

Built in PLC function allows bespoke customised applications to be programmed directly in the drive

Save Time

Simple parameter set allows fast commissioning of pump control systems

Pump operating curve detection automatically detects and monitors normal pump behaviour and is able to react when pumping conditions change

Customisable OLED display provides excellent visibility of drive status and operation in all conditions

Key Features



ECO Vector Motor Control



Standard Induction Motors



Permanent Magnet AC Motors

Brushless DC Motors

Synchronous Reluctance Motors

Energy Optimised Design



Internal EMC Filter



Low Noise Operation



Maximum Pumping Efficiency

Unique Eco Vector Sensorless Control

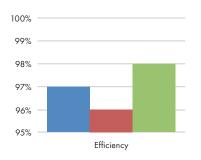
Optidrive Eco Pump uses advanced motor control technology, designed to provide the most energy efficient motor control possible. Operation with standard IM Motors, Permanent Magnet or Synchronous Reluctance motors is possible, all without requiring any feedback device or optional modules – simply change parameters to suit the connected motor, autotune and operate!

Eco Vector continuously adjusts in real time to provide the most efficient operating conditions for the load, typically reducing energy consumption by 2 – 3% compared to standard AC drives – providing similar long term costs savings to selecting a higher efficiency motor.

Energy Optimised Design

Optidrive Eco Pump up to frame size 5 are designed with film capacitors, replacing the traditional electrolytic capacitors used in the DC link. Film capacitors have lower losses, and also remove the need for AC, DC or swinging chokes, improving overall drive efficiency. Efficiency is improved by up to 4% compared to standard AC drives, whilst also reducing supply current total harmonic distortion (iTHD), improving the Real Power Factor and reducing total input current, leading to cost savings on installation through reduced cable and fuse ratings and smaller supply transformer rating.

Improved Efficiency, Reduced Lifetime Costs: e.g. for a 37kW load, operating 10 hours per day, 5 days per week, 50 weeks per year, improving the efficiency by just 1% will provide an energy saving > 900kWh per year.



Typical efficiency comparison for Optidrive Eco Pump vs other AC variable speed drives

Standard AC Variable Speed Drive

AC Variable Speed Drive + 4% Line Choke
Optidrive Eco Pump

OPTIFL Multi-pump Control

Embedded control technology for multi-pump systems



Total Control

A single 'Master' drive acts to control and monitor system operation. Control connections are made to this drive only, saving installation time and reducing costs.

Simple Connection

Additional drives connected on the system require a single RJ45 connection and basic commissioning, leading to time savings and simplified installation.

Flexible Solution

The system can operate with up to five pumps in any configuration, e.g. Jockey Pump / Duty / Assist / Standby. Duty pumps are automatically rotated, ensuring maximum service life and system efficiency.

Energy efficient pumping with **OPTIFL**



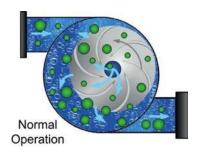
See OPTIFL OW in action

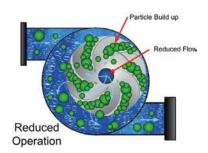
Scan to watch the video or visit http://youtu.be/9QQ89bQYdfs

Avoid Pump Downtime

Blockage Detect/Clear

Optidrive Eco Pump can detect pump blockages and trigger a programmed cleaning cycle to automatically clear them, preventing downtime.





Dry Run Protection

Optidrive Eco Pump can evaluate a pump's speed/power and shut it off or warn when the pump starts to run dry, protecting it from heat/friction damage.

Motor Preheat Function

Optidrive Eco Pump features a motor preheat function to help ensure moisture is not permitted to collect on the motor in periods of inactivity and prior to motor start up. In addition, the motor preheat function can be used to keep condensation from developing on the motor as the motor cools down immediately following a stop. The feature is fully configurable, meaning the pump can be always available the instant it is required.

Pump Stir Cycle

Triggered by a settable period of inactivity, a configurable cleaning cycle can be run to clear sediment, ensuring the pump is ready to run when needed.

Summary

- All drives operate at variable speed for maximum energy efficiency.
- Operating time (Hours Run) is automatically balanced and duty pumps rotated
- Automatic system reconfiguration in the event of a pump fault (including the master pump).
- Continued system operation when drives are individually powered off (including the master drive).
- Communication and +24V control voltage shared between drives via a standard RJ45 patch lead.
- Independent maintenance indicators for each pump.
- Any pump can be switched to Hand operation a the touch of a button, and will automatically rejoin the network when switched back to Auto.
- For waste water applications each pump can be set for blockage/ragging detection and activate an automatic de-ragging/pump cleaning cycle.
- Optional mains isolator with lock-off for safe pump maintenance.
- Optiflow function configured through simple parameter set-up and intelligent drive self configuration.

Consistent Flow

The required pressure and flow levels are maintained regardless of how many pumps are required. When demand increases, additional pumps are automatically brought on stream to assist and are switched off again when not required.

Reduced Downtime

In the event of a fault, or if a pump needs to be isolated for maintenance, the system will automatically continue to operate with the remaining available pumps. The mains power can even be completely isolated from the Master drive without affecting operation of the Slave drives.

Drive Features

A compact and robust range of drives dedicated to pump control





Maintenance interval timer and service indication



Multi Language OLED Display



Hand / Auto Keypad





Pluggable terminals

OLED Display

Installed as standard on all IP55 & IP66 models

- Clear multi-line text display
- Operates -10 to 50°C
- Wide viewing angle, effective in dark and light conditions
- Customisable display
- Multi-language selection



Long Life, Dual Ball Bearing Fans



Integrated cable management





Energy efficient pumping with **OPTIFL** W





Quiet Motor Operation

High switching frequency selection (up to 32kHz) ensures motor noise is minimised.

Quiet System Mechanics

Simple skip frequency selection avoids stresses and noise caused by mechanical resonance in pipework.

Quiet Drive Operation

Long Life Dual Ball Bearing Fans provide quiet operation in addition to extended fan life.

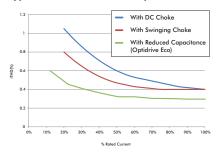
Noise Reduction through Speed Control

Optimising motor speed gives significant energy savings and reduces motor noise.

Optidrive Eco Pump uses innovative design to improve overall efficiency whilst minimising the harmonic distortion levels. All drives designed for 3 phase power supply operation¹ up to frame size 5 utilise film capacitor in the DC link, providing exceptionally low harmonic current distortion without compromising efficiency. Frame size 6 and above include DC chokes and traditional electrolytic capacitors.

Optidrive Eco Pump product range complies with the requirements of EN61000-3-12.

Typical iTHD values at full and part load

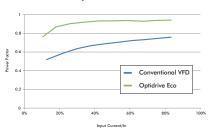


It can be clearly seen that the reduced DC link capacitance significantly reduces the total harmonic distortion at full load, and has a much greater benefit at part load compared to a conventional DC choke or swinging choke. This results in reduced overall input current and reduced transformer heating effect.

Optidrive Eco Pump delivers

- Improved Efficiency, Reduced Lifetime Costs: e.g. for a 37kW load, operating 10 hours per day, 5 days per week, 50 weeks per year, improving the efficiency by just 1% will provide an energy saving > 900kWh per year
- Improved True Power Factor No additional charges etc.
- Lower Mains Supply Current

Power factor comparison



Optidrive Eco offers improved power factor over conventional VFDs under all loads.

¹ 200V and 400V

Options & Accessories

Peripherals to help integrate Optidrive Eco Pump with your pumping systems





Energy efficient pumping with **OPTIFL** W



Powerful PC Software

Drive commissioning and parameter backup

- Real-time parameter editing
- Parameter upload, download and storage
- Simple PLC function programming
- Real-time scope function and data logging
- Real-time data monitoring

Compatible with:

Windows Vista Windows 7 Windows 8 Windows 8.1

Fieldbus Interfaces



BACnet/IP OPT-2-BNTIP-IN



PROFIBUS DP OPT-2-PROFB-IN



DeviceNet OPT-2-DEVNT-IN



EtherNet/IP **OPT-2-ETHNT-IN**



Modbus TCP OPT-2-MODIP-IN

Modbus TCP

PROFINET OPT-2-PFNET-IN



EtherCAT OPT-2-ETCAT-IN



Plug-in Options



Extended I/O

OPT-2-EXTIO-IN

• Additional 3 Digital Inputs Additional Relay Output

Cascade Control OPT-2-CASCD-IN

Additional 3 Relay Outputs

Mains Isolator



Mains Isolator Option

Frame Sizes 2 & 3 can be factory ordered with a built in lockable isolator. Án optional bolt on isolator is available for Frame Sizes 4 & 5.

Product Codes:

Frame Size 4 = OPT-2-ISOL4-IN Frame Size 5 = OPT-2-ISOL5-IN

BACnet MS/TP & Modbus RTU on board as standard



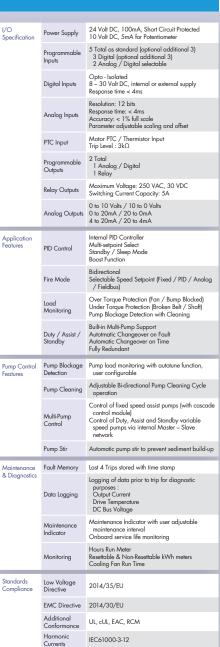
OPTIDRIVE™					
	kW	HP	Amps	Size	
200-240V±10%	0.75	1	4.3	2	ODV - 3 - 2 2 0043 - 1 F 1 # - # N
1 Phase Input	1.5	2	7 10.5	2	ODV - 3 - 2 2 0070 - 1 F 1 # - # N ODV - 3 - 2 2 0105 - 1 F 1 # - # N
	2.2	3	10.5		ODV - 3 - 2 2 0103 - 1 F 1 # - # 1V
	0.75	1	4.3	2	ODV - 3 - 2 2 0043 - 3 F 1 # - # N
	1.5	2	7	2	ODV - 3 - 2 2 0070 - 3 F 1 # - # N
	2.2	3 5	10.5	2	ODV - 3 - 2 2 0105 - 3 F 1 # - # N ODV - 3 - 3 2 0180 - 3 F 1 # - # N
	5.5	7.5	24	3	ODV - 3 - 3 2 0040 - 3 F 1 # - # N
	7.5	10	30	4	ODV - 3 - 4 2 0300 - 3 F 1 # - T N
200-240V±10%	11	15	46	4	ODV - 3 - 4 2 0460 - 3 F 1 # - T N
3 Phase Input	15	20	61	5	ODV - 3 - 5 2 0610 - 3 F 1 # - T N
	18.5	25 30	72 90	5	ODV - 3 - 5 2 0720 - 3 F 1 # - T N ODV - 3 - 5 2 0900 - 3 F 1 # - T N
	30	40	110	6	ODV - 3 - 6 2 1100 - 3 F 1 N - T N
	37	50	150	6	ODV - 3 - 6 2 1500 - 3 F 1 N - T N
	45	60	180	6	ODV - 3 - 6 2 1800 - 3 F 1 N - T N
	55 75	75 100	202	7 7	ODV - 3 - 7 2 2020 - 3 F 1 N - T N ODV - 3 - 7 2 2480 - 3 F 1 N - T N
	/3	100	240	/	ODV - 3 - 7 2 2480 - 3 F 1 N - 1 N
	0.75	1	2.2	2	ODV - 3 - 2 4 0022 - 3 F 1 # - # N
	1.5	2	4.1	2	ODV - 3 - 2 4 0041 - 3 F 1 # - # N
	2.2	3	5.8	2	ODV - 3 - 2 4 0058 - 3 F 1 # - # N
	5.5	5 7.5	9.5	2	ODV - 3 - 2 4 0095 - 3 F 1 # - # N ODV - 3 - 3 4 0140 - 3 F 1 # - # N
	7.5	10	18	3	ODV - 3 - 3 4 0180 - 3 F 1 # - # N
	11	15	24	3	ODV - 3 - 3 4 0240 - 3 F 1 # - # N
	15	20	30	4	ODV - 3 - 4 4 0300 - 3 F 1 # - T N
	18.5	25	39	4	ODV - 3 - 4 4 0390 - 3 F 1 # - T N
380-480V±10%	22 30	30 40	46 61	5	ODV - 3 - 4 4 0460 - 3 F 1 # - T N ODV - 3 - 5 4 0610 - 3 F 1 # - T N
3 Phase Input	37	50	72	5	ODV - 3 - 5 4 0720 - 3 F 1 # - T N
	45	60	90	5	ODV - 3 - 5 4 0900 - 3 F 1 # - T N
	55	75	110	6	ODV - 3 - 6 4 1100 - 3 F 1 N - T N
	75 90	100	150 180	6	ODV - 3 - 6 4 1500 - 3 F 1 N - T N ODV - 3 - 6 4 1800 - 3 F 1 N - T N
	110	175	202	7	ODV - 3 - 7 4 2020 - 3 F 1 N - T N
	132	200	240	7	ODV - 3 - 7 4 2400 - 3 F 1 N - T N
	160	250	302	7	ODV - 3 - 7 4 3020 - 3 F 1 N - T N
	200	300	370	8	ODV - 3 - 8 4 3700 - 3 F 1 2 - T N
	250	350	450	8	ODV - 3 - 8 4 4500 - 3 F 1 2 - T N
	0.75	1	2.1	2	ODV - 3 - 2 6 0021 - 3 0 1 # - # N
	1.5	2	3.1	2	ODV - 3 - 2 6 0031 - 3 0 1 # - # N
	2.2	3	4.1	2	ODV - 3 - 2 6 0041 - 3 0 1 # - # N
	5.5	5 7.5	6.5	2	ODV - 3 - 2 6 0065 - 3 0 1 # - # N ODV - 3 - 2 6 0090 - 3 0 1 # - # N
	7.5	10	12	3	ODV - 3 - 3 6 0120 - 3 0 1 # - # N
	11	15	17	3	ODV - 3 - 3 6 0170 - 3 0 1 # - # N
500-600V±10%	15	20	22	4	ODV - 3 - 4 6 0220 - 3 0 1 # - T N
3 Phase Input	18.5 22	25 30	28 34	4	ODV - 3 - 4 6 0280 - 3 0 1 # - T N ODV - 3 - 4 6 0340 - 3 0 1 # - T N
	30	40	43	4	ODV - 3 - 4 6 0340 - 3 0 1 # - 1 N
	37	50	54	5	ODV - 3 - 5 6 0540 - 3 0 1 # - T N
	45	60	65	5	ODV - 3 - 5 6 0650 - 3 0 1 # - T N
	55	75	78	6	ODV - 3 - 6 6 0780 - 3 0 1 N - T N
	75 90	100 125	105 130	6	ODV - 3 - 6 6 1050 - 3 0 1 N - T N ODV - 3 - 6 6 1300 - 3 0 1 N - T N
	110	150	150	6	ODV - 3 - 6 6 1500 - 3 0 1 N - T N
					22. 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2



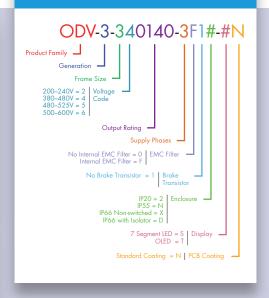


Drive Specification

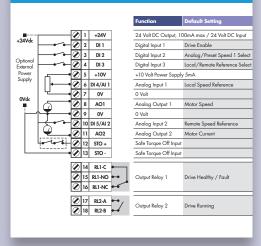
	Input Ratings	Supply Voltage	200 – 240V ± 10% 380 – 480V ± 10% 500 – 600V ± 10%				
		Supply Frequency		48 – 62Hz			
	Displacement Power Factor Phase Imbalance		> 0.98				
			3% Maximum allowed				
			< rated current				
Power Cycles		120 per hour maximum, evenly spaced					
	Output Ratings	Output Power	230V 1Ph. Input: 0.75–2.2kW (1–3HP) 230V 3Ph. Input: 0.75–75kW (1–100HP) 400V 3Ph. Input: 0.75–250kW 460V 3Ph. Input: 1–350HP 575V 3Ph. Input: 0.75–110kW (1–150HP)				
		Overload Capacity	110% for 60 seconds 165% for 4 seconds				
		Output Frequency	0 – 250Hz, 0.1Hz resolution				
		Typical Efficiency	> 98%		ŀ		
	Ambient Conditions	Temperature	Storage: -40 to 60°C Operating: -10 to 50°C				
		Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL)				
		Humidity	95% Max, non condensing				
		Vibration	Conforms to EN61800-5-1 2007, IEC 60068-2-6				
	Enclosure	Ingress Protection	IP20, IP55, IP66		ı		
	Programming	Keypad	ad Built-in keypad as standard Optional remote mountable keypad		ŀ		
		Display	Built-in multi language OLED (IP55 & IP66) 7 Segment LED (IP20)				
		PC	OptiTools Studio				
	Control Specification	Control Method	Eco Sensorless Vector Open Loop Permanent Magnet Vector Open Loop BLDC Vector Open Loop Synchronous Reluctance Vector				
		PWM Frequency	4 – 32kHz Effective				
		Stopping Mode	Ramp to stop: User Adjustable 0.1-600 secs Coast to stop				
		Braking	AC Flux Braking				
		Skip Frequency	Single point, user adjustable				
		Setpoint Control	Analog Signal	0 to 10 Volts / 10 to 0 Volts -10 Volts to +10 Volts 0 to 20mA / 20 to 0mA 4 to 20mA / 20 to 4mA	l		
		Connor	Digital	Motorised Potentiometer (Keypad) Modbus RTU BACnet MS/TP			
	Fieldbus Connectivity	Built-in	BACnet MS/TP	BACnet Application Specific Controller 9.6 - 76.8 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1			
			Modbus RTU	9.6 - 115.2 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1			
			BACnet/IP	Plug-in BACnet/IP interface Dual LAN ports Device Level Ring			
		Optional	Other	PROFIBUS DP (DPV1) PROFINET IO DeviceNet EtherNet/IP EtherCAT Modbus TCP			



Model Code Guide



Connection Diagram





Size



IP20













310

266

4.8 7.7

IP66

257

239

Environmental Conditions

Designed to meet IEC 60721-3-3, in operation: IP20 Drives: 352/3C2 IP55 & 66 Drives: 353/3C3









	922	eco	ec
P55			

IP55			
4	5	6	7
450	540	865	1280
171	235	330	330
252	270	330	360
11.5	23	55	89

mm Height Width mm Depth mm kg Weight

221 261 418 486 222 185 205 240 260 17 3.5 8.1 128 1.8







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Optidrive Eco Pump

✓ Saving Energy / Reducing CO₂

With large scale increases in global energy costs and the introduction of taxes and legislation relating to the industrial production of CO₂ gases the need to reduce energy consumption and save money has never been greater. Optidrive Eco Pump can be used with environmental sensors to reduce pump speed in pumping applications without compromising the required output of the system.

Easy Installation

Compact and modern design utilising the latest available technology have accumulated in a robust Eco Pump drive with small dimensions and innovative mounting and cabling features.

Simple Set-up & Rapid Commissioning

Optidrive Eco Pump was developed from concept for ease of use. A handful of parameters configure the drive for basic pump applications. A short, concise product data means the drive is running in seconds. Advanced powerful functionality is equally easily accessible.

✓ Imaginative Enclosure Design

With a selection of IP55 and IP66 enclosures, Optidrive Eco Pump is well suited to harsh environments, or where cabinet and cabling costs need to be reduced.

Advanced Pump Control Functions

The key pump control functionality required for your application is inbuilt into Optidrive Eco Pump and packaged to be both quick and simple to activate. Added to this is the drive's own PLC programming flexibility that makes drive functionality virtually limitless.

✓ Options for Flexibility

Optidrive Eco Pump combines both peripheral and factory built options to ensure you get the right drive, scaled to suit your application. With inbuilt BACnet and Modbus, and a host of communication options the Optidrive can integrate easily into your industrial network of choice.





www.invertekdrives.com/pump-control

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Invertek Drives Ltd is dedicated to the design, manufacture and marketing of electronic variable speed drives. The state of the art UK headquarters houses specialist facilities for research & development, manufacturing and global marketing. The company pledges to implement and operate the ISO 14001 Environmental Management System to enhance environmental performance.

All company operations are accredited to the exacting customer focused ISO 9001:2008 quality standard. The company's products are sold globally in over 80 different countries. Invertek Drives' unique and innovative drives are designed for ease of use and meet with recognised international design standards.

Global Pump Solutions

Invertek Drives operate at the heart of pumping systems around the world



IRELAND Maintaining pressure at pumping stations



HOLLAND Hot water pumping across district network



Cooling loop flow &



AUSTRALIA Improved reliability & running costs











