PUMP CONTROL
Energy efficient pumping with OPTIFLOW™

0.75kW – 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.

Energy Savings Calculator
Estimate your potential energy savings, CO₂ emissions and financial savings
www.invertekdrives.com/calculator
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

OPTIFLOW 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

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.

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

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 (THD), 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.

Maximum Pumping Efficiency

Unique Eco Vector Sensorless Control

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**OPTIFLOW™ Multi-pump Control**

Embedded control technology for multi-pump systems

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**Flexible pump station control**

with no PLCs or pump control units

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**Setpoint Control**

A standard feature on all drives

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**Pump Prime Mode**

**Pump Prime with Burst Pipe Detection**

Pump prime mode allows starting of the pump in a safely controlled manner, to ensure consistent filling and pressurisation of pipe work and systems. Low pressure warnings are ignored during priming to allow the system to prime correctly, whilst a failsafe timeout prevents the pump from continuing to run in the event of a failure to prime. This helps to prevent the effects of water hammering (such as bursting water pipes) or damage to fountain / sprinkler heads.

The time limit, set for pump prime mode to complete, means that the pressure in the system must reach the minimum level within the set time. Failure of the system to pressurise would indicate a leak or burst pipe within the pump system and result in the Optidrive Eco Pump shutting down the pump. During normal operation the system pressure is still continuously monitored against the minimum level so that a burst pipe during normal operation will likewise result in the drive tripping ‘low pressure’ and shutting the pump down.

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**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.

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**Simple Connection**

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

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**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 OPTIFLOW™

See OPTIFLOW™ 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 at 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

Internal EMC Filter
Compliant with global EMC Standards

Maintenance interval timer and service indication

Integrated cable management

Pluggable terminals

Hand / Auto Keypad

Multi Language OLED Display

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

Enclosure Options

IP66 with optional mains disconnect

IP20
IP66
IP55

Long Life, Dual Ball Bearing Fans

www.invertekdrives.com
Energy efficient pumping with **OPTIFLOW**

**Pump Control**

Optidrive Eco Pump uses innovative design to improve overall efficiency whilst minimising the harmonic distortion levels. All drives designed for 3 phase power supply operation\(^1\) 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.

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 > 100kWh per year
- Improved True Power Factor – No additional charges etc.
- Lower Mains Supply Current

**Noise Reduction through Speed Control**

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

**Reduced Harmonic Current Distortion**

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 offers improved power factor over conventional VFDs under all loads.

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\(^1\) 200V and 400V
Options & Accessories

Peripherals to help integrate Optidrive Eco Pump with your pumping systems

Optistick

Rapid Commissioning Tool
Plug-in or wirelessly copy parameter sets between drives.

OPT-2-STICK-IN

Optipad

Remote Keypad & OLED Display
IP55 panel mount operator interface.

- Clear multi-line text display
- Multiple language select
- Customisable displays

OPT-2-OPPAD-IN
Energy efficient pumping with OptiFlow™

**Pump Control**

**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

- **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

- **BACnet & Modbus RTU**
  - on board as standard

**Mains Isolator**

- **Mains Isolator Option**
  - Frame Sizes 2 & 3 can be factory ordered with a built in lockable isolator. An 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

**Powerful PC Software**

- Drive commissioning and parameter backup
  - Real-time parameter editing
  - Drive network communication
  - Parameter upload, download and storage
  - Simple PLC function programming
  - Real-time scope function and data logging
  - Real-time data monitoring

**Compatible with:**

- Windows XP
- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1

**Note:** Windows 10 is not currently supported.
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Drive Specification

- **Input Ratings**
  - Supply Voltage: 200 – 240V ± 10% / 380 – 480V ± 10%
  - Input Power Factor: 0.98 ≤ Power Factor ≤ 1.00
  - Phase Inrush: 3%, Maximum allowed
  - Inrush Current: ≤ rated current
  - Power Cycles: 120 per hour, evenly spaced

- **Output Ratings**
  - Output Power: 230V 1.0, Input 0.75 – 2.3kW (1 – 3HP)
  - 230V 1.0, Input 0.75 – 2.3kW (1 – 3HP)
  - 400V 3.0, Input 0.75 – 2.5kW (1 – 3HP)
  - Overload Capacity: 1.10 for 60 seconds
  - Output Frequency: 0 – 250Hz, 0.1Hz resolution
  - Typical Efficiency: > 98%

- **Conditions**
  - Temperature: Storage: −40 to 60°C
  - Altitude: Up to 1000m ASL without derating
  - Humidity: 95% Max. non-condensing
  - Vibration: Conforms to EN61000-2-6

- **Endorsements**
  - Ingress Protection: IP20, IP55, IP66
  - PC: OptiSoft Studio

- **Specifications**
  - Power Supply: 24 Volt DC, 100mA, Short Circuit Protected
  - PID Control
  - Application: Monitoring
  - Features: Monitoring
  - Pump Control: Protection
  - Monitoring: Display
  - Displacement: Frequency

- **Connection Diagram**
  - Function: Digital Input 1
  - Default Setting: 5mA
  - Optimal Current: 100mA
  - Safe Torque Off Input

- **Model Code Guide**
  - ODV-3-340140-3F1#N

- **Size**
  - Code: ODV-3-340140-3F1#N
  - Supply Voltage: 200 – 240V ± 10% / 380 – 480V ± 10%
  - Size: 2 to 7

- **Operation**
  - Frequency: 500 – 600V = 6 Voltage
  - 200 – 240V = 2 Voltage

- **Additional**
  - Code: IP55
  - Additional: UL, cUL, EAC, RCM
  - Harmonic Currents: IEC61000-3-12

- **Not to Scale**
  - IP20
  - IP66
  - IP55

- **OLED**
  - IP20
  - IP55

- **Dimensions**
  - Height: 110 – 131 – 222 – 330
  - Depth: 222 – 239 – 266 – 330
  - Weight: 500 – 540 – 585 – 685

- **Protection**
  - IP20
  - IP55
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

- **ITALY**  
  Cooling loop flow & temperature control

- **AUSTRALIA**  
  Improved reliability & running costs