

Pump Control





AC Variable Speed Drive

50.0 H

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# PUMP CONTROL Energy efficient pumping with **OPTIFLOW**



Low Harmonic Design EN 61000-3-12 Compliant

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.







Energy Savings Calculator

Estimate your potential energy savings, CO<sub>2</sub> emissions and financial savings www.invertekdrives.com/calculator





# Save Energy, Cut CO<sub>2</sub>

# 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**<sup>--</sup>**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**



#### 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.

Efficiency

100%

99%

98%

97%

96% 95%



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 W**<sup>™</sup> 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**



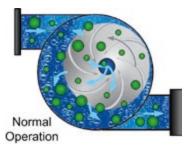
# See OPTIFL**ÓW<sup>™</sup>** in action

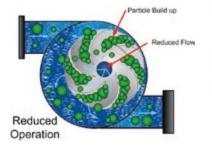
Scan to watch the video or visit http://youtu.be/9QQ89bQYdfs

### **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





# Energy efficient pumping with **OPTIFL**

<sup>m</sup>speed limit 50,0 H≥

#### **Noise Reduction**



#### **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

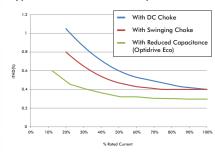
Optimising motor speed gives significant energy savings and reduces motor noise.

#### **Reduced Harmonic Current Distortion**

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<sup>1</sup> 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

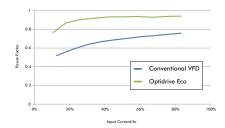


It can be clearly seen that the reduced DC link capacitance significantly reduces the total harmonic distortion at full load, and has a much greater benefit at part load compared to a conventional DC choke or swinging choke. This results in reduced overall input current and reduced transformer heating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

# **Options & Accessories**

Peripherals to help integrate Optidrive Eco Pump with your pumping systems



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# Energy efficient pumping with **OPTIFL**



# **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 Windows 10

## **Fieldbus Interfaces**



EtherCAT OPT-2-ETCAT-IN



Extended I/O OPT-2-EXTIO-IN • Additional 3 Digital Inputs • Additional Relay Output

**Plug-in Options** 

#### 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. 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

# **ec**() optidrive

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380-480V±10% 3 Phase Input       1.5       2       4.1       2         380-480V±10% 3 Phase Input       7.5       10       18       3         380-480V±10% 3 Phase Input       7.5       10       18       3         11       15       24       3       10       0.0V       3.2 4 0058.3 F 1       # # N         0DV       3.2 4 0050.3 F 1       # # N       0DV       3.2 4 0050.3 F 1       # # N         0DV       3.2 4 0050.3 F 1       # # N       0DV       3.3 4 0180.3 F 1       # # N         11       15       20       30       4       0DV       3.4 0180.3 F 1       # T N         0DV       3.4 4 0300.3 F 1       # T N       0DV       3.4 4 0300.3 F 1       # T N         0DV       3.4 4 0300.3 F 1       # T N       0DV       3.4 4 0300.3 F 1       # T N         0DV       3.5 4 0720.3 F 1       # T N       0DV       3.5 4 070.3 F 1       # T N         0DV       3.6 180.6       0DV       3.6 4 1800.3 F 1       # T N       N         0DV       3.6 4 1800.3 F 1       N T N       N       N       N       N         200       300       370       8       20       0DV       3.7 4 2020.3 F 1		75	100	248	7	ODV - 3 - 7 2 2480 - 3 F 1 N - T N				
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380-480V±10% 3 Phase Input       4       5       9.5       2         500-600V±10% 3 Phase Input       3       0.75       10       18       3         500-600V±10% 3 Phase Input       3       0.75       10       18       3         500-600V±10% 3 Phase Input       3       0.150       6       4       0.00V - 3 - 3 4 0140 - 3 F 1       # # N         0DV - 3 - 3 4 0140 - 3 F 1       # # N       0.0V - 3 - 3 4 0140 - 3 F 1       # # N         0DV - 3 - 3 4 0140 - 3 F 1       # T N       0.0V - 3 - 3 4 0140 - 3 F 1       # # N         11       15       20       30       4       0.0V - 3 - 4 4040 - 3 F 1       # T N         0DV - 3 - 4 4040 - 3 F 1       # T N       0.0V - 3 - 5 4 0700 - 3 F 1       # T N       0.0V - 3 - 5 4 0700 - 3 F 1       # T N         0DV - 3 - 5 4 0700 - 3 F 1       # T N       0.0V - 3 - 5 4 0700 - 3 F 1       # T N       0.0V - 3 - 6 4 1800 - 3 F 1       N T N         0DV - 3 - 6 4 1800 - 3 F 1       N T N       0.0V - 3 - 7 4 200 - 3 F 1       N T N       N ODV - 3 - 7 4 200 - 3 F 1       N T N         0DV - 3 - 7 4 200 - 3 F 1       N T N       N ODV - 3 - 7 4 200 - 3 F 1       N T N       N ODV - 3 - 7 4 200 - 3 F 1       N T N         0DV - 3 - 2 6 0021 - 3 0 1       N T N       N ODV - 3 - 2 6 0021 -		1.5	2	4.1	2					
380-480V±10%       5.5       7.5       14       3         380-480V±10%       11       15       20       30       4         15       20       30       4       0DV - 3 - 3 4 0180 - 3 F 1 # # N         22       30       46       4         30       40       61       5         37       50       72       5         45       60       90       5         55       75       110       6         90       150       180       6         101       175       202       7         102       200       240       7         104       250       302       7         105       200       200       7         106       250       302       7         106       250       302       7         106       250       302       7         106       250       302       7         106       250       302       7         106       250       302       7         106       250       302       7         000       3.6       18 <td< td=""><td></td><td>2.2</td><td>3</td><td>5.8</td><td>2</td><td>ODV - 3 - 2 4 0058 - 3 F 1 # - # N</td></td<>		2.2	3	5.8	2	ODV - 3 - 2 4 0058 - 3 F 1 # - # N				
380-480V±10%       7.5       10       18       3         380-480V±10%       15       20       30       4         18.5       25       39       4         22       30       46       4         30       40       61       5         37       50       72       5         45       60       90       5         55       75       110       6         75       100       150       6         90       150       180       6         101       175       202       7         132       200       240       7         160       250       302       7         200       300       370       8         250       350       450       8         0DV - 3 - 74       2020.3       7         106       250       302       7         200       300       370       8         250       350       450       8         110       175       2       1.1         15       2       3.1       2         2.2       3.6.1 <t< td=""><td></td><td>4</td><td>5</td><td>9.5</td><td>2</td><td>ODV - 3 - 2 4 0095 - 3 F 1 # - # N</td></t<>		4	5	9.5	2	ODV - 3 - 2 4 0095 - 3 F 1 # - # N				
380-480V±10%       11       15       24       3         380-480V±10%       18.5       25       39       4         380-480V±10%       37       50       72       5         37       50       72       5       5       55       75       110       6         75       100       150       6       90       55       55       75       110       6         75       100       150       6       90       150       180       6       0DV - 3 - 6 4 1500 - 3 F 1       H T N         0DV - 3 - 6 4 100 - 3 F 1       H T N       0DV - 3 - 6 4 1500 - 3 F 1       H T N       0DV - 3 - 6 4 1500 - 3 F 1       N T N         0DV - 3 - 6 4 1500 - 3 F 1       N T N       0DV - 3 - 7 4 2020 - 3 F 1       N T N         0DV - 3 - 7 4 2020 - 3 F 1       N T N       0DV - 3 - 7 4 2020 - 3 F 1       N T N         0DV - 3 - 7 4 2020 - 3 F 1       N T N       0DV - 3 - 7 4 2020 - 3 F 1       N T N         0DV - 3 - 2 6 0021 - 3 0 1       # # N       0DV - 3 - 2 6 0021 - 3 0 1       # # N         0DV - 3 - 2 6 0021 - 3 0 1       # # N       0DV - 3 - 2 6 0021 - 3 0 1       # # N         0DV - 3 - 2 6 0021 - 3 0 1       # # N       0DV - 3 - 2 6 0021 - 3 0 1       # # N		5.5	7.5	14	3	ODV - 3 - 3 4 0140 - 3 F 1 <mark># - # N</mark>				
380-480V±10%       15       20       30       4         18.5       25       39       4         22       30       46       4         30       40       61       5         37       50       72       5         45       60       90       5         55       75       110       6         75       100       150       6         90       150       180       6         101       175       202       7         102       200       240       7         106       250       350       450         90       150       180       6         101       175       202       7         200       300       370       8         250       350       450       8         0DV - 3 - 2 6 0021 - 3 0 1       1       1         0DV - 3 - 2 6 0021 - 3 0 1       1       1         15       2       3.1       2         20       300       370       8         215       2       3       4.1       2         22       3       4.1		7.5	10	18	3	ODV - 3 - 3 4 0180 - 3 F 1 <mark># - # N</mark>				
380-480V±10% 3 Phase input       18.5       25       39       4         320-480V±10% 3 Phase input       22       30       46       4         30       40       61       5         37       50       72       5         45       60       90       5         55       75       110       6         90       150       180       6         10       175       202       7         132       200       240       7         160       250       302       7         200       300       370       8         200       300       370       8         200       300       370       8         200       300       370       8         200       300       370       8         21.5       2       3.1       2         2.2       3       4.1       2         4       5       6.5       2         5.5       7.5       9       2         7.5       10       12       3         11       15       17       3         15										
380-480V±10% 3 Phase Input         22         30         46         4           30         40         61         5           37         50         72         5           45         60         90         5           55         75         110         6           75         100         150         6           90         150         180         6           110         175         202         7           132         200         240         7           160         250         302         7           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           21.5         2         3.1         2           2.2         3         4.1         2           2.2         3         4.1         2           2.5.5         7.5         9         2										
380-480V±10% 3 Phase Input         30         40         61         5           37         50         72         5           45         60         90         5           55         75         110         6           75         100         150         6           90         150         180         6           90         150         180         6           90         150         180         6           101         175         202         7           132         200         240         7           160         250         302         7           200         300         370         8           250         350         450         8           0DV - 3 - 7         4 200 - 3         F 1         N - TN           ODV - 3 - 7         4 200 - 3         F 1         N - TN           ODV - 3 - 7         4 200 - 3         F 1         N - TN           ODV - 3 - 2         6 0021 - 3         0 1         # + # N           ODV - 3 - 2         6 0021 - 3         0 1         # - # N           ODV - 3 - 2         6 0031 - 3         0 1 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>										
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45       60       90       5         55       75       110       6         75       100       150       6         90       150       180       6         110       175       202       7         132       200       240       7         160       250       300       370         200       300       370       8         250       350       450       8         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 7 4 2020 - 3 F 1       N - T N         0DV - 3 - 8 4 4500 - 3 F 1       N - T N         0DV - 3 - 8 4 4500 - 3 F 1       N - T N         0DV - 3 - 2 6 0021 - 3 0 1       # - # N         0DV - 3 - 2 6 0021 - 3 0 1       # - # N         0DV - 3 - 2 6 0021 - 3 0 1       # - # N         0DV - 3 - 2 6 0021 - 3 0 1       # - # N         0DV - 3 - 2 6 0021 - 3 0 1       # - # N         0DV - 3	3 Phase Input				-					
500-600V ± 10% 3 Phase Input         0.75         1         2.1         2           500-600V ± 10% 3 Phase Input         0.75         1         2.1         2         0.75         0.12         3         1										
500-600V±10% 3 Phase Input         0.75         1         2.1         2           500-600V±10% 3 Phase Input         0.75         1         2.1         2         0.75         1         2.1         2           11         15         2         3.1         2         2         3         4.1         2           0.75         10         12         3         4.1         2         0.7         3.6         0.7         3.0         1         #<#N					-					
90         150         180         6           110         175         202         7           132         200         240         7           160         250         302         7           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           200         300         370         8           21.5         2         3.1         2           2.2         3         4.1         2           4         5         6.5         2           5.5         7.5         9         2           7.5         10         12         3           11										
500-600V±10%         7         20         22         4         7           11         15         12         3         12         0DV - 3 - 7 4 2400 - 3 F 1         N - T N           0DV - 3 - 7 4 3020 - 3 F 1         N - T N         0DV - 3 - 7 4 3020 - 3 F 1         N - T N           100 - 3 - 7 4 3020 - 3 F 1         N - T N         0DV - 3 - 2 6 0021 - 3 0 1         H - H N           11.5         2         3.1         2         0DV - 3 - 2 6 0021 - 3 0 1         H - H N           0DV - 3 - 2 6 0031 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 2 6 0031 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 2 6 0031 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 2 6 0031 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 2 6 0005 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 2 6 0005 - 3 0 1         H - H N         0DV - 3 - 2 6 0031 - 3 0 1         H - H N           0DV - 3 - 4 6 0220 - 3 0 1         H - T N         0DV - 3 - 4 6 0220 - 3 0 1         H - T N           0DV - 3 - 4 6 0220 - 3 0 1         H - T N         0DV - 3 - 5 6 0403 0 3 0 1		90	150	180	6					
500-600V±10% 3 Phase Input         15         20         22         4         23         4         23         4         23         3         1         <		110	175	202	7	ODV - 3 - 7 4 2020 - 3 F 1 N - T N				
200         300         370         8         250         350         450         8           250         350         450         8         ODV - 3 - 8 4 3700 - 3 F 1         2 T N           0.75         1         2.1         2         1.5         2         3.1         2           1.5         2         3.1         2         2.2         3         4.1         2           2.2         3         4.1         2         0DV - 3 - 2 6 0021 - 3 0 1 # - # N         0DV - 3 - 2 6 0031 - 3 0 1 # - # N           5.5         7.5         9         2         0DV - 3 - 2 6 0045 - 3 0 1 # - # N         0DV - 3 - 2 6 0045 - 3 0 1 # - # N           5.5         7.5         10         12         3         0DV - 3 - 2 6 0045 - 3 0 1 # - # N           0DV - 3 - 2 6 0000 - 3 0 1 # - 1 N         15         20         22         4         0DV - 3 - 3 6 0120 - 3 0 1 # - 1 N           15         20         22         4         18.5         25         28         4           22         30         34         4         0DV - 3 - 4 6 0220 - 3 0 1 # - T N         0DV - 3 - 4 6 0240 - 3 0 1 # - T N           0DV - 3 - 5 6 0540 - 3 0 1 # - T N         0DV - 3 - 5 6 0540 - 3 0 1 # - T N         0DV - 3 - 5 6 0560 - 3 0 1 # - T N <td></td> <td>132</td> <td>200</td> <td>240</td> <td>7</td> <td>ODV - 3 - 7 4 2400 - 3 F 1 N - T N</td>		132	200	240	7	ODV - 3 - 7 4 2400 - 3 F 1 N - T N				
500-600V±10%         3         500         450         8         ODV - 3 - 8 4 4500 - 3 F 1         FTN           500-600V±10%         1.5         2         3.1         2         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0021 - 3 0 1 # - # N         ODV - 3 - 2 6 0020 - 3 0 1 # - # N         ODV - 3 - 2 6 0020 - 3 0 1 # - # N         ODV - 3 - 3 6 0170 - 3 0 1 # - # N         ODV - 3 - 4 6 0220 - 3 0 1 # - T N         ODV - 3 - 4 6 0220 - 3 0 1 # - T N         ODV - 3 - 4 6 0230 - 3 0 1 # - T N         ODV - 3 - 4 6 0230 - 3 0 1 # - T N         ODV - 3 - 5 6 0550 - 3 0 1 # - T N         ODV - 3 - 5 6 0550 - 3 0 1 # - T N         ODV - 3 - 5 6 0550 - 3 0 1 # - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV - 3 - 6 6 1050 - 3 0 1 M - T N         ODV		160	250	302	7	ODV - 3 - 7 4 3020 - 3 F 1 N - T N				
500-600V±10%         15         20         22         4         5         5         7.5         9         2           500-600V±10%         15         20         22         4         0DV - 3 - 2 6 0021 - 3 0 1 # - # N           500-600V±10%         7.5         10         12         3         0DV - 3 - 2 6 0031 - 3 0 1 # - # N           500-600V±10%         15         20         22         4         0DV - 3 - 2 6 0041 - 3 0 1 # - # N           11         15         17         3         0DV - 3 - 2 6 0040 - 3 0 1 # - # N           111         15         17         3         0DV - 3 - 3 6 0120 - 3 0 1 # - # N           0DV - 3 - 4 6 0220 - 3 0 1 # - # N         0DV - 3 - 4 6 0280 - 3 0 1 # - T N         0DV - 3 - 4 6 0280 - 3 0 1 # - T N           22         30         34         4         0DV - 3 - 5 6 0550 - 3 0 1 # - T N           3Phase Input         37         50         54         5           45         60         65         5         0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N         0DV - 3 - 5 6 0550 - 3 0 1 M - T N         0DV - 3 - 6 6 1050 - 3 0 1 N - T N           90         125         130         6         0DV - 3 - 6 6 1300 - 3 0 1 N - T N		200	300	370	8					
500-600V±10%       15       2       3.1       2         500-600V±10%       15       20       22       4         11       15       17       3         15       20       22       4         11       15       17       3         15       20       22       4         15       20       22       4         15       20       22       4         15       20       22       4         15       20       22       4         15       20       22       4         0DV - 3 - 4       6020 - 3 0 1       1         15       20       22       4         0DV - 3 - 4       6020 - 3 0 1       1         15       20       22       4         0DV - 3 - 4       6020 - 3 0 1       1         0DV - 3 - 4       6020 - 3 0 1       1         16       20       22       30         37       50       54       5         55       75       78       6         75       100       105       6         90       125       130       6		250	350	450	8	ODV - 3 - 8 4 4500 - 3 F 1 2 - T N				
500-600V±10%         15         22         3         4.1         2           7.5         10         12         3         0DV - 3 - 2 6 0041 - 3 0 1 # - # N           0DV - 3 - 2 6 005 - 3 0 1 # - # N         0DV - 3 - 2 6 005 - 3 0 1 # - # N           0DV - 3 - 2 6 009 - 3 0 1 # - # N           0DV - 3 - 2 6 009 - 3 0 1 # - # N           0DV - 3 - 2 6 009 - 3 0 1 # - # N           0DV - 3 - 2 6 009 - 3 0 1 # - # N           0DV - 3 - 3 6 0120 - 3 0 1 # - # N           0DV - 3 - 3 6 0120 - 3 0 1 # - # N           0DV - 3 - 4 6 0220 - 3 0 1 # - T N           0DV - 3 - 4 6 0280 - 3 0 1 # - T N           0DV - 3 - 4 6 0280 - 3 0 1 # - T N           0DV - 3 - 4 6 0340 - 3 0 1 # - T N           0DV - 3 - 5 6 0540 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 5 6 0550 - 3 0 1 # - T N           0DV - 3 - 6 6 0780 - 3 0 1 N - T N           0DV - 3 - 6 6 1300 - 3 0 1 N - T N           0DV - 3 - 6 6 1300 - 3 0 1 N - T N										
4         5         6.5         2           5.5         7.5         9         2           7.5         10         12         3           11         15         17         3           15         20         22         4           15         20         22         4           15         20         22         4           16         22         30         34         4           20         30         34         4         ODV - 3 · 4 6 0280 · 3 0 1 # - T N           0DV - 3 · 4 6 0340 · 3 0 1 # - T N         0DV - 3 · 4 6 0340 · 3 0 1 # - T N         0DV - 3 · 4 6 0340 · 3 0 1 # - T N           37         50         54         5         ODV - 3 · 5 6 0540 · 3 0 1 # - T N           0DV - 3 · 5 6 0540 · 3 0 1 # - T N         0DV - 3 · 5 6 0560 · 3 0 1 # - T N         0DV - 3 · 6 6 0780 · 3 0 1 # - T N           55         75         78         6         0DV - 3 · 6 6 0780 · 3 0 1 N · T N           0DV - 3 · 6 6 1500 · 3 0 1 N · T N         0DV - 3 · 6 6 1300 · 3 0 1 N · T N         0DV - 3 · 6 6 1300 · 3 0 1 N · T N										
5.5         7.5         9         2           7.5         10         12         3           11         15         17         3           11         15         17         3           15         20         22         4           15         20         22         4           15         20         22         4           16         22         30         34         4           20         30         34         4         ODV - 3 - 4 6 0280 - 3 0 1 # - T N           0DV - 3 - 4 6 0340 - 3 0 1 # - T N         0DV - 3 - 4 6 0340 - 3 0 1 # - T N         ODV - 3 - 5 6 0540 - 3 0 1 # - T N           37         50         54         5         ODV - 3 - 5 6 0560 - 3 0 1 # - T N           0DV - 3 - 5 6 0560 - 3 0 1 # - T N         ODV - 3 - 5 6 0560 - 3 0 1 # - T N         ODV - 3 - 6 6 0780 - 3 0 1 # - T N           55         75         78         6         ODV - 3 - 6 6 1500 - 3 0 1 N - T N           0DV - 3 - 6 6 1500 - 3 0 1 N - T N         ODV - 3 - 6 6 1300 - 3 0 1 N - T N         ODV - 3 - 6 6 1300 - 3 0 1 N - T N										
500-600V±10%         7.5         10         12         3           500-600V±10%         15         20         22         4           15         20         22         4           18.5         25         28         4           22         30         34         4           30         40         43         4           37         50         54         5           55         75         78         6           75         100         105         6           90         125         130         6										
500-600V±10%         11         15         17         3           500-600V±10%         15         20         22         4           18.5         25         28         4           22         30         34         4           30         40         43         4           37         50         54         5           45         60         65         5           55         75         78         6           75         100         105         6           90         125         130         6										
500-600V±10% 3 Phase Input         15         20         22         4         ODV - 3 - 4 6 0220 - 3 0 1 # - T N           22         30         34         4         ODV - 3 - 4 6 0280 - 3 0 1 # - T N           30         40         43         4         ODV - 3 - 4 6 0340 - 3 0 1 # - T N           37         50         54         5         ODV - 3 - 4 6 0340 - 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 - 5 6 0650 - 3 0 1 # - T N           75         100         105         6         ODV - 3 - 6 6 1500 - 3 0 1 N - T N           90         125         130         6         ODV - 3 - 6 6 1300 - 3 0 1 N - T N										
500-600V±10% 3 Phase Input         18.5         25         28         4           22         30         34         4           30         40         43         4           30         40         43         4           37         50         54         5           45         60         65         5           55         75         78         6           75         100         105         6           90         125         130         6										
3 Phase Input         22         30         34         4         ODV - 3 - 4 6 0340 - 3 0 1 # - T N           30         40         43         4         ODV - 3 - 4 6 0340 - 3 0 1 # - T N           37         50         54         5         ODV - 3 - 4 6 0430 - 3 0 1 # - T N           45         60         65         5         ODV - 3 - 5 6 0540 - 3 0 1 # - T N           55         75         78         6         ODV - 3 - 6 6 0780 - 3 0 1 # - T N           75         100         105         6         ODV - 3 - 6 6 1050 - 3 0 1 N - T N           90         125         130         6         ODV - 3 - 6 6 1300 - 3 0 1 N - T N										
30       40       43       4       ODV - 3 - 4 6 0430 - 3 0 1 # - T N         37       50       54       5       ODV - 3 - 5 6 0540 - 3 0 1 # - T N         45       60       65       5       ODV - 3 - 5 6 0540 - 3 0 1 # - T N         55       75       78       6       ODV - 3 - 6 6 0780 - 3 0 1 # - T N         75       100       105       6       ODV - 3 - 6 6 0780 - 3 0 1 N - T N         90       125       130       6       ODV - 3 - 6 6 1300 - 3 0 1 N - T N	3 Phase Input									
37       50       54       5         45       60       65       5         55       75       78       6         75       100       105       6         90       125       130       6										
45       60       65       5         55       75       78       6         75       100       105       6         90       125       130       6										
75         100         105         6         ODV - 3 - 6 6 1050 - 3 0 1         N - T N           90         125         130         6         ODV - 3 - 6 6 1300 - 3 0 1         N - T N										
75         100         105         6         ODV - 3 - 6 6 1050 - 3 0 1         N - T N           90         125         130         6         ODV - 3 - 6 6 1300 - 3 0 1         N - T N										
		75	100	105	6	ODV - 3 - 6 6 1050 - 3 0 1 N - T N				
110 150 150 6 ODV - 3 - 6 6 1500 - 3 0 1 N - T N		90	125	130	6	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				



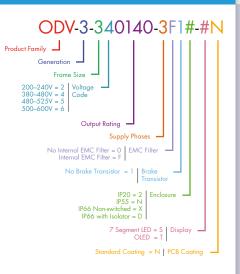


# **Drive Specification**

Input Ratings	Supply Voltage	200 - 240V ± 10% 380 - 480V ± 10% 500 - 600V ± 10%							
	Supply Frequency	48 – 62Hz							
	Displacement Power Factor	> 0.98	> 0.98						
	Phase Imbalance	3% Maximum	allowed	L					
	Inrush Current	< rated current							
	Power Cycles	120 per hour	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	L					
	Typical Efficiency	> 98%		А					
Ambient	Tananatan	Storage: -40	to 60°C	Fe					
Conditions	Temperature	Operating: -	10 to 50°C						
	Altitude	Up to 1000m Up to 2000m Up to 4000m	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL)						
	Humidity	95% Max, no	on condensing						
	Vibration	Conforms to E	Conforms to EN61800-5-1 2007, IEC 60068-2-6						
Enclosure	Ingress Protection	IP20, IP55, IP66							
Programming	Keypad		Built-in keypad as standard Optional remote mountable keypad						
	Display	Built-in multi la 7 Segment LE	inguage OLED (IP55 & IP66) D (IP20)	Fe					
	PC	OptiTools Stu	dio						
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 Ef	fective	L					
	Stopping Mode	Ramp to stop: User Adjustable 0.1–600 secs Coast to stop							
	Braking	AC Flux Braking							
	Skip Frequency	Single point, a	user adjustable						
	Setpoint	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						
	Control	Motorised Potentiometer (Keyp Digital Modbus RTU BACnet MS/TP		l					
Fieldbus Connectivity	Built-in	BACnet MS/TP	BACnet Application Specific Controller 9.6 - 76.8 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1	SI					
		Modbus RTU	9.6 - 115.2 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1	ŀ					
		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						

1/0		24 Volt DC 100mA Short Circuit Protected					
Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer					
	Programmable Inputs	5 Total as standard (optional additional 3) 3 Digital (optional additional 3) 2 Analog / Digital selectable					
	Digital Inputs	Opto - Isolated 8 – 30 Volt DC, internal or external supply Response time < 4ms					
	Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: < 1% full scale Parameter adjustable scaling and offset					
	PTC Input	Motor PTC / Thermistor Input Trip Level : $3k\Omega$					
	Programmable Outputs	2 Total 1 Analog / Digital 1 Relay					
	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 5A					
	Analog Outputs	0 to 10 Volts / 10 to 0 Volts 0 to 20mA / 20 to 0mA 4 to 20mA / 20 to 4mA					
Application Features	PID Control	Internal PID Controller Multi-setpoint Select Standby / Sleep Mode Boost Function					
	Fire Mode	Bidirectional Selectable Speed Setpoint (Fixed / PID / Analog / Fieldbus)					
	Load Monitoring	High Current Protection (Fan / Bump Blocked) Low Current Protection (Broken Belt / Shaft) Pump Blockage Detection with Cleaning					
	Duty / Assist / Standby	Built-in Multi-Pump Support Autotmatic Changeover on Fault Automatic Changeover on Time Fully Redundant					
Pump Control Features	Pump Blockage Detection	Pump load monitoring with autotune function, user configurable					
	Pump Cleaning	Adjustable Bi-directional Pump Cleaning Cycle operation					
	Multi-Pump Control	Control of fixed speed assist pumps (with cascade control module) Control of Duty, Assist and Standby variable speed pumps via internal Master – Slave network					
	Pump Stir	Automatic pump stir to prevent sediment build-up					
Maintenance	Pump Stir Fault Memory	Automatic pump stir to prevent sediment build-up Last 4 Trips stored with time stamp					
Maintenance & Diagnostics							
	Fault Memory	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature					
	Fault Memory Data Logging Maintenance	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature DC: Bus Voltage Maintenance Indicator with user adjustable maintenance interval					
	Fault Memory Data Logging Maintenance Indicator	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature DC: Bus Voltage Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring Hours Run Meter Resettable & Non-Resettable kWh meters					
& Diagnostics	Fault Memory Data Logging Maintenance Indicator Monitoring Low Voltage	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature DC Bus Voltage Maintenance interval Onboard service life monitoring Hours Run Meter Resettable & Non-Resettable kWh meters Cooling Fan Run Time					
& Diagnostics	Fault Memory Data Logging Maintenance Indicator Monitoring Low Voltage Directive	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature DC: Bus Voltage Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring Hours Run Meter Resettable & Non-Resettable kWh meters Cooling Fan Run Time					
& Diagnostics	Fault Memory Fault Memory Data Logging Maintenance Indicator Monitoring Low Voltage Directive EMC Directive Additional	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes : Output Current Drive Temperature DC Bus Voltage Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring Hours Run Meter Resettable & Non-Resettable kWh meters Cooling Fan Run Time 2014/35/EU 2014/30/EU					

# Model Code Guide



## **Connection Diagram**

+24Vdc

Optional External Power Supply

> 0Vdc ₽

					Function	Default Setting		
	0	1	+24V		24 Volt DC Output, 10	00mA max / 24 Volt DC Input		
	0	2	DI 1		Digital Input 1	Drive Enable		
	۲	3	DI 2		Digital Input 2	Analog/Preset Speed 1 Select		
	Ø	4	DI 3		Digital Input 3	Local/Remote Reference Select		
	Ø	5	+10V		+10 Volt Power Supply	r 5mA		
•	Ø	6	DI 4/AI 1		Analog Input 1	Local Speed Reference		
	Ø	7	0V		0 Volt			
6	0	8	AO1		Analog Output 1	Motor Speed		
┝╨──╸	Ø	9	0V		0 Volt			
4.	Ø	10	DI 5/AI 2		Analog Input 2	Remote Speed Reference		
Ψ	۲	11	AO2		Analog Output 2	Motor Current		
4-10-6-	Ø	12	STO +		Safe Torque Off Input			
	Ø	13	STO -		Safe Torque Off Input			
	۲	14	RL1-C					
	0	15	RL1-NO	⊷	Output Relay 1	Drive Healthy / Fault		
	Ø	16	RL1-NC	H <b>-</b>				
	0	17 18	RL2-A		Output Relay 2	Drive Running		

NOT TO SCALE			Modbus							U)		
		IP20					IP66		IP55			
	Size	2	3	4	5	8	2	3	4	5	6	7
mm	Height	221	261	418	486	995	257	310	450	540	865	1280
mm	Width	110	131	160	222	482	188	211	171	235	330	330
mm	Depth	185	205	240	260	480	239	266	252	270	330	360
kg	Weight	1.8	3.5	8.1	17	128	4.8	7.7	11.5	23	55	89





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#### **Optidrive Eco Pump**

## 🖌 Saving Energy / Reducing CO,

With large scale increases in global energy costs and the introduction of taxes and legislation relating to the industrial production of CO<sub>2</sub> 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.



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



HOLLAND

IRELAND

Maintaining pressure

at pumping stations







ITALY Hot water pumping Cooling loop flow & across district network temperature control

AUSTRALIA Improved reliability & running costs



#### www.invertekdrives.com/pump-control

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