



# eco OPTIDRIVE™

AC Variable Speed Drive

## HVAC BUILDING SERVICES

Energy efficient fan & pump control



 **BACnet®**  
MS/TP  
built-in as standard

**Low Harmonic  
Design**

EN 61000-3-12  
Compliant

0.75kW – 250kW / 1HP – 400HP  
**200–600V** Single & 3 Phase Input



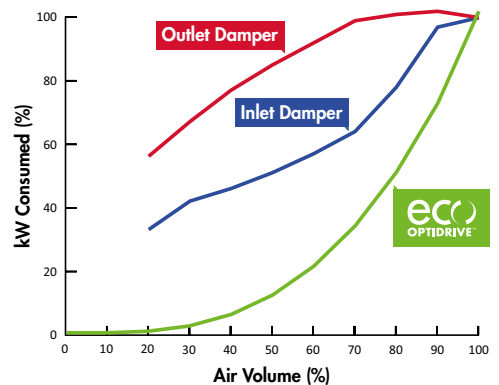


## Energy Efficient Fan & Pump Control

- AC Induction (IM) Motors
- AC Permanent Magnet (PM) Motors
- Brushless DC (BLDC) Motors
- Synchronous Reluctance (SynRM) Motors

### Instant Power Savings

The graph below shows a comparison between the efficiency of various methods which can be used to control the airflow produced by a fan.



From the data, it can be clearly seen that using methods such as dampers to restrict the airflow is much less efficient than controlling the speed of the fan using an Optidrive Eco HVAC.

### Take Control of Your Environment

Modern building ventilation and air conditioning systems are designed to provide optimum climatic conditions for occupants throughout the whole year. As such, they must be designed to operate equally well during the hottest part of the day, with maximum sunlight, through to the colder night time and winter periods. Building designers must take account of these extremes and select components and systems capable of providing the required level of occupant comfort under all conditions. This results in systems operating the majority of the time at less than maximum capacity, which can mean reduced efficiency and wasted energy.

Optidrive Eco HVAC provides a perfect solution to the needs of designers looking to optimise the

performance of fans and pumps used in HVAC applications, allowing them to operate with maximum efficiency under all conditions. Invertek Drives' philosophy to provide innovative products with easy to use, energy efficient features ensures that time, cost and energy savings are maximised at all times, resulting in the shortest possible payback period – the time taken to recover the initial product and installation costs through financial savings achieved through installing Optidrive Eco HVAC drives.

For simple installation into your buildings management system all Optidrive Eco HVAC drives are provided with both BACnet and Modbus RTU as standard across the product range.



IP20



IP55 / NEMA 12



IP66 / NEMA 4X



### Energy Savings Calculator

Estimate your potential energy savings, CO<sub>2</sub> emissions and financial savings

[www.invertekdrives.com/calculator](http://www.invertekdrives.com/calculator)





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

# Save Energy

**Accurate speed control** of fans and pumps provides the most energy efficient control method

**Energy optimisation function** minimises energy usage in real time under partial load conditions

**Sleep & wake functions** ensure operation only when required

# Save Money

**Advanced on-board features** remove the need for peripheral equipment

**Intelligent maintenance interval** timing allows programmable maintenance reminders, avoiding costly downtime

**Automatic load monitoring** provides an early warning of potential faults, such as belt failures or blocked filters

# Save Time

**Built in keypad and OLED text display** provides intuitive operation

**Simple parameter structure** with carefully selected default values reduce commissioning time

**Practical design** allows easy access to power and control terminals without specialist tools

## 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



## Improved Fan Efficiency

### Unique Eco Vector Sensorless Control

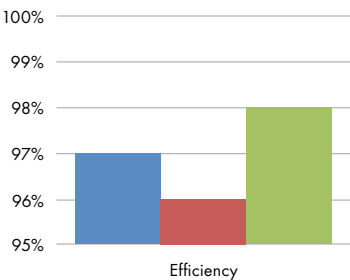
Optidrive Eco HVAC uses advanced motor control, designed to provide the most energy efficient motor control possible. Operation with standard IM Motors, Permanent Magnet or Synchronous Reluctance motors is possible, all without requiring any feedback device or optional modules – simply change parameters 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 HVAC 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 HVAC vs other AC variable speed drives

Standard AC Variable Speed Drive  
AC Variable Speed Drive + 4% Line Choke  
Optidrive Eco HVAC

# Dedicated to HVAC Applications

Take control of your environment

**Stairwell Pressurisation**

**Energy Efficient Air Handling**

**Fire Override**

**Chiller Pump Control**

**Fume Extraction**

**Building Comfort**

**Energy Efficient Air Handling**

Creating comfortable building environments without high energy costs

**Where do the energy savings come from?**

Air conditioning can use a significant amount of energy. In some cases it could even double energy consumption, not to mention the resultant increase in a company's carbon footprint.

**Don't produce more airflow than you need!**

Typically the air conditioning systems in buildings are designed for maximum occupancy and peak outside ambient. This means that for the majority of time there is large scope for running the systems at reduced speed and significant money to be saved with variable speed drives.

Optidrive Eco HVAC can vary the output of your air conditioning system to meet the varying demands throughout the day.

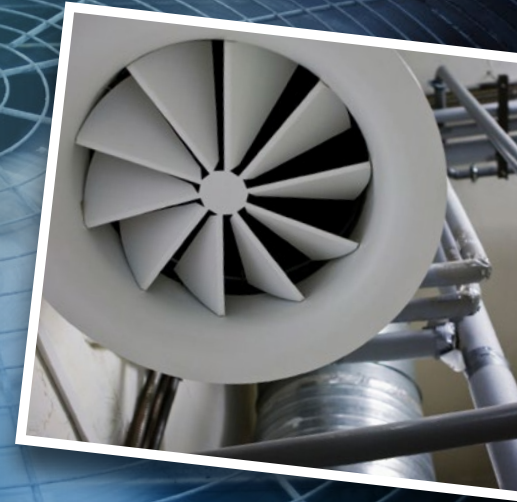
## Variable Speed Control for Pumps

Optidrive Eco HVAC provides the ideal pump control solution for chiller, circulation and cooling pumps.



## Energy efficient control for HVAC systems

Airports  
Hotels  
Conference Centres  
Shopping Centres  
Hospitals  
Schools  
Offices  
Kitchens  
Laboratories



### Building Safety Systems

#### Stairwell Pressurisation

Stairwell (escape route) pressurisation systems are being extensively employed in large buildings and complexes to help ensure the safe evacuation of occupants during a fire. Variable speed drives are playing an increasing role in maintaining pressures (of approximately 50 Pa) within these critical areas. Here Optidrive Eco HVAC is used to provide a smoke free escape by accurately maintaining the air pressure along that route.

Pressures must be maintained at a high enough level that a door opened between the fire floor and the escape route does not result in smoke entering the escape route. Equally, as doors and vents are opened along the escape route allowing air to escape the Optidrive and stairwell pressurisation system must increase output so that the required pressure is accurately maintained.

#### Fume Extraction

Many buildings now incorporate dedicated smoke management and extraction systems designed to safely extract smoke in the event of a fire, these systems are designed to localise and extract smoke such that the rest of the building remains smoke free and can be evacuated safely. Here the Optidrive's Fire Mode function is critical in maintaining continued operation of the smoke extraction system for the longest permissible period.

For applications such as underground car parks the fans providing fresh air intake are often reversed in the event of a fire to provide smoke extraction. Optidrive Eco HVAC is easily configured for bi-directional fire mode operation.

#### Fire Override



**Fire override mode ignores signals and alarms, keeping the Optidrive Eco HVAC operating for as long as possible.**

- This feature is crucial for ensuring smoke extraction from buildings in the event of a fire.
- Selectable logic means that the Optidrive Eco HVAC can be easily configured to the signal produced by your fire management system.
- With an independently set speed for fire mode operation, selectable as either forward or reverse direction, the Optidrive Eco HVAC has the flexibility to match the needs of your fire control system.
- Fire mode operation is indicated clearly on the drive display during periods of fire mode operation.
- Drive output logic can easily be configurable for indicating to external drives that fire mode is active.
- Internal clocks and timers monitoring operation in fire mode, giving clear information on usage.

# Drive Features

A compact and robust range of drives dedicated to HVAC



### Internal EMC Filter

Compliant with global EMC Standards

### Maintenance interval timer and service indication

### Multi Language Text Display



Hand / Auto Keypad



Pluggable terminals



Integrated cable management



Long Life, Dual Ball Bearing Fans



IP66 with optional mains disconnect



## Multi Language Text 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

## Belt Break Detection



Optidrive Eco HVAC can provide immediate warning of broken belt between motor and fan. Due to its simple and flexible configuration the feature can also be used for any loss of load condition, such as broken coupling or other mechanical failure.

Optidrive Eco HVAC monitors the load output profile throughout the speed range and compares it to normal operating conditions (established during commissioning). Sensitivity adjustment means that it is possible to detect the indications of a belt failure (such as belt slipping) prior to complete failure of the belt.

## Drive Controlled Bypass

Optidrive Eco HVAC can operate as a bypass controller when installed as part of a bypass circuit. Activation of Bypass mode can be determined intelligently by the Optidrive Eco HVAC drive based on a command from the building management system. Additionally the drive can be set to automatically select bypass mode when entering into a trip condition ensuring minimal disruption to service.



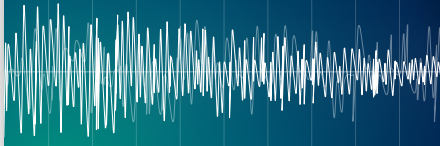
## Energy efficient control for HVAC systems

### Hand / Auto

Allows manual control to easily be selected in the event of an automatic control system failure or for simplified commissioning / system checks, or when a fast temporary override of the control system is required. Built-in 'Auto Control Selection' allows return to automatic system control just as easily.



### 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 ducting or pipework.

#### Quiet Drive Operation

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

#### Noise Reduction through Speed Control

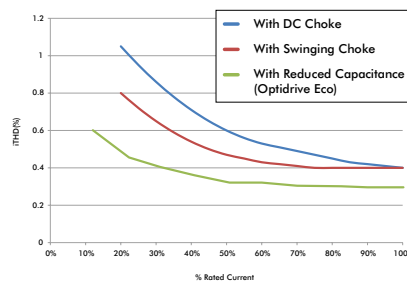
Optimising motor speed gives significant energy savings and reduces motor noise.

### Reduced Harmonic Current Distortion

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

#### Typical iTHD values at full and part load

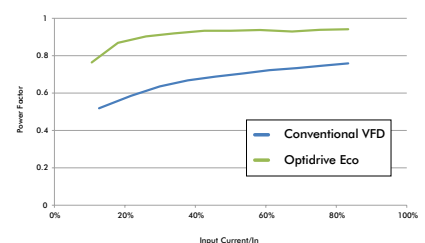


It can be clearly seen that the reduced DC link capacitance significantly reduces the total harmonic distortion at full load, and has a much greater benefit at part load compared to a conventional DC choke or swinging choke. This results in reduced overall input current and reduced transformer heating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

#### Optidrive Eco HVAC 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.

<sup>1</sup> 200V and 400V

# Options & Accessories

Peripherals to help integrate Optidrive Eco HVAC with your HVAC systems



## Optistick Smart



Bluetooth®

### Rapid Commissioning Tool

- Allows copying, backup and restore of drive parameters
- Provides Bluetooth interface to a PC running OptiTools Studio or the OptiTools Mobile app on a smartphone
- Onboard NFC (Near Field Communication) for rapid data transfer

**OPT-3-STICK-IN**

## Optipad



### Remote Keypad & TFT Display

IP55 panel mount operator interface.

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

**OPT-3-OPPAD-IN**

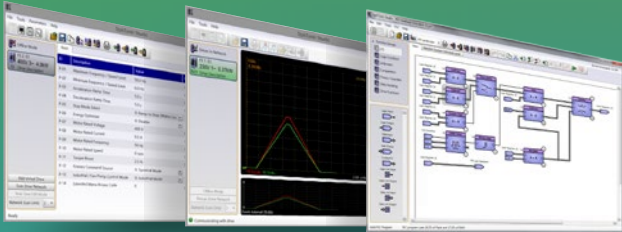






Energy efficient control for HVAC systems

# OptiTools Studio



### 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 Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

## 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 MS/TP & 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

Replace # in model code with enclosure/display option

|                                 | kW   | HP  | Amps | Frame Size | Model Code     |            |            |              |               |               |            | IP20 Cabinet Mount | IP55 TFT Display | Indoor IP66 Non Switched | Indoor IP66 with Disconnect | Outdoor IP66 Non Switched | Outdoor IP66 with Disconnect |               |      |
|---------------------------------|------|-----|------|------------|----------------|------------|------------|--------------|---------------|---------------|------------|--------------------|------------------|--------------------------|-----------------------------|---------------------------|------------------------------|---------------|------|
|                                 |      |     |      |            | Product Family | Generation | Frame Size | Voltage Code | Output Rating | Supply Phases | EMC Filter |                    |                  |                          |                             |                           |                              | Qualification |      |
| 200-240V ± 10%<br>1 Phase Input | 0.75 | 1   | 4.3  | 2          | ODV            | -3         | -2         | 2            | 0043          | -1            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 1.5  | 2   | 7    | 2          | ODV            | -3         | -2         | 2            | 0070          | -1            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 2.2  | 3   | 10.5 | 2          | ODV            | -3         | -2         | 2            | 0105          | -1            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
| 200-240V ± 10%<br>3 Phase Input | 0.75 | 1   | 4.3  | 2          | ODV            | -3         | -2         | 2            | 0043          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 1.5  | 2   | 7    | 2          | ODV            | -3         | -2         | 2            | 0070          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 2.2  | 3   | 10.5 | 2          | ODV            | -3         | -2         | 2            | 0105          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 4    | 5   | 18   | 3          | ODV            | -3         | -3         | 2            | 0180          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 5.5  | 7.5 | 24   | 3          | ODV            | -3         | -3         | 2            | 0240          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 7.5  | 10  | 30   | 3          | ODV            | -3         | -3         | 2            | 0300          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 7.5  | 10  | 30   | 4          | ODV            | -3         | -4         | 2            | 0300          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 11   | 15  | 46   | 4          | ODV            | -3         | -4         | 2            | 0460          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 15   | 20  | 61   | 5          | ODV            | -3         | -5         | 2            | 0610          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 18.5 | 25  | 72   | 5          | ODV            | -3         | -5         | 2            | 0720          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 22   | 30  | 90   | 5          | ODV            | -3         | -5         | 2            | 0900          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 30   | 40  | 110  | 6          | ODV            | -3         | -6         | 2            | 1100          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 30   | 40  | 110  | 6A         | ODV            | -3         | -6         | 2            | 1100          | -3            | F          | 1                  | #                | 2-MN                     |                             |                           |                              |               |      |
|                                 | 37   | 50  | 150  | 6          | ODV            | -3         | -6         | 2            | 1500          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 37   | 50  | 150  | 6A         | ODV            | -3         | -6         | 2            | 1500          | -3            | F          | 1                  | #                | 2-MN                     |                             |                           |                              |               |      |
|                                 | 45   | 60  | 180  | 6          | ODV            | -3         | -6         | 2            | 1800          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 45   | 60  | 180  | 6B         | ODV            | -3         | -6         | 2            | 1800          | -3            | F          | 1                  | #                | 2-MN                     |                             |                           |                              |               |      |
| 55                              | 75   | 202 | 7    | ODV        | -3             | -7         | 2          | 2020         | -3            | F             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 75                              | 100  | 248 | 7    | ODV        | -3             | -7         | 2          | 2480         | -3            | F             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 380-480V ± 10%<br>3 Phase Input | 0.75 | 1   | 2.2  | 2          | ODV            | -3         | -2         | 4            | 0022          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 1.5  | 2   | 4.1  | 2          | ODV            | -3         | -2         | 4            | 0041          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 2.2  | 3   | 5.8  | 2          | ODV            | -3         | -2         | 4            | 0058          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 4    | 5   | 9.5  | 2          | ODV            | -3         | -2         | 4            | 0095          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 5.5  | 7.5 | 14   | 2          | ODV            | -3         | -2         | 4            | 0140          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 5.5  | 7.5 | 14   | 3          | ODV            | -3         | -3         | 4            | 0140          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 7.5  | 10  | 18   | 3          | ODV            | -3         | -3         | 4            | 0180          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 11   | 15  | 24   | 3          | ODV            | -3         | -3         | 4            | 0240          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 15   | 20  | 30   | 3          | ODV            | -3         | -3         | 4            | 0300          | -3            | F          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 15   | 20  | 30   | 4          | ODV            | -3         | -4         | 4            | 0300          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 18.5 | 25  | 39   | 4          | ODV            | -3         | -4         | 4            | 0390          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 22   | 30  | 46   | 4          | ODV            | -3         | -4         | 4            | 0460          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 30   | 40  | 61   | 5          | ODV            | -3         | -5         | 4            | 0610          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 37   | 50  | 72   | 5          | ODV            | -3         | -5         | 4            | 0720          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 45   | 60  | 90   | 5          | ODV            | -3         | -5         | 4            | 0900          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 55   | 75  | 110  | 6          | ODV            | -3         | -6         | 4            | 1100          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 55   | 75  | 110  | 6A         | ODV            | -3         | -6         | 4            | 1100          | -3            | F          | 1                  | #                | 2-MN                     |                             |                           |                              |               |      |
|                                 | 75   | 100 | 150  | 6          | ODV            | -3         | -6         | 4            | 1500          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 75   | 100 | 150  | 6A         | ODV            | -3         | -6         | 4            | 1500          | -3            | F          | 1                  | #                | 2-MN                     |                             |                           |                              |               |      |
|                                 | 90   | 150 | 180  | 6          | ODV            | -3         | -6         | 4            | 1800          | -3            | F          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
| 90                              | 150  | 180 | 6B   | ODV        | -3             | -6         | 4          | 1800         | -3            | F             | 1          | #                  | 2-MN             |                          |                             |                           |                              |               |      |
| 110                             | 175  | 202 | 6B   | ODV        | -3             | -6         | 4          | 2020         | -3            | F             | 1          | #                  | 2-MN             |                          |                             |                           |                              |               |      |
| 110                             | 175  | 202 | 7    | ODV        | -3             | -7         | 4          | 2020         | -3            | F             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 132                             | 200  | 240 | 7    | ODV        | -3             | -7         | 4          | 2400         | -3            | F             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 160                             | 250  | 302 | 7    | ODV        | -3             | -7         | 4          | 3020         | -3            | F             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 200                             | 300  | 370 | 8    | ODV        | -3             | -8         | 4          | 3700         | -3            | #             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 250                             | 400  | 480 | 8    | ODV        | -3             | -8         | 4          | 4800         | -3            | #             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |
| 500-600V ± 10%<br>3 Phase Input | 0.75 | 1   | 2.1  | 2          | ODV            | -3         | -2         | 6            | 0021          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 1.5  | 2   | 3.1  | 2          | ODV            | -3         | -2         | 6            | 0031          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 2.2  | 3   | 4.1  | 2          | ODV            | -3         | -2         | 6            | 0041          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 4    | 5   | 6.5  | 2          | ODV            | -3         | -2         | 6            | 0065          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 5.5  | 7.5 | 9    | 2          | ODV            | -3         | -2         | 6            | 0090          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 7.5  | 10  | 12   | 3          | ODV            | -3         | -3         | 6            | 0120          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 11   | 15  | 17   | 3          | ODV            | -3         | -3         | 6            | 0170          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 15   | 20  | 22   | 3          | ODV            | -3         | -3         | 6            | 0220          | -3            | 0          | 1                  | #                | 2-MN                     |                             | X-TN                      | D-TN                         | A-MN          | E-MN |
|                                 | 15   | 20  | 22   | 4          | ODV            | -3         | -4         | 6            | 0220          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 18.5 | 25  | 28   | 4          | ODV            | -3         | -4         | 6            | 0280          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 22   | 30  | 34   | 4          | ODV            | -3         | -4         | 6            | 0340          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 30   | 40  | 43   | 4          | ODV            | -3         | -4         | 6            | 0430          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              | A-MN          | E-MN |
|                                 | 37   | 50  | 54   | 5          | ODV            | -3         | -5         | 6            | 0540          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 45   | 60  | 65   | 5          | ODV            | -3         | -5         | 6            | 0650          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 55   | 75  | 78   | 6          | ODV            | -3         | -6         | 6            | 0780          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 75   | 100 | 105  | 6          | ODV            | -3         | -6         | 6            | 1050          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
|                                 | 90   | 125 | 130  | 6          | ODV            | -3         | -6         | 6            | 1300          | -3            | 0          | 1                  | #                | 2-MN                     | N-MN                        |                           |                              |               |      |
| 110                             | 150  | 150 | 6    | ODV        | -3             | -6         | 6          | 1500         | -3            | 0             | 1          | #                  | 2-MN             | N-MN                     |                             |                           |                              |               |      |

EMC Filter

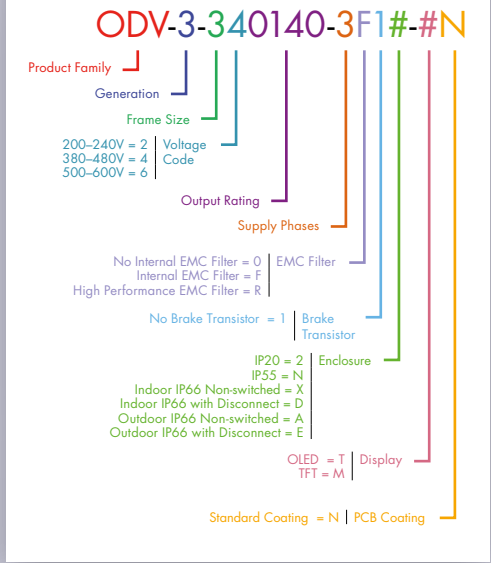
- 0** No Internal EMC Filter
- F** Internal EMC Filter
- R** High Performance EMC Filter

## Drive Specification

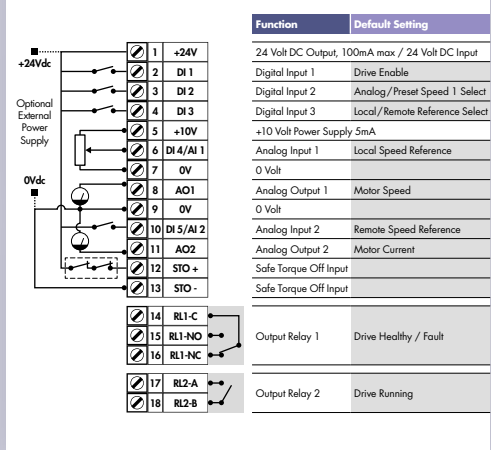
|                       |                           |   |
|-----------------------|---------------------------|---|
| Input Ratings         | Supply Voltage            | 200 – 240V ± 10%<br>380 – 480V ± 10%<br>500 – 600V ± 10%  |
|                       | Supply Frequency          | 48 – 62Hz   |
|                       | Displacement Power Factor | > 0.98  |
|                       | Phase Imbalance           | 3% Maximum allowed  |
|                       | Inrush Current            | < rated current   |
|                       | Power Cycles              | 120 per hour maximum, evenly spaced   |
| Output Ratings        | Output Power              | 230V 1Ph. Input: 0.75–2.2kW (1–3HP)<br>230V 3Ph. Input: 0.75–75kW (1–100HP)<br>400V 3Ph. Input: 0.75–250kW<br>460V 3Ph. Input: 1–400HP<br>575V 3Ph. Input: 0.75–110kW (1–150HP)                     |
|                       | Overload Capacity         | 110% for 60 seconds<br>150% for 15 seconds  |
|                       | Output Frequency          | 0 – 250Hz, 0.1Hz resolution   |
|                       | Typical Efficiency        | > 98%   |
|                       |                           |   |
| Ambient Conditions    | Temperature               | Storage: –40 to 60°C<br>Operating: –10 to 50°C  |
|                       | Altitude                  | Up to 1000m ASL without derating<br>Up to 2000m maximum UL approved<br>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  |
|                       |                           |   |
| Programming           | Keypad                    | Built-in keypad as standard<br>Optional remote mountable keypad   |
|                       | Display                   | Built-in multi language text display  |
|                       | PC                        | OptiTools Studio  |
| Control Specification | Control Method            | Eco Sensorless Vector<br>Open Loop Permanent Magnet Vector<br>Open Loop BLDC Vector<br>Open Loop Synchronous Reluctance Vector  |
|                       | PWM Frequency             | 4 – 32kHz Effective   |
|                       | Stopping Mode             | Ramp to stop: User Adjustable 0.1–600 secs<br>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<br>–10 Volts to +10 Volts<br>0 to 20mA / 20 to 0mA<br>4 to 20mA / 20 to 4mA<br>Digital: Motorised Potentiometer (Keypad)<br>Modbus RTU<br>BACnet MS/TP |
| Fieldbus Connectivity | Built-in                  | BACnet Application Specific Controller<br>9.6 - 76.8 kbps selectable<br>Data Format: 8N1, 8N2, 8O1, 8E1<br>Modbus RTU<br>9.6 - 115.2 kbps selectable<br>Data Format: 8N1, 8N2, 8O1, 8E1             |
|                       |                           | BACnet/IP<br>Plug-in BACnet/IP interface<br>Dual IAN ports<br>Device Level Ring   |
|                       | Optional                  | Other<br>PROFIBUS DP (DPV1)<br>PROFINET IO<br>DeviceNet<br>EtherNet/IP<br>EtherCAT<br>Modbus TCP  |

|                           |   |   |  |
|---------------------------|---|---|--|
| I/O Specification         | Power Supply  | 24 Volt DC, 100mA, Short Circuit Protected<br>10 Volt DC, 10mA for Potentiometer  |  |
|                           | Programmable Inputs   | 5 Total as standard (optional additional 3)<br>3 Digital (optional additional 3)<br>2 Analog / Digital selectable   |  |
|                           | Digital Inputs  | Opto - Isolated<br>8 – 30 Volt DC, internal or external supply<br>Response time < 4ms   |  |
|                           | Analog Inputs   | Resolution: 12 bits<br>Response time: < 4ms<br>Accuracy: < 1% full scale<br>Parameter adjustable scaling and offset   |  |
|                           | PTC Input   | Motor PTC / Thermistor Input<br>Trip Level : 3kΩ  |  |
|                           | Programmable Outputs  | 2 Total<br>1 Analog / Digital<br>1 Relay  |  |
|                           | Relay Outputs   | Maximum Voltage: 250 VAC, 30 VDC<br>Switching Current Capacity: 5A  |  |
|                           | Analog Outputs  | 0 to 10 Volts / 10 to 0 Volts<br>0 to 20mA / 20 to 0mA<br>4 to 20mA / 20 to 4mA   |  |
|                           | Application Features  | PID Control   | Internal PID Controller<br>Multi-setpoint Select<br>Standby / Sleep Mode<br>Boost Function |
|                           |   | Fire Mode   | Bidirectional<br>Selectable Speed Setpoint (Fixed / PID / Analog / Fieldbus)               |
| Load Monitoring           |   | High Current Protection (Fan / Bump Blocked)<br>Low Current Protection (Broken Belt / Shaft)<br>Pump Blockage Detection with Cleaning                             |  |
| Duty / Assist / Standby   |   | Built-in Multi-Pump Support<br>Automatic Changeover on Fault<br>Automatic Changeover on Time<br>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)<br>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 & Diagnostics | Fault Memory  | Last 4 Trips stored with time stamp   |  |
|                           | Data Logging  | Logging of data prior to trip for diagnostic purposes:<br>Output Current<br>Drive Temperature<br>DC Bus Voltage   |  |
|                           | Maintenance Indicator   | Maintenance Indicator with user adjustable maintenance interval<br>Onboard service life monitoring  |  |
|                           | Monitoring  | Hours Run Meter<br>Resettable & Non-Resettable kWh meters<br>Cooling Fan Run Time   |  |
|                           |   |   |  |
| Standards Compliance      | Low Voltage Directive   | 2014/35/EU  |  |
|                           | EMC Directive   | 2014/30/EU  |  |
|                           | Additional Conformance  | UL, cUL, EAC, RCM   |  |
|                           | Harmonic Currents   | IEC61000-3-12   |  |
|                           | Environmental Conditions  | Designed to meet IEC 60721-3-3, in operation:<br>IP20 Drives: 3S2/3C2<br>IP55 & 66 Drives: 3S3/3C3  |  |
| Environmental Class       | Conformal Coated PCBs. Suitable for use in the following environments:<br>IP20: 3C2, 3S2<br>IP55 & IP66: 3C3, 3S3 |   |  |

## Model Code Guide



## Connection Diagram



NOT TO SCALE

| Size             | IP20 |     |     |      |     |     | IP66  |     |     | IP55 |      |     |     |      |      |
|------------------|------|-----|-----|------|-----|-----|-------|-----|-----|------|------|-----|-----|------|------|
|                  | 2    | 3   | 4   | 5    | 6A  | 6B  | 8     | 2   | 3   | 4    | 4    | 5   | 6   | 7    | 8    |
| mm <b>Height</b> | 221  | 261 | 418 | 486  | 614 | 726 | 974   | 257 | 310 | 360  | 450  | 540 | 865 | 1280 | 1334 |
| mm <b>Width</b>  | 110  | 131 | 172 | 233  | 286 | 330 | 444   | 188 | 211 | 240  | 171  | 235 | 330 | 330  | 444  |
| mm <b>Depth</b>  | 185  | 205 | 240 | 260  | 320 | 320 | 423   | 182 | 235 | 271  | 252  | 270 | 332 | 358  | 423  |
| kg <b>Weight</b> | 1.8  | 3.5 | 9.2 | 18.1 | 32  | 43  | 124.5 | 3.5 | 6.6 | 9.5  | 11.5 | 23  | 55  | 89   | TBC  |

## Optidrive Eco HVAC

### ✓ Saving Energy / Reducing CO<sub>2</sub>

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 HVAC can be used with environmental sensors to reduce speed in air handling and pumping applications without compromising the required output of the system.

### ✓ Easy Installation

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

### ✓ Simple Set-up & Rapid Commissioning

Optidrive Eco HVAC was developed from concept for ease of use. A handful of parameters configure the drive for basic HVAC 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 HVAC is well suited to harsh environments, or where cabinet and cabling costs need to be reduced.

### ✓ Advanced Fan Control Functions

The key HVAC control functionality required for your application is inbuilt into the Optidrive Eco HVAC 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 HVAC 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.



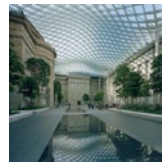
UK Headquarters, Welshpool

**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 HVAC Solutions

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



#### USA

National Portrait Gallery climate control



#### UK

Saving energy in ventilation and boilers



#### DUBAI

Saving energy in air conditioning systems



#### SINGAPORE

Energy saving & noise reduction programme



[www.invertekdrives.com/hvac-building-services](http://www.invertekdrives.com/hvac-building-services)

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