





AC Variable Speed Drive

# HVAC BUILDING SERVICES

Energy efficient fan & pump control



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





#### AC Variable Speed Drive

0.75kW - 250kW / IHP - 350HP **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

#### 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.

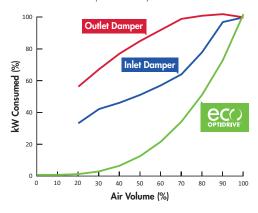
Optidrive Eco HVAC provides a perfect solution to the needs of designers looking to optimise the performance of fans and pumps used in HVAC applications, allowing them to operate with maximum efficiency under all conditions. Invertek Drives' philosophy to provide innovative products

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.

#### **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.









# 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

**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.





**IP55** / NEMA 12

**IP66** / NEMA 4X

# Dedicated to HVAC Applications

Take control of your environment

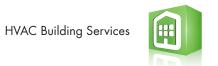


conditioning system to meet the varying demands throughout

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



#### **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 safety exact 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



Maintenance interval timer and service indication





Hand / Auto Keypad



Pluggable terminals



Long Life, Dual **Ball Bearing Fans** 



Integrated cable management



IP66 with optional mains disconnect



# OLED Display

#### Installed as standard on all IP55 & IP66 models

- Wide viewing angle, effective in dark and light
- Customisable display

#### **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



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 Contro 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**

Temperature-controlled cooling fans ensure quiet operation in periods of reduced load.

#### Noise Reduction through Speed Control

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

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

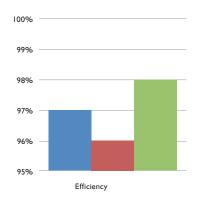
Optidrive Eco HVAC uses innovative design to improve overall efficiency whilst minimising the harmonic distortion levels. All drives designed for 3 phase power supply operation up to frame size 5 utilise film capacitor in the DC link, providing exceptionally low harmonic current distortion without compromising 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.

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

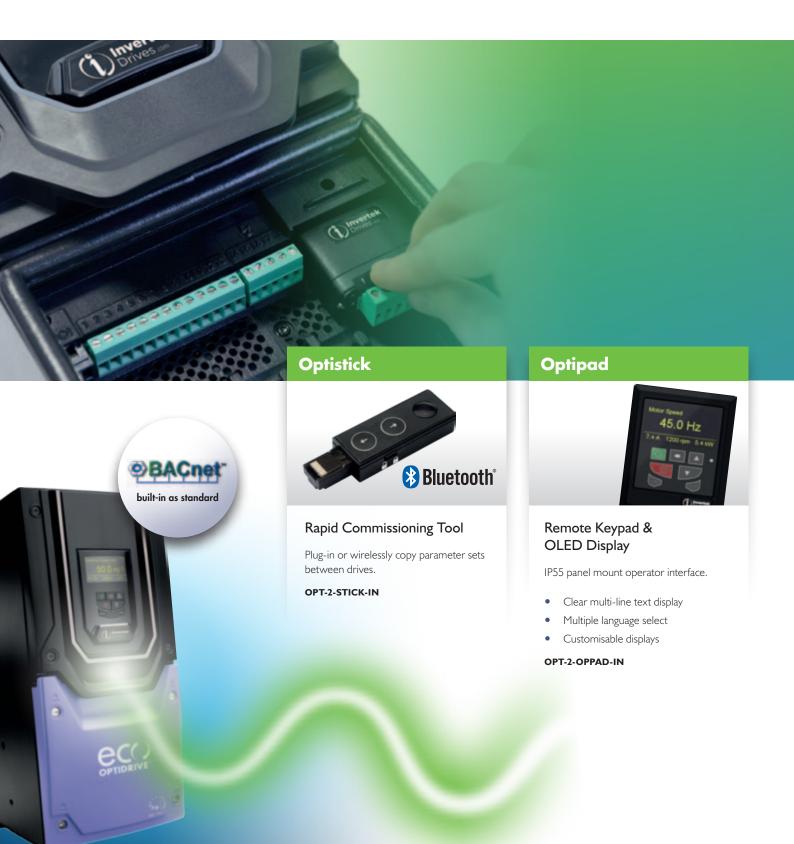
Typical efficiency comparison for Optidrive Eco HVAC vs other AC variable speed drives





# Options & Accessories

Peripherals to help integrate Optidrive Eco HVAC with your HVAC systems





### Energy efficient control for HVAC systems







## Powerful PC Software

Drive commissioning and parameter backup

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

Compatible with Windows XP, Windows Vista & Windows 7

#### Fieldbus Interfaces



**BACnet/IP** OPT-2-BNTIP-IN



**PROFIBUS DP** OPT-2-PROFB-IN



**DeviceNet OPT-2-DEVNT-IN** 



EtherNet/IP



**Modbus TCP** OPT-2-MODIP-IN

**Modbus** TCP

**PROFINET** OPT-2-PFNET-IN



**EtherCAT OPT-2-ETCAT-IN** 



## **Plug-in Options**



#### Extended I/O OPT-2-EXTIO-IN

- Additional 3 Digital Inputs
- Additional Relay Output

Cascade Control OPT-2-CASCD-IN

Additional 3 Relay Outputs

#### **Mains Isolator**



#### Mains Isolator Option

Frame Sizes 2 & 3 can be factory ordered with a built in lockable isolator. 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

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

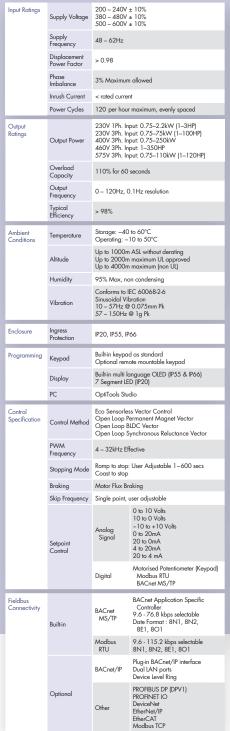


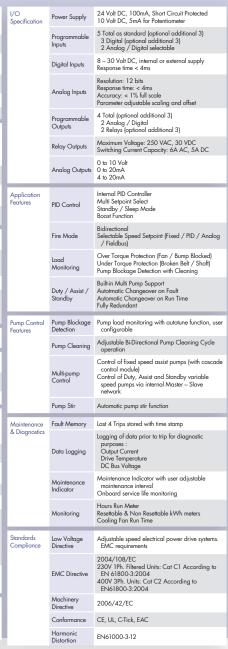
OPTIDRIVE™						
	kW	HP	Amps	Size		
200-240V±10%	0.75	1	4.3 7	2	ODV - 3 - 2 2 0043 - 1 F 1 # - # N ODV - 3 - 2 2 0070 - 1 F 1 # - # N	
1 Phase Input	2.2	3	10.5	2	ODV - 3 - 2 2 0105 - 1 F 1 # - # N	
	0.75	,	4.3	2	ODV - 3 - 2 2 0043 - 3 F 1 # - # N	
	1.5	1	4.3 7	2	ODV - 3 - 2 2 0043 - 3 F 1 # - # N	
	2.2	3	10.5	2	ODV - 3 - 2 2 0105 - 3 F 1 # - # N	
	4	5	15	3	ODV - 3 - 3 2 0150 - 3 F 1 # - # N	
	5.5	7.5 10	24 30	3	ODV - 3 - 3 2 0240 - 3 F 1 # - # N	
	7.5 11	15	46	4	ODV - 3 - 4 2 0300 - 3 F 1 N - T N ODV - 3 - 4 2 0460 - 3 F 1 N - T N	
200-240V±10%	15	20	60	5	ODV - 3 - 5 2 0600 - 3 F 1 N - T N	
3 Phase Input	18.5	25	72	5	ODV - 3 - 5 2 0720 - 3 F 1 N - T N	
	22	30	90	5	ODV - 3 - 5 2 0900 - 3 F 1 N - T N	
	30 37	40 50	110	6	ODV - 3 - 6 2 1100 - 3 F 1 N - T N ODV - 3 - 6 2 1500 - 3 F 1 N - T N	
	45	60	180	6	ODV - 3 - 6 2 1800 - 3 F 1 N - T N	
	55	75	202	7	ODV - 3 - 7 2 2020 - 3 F 1 N - T N	
	75	100	248	7	ODV - 3 - 7 2 2480 - 3 F 1 N - T N	
	0.75	1	2.2	2	ODV - 3 - 2 4 0022 - 3 F 1 # - # N	
	1.5	2	4.1	2	ODV - 3 - 2 4 0041 - 3 F 1 # - # N	
	2.2	3	5.8	2	ODV - 3 - 2 4 0058 - 3 F 1 # - # N	
	4	5	9.5	2	ODV - 3 - 2 4 0095 - 3 F 1 # - # N	
	5.5	7.5	14	3	ODV - 3 - 3 4 0140 - 3 F 1 # - # N	
	7.5 11	10	18 24	3	ODV - 3 - 3 4 0180 - 3 F 1 # - # N ODV - 3 - 3 4 0240 - 3 F 1 # - # N	
	15	20	30	4	ODV - 3 - 4 4 0300 - 3 F 1 N - T N	
	18.5	25	39	4	ODV - 3 - 4 4 0390 - 3 F 1 N - T N	
380-480V±10%	22	30	46	4	ODV - 3 - 4 4 0460 - 3 F 1 N - T N	
3 Phase Input	30 37	40 50	61 72	5	ODV - 3 - 5 4 0610 - 3 F 1 N - T N ODV - 3 - 5 4 0720 - 3 F 1 N - T N	
	45	60	90	5	ODV - 3 - 5 4 0900 - 3 F 1 N - T N	
	55	75	110	6	ODV - 3 - 6 4 1100 - 3 F 1 N - T N	
	75	100	150	6	ODV - 3 - 6 4 1500 - 3 F 1 N - T N	
	90	150 175	180	6 7	ODV - 3 - 6 4 1800 - 3 F 1 N - T N ODV - 3 - 7 4 2020 - 3 F 1 N - T N	
	132	200	240	7	ODV - 3 - 7 4 2400 - 3 F 1 N - T N	
	160	250	302	7	ODV - 3 - 7 4 3020 - 3 F 1 N - T N	
	200	300	370	8	ODV - 3 - 8 4 3700 - 3 F 1 2 - T N	
	250	350	450	8	ODV - 3 - 8 4 4500 - 3 F 1 2 - T N	
	132	175	185	7	ODV - 3 - 7 5 1850 - 3 0 1 N - T N	
480-525V±10%	150	200	205	7	ODV - 3 - 7 5 2050 - 3 0 1 N - T N	
3 Phase Input	185	250 270	255 275	7 7	ODV - 3 - 7 5 2550 - 3 0 1 N - T N ODV - 3 - 7 5 2750 - 3 0 1 N - T N	
	200	2/0	2/3	/	ODV - 3 - 7 5 2/30 - 3 0 1 N - 1 N	
	0.75	1	2.1	2	ODV - 3 - 2 6 0021 - 3 0 1 # - # N	
	1.5	2	3.1	2	ODV - 3 - 2 6 0031 - 3 0 1 # - # N	
	2.2	3	4.1	2	ODV - 3 - 2 6 0041 - 3 0 1 # - # N	
	5.5	5 7.5	6.5	2	ODV - 3 - 2 6 0065 - 3 0 1 # - # N ODV - 3 - 2 6 0090 - 3 0 1 # - # N	
	7.5	10	12	3	ODV - 3 - 3 6 0120 - 3 0 1 # - # N	
	11	15	17	3	ODV - 3 - 3 6 0170 - 3 0 1 # - # N	
500-600V±10%	15	20	22	4	ODV - 3 - 4 6 0220 - 3 0 1 N - T N	
3 Phase Input	18.5	25 30	28 34	4	ODV - 3 - 4 6 0280 - 3 0 1 N - T N ODV - 3 - 4 6 0340 - 3 0 1 N - T N	
	30	40	43	4	ODV - 3 - 4 6 0430 - 3 0 1 N - 1 N	
	37	50	54	5	ODV - 3 - 5 6 0540 - 3 0 1 N - T N	
	45	60	65	5	ODV - 3 - 5 6 0650 - 3 0 1 N - T N	
	55	75	78	5	ODV - 3 - 5 6 0780 - 3 0 1 N - T N	
	75 90	100 125	105	6	ODV - 3 - 6 6 1050 - 3 0 1 N - T N ODV - 3 - 6 6 1300 - 3 0 1 N - T N	
	110	150	150	6	ODV - 3 - 6 6 1500 - 3 0 1 N - T N	



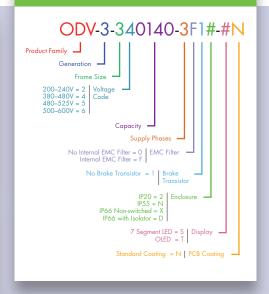


#### **Drive Specification**

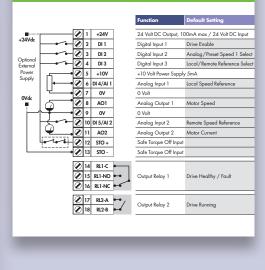




#### **Model Code Guide**



#### **Connection Diagram**











7.7









C:
Size
Height
Width
Depth
Weight

IF ZV	IFOO	
2	3	2
221	261	257
110	131	188
185	205	239
1.8	3.5	4.8



6	7
865	1280
330	330
330	360
55	89





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#### Optidrive Eco HVAC

#### ✓ 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 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 guick 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.



#### www.invertekdrives.com/hvac-building-services

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Invertek Drives Ltd is dedicated to the design, manufacture and marketing

All company operations are accredited to the exacting customer focused globally in over 80 different countries. Invertek Drives' unique and innovative drives are designed for ease of use and meet with recognised

# Global HVAC Solutions

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



National Portrait



Saving energy in ventilation and boilers



DUBAI Saving energy in air



SINGAPORE Energy saving & noise reduction programme









