Invertek Drives.com

Pump Control

eco OPTIDRIVE HVAC

AC Variable Speed Drive

PUMP CONTROL

Energy efficient pumping with OPTIFLOW™

BACnet™ built-in as standard

Low Harmonics EN61000-3-12 compliant

5.5kW–45kW / 7.5HP–60HP

380–480V 3 Phase Input

OPTIDRIVE HVAC

AC Variable Speed Drive

5.5kW – 45kW / 7.5HP – 60HP
380 – 480V 3 Phase Input

Energy Efficient
Pump Control

- Low Input Harmonic Current Distortion, compliant with EN61000-3-12
- > 98% drive efficiency
- Low audible noise motor operation

Energy Savings Calculator

Estimate your potential energy savings, CO_2 emissions and financial savings

www.invertekdrives.com/calculator

Download on the App Store

GET IT ON Google play

Variable Speed Optimisation

Pump systems are often sized to be most efficient at an application's maximum flow rate.

In systems with peak rather than continuous demand, Optidrive HVAC Eco matches pump output to the demands of pump systems. This variable speed control offers significant savings by maximising system efficiency at all flow rates.

Traditional means of controlling pump output involve dissipating or diverting the output already generated by the pump running at full speed. In comparison, Optidrive HVAC Eco saves energy by generating only the required output.

Invertek's philosophy to provide innovative products with easy to use, energy efficient features ensures that time, set up costs and operational (energy) savings are maximised at all times. This results in the shortest possible payback period, namely the time taken to recover the initial product and installation costs through financial savings achieved through installing Optidrive HVAC Eco drives.

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

Save Energy, Cut CO_2

Save Energy

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

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

Automatic Pump Cleaning ensures maximum operating efficiency at all times

Save Money

OPTIFLOW™ technology allows simple operation of multiple pump sets without the need for a PLC

Pump blockage detection and cleaning dramatically reduces pump maintenance requirements

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

Save Time

Simple parameter set allows fast commissioning of pump control systems

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

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

Key Features

- **Low Harmonic Technology**
  - Reduces Supply Total Harmonic Current Distortion (iTHD)
  - Reduces total Supply Current
  - Reduces cable and busbar rating requirements
  - Reduces fuse sizes
  - Reduces required supply transformer load or rating
- **Built In EMC Filters**
  - Compliance with global EMC Standards
- **Advanced Motor Control**
  - Operation with:
    Standard Induction Motors
    Permanent Magnet AC Motors
    Brushless DC Motors
    Synchronous Reluctance Motors
  - Constant or Variable Torque selectable
  - Maximum motor efficiency
- **Quiet Operation**
  - Temperature controlled cooling fans operate only when required
  - PWM switching technique reduces motor audible noise

Optimising Efficiency

Energy Optimisation

The advanced optimisation function intelligently matches energy usage to the pump load to ensure your pump operates at maximum efficiency.

Energy Monitoring

The inbuilt energy consumption meters allow energy consumption to be clearly displayed and savings to be calculated.

Resonance Avoidance

Optidrive HVAC Eco can be easily configured to avoid frequencies that cause resonance in pumping systems, preventing unnecessary noise and mechanical damage to motors and pipework.

In-built Sleep Mode with Auto-boost

Sleep mode saves energy by detecting when a pump is running inefficiently and producing little useful work. Optidrive HVAC Eco can be programmed to enter into a sleep/disabled mode until the demand increases. To help prevent sleep mode oscillation, Optidrive HVAC Eco can automatically initiate a boost cycle to increase pressure on starting or stopping.

Internal EMC Filter

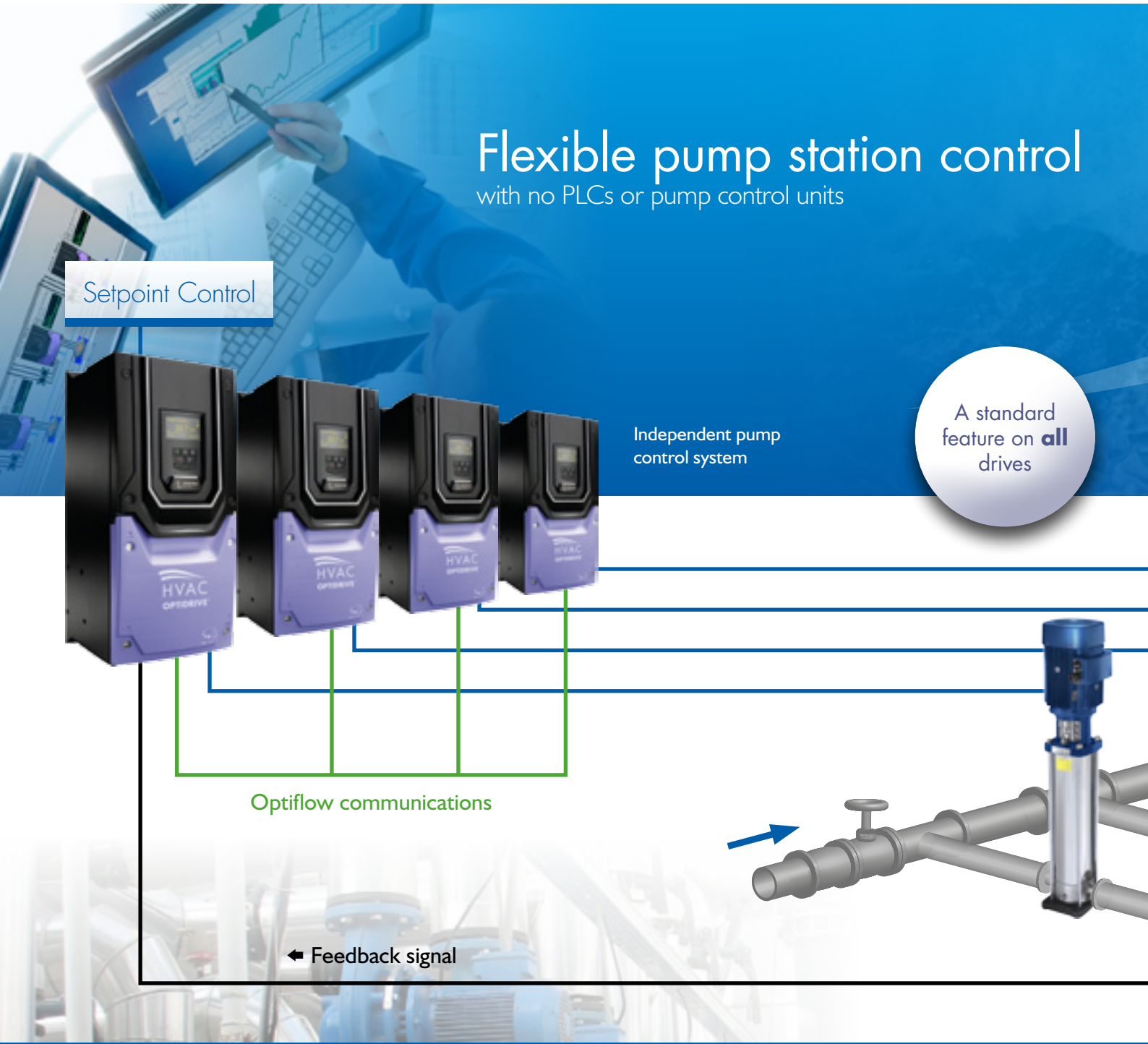
OPTIFLOW™ Multiple Pump Control

IP55 / NEMA 12

IP66 / NEMA 4X

OPTIFLOW™ 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. Duty / Assist / Standby. Duty pumps are automatically rotated, ensuring maximum service life and system efficiency.

Energy efficient pumping with OPTIFLOW™

See OPTIFLOW™ in action

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

Summary

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

Consistent Flow

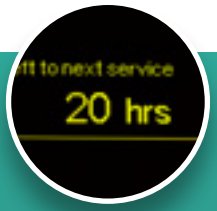
The required pressure and flow levels are maintained regardless of how many pumps are required. When demand increases, additional pumps are automatically brought on stream to assist and are switched off again when not required.

Reduced Downtime

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

Drive Features

A compact and robust range of drives dedicated to pump control



Maintenance interval timer and service indication

Internal EMC Filter

Multi-language, high visibility OLED display

OLED Display

Installed as standard on all IP55 & IP66 models

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

Simple user interface with HAND / AUTO select

Pluggable control terminals

Integrated cable management

High quality long-life fans

Enclosure Options

IP66

IP55

Size 3	Sizes 4 & 5
Wall or cabinet mount	Wall or cabinet mount

Optional kit is available for through-hole mounting

IP66: Protection in Harsh Environments

Dust-tight

Install in-situ and be sure of protection from dust and contaminants.

IP66 Inbuilt isolator option available

Washdown Ready

With a sealed ABS enclosure and corrosion resistant heatsink, IP66 rated drives are ideal for high pressure washdown applications.

Corrosion Protection

The heat-sink of the IP66 drive is specially coated to protect against attack / corrosion by harsh environments and chemicals. For additional protection in water and waste water applications all HVAC drives can be ordered with full conformal coating of the internal drive electronics. The conformal coating option provides protection to level 3C2 according to IEC60721-3-3. Localised conformal coating of critical components is provided as standard.

Energy efficient pumping with OPTIFLOW™

Internal EMC Filter

Compliant with global EMC Standards

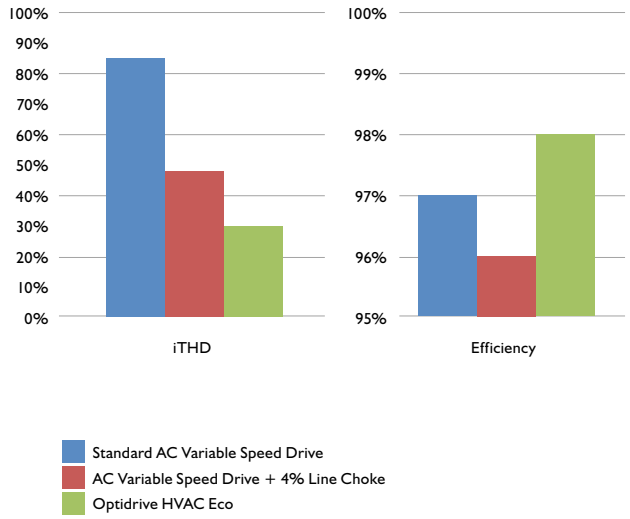
Reduced Harmonic Current Distortion

Optidrive HVAC Eco is a dedicated 'low harmonics' drive that uses the latest technology to minimise disruption (harmonics) of the incoming mains power supply which can be created by non-linear loads, such as AC drives. The third generation HVAC drive can reduce harmonic current distortion to below 30% iTHD (Total Harmonic Distortion), whilst also increasing efficiency by reducing the input current levels – leading to reduced life time costs.

Optidrive HVAC Eco delivers…

- Lower mains supply current - reduced cable size, reduced fuse size, reduced transformer size
- Improved power factor - no additional charges from the electricity supply company due to low power factor
- Improved efficiency - Reduced Life Time Costs. E.g. 37kW, operating 10 hours per day, 5 days per week, 50 weeks per years - Power Consumption is 92500kWh - 1.1% reduction is > 100kWh saving

Typical Total Harmonic Current Distortion (iTHD) and efficiency comparison for Optidrive HVAC Eco vs other AC variable speed drives



EN61000-3-12 compliant

Options & Accessories

Peripherals to help integrate Optidrive HVAC Eco with your pumping systems

BACnet
built-in as standard

Optistick

Bluetooth®

Rapid Commissioning Tool

Plug-in or wirelessly copy parameter sets between drives.

OPT-2-STICK-IN

Optipad

Remote Keypad & OLED Display

IP55 panel mount operator interface.

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

OPT-2-OPPAD-IN

Energy efficient pumping with OPTIFLOW™

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 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
OPT-2-ETHNT-IN

Modbus TCP
OPT-2-MODIP-IN

Profinet
OPT-2-PFNET-IN

EtherCat
OPT-2-ETCAT-IN

Plug-in Options

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

- Additional 3 Digital Inputs
- Additional Relay Output

Cascade Control **OPT-2-CASCD-IN**

Additional 3 Relay Outputs

BACnet & Modbus RTU on board as standard

Mains Isolator

Mains Isolator Option

Frame Size 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

eco OPTIDRIVE HVAC

kW	HP	Amps	Size	Model Code	Factory Build Options
5.5	7.5	14	3	ODV-3-3 4 0140-3 F I #-##	F I 2 X D S T N C
7.5	10	18	3	ODV-3-3 4 0180-3 F I #-##	F I 2 X D S T N C
11	15	24	3	ODV-3-3 4 0240-3 F I 2-S #	F I 2 S N C
11	15	24	4	ODV-3-4 4 0240-3 F I N-T #	F I N T N C
15	20	30	4	ODV-3-4 4 0300-3 F I N-T #	F I N T N C
18.5	25	39	4	ODV-3-4 4 0390-3 F I N-T #	F I N T N C
22	30	46	4	ODV-3-4 4 0460-3 F I N-T #	F I N T N C
30	40	61	5	ODV-3-5 4 0610-3 F I N-T #	F I N T N C
37	50	72	5	ODV-3-5 4 0720-3 F I N-T #	F I N T N C
45	60	90	5	ODV-3-5 4 0900-3 F I N-T #	F I N T N C

380–480V ± 10%
3 Phase Input

Model Code: Product Range | Generation | Frame Size | Supply Voltage | Capacity | Input Phases | Factory Build Options

EMC Filter — Internal EMC Filter
Brake Transistor — No Brake Transistor
Enclosure — IP20 | IP55 | IP66 Non-switched | IP66 with Isolator
Display — 7 Segment LED Display | OLED Display
PCB Coating — Standard Coating | Full Conformal Coating

Replace # in model code with colour-coded option
IP20 units are available with 7 Segment LED Display only
All other models are available with OLED Text Display only

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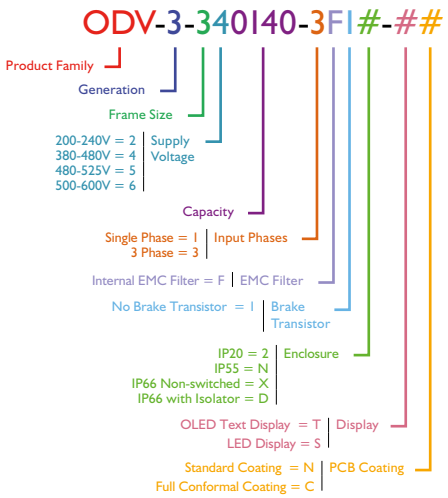
Drive Specification

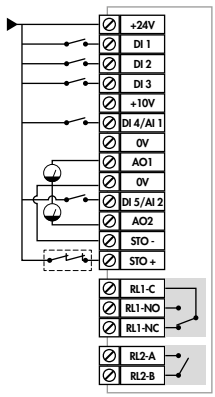
Input Ratings	Supply Voltage	380 – 480V ± 10%
	Supply Frequency	48 – 62Hz
	Displacement Power Factor	> 0.98
	Phase Imbalance	3% Maximum allowed
	Inrush Current	< rated current
	Power Cycles	120 per hour maximum, evenly spaced
	Total Harmonic Current Distortion	< 30% iTHD
Output Ratings	Output Power	5.5kW – 45kW
	Overload Capacity	110% for 60 seconds
	Output Frequency	0 – 120Hz, 0.1Hz resolution
	Typical Efficiency	98%
Ambient Conditions	Temperature	Storage : –40 to 60°C Operating : –10 to 50°C
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL) Derate 1% per 100m above 1000m
	Humidity	95% without condensing, dripping water or ice forming, according to IEC 60068-2-78
	Vibration	Conforms to IEC 60068-2-6 Sinusoidal Vibration Frequency Range : 10 – 150Hz 10 – 57Hz @ 0.075mm Pk 57 – 150Hz @ 1g Pk
Programming	Keypad	Built-in keypad as standard Optional remote keypad
	Display	Multi language OLED display
	PC	OptiTools Studio
Control Specification	Control Method	IM Motors PM Motors BLDC Motors SynRel Motors Sensorless Vector CT / VT Operation
	PWM Frequency	10 – 32kHz Effective
	Stopping Mode	Ramp to Stop : User Adjustable 1 – 600 seconds Coast to Stop
	Braking	Motor Flux Braking
	Resonance Avoidance	Skip frequency
I/O Specification	Setpoint Control	Analog Signal: 0 to 10 Volts, 10 to 0 Volts, 0 to 20mA, 4 to 20mA, 20 to 4mA, 20 to 0mA Digital: Motorised Potentiometer, Modbus RTU, BACnet MS/TP Optional: BACnet IP, Profibus DP, DeviceNet, EtherNet IP, EtherCat, Modbus TCP, Profinet IO
	Power Supply	24 Volt DC, 100mA, Over Current Protected 10 Volt DC, 5mA
	Programmable Inputs	5 Onboard (Optional Additional 3) 2 Analog / Digital 3 Digital
	Digital Inputs	10 – 30 Volt DC, Internal or External Supply PNP Response time : < 4ms
	Analog Inputs	Resolution : 12 bits Response time : < 4ms Accuracy : Better than 1% Full Scale Parameter adjustable scaling and offset
	Programmable Outputs	4 Total (Optional additional 3) 2 Analog / Digital 2 Relays (Optional additional 3)
	Relay Outputs	Maximum Voltage : 250 VAC, 30 VDC Switching Current : 6A AC, 5A DC
	Analog Outputs	0 – 10 Volts 0 – 20mA 4 – 20mA

Control Features	Fire Mode	Selectable Speed Setpoint (Fixed / PID / Analog / Fieldbus) Selectable Direction
	PID Controller	Internal PID Controller Multi Setpoint Select Standby / Sleep Mode
	Load Monitoring	Over Torque Protection (Fan / Pump Blocked) Under Torque Protection (Broken Belt / Shaft / Impellor)
	Maintenance Indicator	User programmable Maintenance Warning Timer
	Duty / Assist / Standby	Automated Changeover for Duty / Standby Automatic Assist Control
Fieldbus	BACnet MS/TP	Built in BACnet MS / TP interface (BacNet Application Specific Controller) 9.6 – 76.8 kbps selectable Date Format : 8N1, 8N2, 8E1, 8O1
	Modbus RTU	Built In Modbus RTU 9.6 – 115.2 kbps selectable User Selectable Format
	BACnet IP	Optional Plug In BACnet IP Interface (BacNet Application Specific Controller) Dual LAN ports with switch support Device Level Ring
	Modbus TCP	Optional Plug In Modbus TCP Interface Dual LAN ports with switch support Device Level Ring Read / Write Parameter access
	Other	Optional Fieldbus Interfaces for Profinet IO Profibus DP (DPV1) DeviceNet Ethernet IP EtherCat
Maintenance & Diagnostics	Cooling	Long life dual ball bearing fans Fan operation time monitoring
	Fault Memory	Last 4 Trips
	Critical Fault Counters	Over Current Over Voltage Over Temperature Mains Loss Communications Loss
	Data Logging	Logging of critical data for diagnostic prior to last trip : Output Current DC Link Voltage Heatsink Temperature
	High Speed Scope Data Logger	1mS Sample time Download & Trace via Optitools Studio PC Software
	Real Time Usage	Run Time Counter Energy Consumption Meter External Real Time Data Logging via RS485 or Bluetooth to Optitools Studio PC software
Design Standards	Low Voltage Directive	2006 / 95 / EC
	EMC Directive	2004 / 108 / EC Category C1 / C2 according to EN61800-3 : 2004 EN61000-3-12
	Machinery Directive	98 / 37 / EC
	Conformance	UL, cUL, CTick
	Ingress Protection	IP20, IP55, IP66

Model Code Guide



Connection Diagram



Function	Default Setting
24 Volt DC Output, 100mA max / 24 Volt DC Input	
Digital Input 1	Drive Enable
Digital Input 2	Analog/Preset Speed 1 Select
Digital Input 3	Local/Remote Reference Select
+10 Volt Power Supply 5mA	
Analog Input 1	Local Speed Reference
0 Volt	
Analog Output 1	Motor Speed
0 Volt	
Analog Input 2	Remote Speed Reference
Analog Output 2	Motor Current
Safe Torque Off Input	
Safe Torque Off Input	
Output Relay 1	Drive Healthy / Fault
Output Relay 2	Drive Running

NOT TO SCALE

	Size	IP20	IP66	IP55	
		3	3	4	5
mm	Height	261	310	440	540
mm	Width	131	211	171	235
mm	Depth	205	266	252	270
kg	Weight	3.5	7.3	11.5	22.5

eco OPTIDRIVE HVAC

Invertek Drives.com

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Optidrive HVAC Eco

✓ Saving Energy / Reducing CO_2

With large scale increases in global energy costs and the introduction of taxes and legislation relating to the industrial production of CO_2 gases the need to reduce energy consumption and save money has never been greater. Optidrive HVAC Eco 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 HVAC drive with small dimensions and innovative mounting and cabling features.

✓ Simple Set-up & Rapid Commissioning

Optidrive HVAC Eco 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 enclosure design from IP20 all the way up to IP66, Optidrive HVAC Eco 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 HVAC Eco 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 HVAC Eco 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 Pump Solutions

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

IRELAND
Maintaining pressure at pumping stations

HOLLAND
Hot water pumping across district network

ITALY
Cooling system control in steel foundry

IRELAND
Storm water pumping in Dublin Port Tunnel

www.invertekdrives.com/pump-control

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