Invertek Drives.com

OPTIDRIVE™ E3

AC Variable Speed Drive

General Purpose Drive
Easy control for all motor types

Easy to Use

0.37kW – 37kW / 0.5HP – 50HP
110–480V Single & 3 Phase Input

IP20 **IP66**

OPTIDRIVE™ E3

Easy to Use

General Purpose Drive

Focused on ease of use, **Optidrive E3** provides unrivalled simplicity of installation, connection and commissioning, allowing the user to benefit from precise motor control and energy savings within minutes.

Simple Commissioning

With just 14 basic parameters and application macro functions providing rapid set up, Optidrive E3 minimises start-up time.

Intuitive Keypad Control

Precise digital control at the touch of a button.

Application Macros

Switch between **Industrial**, **Pump** & **Fan** modes to optimise Optidrive E3 for your application.

Industrial | Pump | Fan

See **Page 6**

IP20

Up to 37kW

- ✓ Easy to use
- ✓ Compact & robust

See **Page 4**

Take a closer look at the stunning Optidrive E3

www.invertekdrives.com/optidrive-e3

Sensorless Vector Control for all Motor Types

IM
IE2 & IE3 Induction Motors

PM
AC Permanent Magnet Motors

BLDC
Brushless DC Motors

SynRM
Synchronous Reluctance Motors

Precise and reliable control for
IE2, IE3 & IE4 motors

IP66

Up to 22kW

- ✓ Outdoor rated
- ✓ Dust-tight
- ✓ Washdown ready

See **Page 5**

Key Features

- ✓ Internal Category C1 EMC filter
- ✓ Internal PI control
- ✓ Internal brake chopper
- ✓ Dual analogue inputs
- ✓ Operates up to 50°C
- ✓ Bluetooth® connectivity
- ✓ Option for control of single phase motors (*see* **Page 8**)

Modbus *RTU*
CAN

on-board as standard

Internal Category C1 EMC Filter

An internal filter in every Optidrive E3 saves cost and time for installation.

Cat C1 according to EN61800-3:2004

OPTIDRIVE™ E3

IP20 **Up to 37kW**

Compact, robust and reliable general purpose drive for panel mounting

Fast Connection
5mm rising clamp terminals with captive screws

Simple Installation
DIN rail and keyhole mounting options

Power supply connects at top

Quick Reference
Integrated help card

Operates up to 50°C

Modbus RTU
CAN
on-board as standard

Optistick Smart
Rapid commissioning tool
See **Page 10**

Dual analogue inputs

Motor supply connects at base

Incredibly Easy to Use

- ✓ Built in PI control, EMC filter (C1) & brake chopper
- ✓ Application macros for industrial, fan and pump operation
- ✓ Bluetooth® connectivity

Controls Multiple Motor Types

- ✓ IE2, 3 & 4
- ✓ IM, PM, BLDC and SynRM

5 sizes cover global supply ratings

Simply Power Up

Optidrive E3 provides precise motor control and energy savings using the factory settings. Simply power up and the drive can immediately deliver energy savings.

14 basic parameters allow simple adjustment for your application if required, with up to 50 parameters available in total for a highly flexible performance.

OPTIDRIVE™ E3

IP66 Outdoor

Up to 22kW

Coated Heatsink as Standard

Ideal for hygiene based operations requiring washdown — such as food and beverage

Outdoor rated enclosed drives for direct machine mounting, dust tight and ready for washdown duty

Switched or non-switched

Locally customisable

Flat front to terminal cover with mounting points for switches and an internal PCB.

Conformal coating as standard

1. **2 x RJ45 ports** eliminate the need for a splitter.
2. **Easily accessible EMC disconnect**
3. **Easy to wire** due to the large, accessible chamber and removeable gland plate.

IP66/Nema 4X outdoor rated

Built with tough polycarbonate plastics specifically chosen to withstand degredation by ultra violet (UV), greases, oils and acids. Also robust enough not to be brittle at -20°C.

Dust-Tight Design

Install directly on your processing equipment and be sure of protection from dust and contaminants.

Washdown Ready

With a sealed ABS enclosure and corrosion resistant heatsink, the Optidrive E3 IP66 is ideal for high-pressure washdown applications.

Switched models

Simply wire up the drive, turn the inbuilt potentiometer and the motor will start running – allowing immediate energy savings.

Saving energy cannot be easier than this!

For ultimate ease of use

Local Speed Potentiometer

Run Reverse / Off / Run Forward Switch

Lockable Mains Disconnect / Isolator

Application Macros

Switch modes at the touch of a button to optimise Optidrive E3 for your application

Single parameter application macro selection

Industrial Mode

Industrial Mode optimises Optidrive E3 for load characteristics of typical industrial applications.

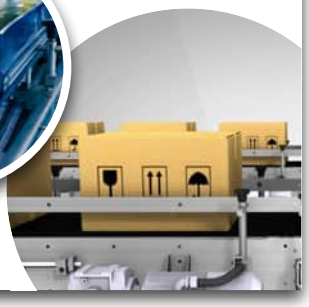
Applications include:

- Conveyors
- Mixers
- Treadmills

Sensorless Vector provides high starting torque and excellent speed regulation

IP20 panel mount units or
IP66 for direct machine mounting

Rapid parameter cloning using **OPTISTICK** Smart



Pump Mode

Pump Mode makes energy efficient pump control easier than ever.

Applications include:

- Dosing Pumps
- Borehole Pumps
- Transfer Pumps
- Swimming Pools
- Spas
- Fountains

- Constant or variable torque
- Internal PI control

Fan Mode

Fan Mode (inc. fire operation) makes air handling a breeze, ideal for simple HVAC systems.

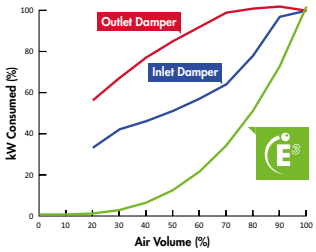
Applications include:

- Air Handling Units
- Ventilation Fans
- Circulating Fans
- Air Curtains
- Kitchen Extract

- High efficiency **variable torque** motor control
- Flying start capability
- Mains loss ride through
- PI control

Instant Power Savings

The graph below shows the incredible efficiency of Optidrive E3 for controlling airflow compared to traditional damper control methods.



Modbus RTU
CAN

on-board as standard

How much energy could you save?

Estimate potential energy savings, CO_2 emissions and financial savings for your application with the Invertek Drives **Energy Savings Calculator** app.

Download on the App Store

GET IT ON Google Play

www.invertekdrives.com/calculator

OPTIDRIVE™ E3

Invertek Drives.com

	kW	HP	Amps	Frame	Model Code (Product Family, Generation, Frame Size, Voltage Code, Output Current x 10, Supply Phases, EMC Filter, Brake Transistor, Enclosure Option)
110–115V ± 10% 1 Phase Input	0.37	0.5	2.3	1	ODE - 3 - 1 1 0023 - 1 0 1 #
	0.75	1	4.3	1	ODE - 3 - 1 1 0043 - 1 0 1 #
	1.1	1.5	5.8	2	ODE - 3 - 2 1 0058 - 1 0 4 #
200–240V ± 10% 1 Phase Input	0.37	0.5	2.3	1	ODE - 3 - 1 2 0023 - 1 # 1 #
	0.75	1	4.3	1	ODE - 3 - 1 2 0043 - 1 # 1 #
	1.5	2	7	1	ODE - 3 - 1 2 0070 - 1 # 1 #
	1.5	2	7	2	ODE - 3 - 2 2 0070 - 1 # 4 #
	2.2	3	10.5	2	ODE - 3 - 2 2 0105 - 1 # 4 #
	4	5	15.3	3	ODE - 3 - 3 2 0153 - 1 0 4 #
200–240V ± 10% 3 Phase Input	0.37	0.5	2.3	1	ODE - 3 - 1 2 0023 - 3 0 1 #
	0.75	1	4.3	1	ODE - 3 - 1 2 0043 - 3 0 1 #
	1.5	2	7	1	ODE - 3 - 1 2 0070 - 3 0 1 #
	1.5	2	7	2	ODE - 3 - 2 2 0070 - 3 # 4 #
	2.2	3	10.5	2	ODE - 3 - 2 2 0105 - 3 # 4 #
	4	5	18	3	ODE - 3 - 3 2 0180 - 3 # 4 #
	5.5	7.5	24	3	ODE - 3 - 3 2 0240 - 3 # 4 #
	7.5	10	30	4	ODE - 3 - 4 2 0300 - 3 # 4 #
	11	15	46	4	ODE - 3 - 4 2 0460 - 3 # 4 #
	15	20	61	5	ODE - 3 - 5 2 0610 - 3 F 4 2
	18.5	25	72	5	ODE - 3 - 5 2 0720 - 3 F 4 2
380–480V ± 10% 3 Phase Input	0.75	1	2.2	1	ODE - 3 - 1 4 0022 - 3 # 1 #
	1.5	2	4.1	1	ODE - 3 - 1 4 0041 - 3 # 1 #
	1.5	2	4.1	2	ODE - 3 - 2 4 0041 - 3 # 4 #
	2.2	3	5.8	2	ODE - 3 - 2 4 0058 - 3 # 4 #
	4	5	9.5	2	ODE - 3 - 2 4 0095 - 3 # 4 #
	5.5	7.5	14	3	ODE - 3 - 3 4 0140 - 3 # 4 #
	7.5	10	18	3	ODE - 3 - 3 4 0180 - 3 # 4 #
	11	15	24	3	ODE - 3 - 3 4 0240 - 3 # 4 #
	15	20	30	4	ODE - 3 - 4 4 0300 - 3 # 4 #
	18.5	25	39	4	ODE - 3 - 4 4 0390 - 3 # 4 #
	22	30	46	4	ODE - 3 - 4 4 0460 - 3 # 4 #
	30	40	61	5	ODE - 3 - 5 4 0610 - 3 F 4 2
	37	50	72	5	ODE - 3 - 5 4 0720 - 3 F 4 2

Replace # in model code with colour-coded option

Enclosure Types

A
IP66 Outdoor Use
Non-switched

B
IP66 Outdoor Use
Switched

2
IP20

EMC Filter

F Internal EMC Filter

0 No Internal EMC Filter

IP20

	Size	1	2	3	4	5
mm	Height	173	221	261	420	486
mm	Width	83	110	131	171	222
mm	Depth	123	150	175	212	226
kg	Weight	1.0	1.7	3.2	9.1	18.1
	Fixings	4xM5	4xM5	4xM5	4xM8	4xM8

IP66

	Size	1	2	3	4
mm	Height	232	257	310	360
mm	Width	161	188	211	240
mm	Depth	162	182	235	271
kg	Weight	2.3	3.5	6.6	9.5
	Fixings	4xM4	4xM4	4xM4	4xM4

Drive Specification

Input Ratings	Supply Voltage	110 – 115V ± 10% 200 – 240V ± 10% 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
Output Ratings	Output Power	110V 1 Ph Input: 0.5–1.5HP (230V 3 Ph Output) 230V 1 Ph Input: 0.37–4kW (0.5–5HP) 230V 3 Ph Input: 0.37–18.5kW (0.5-25HP) 400V 3 Ph Input: 0.75–37kW 460V 3 Ph Input: 1–50HP
	Overload Capacity	150% for 60 Seconds 175% for 2.5 seconds
	Output Frequency	0 – 500Hz, 0.1Hz resolution
	Acceleration Time	0.01 – 600 seconds
	Deceleration Time	0.01 – 600 seconds
	Typical Efficiency	> 98%
Ambient Conditions	Temperature	Storage: –40 to 60°C Operating: –20 to 50°C
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL)
	Humidity	95% Max, non condensing
	Vibration	Conforms to EN61800-5-1
Enclosure	Ingress Protection	IP20, IP66

Programming	Keypad		Built-in keypad as standard Optional remote mountable keypad
	Display		7 Segment LED
	PC		OptiTools Studio
Control Specification	Control Method		Sensorless Vector Speed Control PM Vector Control BLDC Control Synchronous Reluctance
	PWM Frequency		4–32kHz Effective
	Stopping Mode		Ramp to stop: User Adjustable 0.1–600 secs Coast to stop
	Braking		Motor Flux Braking Built-in braking transistor (not frame size 1)
	Skip Frequency		Single point, user adjustable
	Setpoint Control	Analog Signal	0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA
		Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP
Fieldbus	Built-in	CANopen	125–1000 kbps
		Modbus RTU	9.6–115.2 kbps selectable

I/O Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer
	Programmable Inputs	4 Total 2 Digital 2 Analog / Digital selectable
	Digital Inputs	8 – 30 Volt DC, internal or external supply Response time < 4ms
	Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset
	Programmable Outputs	2 Total 1 Analog / Digital 1 Relay
	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC
	Analog Outputs	0 to 10 Volt
Application Features	PI Control	Internal PI Controller Standby / Sleep Function
	Fire Mode	Bidirectional Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus)
Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp
	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage
	Monitoring	Hours Run Meter
Standards Compliance	Low Voltage Directive	Adjustable speed electrical power drive systems. EMC requirements
	EMC Directive	2014/30/EU Cat C1 according to EN61800-3:2004
	Machinery Directive	2006/42/EC
	Conformance	CE, UL, RCM
	Environmental Class	Conformal Coated PCBs. Suitable for use in the following environments: IP20: 3C2, 3S2 IP66: 3C3, 3S3

OPTIDRIVE™ E3

For Single Phase Motors

IP20 **IP66**

Up to 1.1kW

Single Phase Motor Control for PSC & Shaded-Pole Motors

Key Features

- ✓ 110–115V and 200–240V models
- ✓ Small mechanical envelope
- ✓ Rugged industrial operation
- ✓ Fast setup, and simple operation with 14 basic parameters
- ✓ Unique motor control strategy optimised for single phase motors
- ✓ Motor current and rpm indication
- ✓ Built in PI control, EMC filter (C1) & brake chopper
- ✓ Application macros for industrial, fan and pump operation
- ✓ Bluetooth® connectivity

Modbus RTU
CAN

on-board as standard

150% overload for 60 secs (175% for 2 secs)

Dedicated to Single Phase Motor Control

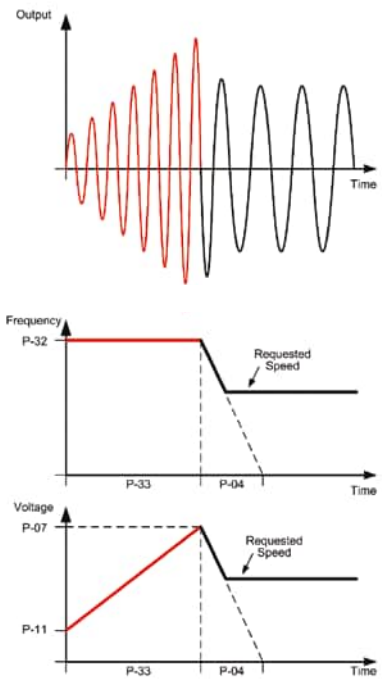
Designed to be cost effective and easy to use, the Optidrive E3 for Single Phase Motors is for use with PSC (Permanent Split Capacitor) or Shaded-Pole Single Phase induction motors.

Optidrive E3 for Single Phase Motors uses a revolutionary motor control strategy to achieve reliable intelligent starting of single phase motors.

- Removes the need for 3 phase supply wiring
- Provides the same performance features as the 3 phase Optidrive E3
- The ideal energy saving solution where high starting torque is not required — typically including fans, blowers, centrifugal pumps, fume extractors and air flow controllers

Special Boost Phase

To ensure reliable starting of single phase motors, the drive initially ramps the motor voltage up to rated voltage whilst maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.



OPTIDRIVE™ E3

For Single Phase Motors

	kW	HP	Amps	Size	Model Code (Product Family, Generation, Frame Size, Voltage Code, Capacity, Supply Phases, EMC Filter, Brake Transistor, Enclosure Type, Single Phase Output)
110–115V ± 10% 1 Phase Input	0.37	0.5	7	1	ODE - 3 - 1 1 0070 - 1 # 1 # - 01
	0.55	0.75	10.5	2	ODE - 3 - 2 1 0105 - 1 # 4 # - 01
200–240V ± 10% 1 Phase Input	0.37	0.5	4.3	1	ODE - 3 - 1 2 0043 - 1 # 1 # - 01
	0.75	1	7	1	ODE - 3 - 1 2 0070 - 1 # 1 # - 01
	1.1	1.5	10.5	2	ODE - 3 - 2 2 0105 - 1 # 4 # - 01

Replace # in model code with colour-coded option

Model Code Guide:

ODE-3-120043-3F12-01

- Product Family
- Generation
- Frame Size
- Voltage Code: 110–115V = 1, 200–240V = 2, 380–480V = 4
- Capacity
- Supply Phases: Single Phase = 1, 3 Phase = 3
- EMC Filter: Internal EMC Filter = F, No Internal EMC Filter = 0
- Brake Transistor: No Internal Brake Transistor = 1, Internal Brake Transistor = 4
- Enclosure Type: IP20 = 2, IP66 Outdoor use Non-switched = A, IP66 Outdoor use Switched = B
- Single Phase Output

Enclosure Types

A

IP66 Outdoor Use Non-switched

B

IP66 Outdoor Use Switched

2

IP20

EMC Filter

F	Internal EMC Filter
0	No Internal EMC Filter

IP20

	Size	1	2
mm	Height	173	221
mm	Width	83	110
mm	Depth	123	150
kg	Weight	1.0	1.7
	Fixings	4xM5	4xM5

IP66

	Size	1	2
mm	Height	232	257
mm	Width	161	188
mm	Depth	162	182
kg	Weight	2.3	3.5
	Fixings	4xM4	4xM4

Drive Specification

Input Ratings	Supply Voltage	110 – 115V ± 10% 200 – 240V ± 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	110V 1 Ph Input: 0.5–0.75HP 230V 1 Ph Input: 0.37–1.1kW (0.5–1.5HP)
	Overload Capacity	150% for 60 Seconds 175% for 2.5 seconds
	Output Frequency	0 – 500Hz, 0.1Hz resolution
	Acceleration Time	0.01 – 600 seconds
	Deceleration Time	0.01 – 600 seconds
	Typical Efficiency	> 98%
Ambient Conditions	Temperature	Storage: –40 to 60°C Operating: –20 to 50°C
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL)
	Humidity	95% Max, non condensing
	Vibration	Conforms to EN61800-5-1
Enclosure	Ingress Protection	IP20, IP66
Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad
	Display	7 Segment LED
	PC	OptiTools Studio

Control Specification	Control Method	V/F Voltage Energy Optimsied V/F	
	PWM Frequency	4–32kHz Effective	
	Stopping Mode	Ramp to stop: User Adjustable 0.1–600 secs Coast to stop	
	Braking	Motor Flux Braking Built-in braking transistor (frame size 2)	
	Skip Frequency	Single point, user adjustable	
	Setpoint Control	Analog Signal	0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA
		Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP
Fieldbus	Built-in	CANopen	125–1000 kbps
		Modbus RTU	9.6–115.2 kbps selectable
I/O Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer	
	Programmable Inputs	4 Total 2 Digital 2 Analog / Digital selectable	
	Digital Inputs	8 – 30 Volt DC, internal or external supply Response time < 4ms	
	Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset	
	Programmable Outputs	2 Total 1 Analog / Digital 1 Relay	
	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC	
	Analog Outputs	0 to 10 Volt	

Application Features	PI Control	Internal PI Controller Standby / Sleep Function
	Fire Mode	Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus)
Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp
	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage
	Monitoring	Hours Run Meter
Standards Compliance	Low Voltage Directive	Adjustable speed electrical power drive systems. EMC requirements
	EMC Directive	2014/30/EU 230V 1Ph. Filtered Units : Cat C1 according to EN61800-3:2004
	Machinery Directive	2006/42/EC
	Conformance	CE, UL, RCM
	Environmental Class	Conformal Coated PCBs. Suitable for use in the following environments: IP20: 3C2, 3S2 IP66: 3C3, 3S3

Options & Accessories

Optistick Smart

Optistick Smart **OPT-3-STICK-IN**

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

Remote Keypads

Optipad **OPT-3-OPPAD-IN**

Remote Keypad & TFT Display

Optiport 2 **OPT-2-OPORT-IN**

Remote Keypad & LED Display

RJ45 Accessories

Ideal for simple and fast connection of Modbus RTU/CAN networks

OPT-J4505-IN	RJ45 Cable 0.5m
OPT-J4510-IN	RJ45 Cable 1.0m
OPT-J4530-IN	RJ45 Cable 3.0m
OPT-J45SP-IN	RS485 3 Way Data Cable Splitter RJ45

EtherNet Module

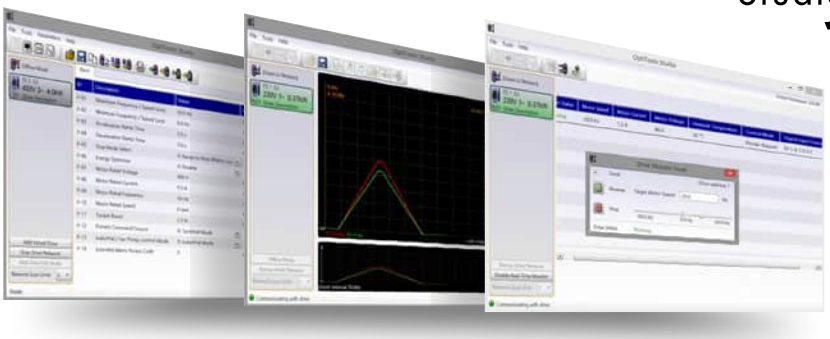
EtherNet Module **OPT-2-ETHEG-IN**

- ODVA compliant EtherNet/IP Modbus Translator Device
- Compatible with all drive platforms: P2, E3 & Eco
- Integrated network switch: simplifying network architecture
- Compatible with RSLogix and CoDeSys PLCs

External EMC Filters, Input Chokes & Output Filters are available

See **www.invertekdrives.com** for details

OptiTools Studio



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

Proven Worldwide in Low Power Applications

Chain wax development for Team Sky cycling team

Muc-Off, UK

Cooling loop for solar energy research

Solar Tech Lab, Italy

Chilled water pump control predicted to save AED 12385 per year

Al Jahili Fort, UAE

Business-critical climate control for commercial horticulturist

Hatziminas Flowers, Greece

Efficient water circulation gives energy savings of 60% per annum

Leisure World, Australia

Pallet handling in **UK**

Olive oil decanting in **Greece**

Seed processing in **Netherlands**

Pizza making in **Belgium**

Chamfering machines in **Italy**

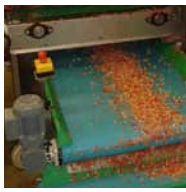
Machine tool OEM in **UK**

Chemical fume removal in **Singapore**

Sawmill optimisation in **UK**

Precision polishing in **Switzerland**

See **www.invertekdrives.com**/solutions for full case studies



OPTIDRIVE™ E3

Invertek Drives.com

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Optidrive E3

Low Power Applications

Dedicated to low power applications, Optidrive E3 combines innovative technology, reliability, robustness and ease of use in a range of compact IP20 & IP66 enclosures.

Simple Commissioning

14 parameter basic setup. Default settings suitable for most applications. Contactor style connection for simple wiring.

Optidrive E3 IP66

Environmentally protected, IP66 rated models can be mounted directly on your processing equipment.

IP66 / NEMA 4X

Washdown Ready

With a sealed ABS enclosure and corrosion resistant heatsink, Optidrive E3 IP66 models are ideal for high-pressure washdown applications.

On-drive Control

IP66 models feature optional, convenient controls for speed control, REV/OFF/FWD and Power ON/OFF, complete with safety lock.

Single Phase Motor Control

Optidrive E3 for Single Phase Motors provides accurate speed control of single phase PSC or shaded pole motors. Special boost phase ensures reliable starting, initially ramping the motor voltage up to rated voltage whilst maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.

About Invertek Drives

- **Sales, service & application support in over 80 countries**
- **World-class production, innovation & training facilities at UK headquarters**
- **Global assembly cells controlled by cloud-based manufacturing database**
- **ISO 14001 environmental & ISO 9001 quality management systems**

www.invertekdrives.com/optidrive-e3

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