



# OPTIDRIVE™ CP<sup>2</sup>

AC Variable Speed Drive

**Powerful Performance**  
Advanced motor control



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



# Powerful Performance

World leading control for the latest generation of permanent magnet and standard induction motors

Manufacturing Conveyer Systems Processing Plants Chemical  
Pumping Machine Tools Plastics Rubber Elevators Cranes



## World Leading Motor Control

The all new Optidrive P2 offers the perfect combination of high performance together with ease of use to allow even the most demanding applications to be tackled easily.

Designed for fast installation and commissioning, Optidrive P2 provides the most cost effective solution for industry.

All Optidrive P2 units provide 150% overload for 60 seconds as standard, ensuring each drive is suitable for Heavy Duty applications, whilst the IP55 enclosed versions ensure the drive is tough enough to survive in industrial environments.

Extensive I/O and communications interface capabilities ensure the drive can be integrated quickly and efficiently into a wide variety of control systems with the minimum commissioning time, ensuring rapid start up. Invertek's simple parameter structure, and carefully selected factory parameter settings ensure that commissioning time is kept to a minimum.



Compliant with international standards.  
Manufactured in the UK.

150% overload for  
60 seconds



## Advanced Motor Control

Optidrive P2 has been uniquely developed to allow a wide range of different motor types to be used, with only parameter changes being required. This technology allows the same drive to be used in a wide range of applications, allowing OEMs and end user alike to take advantage of the energy saving provided by using the latest motor technologies.

### AC Induction Motors

The majority of AC motors in use today around the world are standard induction motors. These motors are relatively low cost, readily available and provide good performance with long service life. With the ever increasing focus on energy efficiency, motor manufacturers have refined and improved their designs in recent years.

Optidrive P2 has been developed to provide optimum control and maximum efficiency when operating with older motors designs, or newer high efficiency designs.

Operation can be in simple V/F control mode or in High Performance Third Generation Vector Mode, which provides up to 200% torque from zero speed without requiring an encoder.

### Permanent Magnet AC Motors

Permanent magnet AC motors provide improved efficiency compared to standard induction motors. Using permanent magnets in the motor construction eliminates the need for any magnetising current, reducing electrical losses. PM motors have been used for many years in high performance applications, however this has always required the use of a feedback device, such as a resolver or encoder. Optidrive P2 has been designed to operate with AC PM motors without requiring any feedback device, allowing them to be used for their energy efficiency benefits without incurring extra cost and complexity in applications which do not require position feedback.

### Brushless DC Motors

BLDC motors are similar to AC PM motors, however the design requires a slightly different control method to optimise the performance. Optidrive P2 has the flexibility to control this type of motor, requiring only simple parameter changes. This provides much greater flexibility for OEMs, allowing Optidrive P2 to be used in a variety of applications, with various motor types.

### Synchronous Reluctance Motors

Synchronous Reluctance Motors (SynRM), not to be confused with Switched Reluctance Motors, share a similar stator construction to standard induction motors, however the rotor is substantially different, in order to improve the overall efficiency of the motor. SynRM motors are ideally suited to variable torque applications.

Optidrive P2 can control synchronous reluctance motors, allowing the energy saving benefits to be realised.

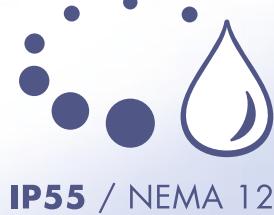
# At a Glance...

High performance, excellent usability and flexible to meet the needs of your application

Keyhole  
Mounts for fast  
installation



Integrated  
Keypad & Display  
(LED or Multi-language OLED  
Display)



IP55 / NEMA 12

Integrated  
EMC Filter



Pluggable Control  
Terminals



High Quality  
Long-life Fans

Integrated Cable  
Management



Integral  
Brake  
Transistor



Safe Torque Off (provided as standard)	With	Without
Optidrive P2 features a safe torque off function to allow simple integration into machine critical safety circuits.	<ul style="list-style-type: none"> <li>Simple machine design reduces component costs, saves panel space and minimises installation time</li> <li>Faster shut down and reset procedures reduce system maintenance time</li> <li>Better safety standard compared to mechanical solution</li> <li>Better motor connection. Single cable with no interruption.</li> </ul>	

**TÜV Rheinland Functional Safety Type Approved FS**

# Applications

High performance, accurate motor control for even the most demanding of applications



## Mining & Quarrying

- Feed conveyers
- Crushers
- Cranes

## Metals & Processing

- Grinding
- Cutting
- Polishing
- Drilling
- Rolling

## Rubber & Plastics

- Extruders
- Moulding
- Mixers
- Winding

## Food & Beverage

- Conveyers
- Pumps
- Mixers
- Palletisers

Powerful, versatile and  
easy to use



### Cranes

#### Requirements:

- High starting torque
- Smooth motor operation throughout starting and stopping phases
- Motor holding brake control
- Avoidance of load droop and sag
- Regeneration and braking capability during load lowering

#### Optidrive P2 provides:

- Dedicated Hoist Mode Operation with motor holding brake control algorithm
- Up to 200% torque from zero speed in vector operation without encoder feedback
- Multiple Preset Speed or variable speed operation
- Built in dynamic braking transistor, requires only an external resistor



### Compressors

#### Requirements:

- Precise regulation of speed to ensure a consistent end product
- High starting torque demand in many applications
- Maximum efficiency under all conditions
- Safe operation to prevent accidents and injuries

#### Optidrive P2 Provides:

- PM Motor control mode to allows open loop operation with Permanent Magnet motors for maximum efficiency
- Maximum starting torque with standard AC motors
- Better than 0.5% speed holding accuracy in Open Loop Vector Operation
- Dedicated Safe Torque Off input complies with EN62061 SIL Level 2 for safe operation



### Winding

#### Requirements:

- Precise control of motor torque over a broad speed range
- Accurate control of material tension under all conditions
- Open or closed loop control capability, based on tension feedback or winding diameter
- Web break protection in case of material breakage

#### Optidrive P2 Provides:

- PID Closed Loop Tension Control with feedback from a load cell or dancer arm
- Open Loop Vector control provides optimum control of the output torque level
- Encoder feedback option allows for a very wide speed range, even down to zero speed
- Safe Torque Off input immediately disables the drive in Emergency conditions

# Options & Accessories

Installation options, plug-in modules and commissioning tools



Modbus RTU and CANopen  
on board as standard

For additional communication  
interfaces or functionality a  
range of plug-in modules is  
available:

## Fieldbus Interfaces



**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



## Encoder Feedback

OPT-2-ENCOD-IN (5 Volt)  
OPT-2-ENCHT-IN (15 – 30 Volt)

Closed loop encoder feedback,  
compatible with a wide range of  
incremental encoders

## Extended I/O

OPT-2-EXTIO-IN

- Additional 3 Digital Inputs
- Additional Relay Output

## Extended Relay

OPT-2-CASCD-IN

Additional 3 Relay Outputs:

**Relay 3** – Drive Healthy Indication  
**Relay 4** – Drive Fault Indication  
**Relay 5** – Drive Running Indication

Functions are programmable / adjustable

# Installation & Peripheral Options

A range of external EMC Filters, Brake Resistors, Input Chokes and Output Filters are available, to suit all installation requirements

Optistick

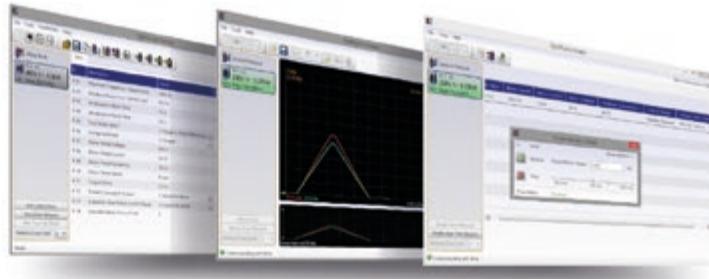


## Rapid Commissioning

- Allows rapid copying of parameters between multiple drives
- Provides Bluetooth wireless interface to a PC running OptiTools Studio
- Backup and restore of drive parameters

OPT-2-STICK-IN

# 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  
Windows 8  
Windows 8.1  
Windows 10

	<b>kW Model Code</b>	<b>HP Model Code</b>	
	Product Family	Product Family	
	Frame Size	Frame Size	
	Voltage Code	Voltage Code	
	Power Rating Code	Power Rating Code	
	Supply Phases	Supply Phases	
	EMC Filter	EMC Filter	
	Bridge Transistor	Bridge Transistor	
	Enclosure	Enclosure	
	Display	Display	
	PCB Coating	PCB Coating	
200-240V±10% 1 Phase Input	0.75 1 4.3 2 1.5 2 7 2 2.2 3 10.5 2	ODP - 2 - 2 2 075 - 1 K F 4 # - # N ODP - 2 - 2 2 150 - 1 K F 4 # - # N ODP - 2 - 2 2 220 - 1 K F 4 # - # N	ODP - 2 - 2 2 010 - 1 H F 4 # - # N ODP - 2 - 2 2 020 - 1 H F 4 # - # N ODP - 2 - 2 2 030 - 1 H F 4 # - # N
200-240V±10% 3 Phase Input	0.75 1 4.3 2 1.5 2 7 2 2.2 3 10.5 2 4 5 18 3 5.5 7.5 24 3 5.5 7.5 24 4 7.5 10 30 4 11 15 46 4 15 20 60 5 18.5 25 72 5 22 30 90 6 30 40 110 6 37 50 150 6 45 60 180 6 55 75 202 7 75 100 240 7	ODP - 2 - 2 2 075 - 3 K F 4 # - # N ODP - 2 - 2 2 150 - 3 K F 4 # - # N ODP - 2 - 2 2 220 - 3 K F 4 # - # N ODP - 2 - 3 2 040 - 3 K F 4 # - # N ODP - 2 - 3 2 055 - 3 K F 4 2 - S N ODP - 2 - 4 2 055 - 3 K F 4 # - T N ODP - 2 - 4 2 075 - 3 K F 4 # - T N ODP - 2 - 4 2 110 - 3 K F 4 # - T N ODP - 2 - 5 2 150 - 3 K F 4 # - T N ODP - 2 - 5 2 185 - 3 K F 4 # - T N ODP - 2 - 6 2 022 - 3 K F 4 N - T N ODP - 2 - 6 2 030 - 3 K F 4 N - T N ODP - 2 - 6 2 037 - 3 K F 4 N - T N ODP - 2 - 6 2 045 - 3 K F 4 N - T N ODP - 2 - 7 2 055 - 3 K F 4 N - T N ODP - 2 - 7 2 075 - 3 K F 4 N - T N	ODP - 2 - 2 2 010 - 3 H F 4 # - # N ODP - 2 - 2 2 020 - 3 H F 4 # - # N ODP - 2 - 2 2 030 - 3 H F 4 # - # N ODP - 2 - 3 2 050 - 3 H F 4 # - # N ODP - 2 - 3 2 075 - 3 H F 4 2 - S N ODP - 2 - 4 2 075 - 3 H F 4 # - T N ODP - 2 - 4 2 100 - 3 H F 4 # - T N ODP - 2 - 4 2 150 - 3 H F 4 # - T N ODP - 2 - 5 2 020 - 3 H F 4 # - T N ODP - 2 - 5 2 025 - 3 H F 4 # - T N ODP - 2 - 6 2 030 - 3 H F 4 N - T N ODP - 2 - 6 2 040 - 3 H F 4 N - T N ODP - 2 - 6 2 050 - 3 H F 4 N - T N ODP - 2 - 6 2 060 - 3 H F 4 N - T N ODP - 2 - 7 2 075 - 3 H F 4 N - T N ODP - 2 - 7 2 100 - 3 H F 4 N - T N
380-480V±10% 3 Phase Input	0.75 1 2.2 2 1.5 2 4.1 2 2.2 3 5.8 2 4 5 9.5 2 5.5 7.5 14 3 7.5 10 18 3 11 15 24 3 11 15 24 4 15 20 30 4 18.5 25 39 4 22 30 46 4 30 40 61 5 37 50 72 5 45 60 90 6 55 75 110 6 75 120 150 6 90 150 180 6 110 175 202 7 132 200 240 7 160 250 302 7 200 300 370 8 250 350 450 8	ODP - 2 - 2 4 075 - 3 K F 4 # - # N ODP - 2 - 2 4 150 - 3 K F 4 # - # N ODP - 2 - 2 4 220 - 3 K F 4 # - # N ODP - 2 - 2 4 400 - 3 K F 4 # - # N ODP - 2 - 3 4 055 - 3 K F 4 # - # N ODP - 2 - 3 4 075 - 3 K F 4 # - # N ODP - 2 - 3 4 110 - 3 K F 4 2 - S N ODP - 2 - 4 4 110 - 3 K F 4 # - T N ODP - 2 - 4 4 150 - 3 K F 4 # - T N ODP - 2 - 4 4 185 - 3 K F 4 # - T N ODP - 2 - 4 4 220 - 3 K F 4 # - T N ODP - 2 - 5 4 300 - 3 K F 4 # - T N ODP - 2 - 5 4 370 - 3 K F 4 # - T N ODP - 2 - 6 4 045 - 3 K F 4 N - T N ODP - 2 - 6 4 055 - 3 K F 4 N - T N ODP - 2 - 6 4 075 - 3 K F 4 N - T N ODP - 2 - 6 4 090 - 3 K F 4 N - T N ODP - 2 - 7 4 110 - 3 K F 4 N - T N ODP - 2 - 7 4 132 - 3 K F 4 N - T N ODP - 2 - 7 4 160 - 3 K F 4 N - T N ODP - 2 - 8 4 200 - 3 K F 4 2 - T N ODP - 2 - 8 4 250 - 3 K F 4 2 - T N	ODP - 2 - 2 4 010 - 3 H F 4 # - # N ODP - 2 - 2 4 020 - 3 H F 4 # - # N ODP - 2 - 2 4 030 - 3 H F 4 # - # N ODP - 2 - 2 4 050 - 3 H F 4 # - # N ODP - 2 - 3 4 075 - 3 H F 4 # - # N ODP - 2 - 3 4 100 - 3 H F 4 # - # N ODP - 2 - 3 4 150 - 3 H F 4 2 - S N ODP - 2 - 4 4 150 - 3 H F 4 # - T N ODP - 2 - 4 4 200 - 3 H F 4 # - T N ODP - 2 - 4 4 250 - 3 H F 4 # - T N ODP - 2 - 4 4 300 - 3 H F 4 # - T N ODP - 2 - 5 4 040 - 3 H F 4 # - T N ODP - 2 - 5 4 050 - 3 H F 4 # - T N ODP - 2 - 6 4 060 - 3 H F 4 N - T N ODP - 2 - 6 4 075 - 3 H F 4 N - T N ODP - 2 - 6 4 120 - 3 H F 4 N - T N ODP - 2 - 6 4 150 - 3 H F 4 N - T N ODP - 2 - 7 4 175 - 3 H F 4 N - T N ODP - 2 - 7 4 200 - 3 H F 4 N - T N ODP - 2 - 7 4 250 - 3 H F 4 N - T N ODP - 2 - 8 4 300 - 3 H F 4 2 - T N ODP - 2 - 8 4 350 - 3 H F 4 2 - T N
500-600V±10% 3 Phase Input	0.75 1 2.1 2 1.5 2 3.1 2 2.2 3 4.1 2 4 5 6.5 2 5.5 7.5 9 2 7.5 10 12 3 11 15 17 3 15 20 22 3 15 20 22 4 18.5 25 28 4 22 30 34 4 30 40 41 4 37 50 54 5 45 60 65 5 55 75 78 6 75 100 105 6 90 125 130 6 110 150 150 6	ODP - 2 - 2 6 075 - 3 K 0 4 # - # N ODP - 2 - 2 6 150 - 3 K 0 4 # - # N ODP - 2 - 2 6 220 - 3 K 0 4 # - # N ODP - 2 - 2 6 400 - 3 K 0 4 # - # N ODP - 2 - 2 6 055 - 3 K 0 4 # - # N ODP - 2 - 3 6 075 - 3 K 0 4 # - # N ODP - 2 - 3 6 110 - 3 K 0 4 # - # N ODP - 2 - 3 6 150 - 3 K 0 4 2 - S N ODP - 2 - 4 6 150 - 3 K 0 4 # - T N ODP - 2 - 4 6 185 - 3 K 0 4 # - T N ODP - 2 - 4 6 220 - 3 K 0 4 # - T N ODP - 2 - 5 6 300 - 3 K 0 4 # - T N ODP - 2 - 5 6 370 - 3 K 0 4 # - T N ODP - 2 - 5 6 045 - 3 K 0 4 # - T N ODP - 2 - 6 6 055 - 3 K 0 4 N - T N ODP - 2 - 6 6 075 - 3 K 0 4 N - T N ODP - 2 - 6 6 090 - 3 K 0 4 N - T N ODP - 2 - 6 6 110 - 3 K 0 4 N - T N	ODP - 2 - 2 6 010 - 3 H 0 4 # - # N ODP - 2 - 2 6 020 - 3 H 0 4 # - # N ODP - 2 - 2 6 030 - 3 H 0 4 # - # N ODP - 2 - 2 6 050 - 3 H 0 4 # - # N ODP - 2 - 2 6 075 - 3 H 0 4 # - # N ODP - 2 - 3 6 100 - 3 H 0 4 # - # N ODP - 2 - 3 6 150 - 3 H 0 4 # - # N ODP - 2 - 3 6 200 - 3 H 0 4 2 - S N ODP - 2 - 4 6 200 - 3 H 0 4 # - T N ODP - 2 - 4 6 250 - 3 H 0 4 # - T N ODP - 2 - 4 6 300 - 3 H 0 4 # - T N ODP - 2 - 5 6 400 - 3 H 0 4 # - T N ODP - 2 - 5 6 050 - 3 H 0 4 # - T N ODP - 2 - 5 6 060 - 3 H 0 4 # - T N ODP - 2 - 6 6 075 - 3 H 0 4 N - T N ODP - 2 - 6 6 100 - 3 H 0 4 N - T N ODP - 2 - 6 6 125 - 3 H 0 4 N - T N ODP - 2 - 6 6 150 - 3 H 0 4 N - T N

**kW Models: Factory Settings**

Motor Rated Frequency: 50Hz  
Motor Rated Voltage: 400V

**HP Models: Factory Settings**

Motor Rated Frequency: 60Hz  
Motor Rated Voltage: 460V

**Enclosure & Display Types**

Replace #s in model code with colour-coded option

**IP20**

With LED Display



With OLED Display


**IP66 Non-switched**

With OLED Display


**IP66 Switched**

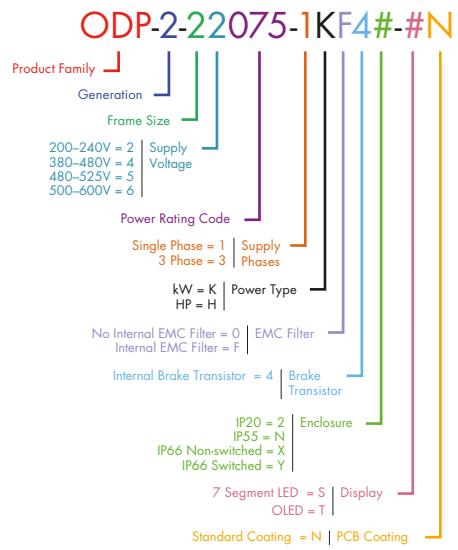
With OLED Display



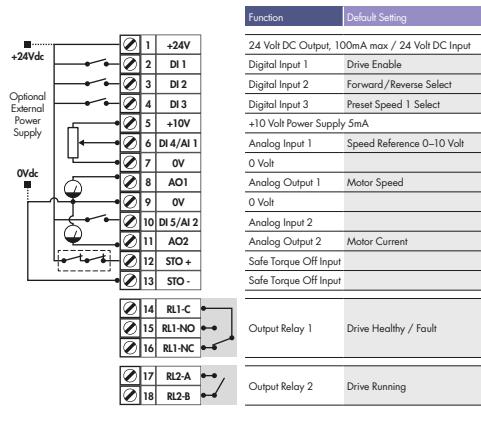
## Drive Specification

Input Ratings	Supply Voltage	200 – 240V ± 10% 380 – 480V ± 10% 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) 400V 3Ph. Input: 0.75–75kW (1–100HP) 400V 3Ph. Input: 0.75–250kW 460V 3Ph. Input: 1–350HP 575V 3Ph. Input: 0.75–110kW (1–150HP)
	Overload Capacity	150% for 60 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: -10 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 IEC 60068-2-6 Sinusoidal Vibration 10 - 57Hz @ 0.075mm Pk 57 - 150Hz @ 1g Pk
Enclosure	Ingress Protection	IP20, IP55, IP66
Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad
	Display	Built-in multi language OLED (IP55 & IP66) 7 Segment LED (IP20)
	PC	OptiTools Studio
Control Specification	Control Method	V/F Voltage Vector Energy Optimised V/F 3GV Sensorless Vector Speed Control 3GV Sensorless Vector Torque Control Closed Loop (Encoder) Speed Control Closed Loop (Encoder) Torque Control PM Vector Control BLDC Control Synchronous Reluctance
		PWM Frequency
		4–32kHz Effective
		Stopping Mode
		Ramp to Stop: User Adjustable 0.01–600 secs Coast to Stop
	Braking	Motor Flux Braking Built-in Braking Transistor
		Skip Frequency
		Single point, user adjustable
		Analog Signal
		0 to 10 Volts 10 to 0 Volts -10 to +10 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA
	Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen

## Model Code Guide



## Connection Diagram



NOT TO SCALE



IP66	
2	3
257	310
188	211
171	235
239	266
252	270
270	330
330	360

IP55	
4	5
450	540
235	330
270	330
330	360
55	865
23	1280

IP20	
2	3
221	261
110	131
185	205
486	418
222	222
482	486
995	995
1.8	3.5
9.2	18.2
128	128

**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 Drive Solutions

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



### Crane Control

Demanding application at South African mine



### Machine Tool OEM

UK machine tool supplier specifies Optidrive



### Film Manufacturing

Optimum tension control in Australia



### Food Processing

Precision conveyor control in Spain



### Amusement Parks

Reliable control of difficult loads in Spain



### Optidrive P2 User Guide



Scan to download or visit the Invertek Drives website

[www.invertekdrives.com/optidrive-p2](http://www.invertekdrives.com/optidrive-p2)

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