

OPTIDRIVE™ CP²

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 Pumping Conveyer Systems Machine Tools Processing Plants Chemical Rubber Elevators Cranes



World Leading Motor Control

The 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 200% overload for 4 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. Inverter'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.

200% overload for 4 seconds



IP20

Up to 350HP, 450A



IP55 / NEMA 12

Up to 250HP, 302A



IP66 / NEMA 4X

Up to 10HP, 18A

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

Select Language
Español
Deutsch
▶ English

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

IP55 / NEMA 12

Integrated EMC Filter

Pluggable Control Terminals

High Quality Long-life Fans

Integral Brake Transistor

Integrated Cable Management

Contactor-style Power Wiring Arrangement



Keyhole Mounts for fast installation



Convenient Reference Card



DIN Rail Mount

Modbus RTU and CANopen on board as standard



Pluggable Modules for I/O, Encoder, Alternative Fieldbus

Modbus
CANopen



Safe Torque Off (provided as standard)

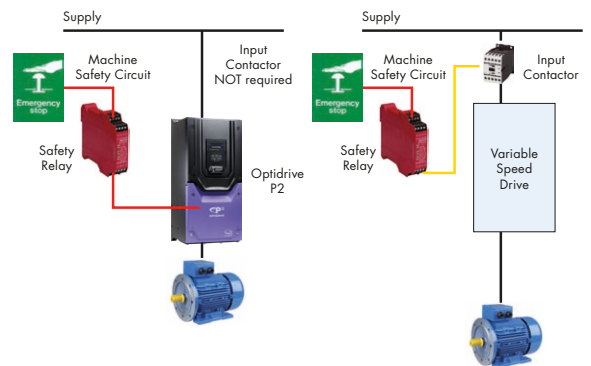
Optidrive P2 features a safe torque off function to allow simple integration into machine critical safety circuits.

- Simple machine design reduces component costs, saves panel space and minimises installation time
- Faster shut down and reset procedures reduce system maintenance time
- Better safety standard compared to mechanical solution
- Better motor connection. Single cable with no interruption.



With

Without



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



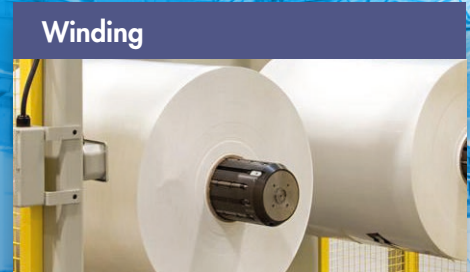
Compressors

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 allow 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

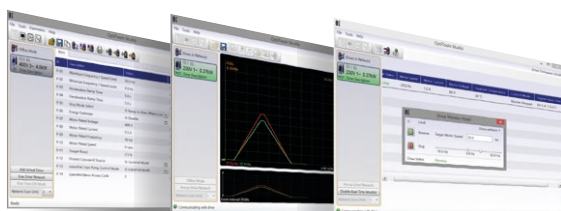
Requirements:

- 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

OptiTools Studio



Powerful PC Software

Drive commissioning and parameter backup

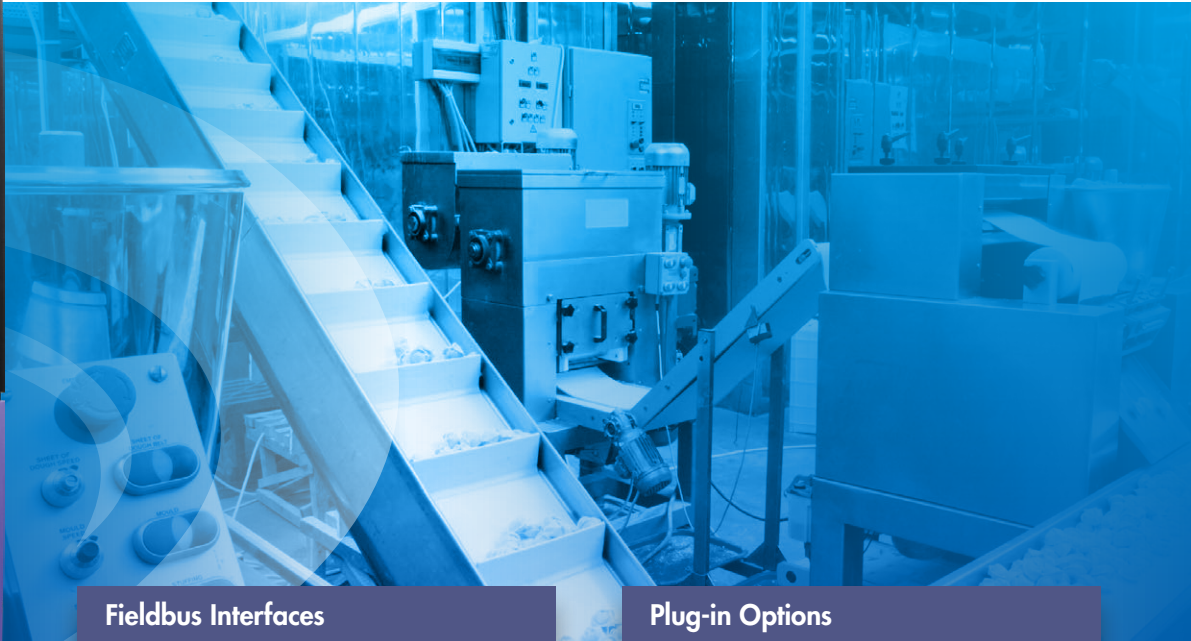
- Real-time parameter editing
- Drive network communication
- Parameter upload, download and storage
- Simple PLC function programming
- Real-time scope function and data logging
- Real-time data monitoring

Compatible with:

Windows XP
Windows Vista
Windows 7
Windows 8
Windows 8.1
Windows 10

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 Smart



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

OPT-3-WLKIT-IN

Optistick Smart + Bluetooth Dongle

OPT-3-PCKIT-IN

Optistick Smart + Bluetooth Dongle + NFC Pad

Optipad



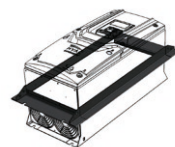
Remote Keypad
TFT Display

Optipad Language Support

- English
- German
- Spanish
- Italian
- French
- Swedish
- Russian
- Polish
- Portuguese
- Finnish

OPT-3-OPPAD-IN

Through Hole Mount Kit



Through Hole
Mounting

Through hole mount kits allow optidrive to be mounted through panel, ensuring that the heat from the drives heat sink is kept separate from the control electronics. This allows the optimum panel cooling arrangement to be used, with best possible separation of hot and cold air.

OPT-2-TMHT04
OPT-2-TMHT05

OPT-2-TMHT06
OPT-2-TMHT07

Local Isolator



Local isolator option allows complete disconnection of the incoming AC power to the drive. The isolator mounts directly to the drive, and provides a local disconnect option. The handle can be padlocked in the off position for safe maintenance.

OPT-2-ISOLO-S4

OPT-2-ISOLO-S5

Brake Resistors



Optibrake dynamic braking resistors are designed specifically for the Optidrive range. For use with high inertia loads which need to be stopped rapidly. Optibrake dynamic braking resistors assist the Optidrive in managing the electrical energy returned from the motor during braking by converting it to heat energy.







OD-BR100-IN
OD-BRES4-IN

Replace # in model code with enclosure/display option

Input Voltage	HP	Amps	Frame Size	HP Model Code							Enclosure/Display Option						
				Product Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phase	Power Type	EMC Filter	Brake Transistor	IP20 Cabinet Mount	IP55/NEMA12 OLED Display	Indoor IP66/NEMA4X Non Switched	Indoor IP66/NEMA4X Switched	Outdoor IP66/NEMA4X Non Switched
200-240V ± 10% 1 Phase Input	1	4.3	2	ODP	- 2 - 2 2	075	- 1	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	2	7	2	ODP	- 2 - 2 2	150	- 1	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	3	10.5	2	ODP	- 2 - 2 2	220	- 1	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
200-240V ± 10% 3 Phase Input	1	4.3	2	ODP	- 2 - 2 2	075	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	2	7	2	ODP	- 2 - 2 2	150	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	3	10.5	2	ODP	- 2 - 2 2	220	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	5	18	3	ODP	- 2 - 3 2	040	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	7.5	24	3	ODP	- 2 - 3 2	055	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	10	30	4	ODP	- 2 - 4 2	075	- 3	H	F	4	#	2-MN	N-TN				
	15	46	4	ODP	- 2 - 4 2	110	- 3	H	F	4	#	2-MN	N-TN				
	20	60	5	ODP	- 2 - 5 2	150	- 3	H	F	4	#	2-MN	N-TN				
	25	72	5	ODP	- 2 - 5 2	185	- 3	H	F	4	#	2-MN	N-TN				
	30	90	6A	ODP	- 2 - 6 2	022	- 3	H	F	4	#	2-MN	N-TN				
	40	110	6A	ODP	- 2 - 6 2	030	- 3	H	F	4	#	2-MN	N-TN				
	380-480V ± 10% 3 Phase Input	1	2.2	2	ODP	- 2 - 2 4	075	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN
2		4.1	2	ODP	- 2 - 2 4	150	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
3		5.8	2	ODP	- 2 - 2 4	220	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
5		9.5	2	ODP	- 2 - 2 4	400	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
7.5		14	3	ODP	- 2 - 3 4	055	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
10		18	3	ODP	- 2 - 3 4	075	- 3	H	F	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
15		24	3	ODP	- 2 - 3 4	110	- 3	H	F	4	#	2-MN					
20		30	4	ODP	- 2 - 4 4	150	- 3	H	F	4	#	2-MN	N-TN				
25		39	4	ODP	- 2 - 4 4	185	- 3	H	F	4	#	2-MN	N-TN				
30		46	4	ODP	- 2 - 4 4	220	- 3	H	F	4	#	2-MN	N-TN				
40		61	5	ODP	- 2 - 5 4	300	- 3	H	F	4	#	2-MN	N-TN				
500-600V ± 10% 3 Phase Input		1	2.1	2	ODP	- 2 - 2 6	075	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN
	2	3.1	2	ODP	- 2 - 2 6	150	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	3	4.1	2	ODP	- 2 - 2 6	220	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	5	6.5	2	ODP	- 2 - 2 6	400	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	7.5	9	2	ODP	- 2 - 2 6	550	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	10	12	3	ODP	- 2 - 3 6	075	- 3	H	O	4	#	2-MN		X-TN	Y-TN	A-MN	B-MN
	15	17	3	ODP	- 2 - 3 6	110	- 3	H	O	4	#	2-MN				A-MN	B-MN
	20	22	3	ODP	- 2 - 3 6	150	- 3	H	O	4	#	2-MN					
	20	22	4	ODP	- 2 - 4 6	150	- 3	H	O	4	#		N-TN				
	25	28	4	ODP	- 2 - 4 6	185	- 3	H	O	4	#	2-MN	N-TN				
	30	34	4	ODP	- 2 - 4 6	220	- 3	H	O	4	#	2-MN	N-TN				
	40	43	4	ODP	- 2 - 4 6	300	- 3	H	O	4	#	2-MN	N-TN				
50	54	5	ODP	- 2 - 5 6	370	- 3	H	O	4	#	2-MN	N-TN					
60	65	5	ODP	- 2 - 5 6	450	- 3	H	O	4	#	2-MN	N-TN					
75	78	6	ODP	- 2 - 6 6	055	- 3	H	O	4	#		N-TN					
100	105	6	ODP	- 2 - 6 6	075	- 3	H	O	4	#		N-TN					
125	130	6	ODP	- 2 - 6 6	090	- 3	H	O	4	#		N-TN					
150	150	6	ODP	- 2 - 6 6	110	- 3	H	O	4	#		N-TN					

HP Models: Factory Settings
 Motor Rated Frequency: 60Hz
 Motor Rated Voltage: 30/460/575V

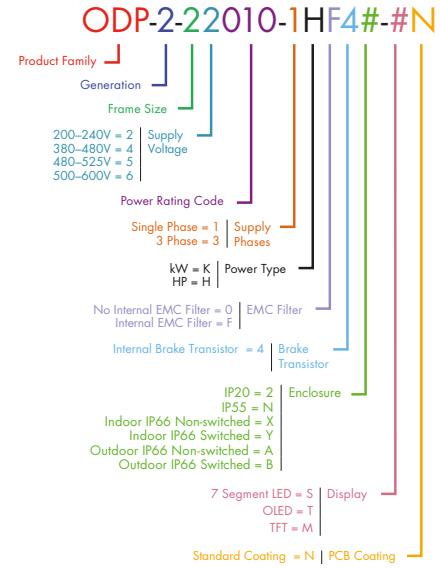
Enclosure & Display Types

2-MN	IP20 Cabinet Mount	
N-TN	IP55/NEMA12 With OLED Display	
X-TN	Indoor IP66/NEMA4X Non-switched	
Y-TN	Indoor IP66/NEMA4X Switched	
A-MN	Outdoor IP66/NEMA4X Non-switched	
B-MN	Outdoor IP66/NEMA4X Switched	

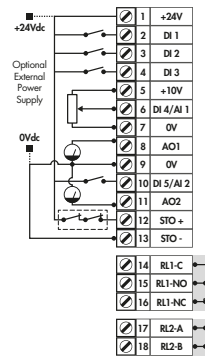
Drive Specification

Input Ratings	Supply Voltage	200 – 240V ± 10% 380 – 480V ± 10% 500 – 600V ± 10%	Fieldbus Connectivity	Builtin	CANopen	125 – 1000kbps
	Supply Frequency	48 – 62Hz		Optional	Modbus RTU	9.6 - 115.2 kbps selectable 8N1, 8N2, 8E1, 8O1
	Displacement Power Factor	> 0.98		Optional	Other	PROFIBUS DP (DPV1) PROFINET IO DeviceNet EtherNet/IP EtherCAT Modbus TCP
	Phase Imbalance	3% Maximum allowed		I/O Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer
	Inrush Current	< rated current			Programmable Inputs	5 Total as standard (Optional additional 3) 3 Digital (Optional additional 3) 2 Analog / Digital Selectable
	Power Cycles	120 per hour maximum, evenly spaced			Digital Inputs	Opto - Isolated 8 – 30 Volt DC, internal or external supply Response time < 4ms Resolution: 12 bits Response time: < 4ms Accuracy: < 1% full scale Parameter adjustable scaling and offset
Output Ratings	Output Power	230V 1Ph. Input: 0.75–2.2kW (1–3HP) 230V 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)	Analog Inputs		Motor PTC / Thermistor Input Trip Level: 3kΩ	
		Overload Capacity	200% for 4 seconds		PTC Input	4 Total (Optional additional 3) 2 Analog / Digital 2 Relays (Optional additional 3)
Output Ratings	Output Frequency	0 – 500Hz, 0.1Hz resolution	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 5A AC, 5A DC		
		Acceleration Time	0.01 – 600 seconds	Analog Outputs	0 to 10 Volt 0 to 20mA 4 to 20mA	
Output Ratings	Deceleration Time	0.01 – 600 seconds	Application Features	PID Control	Internal PID Controller Multi Setpoint Select Standby / Sleep Mode Boost Function	
		Typical Efficiency		> 98%	Hoist Mode	Dedicated Hoist Mode Motor Holding Brake Pre-Torque & Control Over Limit Protection
Ambient Conditions	Temperature	Storage: –40 - 140F Operating: 14 - 122F	Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp	
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL Approved Up to 4000m maximum (non UL)		Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage	
	Humidity	95% Max, non condensing		Maintenance Indicator	Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring	
Enclosure	Ingress Protection	IP20, IP55 NEMA12, IP66 NEMA4X	Monitoring	Hours Run Meter	Resetable & Non Resetable kWh meters Cooling Fan Run Time	
	Programming	Keypad		Built-in keypad as standard Optional remote mountable keypad	Standards Compliance	Low Voltage Directive: 2014/35/EU EMC Directive: 2014/30/EU Additional Conformance: UL, cUL, EAC, RCM Marine Certification: DNV Type Approval Environmental Conditions: Designed to meet IEC 60721-3-3, in operation: IP20 Drives: 3S2/3C2 IP55 & 66 Drives: 3S3/3C3
Control Specification	Display	Built-in multi language OLED (IP55 & IP66) 7 Segment LED (IP20)	Setpoint Control	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	
	PC	OptiTools Studio		Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen	

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	Forward/Reverse Select
Digital Input 3	Preset Speed 1 Select
+10 Volt Power Supply 5mA	
Analog Input 1	Speed Reference 0–10 Volt
0 Volt	
Analog Output 1	Motor Speed
0 Volt	
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



IP20

Size	2	3	4	5	6A	6B	8
mm Height	221	261	418	486	614	726	995
mm Width	110	131	160	222	286	330	482
mm Depth	185	205	240	260	320	320	480
kg Weight	1.8	3.5	9.2	18.2	32	43	128

IP66 / NEMA4X

Size	2	3
mm Height	257	310
mm Width	188	211
mm Depth	239	266
kg Weight	4.8	7.7

IP55 / NEMA12

Size	4	5	6	7
mm Height	450	540	865	1280
mm Width	171	235	330	330
mm Depth	252	270	330	360
kg Weight	11.5	23	55	89

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.



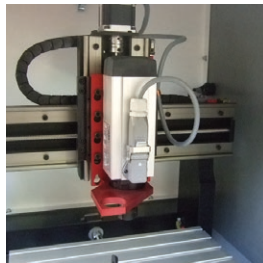
UK Headquarters, Welshpool

Global Drive Solutions

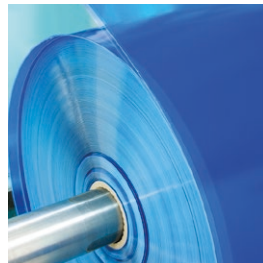
Invertek Drives operate at the heart of automated systems around the world



Crane Control
Demanding application at South African mine



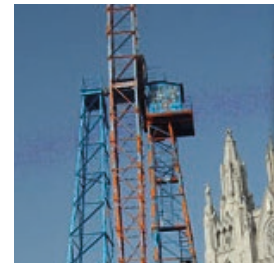
Machine Tool OEM
UK machine tool supplier specifies Optidrive



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

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