



OPTIDRIVE™ CP²

AC Variable Speed Drive

Powerful Performance
Advanced motor control



0.75kW–250HP / 1HP–400HP
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
Pumping
Machine Tools
Processing Plants
Plastics
Rubber
Chemical
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 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 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 motor 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



Contactor-style Power
Wiring Arrangement



Keyhole
Mounts for fast
installation



DIN Rail Mount

Modbus RTU
and CANopen
on board as
standard



Pluggable Modules for I/O,
Encoder, Alternative Fieldbus

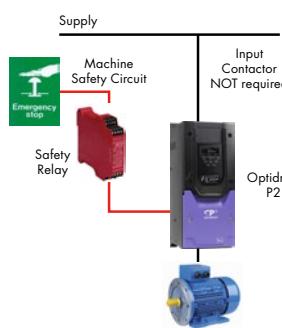
Modbus
CANopen

Safe Torque Off (provided as standard)

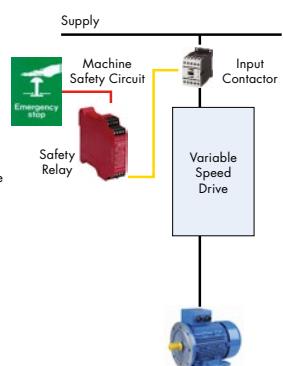
Optidrive P2 features a safe torque off function to allow simple integration into machine critical safety circuits.

- 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 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

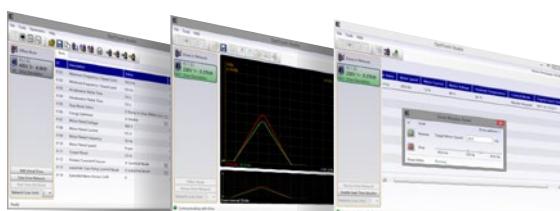
Requirements:

- 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

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

PC Connection Kit



OPT-2-USB-OBUS is a dedicated PC connection kit for all Optidrive models, allowing direct connection from the PC USB port to the drive RJ45 communication connection for use with Optitools studio software.

OPT-2-USB485-OBUS

Optipad



Remote Keypad TFT Display

Optipad Language Support

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

OPT-3-OPPAD-IN

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

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 spate 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

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

	kW	HP	Amps	Frame Size	HP Model Code	Product Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phases	Power Type	EMC Filter	Brake Transistor	IP20 Cabinet Mount	IP55/NEMA12 TFT Display	Outdoor IP66/NEMA4X Non Switched	Outdoor IP66/NEMA4X Switched
200-240V ±10%	0.75	1	4.3	2	ODP - 2 - 2 010 - 1 H F 4 #										2-MN	A-MN	B-MN	
1 Phase Input	1.5	2	7	2	ODP - 2 - 2 020 - 1 H F 4 #										2-MN	A-MN	B-MN	
2.2	3	10.5	2		ODP - 2 - 2 030 - 1 H F 4 #										2-MN	A-MN	B-MN	
200-240V	4	5	15.3	3	ODP - 2 - 3 050 - 1 H F 4 #											A-MN	B-MN	
3 Phase Output	5.5	7.5	24	4	ODP - 2 - 4 075 - 1 H O 4 #											A-MN	B-MN	
	7.5	10	30	4	ODP - 2 - 4 100 - 1 H O 4 #											A-MN	B-MN	
200-240V ±10%	0.75	1	4.3	2	ODP - 2 - 2 010 - 3 H F 4 #										2-MN	A-MN	B-MN	
1 Phase Input	1.5	2	7	2	ODP - 2 - 2 020 - 3 H F 4 #										2-MN	A-MN	B-MN	
2.2	3	10.5	2		ODP - 2 - 2 030 - 3 H F 4 #										2-MN	A-MN	B-MN	
4	5	18	3		ODP - 2 - 3 050 - 3 H F 4 #										2-MN	A-MN	B-MN	
200-240V ±10%	5.5	7.5	24	3	ODP - 2 - 3 075 - 3 H F 4 #										2-MN	A-MN	B-MN	
3 Phase Input	5.5	7.5	24	4	ODP - 2 - 4 075 - 3 H F 4 #											N-MN		
200-240V	7.5	10	30	4	ODP - 2 - 4 100 - 3 H F 4 #										2-MN	N-MN	A-MN	B-MN
3 Phase Output	11	15	46	4	ODP - 2 - 4 150 - 3 H F 4 #										2-MN	N-MN	A-MN	B-MN
	15	20	60	5	ODP - 2 - 5 020 - 3 H F 4 #										2-MN	N-MN		
200-240V ±10%	18.5	25	72	5	ODP - 2 - 6 030 - 3 H F 4 #											N-MN		
3 Phase Input	22	30	90	6	ODP - 2 - 6 030 - 3 H F 4 #										2-MN			
200-240V	22	30	90	6A	ODP - 2 - 6 030 - 3 H F 4 #													
3 Phase Output	30	40	110	6	ODP - 2 - 6 040 - 3 H F 4 #										2-MN			
	30	40	110	6A	ODP - 2 - 6 040 - 3 H F 4 #										2-MN			
30	40	150	6		ODP - 2 - 6 050 - 3 H F 4 #										2-MN			
	37	50	150	6B	ODP - 2 - 6 050 - 3 H F 4 #										2-MN			
30	45	180	6		ODP - 2 - 6 060 - 3 H F 4 #										2-MN			
	45	60	180	6B	ODP - 2 - 6 060 - 3 H F 4 #										2-MN			
30	55	202	7		ODP - 2 - 7 025 - 3 H F 4 #										N-MN			
	75	100	248	7	ODP - 2 - 7 100 - 3 H F 4 #											N-MN		
380-480V ±10%	0.75	1	2.2	2	ODP - 2 - 2 4 010 - 3 H F 4 #										2-MN	A-MN	B-MN	
3 Phase Input	1.5	2	4.1	2	ODP - 2 - 2 4 020 - 3 H F 4 #										2-MN	A-MN	B-MN	
2.2	3	5.8	2		ODP - 2 - 2 4 030 - 3 H F 4 #										2-MN	A-MN	B-MN	
4	5	9.5	2		ODP - 2 - 2 4 050 - 3 H F 4 #										2-MN	A-MN	B-MN	
5.5	7.5	14	3		ODP - 2 - 3 4 075 - 3 H F 4 #										2-MN	A-MN	B-MN	
7.5	10	18	3		ODP - 2 - 3 4 100 - 3 H F 4 #										2-MN	A-MN	B-MN	
11	15	24	3		ODP - 2 - 3 4 150 - 3 H F 4 #										2-MN	A-MN	B-MN	
11	15	24	4		ODP - 2 - 4 150 - 3 H F 4 #										N-MN			
15	20	30	4		ODP - 2 - 4 200 - 3 H F 4 #										2-MN	N-MN	A-MN	B-MN
	18.5	25	39	4	ODP - 2 - 4 250 - 3 H F 4 #										2-MN	N-MN	A-MN	B-MN
22	30	46	4		ODP - 2 - 4 300 - 3 H F 4 #										2-MN	N-MN	A-MN	B-MN
30	40	61	5		ODP - 2 - 5 4 040 - 3 H F 4 #										2-MN	N-MN		
	37	50	72	5	ODP - 2 - 5 4 050 - 3 H F 4 #										2-MN	N-MN		
380-480V ±10%	45	60	90	6	ODP - 2 - 6 060 - 3 H F 4 #										2-MN	N-MN		
3 Phase Input	45	60	90	6A	ODP - 2 - 6 060 - 3 H F 4 #										2-MN			
55	75	110	6		ODP - 2 - 6 075 - 3 H F 4 #										2-MN			
55	75	110	6A		ODP - 2 - 6 075 - 3 H F 4 #										2-MN			
75	120	150	6		ODP - 2 - 6 120 - 3 H F 4 #										2-MN			
75	120	150	6B		ODP - 2 - 6 120 - 3 H F 4 #										2-MN			
90	150	180	6		ODP - 2 - 6 150 - 3 H F 4 #										2-MN			
90	150	180	6B		ODP - 2 - 6 150 - 3 H F 4 #										2-MN			
110	175	202	6B		ODP - 2 - 6 175 - 3 H F 4 #										N-MN			
110	175	202	7		ODP - 2 - 7 4 175 - 3 H F 4 #										N-MN			
132	200	240	7		ODP - 2 - 7 4 200 - 3 H F 4 #										N-MN			
160	250	302	7		ODP - 2 - 7 4 250 - 3 H F 4 #										N-MN			
200	300	370	8		ODP - 2 - 8 4 300 - 3 H F 4 #										2-MN	N-MN		
250	400	480	8		ODP - 2 - 8 4 250 - 3 H F 4 #										2-MN	N-MN		
500-600V ±10%	0.75	1	2.1	2	ODP - 2 - 2 6 010 - 3 H 0 4 #										2-MN	A-MN	B-MN	
3 Phase Input	1.5	2	3.1	2	ODP - 2 - 2 6 020 - 3 H 0 4 #										2-MN	A-MN	B-MN	
2.2	3	4.1	2		ODP - 2 - 2 6 030 - 3 H 0 4 #										2-MN	A-MN	B-MN	
4	5	6.5	3		ODP - 2 - 2 6 050 - 3 H 0 4 #										2-MN	A-MN	B-MN	
5.5	7.5	9	2		ODP - 2 - 2 6 075 - 3 H 0 4 #										2-MN	A-MN	B-MN	
7.5	10	12	3		ODP - 2 - 3 6 100 - 3 H 0 4 #										2-MN	A-MN	B-MN	
11	15	17	3		ODP - 2 - 3 6 150 - 3 H 0 4 #										2-MN	A-MN	B-MN	
15	20	22	3		ODP - 2 - 3 6 200 - 3 H 0 4 #										2-MN	A-MN	B-MN	
15	20	22	4		ODP - 2 - 4 6 200 - 3 H 0 4 #										N-MN			
	18.5	25	28	4	ODP - 2 - 4 6 250 - 3 H 0 4 #										2-MN	N-MN	A-MN	B-MN
500-600V	22	30	34	4	ODP - 2 - 4 6 300 - 3 H 0 4 #										2-MN	N-MN	A-MN	B-MN
30	40	41	4		ODP - 2 - 4 6 400 - 3 H 0 4 #										2-MN	N-MN	A-MN	B-MN
37	50	54	5		ODP - 2 - 5 6 050 - 3 H 0 4 #										2-MN	N-MN		
45	60	65	5		ODP - 2 - 5 6 060 - 3 H 0 4 #										2-MN	N-MN		
55	75	78	6		ODP - 2 - 6 075 - 3 H 0 4 #										N-MN			
75	100	105	6		ODP - 2 - 6 100 - 3 H 0 4 #										N-MN			
90	125	130	6		ODP - 2 - 6 125 - 3 H 0 4 #										N-MN			
110	150	150	6		ODP - 2 - 6 150 - 3 H 0 4 #										N-MN			

Enclosure & Display Types

2-MN IP20 Cabinet Mount



N-MN IP55/NEMA12 With TFT Display



A-MN Outdoor IP66/NEMA4X Non-switched



B-MN Outdoor IP66/NEMA4X Switched



HP Models: Factory Settings

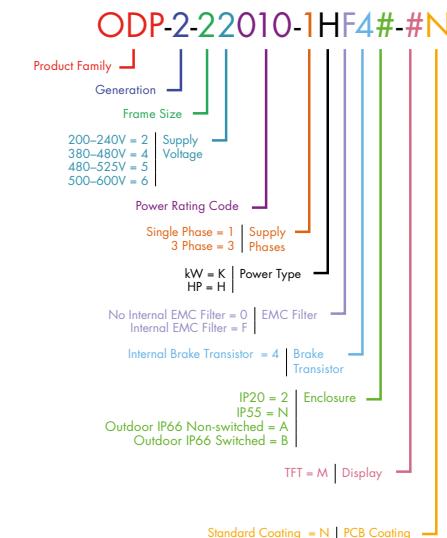
Motor Rated Frequency: 60Hz

Motor Rated Voltage: 30/460/575V

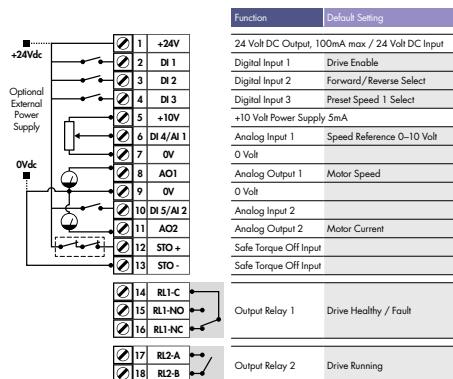
Drive Specification

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 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)
Output Ratings	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: -40 – 140F Operating: 14 – 122F Altitude: Up to 1000m ASL without derating Up to 2000m maximum UL Approved Up to 4000m maximum [non UL] Humidity: 95% Max, non condensing Conforms to IEC 60068-2-6 Sinusoidal Vibration 10 – 57Hz @ 0.075mm Pk 57 – 150Hz @ 1g Pk
	Enclosure	Ingress Protection: IP20, IP55 NEMA12, IP66 NEMA4X
Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad
	Display	Built-in multi language TFT
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
	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 Digital: Motorized Potentiometer [Keypad] Modbus RTU CANopen
	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

Model Code Guide



Connection Diagram



IP20							IP66 / NEMA4X				IP55 / NEMA12				
Size	2	3	4	5	6A	6B	8	2	3	4	4	5	6	7	8
mm Height	221	261	418	486	614	726	974	257	310	360	450	540	865	1280	1334
mm Width	110	131	172	233	286	330	444	188	211	240	171	235	330	330	444
mm Depth	185	205	240	260	320	320	423	172	235	271	252	270	332	358	423
kg Weight	1.8	3.5	9.2	18.1	32	43	124.5	3.5	6.6	9.5	11.5	23	55	89	TBC

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/variable-frequency-drives/optidrive-p2

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