



Solar Pumping



OPTIDRIVE™ IP²SOLARPUMP

Dedicated AC Drive for pumping applications isolated from the commercial grid using photovoltaic arrays (PV)



0.75kW–250kW / 1HP–400HP
185–410Vdc / 345–800Vdc input

Applications:

Watering, irrigation, agriculture, swimming pools, water supplies, water treatment and others.



Key Features

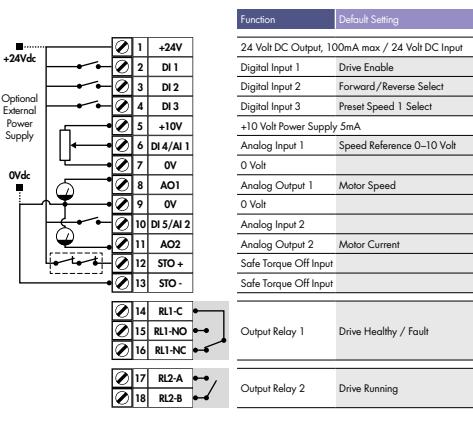
- **Maximum power point tracking (MPPT)** algorithm continuously adapts the system load for maximum system output power under varying conditions of irradiance and temperature. MPPT is the best choice for getting the maximum pumping delivery from your PV array under all conditions.
- **Extended DC operative voltage range**, 345–800Vdc HV, 185–410Vdc LV which increases the system operational time per day and reducing unnecessary stoppages caused by the low array voltages present during dawn and dusk.
- **Advanced pump protection functions**, dry run protection, pipe-burst detection, pump clean function and pump stir function. These protection functions are designed for a reliable system whilst reducing the risk of damage to the pump.
- **Pipe-Fill function**, allows a configurable period for the pipe to fill slowly before operating normally and pipe-burst detection can be activated.
- **Remote monitoring**. All data can be accessed using Modbus RTU or BACnet MSTP communications on board or Ethernet pluggable option modules.
- **3 different methods for PID Sleep and wake up**. An optional external irradiance sensor could be selected to re-start the pump when sufficient energy is available from the sun.
- **Dual supply mode**. The P2 Solar pump can be powered by a DC voltage coming from PV arrays or the traditional commercial grid.
- **PLC integrated** to customize the more demanding applications where the user may need to control for example, valve actuators or monitor system water pressure to stop the drive above defined limits. The on-board PLC provides a high degree of flexibility.
- **Compatibility with all types of motors**, the P2 Solar Pump is compatible with AC induction motors, Permanent Magnet (PM) motors, Synchronous Reluctance (SynRM) motors, Brushless DC (BLDC) motors.
- **Digital inputs for tank high water level and well low water detection**, forcing the drive to stop when the destination tank is full or the water well is empty. Configurable delays can be programmed on the start/stop commands to work with the float switches to overcome the effects of waves on the water
- **Second analog input for pressure monitoring**, this can be used just to monitor system pressure locally or remotely or for pressure regulation.
- **Irradiance level can be monitored on the drive display** with the use of an external sensor (not supplied)
- **Available in different IP enclosures IP20, IP55, IP66**

Drive Specification

Input Ratings	Supply Voltage	185–410Vdc 345–800Vdc
	Phase Imbalance	3% Maximum allowed
	Inrush Current	< rated current
	Power Cycles	120 per hour maximum, evenly spaced
Output Ratings	Output Power	230V; 0.75–75kW (1–100HP) 400V; 0.75–250kW
	Overload Capacity	110% for 60 seconds
	Output Frequency	0 – 500Hz, 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)
	Humidity	95% Max, non condensing
	Vibration	Sinusoidal Vibration Conforms to IEC 60068-2-6 Random Vibration Conforms to IEC 60068-2-64 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	ECO Vector Control PM Vector Control BLDC Vector Control Synchronous Reluctance Vector Control
	PWM Frequency	4–32kHz Effective
	Stopping Mode	Ramp to Stop: User Adjustable 0.01–600 secs Coast to Stop
	Skip Frequency	Single point, user adjustable
Fieldbus Connectivity	Setpoint Control	MPPT 0 to 10 Volts 10 to 0 Volts -10 to +10 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA
		Analog Signal Digital Motorised Potentiometer (Keypad) Modbus RTU BACnet MS/TP
	BACnet MS/TP	BACnet Application Specific Controller 9.6 - 76.8 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1
	Modbus RTU	9.6 - 115.2 kbps selectable 8N1, 8N2, 8E1, 8O1
Optional	Other	PROFIBUS DP (DPV1) PROFINET IO DeviceNet EtherNet/IP EtherCAT Modbus TCP

I/O Specification	
Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer
Programmable Inputs	5 Total as standard (Optional additional 3) 3 Digital (Optional additional 3) 2 Analog / Digital Selectable
Digital Inputs	Opto- Isolated 8 – 30 Volt DC, internal or external supply Response time < 4ms
Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: < 1% full scale Parameter adjustable scaling and offset
PTC Input	Motor PTC / Thermistor Input Trip Level : 2.5kΩ
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 Capacity: 5A
Analog Outputs	0 to 10 Volt 0 to 20mA 4 to 20mA
Application Features	PID In-built MPPT mode MPPT Optimisation Dual PID Set-point
	Pump Features Pipe-Fill function Pipe Burst detection Dry Run detection Blocked Pump detection/clean Pump Stir
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
	Maintenance Indicator Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring
	Monitoring Hours Run Meter Resettable & Non Resettable kWh meters Cooling Fan Run Time
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
	Environmental Class Conformal Coated PCBs. Suitable for use in the following environments: IP20: 3C2, 3S2 IP55 & IP66: 3C3, 3S3

Connection Diagram



NOT TO SCALE

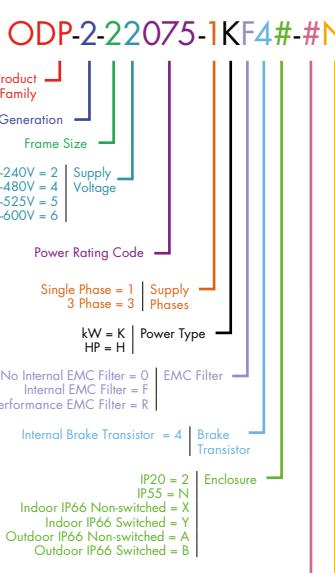


Size	IP20							IP66							IP55						
Height	2	3	4	5	6A	6B	8	Height	2	3	4	Height	4	5	6	7	8				
Width	221	261	418	486	614	726	974	Width	257	310	360	Width	450	540	865	1280	1334				
Depth	110	131	172	233	286	330	444	Depth	188	211	240	Depth	171	235	330	330	444				
Weight	1.8	3.5	9.2	18.1	32	43	124.5	Weight	3.5	6.6	9.5	Weight	11.5	23	55	89	TBC				

				kW Model Code	Product Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phases	Power Type	EMC Filter	Brake Transistor	IP20 Cabinet Mount	IP55 TFT Display	Indoor IP66 Non Switched	Indoor IP66 Switched	Outdoor IP66 Non Switched	Outdoor IP66 Switched
200–240V±10%																			
1 Phase Input	0.75	4.3	2	ODP - 2 - 2 2 075 - 1 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	1.5	7	2	ODP - 2 - 2 2 150 - 1 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	2.2	10.5	2	ODP - 2 - 2 2 220 - 1 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
200–240V±10%																			
3 Phase Input	0.75	4.3	2	ODP - 2 - 2 2 075 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	1.5	7	2	ODP - 2 - 2 2 150 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	2.2	10.5	2	ODP - 2 - 2 2 220 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	4	18	3	ODP - 2 - 3 2 040 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	5.5	24	3	ODP - 2 - 3 2 055 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	5.5	24	4	ODP - 2 - 4 2 055 - 3 K F 4 #						N-MN									
	7.5	30	4	ODP - 2 - 4 2 075 - 3 K F 4 #						2-MN	N-MN								
	11	46	4	ODP - 2 - 4 2 110 - 3 K F 4 #						2-MN	N-MN								
	15	60	5	ODP - 2 - 5 2 150 - 3 K F 4 #						2-MN	N-MN								
	18.5	72	5	ODP - 2 - 5 2 185 - 3 K F 4 #						2-MN	N-MN								
	22	90	6	ODP - 2 - 6 2 022 - 3 K F 4 #						N-MN									
	22	90	6A	ODP - 2 - 6 2 022 - 3 K F 4 #						2-MN									
	30	110	6	ODP - 2 - 6 2 030 - 3 K F 4 #						N-MN									
	30	110	6A	ODP - 2 - 6 2 030 - 3 K F 4 #						2-MN									
	37	150	6	ODP - 2 - 6 2 037 - 3 K F 4 #						N-MN									
	37	150	6B	ODP - 2 - 6 2 037 - 3 K F 4 #						2-MN									
	45	180	6	ODP - 2 - 6 2 045 - 3 K F 4 #						N-MN									
	45	180	6B	ODP - 2 - 6 2 045 - 3 K F 4 #						2-MN									
	55	202	7	ODP - 2 - 7 2 055 - 3 K F 4 #						N-MN									
	75	248	7	ODP - 2 - 7 2 075 - 3 K F 4 #						N-MN									
380–480V±10%																			
3 Phase Input	0.75	2.2	2	ODP - 2 - 2 4 075 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	1.5	4.1	2	ODP - 2 - 2 4 150 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	2.2	5.8	2	ODP - 2 - 2 4 220 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	4	9.5	2	ODP - 2 - 2 4 400 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	5.5	14	3	ODP - 2 - 3 4 055 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	7.5	18	3	ODP - 2 - 3 4 075 - 3 K F 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	11	24	3	ODP - 2 - 3 4 110 - 3 K F 4 #						2-MN			A-MN	B-MN					
	11	24	4	ODP - 2 - 4 4 110 - 3 K F 4 #						N-MN									
	15	30	4	ODP - 2 - 4 4 150 - 3 K F 4 #						2-MN	N-MN		A-MN	B-MN					
	18.5	39	4	ODP - 2 - 4 4 185 - 3 K F 4 #						2-MN	N-MN		A-MN	B-MN					
	22	46	4	ODP - 2 - 4 4 220 - 3 K F 4 #						2-MN	N-MN		A-MN	B-MN					
	30	61	5	ODP - 2 - 5 4 300 - 3 K F 4 #						2-MN	N-MN								
	37	72	5	ODP - 2 - 5 4 370 - 3 K F 4 #						2-MN	N-MN								
	45	90	6	ODP - 2 - 6 4 045 - 3 K F 4 #						N-MN									
	45	90	6A	ODP - 2 - 6 4 045 - 3 K F 4 #						2-MN									
	55	110	6	ODP - 2 - 6 4 055 - 3 K F 4 #						N-MN									
	55	110	6A	ODP - 2 - 6 4 055 - 3 K F 4 #						2-MN									
	75	150	6	ODP - 2 - 6 4 075 - 3 K F 4 #						N-MN									
	75	150	6B	ODP - 2 - 6 4 075 - 3 K F 4 #						2-MN									
	90	180	6	ODP - 2 - 6 4 090 - 3 K F 4 #						N-MN									
	90	180	6B	ODP - 2 - 6 4 090 - 3 K F 4 #						2-MN									
	110	202	6B	ODP - 2 - 6 4 110 - 3 K F 4 #						N-MN									
	110	202	7	ODP - 2 - 7 4 110 - 3 K F 4 #						2-MN									
	132	240	7	ODP - 2 - 7 4 132 - 3 K F 4 #						N-MN									
	160	302	7	ODP - 2 - 7 4 160 - 3 K F 4 #						N-MN									
	200	370	8	ODP - 2 - 8 4 200 - 3 K # 4 #						2-MN	N-MN								
	250	480	8	ODP - 2 - 8 4 250 - 3 K # 4 #						2-MN	N-MN								
480–525V±10%																			
3 Phase Input	132	185	7	ODP - 2 - 7 5 132 - 3 K 0 4 #						N-MN									
	150	205	7	ODP - 2 - 7 5 150 - 3 K 0 4 #						N-MN									
	185	255	7	ODP - 2 - 7 5 185 - 3 K 0 4 #						N-MN									
	200	275	7	ODP - 2 - 7 5 200 - 3 K 0 4 #						N-MN									
500–600V±10%																			
3 Phase Input	0.75	2.1	2	ODP - 2 - 2 6 075 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	1.5	3.1	2	ODP - 2 - 2 6 150 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	2.2	4.1	2	ODP - 2 - 2 6 220 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	4	6.5	2	ODP - 2 - 2 6 400 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	5.5	9	2	ODP - 2 - 2 6 550 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	7.5	12	3	ODP - 2 - 3 6 075 - 3 K 0 4 #						2-MN	X-TN	Y-TN	A-MN	B-MN					
	11	17	3	ODP - 2 - 3 6 110 - 3 K 0 4 #						2-MN			A-MN	B-MN					
	15	22	3	ODP - 2 - 3 6 150 - 3 K 0 4 #						2-MN			A-MN	B-MN					
	15	22	4	ODP - 2 - 4 6 150 - 3 K 0 4 #						N-MN									
	18.5	28	4	ODP - 2 - 4 6 185 - 3 K 0 4 #						2-MN	N-MN								
	22	34	4	ODP - 2 - 4 6 220 - 3 K 0 4 #						2-MN	N-MN								
	30	43	4	ODP - 2 - 4 6 300 - 3 K 0 4 #						2-MN	N-MN								
	37	54	5	ODP - 2 - 5 6 370 - 3 K 0 4 #						2-MN	N-MN								
	45	65	5	ODP - 2 - 5 6 450 - 3 K 0 4 #						2-MN	N-MN								
	55	78	6	ODP - 2 - 6 6 055 - 3 K 0 4 #						N-MN									
	75	105	6	ODP - 2 - 6 6 075 - 3 K 0 4 #						N-MN									
	90	130	6	ODP - 2 - 6 6 090 - 3 K 0 4 #						N-MN									
	110	150	6	ODP - 2 - 6 6 110 - 3 K 0 4 #						N-MN									

Replace # in model code with enclosure/display option

Model Code Guide



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kW Models: Factory Settings

Motor Rated Frequency: 50Hz

Motor Rated Voltage: 30/400/575V