



OPTIDRIVE™ IP² SOLARPUMP

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



0.75kW – 250kW / 1HP – 350HP
185 – 410Vdc / 345 – 800Vdc input

Applications:

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

Maximum power point tracking (MPPT) algorithm significantly boosts system efficiency

Advanced PI set up, built in dual PI set point, dead-band and PI transition error

Extended DC operative voltage range
345-800Vdc HV
185-410Vdc LV



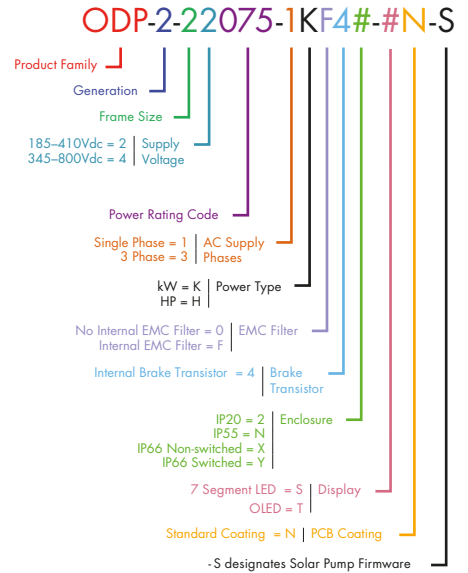
Key Features

- **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 PI set up** built in dual PI set point, dead-band and PI transition error, creating very stable system control that responds slowly to small changes in irradiance but responds quickly to large changes in solar irradiance.
- **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 CANopen 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.
- **Second analog input for pressure monitoring**, this can be used just to monitor system pressure locally or remotely or to stop the pump if the water pressure exceeds a configured level.
- **Irradiance level can be monitored on the drive display**
- **Optional Sine-Wave filters**
- **Available in different IP enclosures IP20, IP55, IP66**

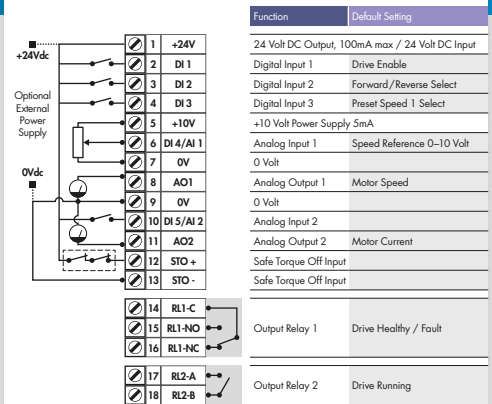
Drive Specification

Input Ratings	Supply Voltage	185–410Vdc 345–800Vdc	Fieldbus Connectivity	BACnet MS/TP Modbus RTU	BACnet Application Specific Controller 9.6 - 76.8 kbps selectable Data Format: 8N1, 8N2, 8O1, 8E1				
	Phase Imbalance	3% Maximum allowed			N/A				
	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	I/O Specification	Optional	PROFIBUS DP (DPV1) PROFINET IO DeviceNet EtherNet/IP EtherCAT Modbus TCP				
	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	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer					
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL Approved Up to 4000m maximum (non UL)		Programmable Inputs	5 Total as standard (Optional additional 3) 3 Digital (Optional additional 3) 2 Analog / Digital Selectable				
	Humidity	95% Max, non condensing			Digital Inputs	Opto - Isolated 8 – 30 Volt DC, internal or external supply Response time < 4ms			
	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		Analog Inputs		Resolution: 12 bits Response time: < 4ms Accuracy: < 1% full scale Parameter adjustable scaling and offset			
Enclosure	Ingress Protection	IP20, IP55, IP66	PTC Input		Motor PTC / Thermistor Input Trip Level : 3kΩ				
	Programming	Keypad		Built-in keypad as standard Optional remote mountable keypad	Programmable Outputs	4 Total (Optional additional 3) 2 Analog / Digital 2 Relays (Optional additional 3)			
		Display		Built-in multi language OLED (IP55 & IP66) 7 Segment LED (IP20)		Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 5A		
		PC		OptiTools Studio			Analog Outputs	0 to 10 Volt 0 to 20mA 4 to 20mA	
Control Specification	Control Method	ECO Vector Control PM Vector Control BLDC Vector Control Synchronous Reluctance Vector Control	Application Features	PID	In-built MPPT mode MPPT Optimisation Dual PID Set-point Dual PID Gains				
	PWM Frequency	4–32kHz Effective			Pump Features	Pipe-Fill function Pipe Burst detection Dry Run detection Blocked Pump detection/clean Pump Stir			
	Stopping Mode	Ramp to Stop: User Adjustable 0.01–600 secs Coast to Stop				Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage	
	Skip Frequency	Single point, user adjustable						Data Logging	Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring
Setpoint Control	Analog Signal	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	Monitoring	Hours Run Meter Resettable & Non Resettable kWh meters Cooling Fan Run Time					
		Digital		Motorised Potentiometer (Keypad) Modbus RTU BACnet MS/TP	Standards Compliance	Low Voltage Directive	2014/35/EU		
Standards Compliance	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



NOT TO SCALE



Size	IP20					IP66		IP55			
	2	3	4	5	8	2	3	4	5	6	7
mm Height	221	261	418	486	995	257	310	450	540	865	1280
mm Width	110	131	160	222	482	188	211	171	235	330	330
mm Depth	185	205	240	260	480	239	266	252	270	330	360
kg Weight	1.8	3.5	9.2	18.2	128	4.8	7.7	11.5	23	55	89

	kW Model Code				kW Model Code													HP Model Code				HP Model Code																						
	kW	HP	Amps	Size	Product Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phases	Power Type	EMC Filter	Backplate	Transistor	Enclosure	Display	PCB Coating	Product Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phases	Power Type	EMC Filter	Backplate	Transistor	Enclosure	Display	PCB Coating														
185-410Vdc PV (200-240Vac ± 10% 1 phase input)	0.75	1	4.3	2	ODP - 2 - 2 2 075 - 1 K F 4	#	-	#	N	ODP - 2 - 2 2 010 - 1 H F 4	#	-	#	N	ODP - 2 - 2 2 150 - 1 K F 4	#	-	#	N	ODP - 2 - 2 2 020 - 1 H F 4	#	-	#	N	ODP - 2 - 2 2 220 - 1 K F 4	#	-	#	N	ODP - 2 - 2 2 030 - 1 H F 4	#	-	#	N										
	1.5	2	7	2	ODP - 2 - 2 2 075 - 3 K F 4	#	-	#	N	ODP - 2 - 2 2 010 - 3 H F 4	#	-	#	N	ODP - 2 - 2 2 150 - 3 K F 4	#	-	#	N	ODP - 2 - 2 2 020 - 3 H F 4	#	-	#	N	ODP - 2 - 2 2 220 - 3 K F 4	#	-	#	N	ODP - 2 - 2 2 030 - 3 H F 4	#	-	#	N										
	2.2	3	10.5	2	ODP - 2 - 3 2 040 - 3 K F 4	#	-	#	N	ODP - 2 - 3 2 050 - 3 H F 4	#	-	#	N	ODP - 2 - 3 2 055 - 3 K F 4	2	-	S	N	ODP - 2 - 3 2 075 - 3 H F 4	2	-	S	N	ODP - 2 - 4 2 055 - 3 K F 4	#	-	T	N	ODP - 2 - 4 2 075 - 3 H F 4	#	-	T	N										
185-410Vdc PV (200-240Vac ± 10% 3 phase input)	0.75	1	4.3	2	ODP - 2 - 4 2 075 - 3 K F 4	#	-	T	N	ODP - 2 - 4 2 010 - 3 H F 4	#	-	T	N	ODP - 2 - 4 2 110 - 3 K F 4	#	-	T	N	ODP - 2 - 4 2 150 - 3 H F 4	#	-	T	N	ODP - 2 - 5 2 185 - 3 K F 4	#	-	T	N	ODP - 2 - 5 2 020 - 3 H F 4	#	-	T	N	ODP - 2 - 6 2 022 - 3 K F 4	N	-	T	N	ODP - 2 - 6 2 030 - 3 H F 4	N	-	T	N
	1.5	2	7	2	ODP - 2 - 5 2 185 - 3 K F 4	#	-	T	N	ODP - 2 - 5 2 025 - 3 H F 4	#	-	T	N	ODP - 2 - 6 2 037 - 3 K F 4	N	-	T	N	ODP - 2 - 6 2 050 - 3 H F 4	N	-	T	N	ODP - 2 - 6 2 045 - 3 K F 4	N	-	T	N	ODP - 2 - 6 2 060 - 3 H F 4	N	-	T	N										
	2.2	3	10.5	2	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 H F 4	N	-	T	N	ODP - 2 - 7 2 075 - 3 H F 4	N	-	T	N	ODP - 2 - 7 2 075 - 3 K F 4	N	-	T	N	ODP - 2 - 7 2 100 - 3 H F 4	N	-	T	N										
	4	5	18	3	ODP - 2 - 7 2 075 - 3 K F 4	N	-	T	N	ODP - 2 - 7 2 100 - 3 H F 4	N	-	T	N	ODP - 2 - 8 2 200 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 250 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 250 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 350 - 3 H F 4	2	-	T	N										
	5.5	7.5	24	3	ODP - 2 - 8 2 250 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 350 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	5.5	7.5	24	4	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	7.5	10	30	4	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	11	15	46	4	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	15	20	60	5	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	18.5	25	72	5	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	22	30	90	6	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
	30	40	110	6	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N										
37	50	150	6	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N											
45	60	180	6	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N											
55	75	202	7	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N											
75	100	240	7	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 K F 4	2	-	T	N	ODP - 2 - 8 2 450 - 3 H F 4	2	-	T	N											

Enclosure & Display Types

Replace #s in model code with colour-coded option

- 2-SN** With LED Display 
- 2-SN** With LED Display 
- 2-TN** With OLED Display 
- 2-TN** With OLED Display 

- X-TN** **IP66** Non-switched With OLED Display 

- Y-TN** **IP66** Switched With OLED Display 

- N-TN** With OLED Display 
- N-TN** With OLED Display 

kW Models: Factory Settings
 Motor Rated Frequency: 50Hz
 Motor Rated Voltage: 230/400/575V

HP Models: Factory Settings
 Motor Rated Frequency: 60Hz
 Motor Rated Voltage: 230/460/575V

