



Smart
connections.

Data sheet

INVEOR MPP

Special functions of the INVEOR MPP



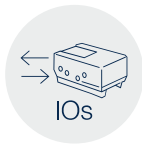
Pump display

Control based on pump-specific process variables. Pressure or flow directly adjustable.



Smart Sensor

Acceleration sensor for detecting vibrations in the application. Provision of data for predictive maintenance.



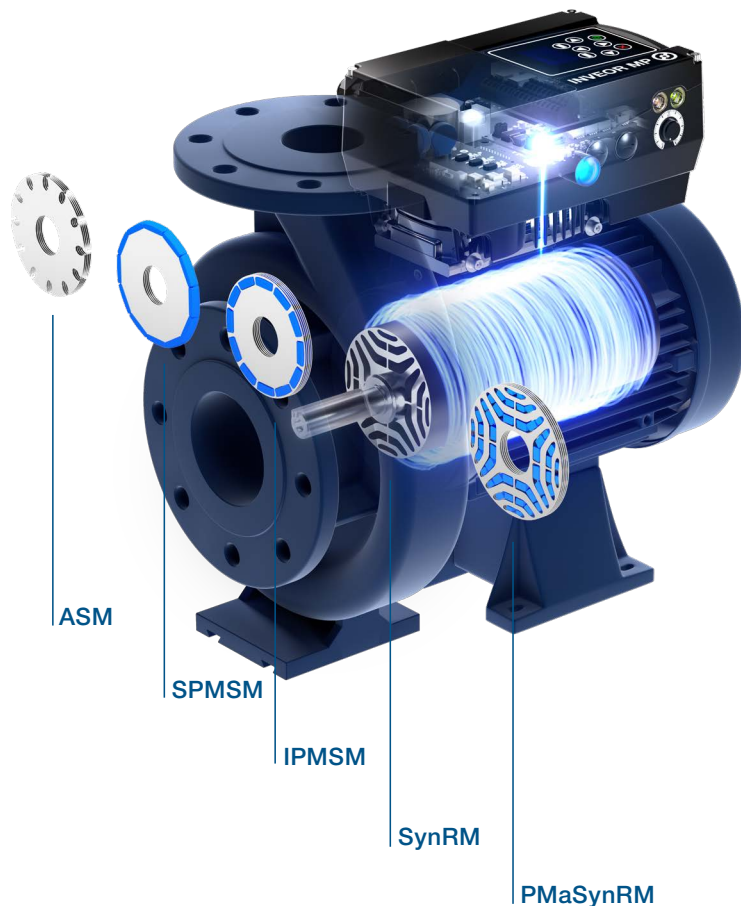
Bidirectional IOs

Bidirectional IOs can be assigned as inputs or outputs as required. Greatest possible flexibility in the use of inputs and outputs.

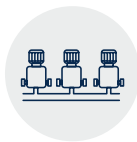


Temperature sensor input

Possibility to connect a PT1000 resistance temperature sensor. Temperature monitoring and control in the application.

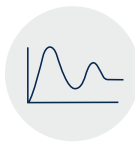


Pump-specific functions



Multi-pump operation

- Demand-based control of up to 6 pumps in a master-slave network
- Constant supply pressure with fluctuating delivery rates
- Reduced wear, longer service life of pumps
- High fail-safety and reliability



PID controller

- Precise control to the desired process variable
- Energy saving, prevention of motor heating, reduction of wear and tear



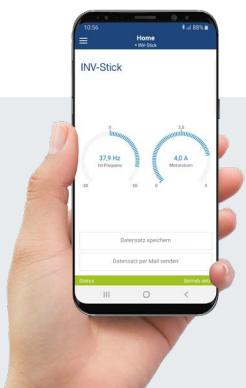
Dry run protection

- Prevents a pump from continuing to run without pumped medium
- Immediate shutdown and error message
- Protection of the pump



Blocking detection




- Detection of a blocked drive
- Immediate shutdown and error message
- Protection of the frequency inverter as well as the motor



KOSTAL INVERTERApp – Operation made easy.



400 V devices, technical data for INVEOR MPP

Size	A					B				C			D						
Recommended motor rating ¹⁾ [kW]	0.55	0.75	1.1	1.5	2.2 LD ⁵⁾	2.2	3	4	5.5 LD ⁵⁾	5.5	7.5	11 LD ⁵⁾	11	15	18.5	22	30 LD ⁵⁾		
Supply voltage	3x200 V AC -10%...480 V AC +10 % 280 V DC -10%...680 V DC +10 % ²⁾																		
Grid frequency	50/60 Hz ± 6%																		
Network configurations	TN / TT																		
Line current [A]	1.4	1.9	2.6	3.3	3.9	4.6	6.2	7.9	9.3	10.8	13.8	18.3	23.2	28.2	33.2	38.2	49.8		
Rated current output eff. [IN at 4 kHz]	1.7	2.3	3.1	4	4.8	5.6	7.5	9.5	11	13	16.5	22	28	34	40	46	60		
Min. brake resistance [Ω]	100					50					30								
Overload for 60 sec. [%]	150					110				150			110		150			110	
Overload for 3 sec. [%]	200					150				200			150		200			150	
Switching frequency	Automatic regardless of temperature, 2 kHz, 4 kHz, 6 kHz, 8 kHz, 12 kHz, 16 kHz (factory setting 4 kHz)																		
Output frequency	0 Hz – 599 Hz																		
Nominal output apparent power [kVA]	1.06	1.43	1.93	2.49	2.99	3.49	4.68	5.92	6.86	8.11	10.29	13.72	17.46	21.2	24.94	28.68	37.41		
Mains cycles of operation / restart	Unlimited ³⁾												> 2 min.						
DIN EN 61800-9-2 touch current	< 3.5 mA ⁴⁾																		
Protective function	Overvoltage and undervoltage, I ² t restriction, short-circuit, ground leak, motor and variable frequency drive temperature, stall prevention, blocking detection, PID dry run protection, functional safety (SIL 2/PLe)																		
Software functions	Torque control ⁶⁾ , multiple pumps, process control (PID controller), fixed frequencies, data record changeover, flying restart, motor current limit																		
Soft PLC	IEC61131-3, FBD, ST, AWL																		
Housing	Two-part aluminium die-cast casing																		
Dimensions [L x W x H] mm	233 x 153 x 120					270 x 189 x 140				307 x 223 x 181			414 x 294 x 232						
Weight including adapter plate [kg]	3.9					5.0				8.7			21.0						
Protection class [IPxy]	IP 65										IP 55								
Cooling	Passive Cooling												Active Cooling						
Climate class (DIN EN 60721-3-3)	3K3 (50°C)				3K3 (40°C)	3K3 (50°C)			3K3 (40°C)	3K3 (50°C)		3K3 (40°C)	3K3 (50°C)			3K3 (40°C)			
Ambient temperature	-40 °C (non condensing) to +50 °C (without derating)				up to +40°C	-40 °C (non condensing) to +50 °C (without derating)			up to +40°C	-40 °C to +50 °C > 50 °C (with derating)		to +40°C	-40 °C to +50 °C > 50 °C (with derating)			to +40°C			
Storage temperature	-40 °C...+85 °C																		
Altitude of the installation location	Up to 1000 m above sea level / over 1000 m with reduced performance (1 % per 100 m) / above 2000 m see operating manual																		
Relative air humidity	≤ 96 %, condensation not permitted.																		
Vibration class (DIN EN 60721-3-3) ⁷⁾	3M7 (3g)																		
EMC (DIN-EN-61800-3)	C2																		
Energy efficiency class (EN 61800-9-2)	IE2																		
Certificates and conformity	  																		

I/O interfaces	4 DI / 1 DO / 2 DIO / 2 AI / 1 AIO / 2 relays
Potentiometer on device	Standard
Foil keypad	Option (only size A-B)
MMI in the lid	Option
Bluetooth	Option
Internal power supply	24 VDC, 100 mA / 10 VDC, 30 mA / short-circuit proof
External feed-in 24 V DC	24 VDC +/-15 %
Integrated fieldbus	Modbus RTU
Fieldbus option	CANopen / PROFINET / EtherCAT / Ethernet IP
PT 1000	Standard

Technical data for 400 V devices INVEOR MPP (subject to technical changes)

¹⁾ Recommended motor rating (4-pole asynchr. motor) is given based on the 400 V AC supply voltage.

²⁾ In compliance with the overvoltage category.

³⁾ < 3s may result in power failure/intermediate circuit undervoltage faults.

⁴⁾ With 1LA7 asynchronous motor, motor-mounted.

⁵⁾ Low-duty devices with reduced output currents.

⁶⁾ Only for synchronous and reluctance motors.

⁷⁾ Installation- and application-related resonant frequencies can damage the devices.

INVEOR – "Smart connections." on five levels

1 The INVEOR

- IP65 protection class
- Integrated soft PLC
- Multiple-pump function
- Pre-fitted cable glands
- Design without a fan up to 11 kW
- Cover level and internal space for e.g. the customer to mount a switch
- Grid connection can be plugged in (Quickon)
- Optional slot
- Robust and vibration-resistant housing concept
- STO functional safety
- Internal PTC brake resistor
- PT 1000
- Smart Sensor



3 Operation and observation

- Potentiometer
- M12 RS485 service interface
- Main switch
- Integrated foil keypad
- MMI handheld controller
- Pump display (MMI cover option)
- Touch operating terminal
- PC software: KOSTAL INVERTERpc
- App: KOSTAL INVERTERapp



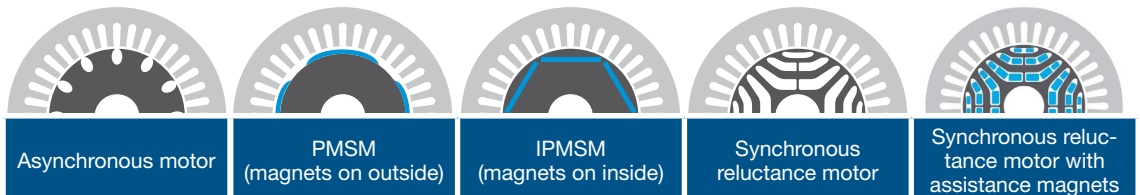
4 Motor adaptations

- Robust and vibration-resistant adapter concept
- Motor adapter concept compatible with all commercially available motors
- Mechanics of motor adapter compatible with INVEOR M product group

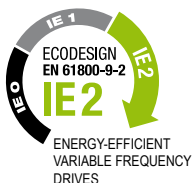
5 Control process

- Supports all synchronous reluctance, synchronous and asynchronous motors with maximum energy efficiency

2 Communication



INVEOR variable frequency drives meet the highest energy efficiency requirements.



Variable frequency drive losses in accordance with EN 61800-9-2

Device	Supply voltage [V]	Nominal current [A]	Measurement (90; 100)	Measurement (50; 100)	Measurement (10; 100)	Measurement (90; 50)	Measurement (50; 50)	Measurement (10; 50)	Measurement (50; 25)	Measurement (10; 25)	Standby losses [W]	IE-Class
			Absolute power loss [W] ^{1) 2)}									
			Relative losses [%] ^{1) 2) 3)}									
Size A 0,55 kW	400	1.7	24	24	27	22	20	25	24	25	5	IE2
			2.3	2.2	2.5	2	1.9	2.4	2.2	2.3		
Size A 0,75 kW	400	2.3	29	28	32	23	21	28	25	27	5	IE2
			2	1.9	2.2	1.6	1.5	2	1.7	1.9		
Size A 1,1 kW	400	3.1	35	30	38	27	26	31	26	28	5	IE2
			1.8	1.6	2	1.4	1.3	1.6	1.4	1.4		
Size A 1,5 kW	400	4.0	45	39	46	31	27	36	25	31	5	IE2
			1.8	1.6	1.8	1.3	1.1	1.4	1	1.2		
Size A 2,2 kW LD	400	4.8	56	51	54	39	36	40	35	33	5	IE2
			1.9	1.7	1.8	1.3	1.2	1.3	1.2	1.1		
Size B 2,2 kW	400	5.6	61	60	65	46	38	48	37	42	7	IE2
			1.7	1.7	1.9	1.3	1.1	1.4	1	1.2		
Size B 3,0 kW	400	7.5	83	62	80	54	38	58	28	51	7	IE2
			1.8	1.3	1.7	1.2	0.8	1.3	0.6	1.1		
Size B 4,0 kW	400	9.5	107	80	98	66	51	70	31	58	7	IE2
			1.8	1.4	1.7	1.1	0.9	1.2	0.5	1		
Size B 5,5 kW LD	400	11.0	137	117	122	71	67	70	50	56	7	IE2
			2	1.7	1.8	1	1	1	0.7	0.8		
Size C 5,5 kW	400	13.0	149	114	125	69	52	76	44	70	7	IE2
			1.8	1.4	1.5	0.9	0.6	0.9	0.5	0.9		
Size C 7,5 kW	400	16.5	203	157	166	98	75	95	58	78	7	IE2
			2	1.5	1.6	0.9	0.7	0.9	0.6	0.8		
Size C 11,0 kW LD	400	22.0	323	226	244	151	123	133	80	99	7	IE2
			2.4	1.6	1.8	1.1	0.9	1	0.6	0.7		
Size D 11,0 kW	400	28.0	249	222	245	148	133	140	101	109	18	IE2
			1.4	1.3	1.4	0.8	0.8	0.8	0.6	0.6		
Size D 15,0 kW	400	34.0	314	279	298	181	163	173	122	134	18	IE2
			1.5	1.3	1.4	0.9	0.8	0.8	0.6	0.6		
Size D 18,5 kW	400	40.0	381	333	347	211	189	202	140	152	18	IE2
			1.5	1.3	1.4	0.8	0.8	0.8	0.6	0.6		
Size D 22,0 kW	400	46.0	485	398	392	247	189	276	197	194	18	IE2
			1.7	1.4	1.4	0.9	0.7	1	0.7	0.7		
Size D 30,0 kW LD	400	60.0	710	579	581	360	284	317	125	243	18	IE2
			1.9	1.5	1.6	1	0.8	0.8	0.3	0.6		

¹⁾ Loss values were determined at 4 kHz switching frequency
²⁾ Loss values include 10% supplement in accordance with standard
³⁾ Relative losses in relation to the device's rated apparent power



KOSTAL Industrie Elektrik GmbH & Co. KG
 Lange Eck 11, 58099 Hagen, Deutschland

Telephone: +49 2331 8040-468
 sales-industrial@kostal.com

www.kostal-drives-technology.com