



Smart
connections.

Data sheet

INVEOR MPM

INVEOR – "Smart connections." on five levels

1 The INVEOR

IP65 protection class

Design without a fan up to 11 kW

Cover level and internal space for e.g. the customer to mount a switch

100% of connections can be plugged in (Harting plug HAN Q4/2, Quickon)

Optional slots

Brake module

Robust and vibration-resistant housing concept

Internal PTC brake resistor

Functional safety



3 Operation and observation

Potentiometer

M12 RS485 service interface

Main switch

MMI handheld controller

MMI cover option

Touch operating terminal

PC software: KOSTAL INVERTERpc

App: KOSTAL INVERTERapp



2 Communication

CANopen

PROFINET

MODBUS RTU

EtherNet/IP

EtherCAT

Bluetooth

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



Asynchronous motor



PMSM (magnets on outside)



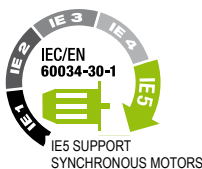
IPMSM (magnets on inside)






Synchronous reluctance motor



Synchronous reluctance motor with assistance magnets



400 V devices, technical data for INVEOR MP Modular

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	3 x 200 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	150			110	
Overload for 3 sec. [%]	200				150	200			150	200		150	200			150	
Switching frequency	Auto 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	28.6	37.41
Mains cycles of operation / restart	Unlimited ³⁾												> 2 min.				
DIN EN 61800-5 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, functional safety (SIL 2/PLd)																
Software functions	Torque control ⁶⁾ , fixed frequencies, data record changeover, flying restart, motor current limit																
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 1000m above sea level / over 1000m 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	  																

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

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

²⁾ In compliance with the overvoltage category.

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

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

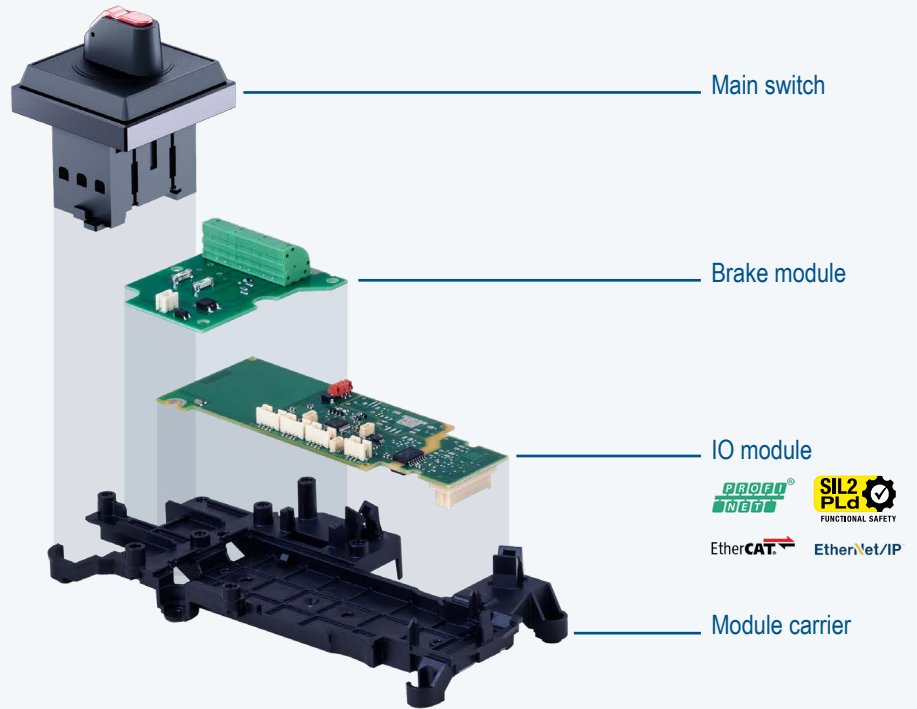
⁵⁾ Low-duty devices with reduced output currents.

⁶⁾ Only for synchronous and reluctance motors.

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

INVEOR MP Modular – Individually smart.

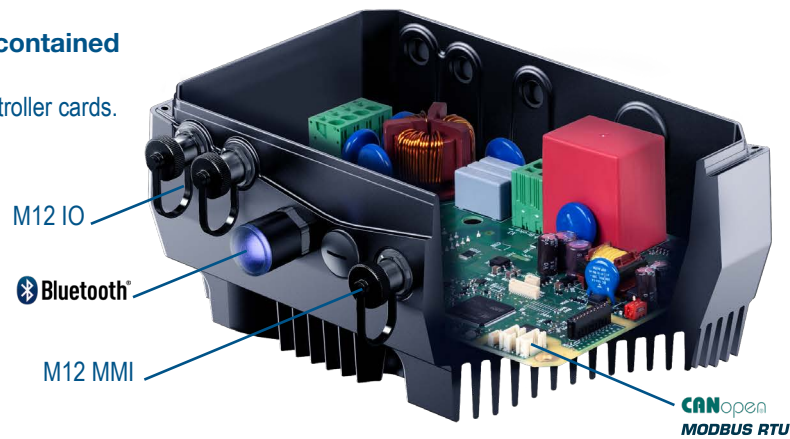
MODULES



POWER STACK

Power stack, self-contained

Works without extra controller cards.



Model	Without IO module	With IO module 1
I/O interfaces ¹⁾	-	3 DI / 1 DO
STO input Sil 2 PLd	-	Option ²⁾
Potentiometer on device	-	Option
MMI/MMI option	-	Option
Bluetooth	-	Option
Internal power supply	-	24 V DC, 100 mA short-circuit proof
External feed-in 24 V DC	-	only with STO or fieldbus option
Fieldbus integrated ¹⁾	Modbus RTU or CANopen	Modbus RTU and CANopen
Fieldbus option	-	Profinet, EtherCAT, EtherNet/IP
Brake module	-	Option
Main switch	-	Option

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

¹⁾ Via M12 plug connector (optional)

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
 info-industrie@kostal.com

www.kostal-drives-technology.com