



Smart  
connections.

Data sheet

INVEOR M

# INVEOR – "Smart connections." on five levels

## 1 The INVEOR

- IP65 protection class
- Integrated soft PLC
- Pre-fitted cable glands
- Fan-free design up to 7.5 kW
- Robust and vibration-resistant housing concept
- STO functional safety

## 3 Operation and observation

- Potentiometer
- M12 RS485 service interface
- Integrated foil keypad
- MMI handheld controller
- MMI cover option
- Touch operating terminal
- INVEOR PC software

## 2 Communication



## 4 Motor adaptations

- Robust and vibration-resistant adapter concept
- Motor adapter concept compatible with all commercially available motors

## 5 Control process

- IE1, IE2, IE3, IE4: for asynchronous motors and synchronous motors

## Overview of INVEOR M sizes



α

A




B

C

D



## 230 V devices, technical data for INVEOR M

Size	$\alpha$				A			
Recommended motor rating <sup>1)</sup> [kW]	0.25	0.37	0.55	0.75	0.37	0.55	0.75	1.1
Grid voltage	1 x 100 VAC -15 %...230 VAC +10 % 140 VDC -15 %...320 VDC +10 %							
Grid frequency	50/60 Hz $\pm$ 6%							
Mains configurations	TN / TT / IT (option)				TN / TT			
Line current [A]	4.5	4.5	5.8	7.3	4.5	5.6	6.9	9.2
Rated current output eff. [IN at 8 kHz]	1.4	2.2	2.7	3.3	2.3	3.2	3.9	5.2
Min. brake resistance [ $\Omega$ ]	-				50			
Overload for 60 sec.	150 %							
Switching frequency	4 kHz, 8 kHz, 16 kHz, (factory setting 8 kHz)							
Output frequency	0 Hz – 400 Hz							
Mains cycles of operation / restart	Every 2 min.							
DIN EN 61800-5 touch current	< 10 mA <sup>2)</sup>							
Protective function	Overvoltage and undervoltage, I <sup>2</sup> t restriction, short-circuit, ground leak, motor and drive controller temperature, stall prevention, blocking detection, PID dry run protection							
Software functions	Process control (PID controller), fixed frequencies, data record changeover, flying restart, motor current limit							
Soft PLC	IEC61131-3, FBD, ST, AWL							
Housing	Plastic adapter plate / aluminium die-cast casing				Two-part aluminium die-cast casing			
Dimensions [L x W x H] mm	187 x 126 x 70		187 x 126 x 80		233 x 153 x 120			
Weight including adapter plate	1.5 kg				3.9 kg			
Protection class [IPxy]	IP 65							
Cooling	Passive cooling							
Ambient temperature	-10 °C (non-condensing) to +40 °C (50 °C with derating)							
Storage temperature	-25 °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	$\leq$ 96 %, condensation not permitted.							
Vibration resistance (DIN EN 60068-2-6)	50 m/s <sup>2</sup> ; 5...200 Hz <sup>3)</sup>							
Shock resistance (DIN EN 60068-2-27)	300 m/s <sup>2</sup>							
EMC (DIN-EN-61800-3)	C2				C1			
Certificates and conformity	  							

Size	$\alpha$		A	
Application circuit board model	Standard		Basic	Standard
I/O interfaces	2 DI / 1 DO / 1 AI / - AO / 1 relay		2 DI / 1 DO / 1 AI / - AO / - relay	4 DI / 2 DO / 2 AI / 1 AO / 2 relays
Potentiometer on device	Accessories		Option	Option
Foil keypad	Option		Option	Option
MMI option	-		Option	Option
Internal power supply	24 VDC, 100 mA / 10 VDC, 30 mA / short-circuit proof			
External feed-in 24 VDC	-		-	24 VDC +/-15 %
Fieldbus integrated	Modbus RTU			
Fieldbus option	CANopen		-	CANopen / PROFIBUS / PROFINET / EtherCAT / Sercos III



Technical data for 230 V devices INVEOR M (subject to technical changes)

<sup>1)</sup> Recommended motor rating (4-pole asynchr. motor) is given based on the 230 VAC supply voltage.

<sup>2)</sup> With 1LA7 asynchronous motor, motor-mounted

<sup>3)</sup> Combined vibration test, part 4, severity 2 in accordance with FN942017

## 400 V devices, technical data for INVEOR M

Sizes	A				B			C		D			
Recommended motor rating <sup>1)</sup> [kW]	0.55	0.75	1.1	1.5	2.2	3.0	4.0	5.5	7.5	11.0	15.0	18.5	22.0
Grid voltage	3 x 200 VAC -10 %...480 VAC +10 % 280 VDC -10 %...680 VDC +10 %												
Grid frequency	50/60 Hz ± 6 %												
Mains configurations	TN / TT												
Line current [A]	1.4	1.9	2.6	3.3	4.6	6.2	7.9	10.8	14.8	23.2	28.2	33.2	39.8
Rated current output eff. [IN at 8 kHz]	1.7	2.3	3.1	4.0	5.6	7.5	9.5	13.0	17.8	28.0	34.0	40.0	48.0
Min. brake resistance [Ω]	100				50			50		30			
Overload for 60 sec. in %	150												130
Switching frequency	4 kHz, 8 kHz, 16 kHz, (factory setting 8 kHz)												
Output frequency	0 Hz – 400 Hz												
Mains cycles of operation / restart	Unlimited									2 min.			
DIN EN 61800-5 touch current	< 3.5 mA <sup>2)</sup>												
Protective function	Overvoltage and undervoltage, I <sup>2</sup> t restriction, short circuit, ground leak, motor and drive controller temperature, stall prevention, blocking detection, PID dry run protection												
Software functions	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	3.9 kg				5.0 kg			8.7 kg		21.0 kg			
Protection class	IP 65									IP 55			
Cooling	Passive cooling									Active cooling			
Ambient temperature	-25 °C (non-condensing) to +50 °C (without derating)												
Storage temperature	-25 °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 resistance (DIN EN 60068-2-6)	50 m/s <sup>2</sup> ; 5...200 Hz <sup>3)</sup>												
Shock resistance (DIN EN 60068-2-27)	300 m/s <sup>2</sup>												
EMC (DIN-EN-61800-3)	C2												
Certificates and conformity	  												

Size	A, B, C		A, B, C, D	
Application circuit board model	Basic		Standard	Functional safety
I/O interfaces	2 DI / 1 DO / 1 AI / - AO / - relay		4 DI / 2 DO / 2 AI / 1 AO / 2 relays	4 DI / 2 DO / 2 AI / 1 AO / - relay / 2 STO channels
Potentiometer on device	Option		Option	Option
Foil keypad	Option		Option	Option
MMI option	Option		Option	Option
Internal power supply	24 VDC, 100 mA / 10 VDC, 30 mA / short-circuit proof			
External feed-in 24 VDC	-		24 VDC +/-15 %	24 VDC +/-15 %
Fieldbus integrated	Modbus RTU			
Fieldbus option	-		CANopen / PROFIBUS / PROFINET / EtherCAT / Sercos III	

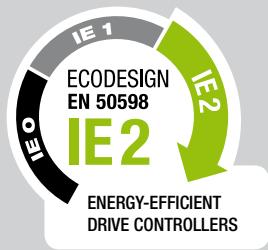
Technical data for 400 V devices INVEOR M (subject to technical changes)

<sup>1)</sup> Recommended motor rating (4-pole asynch. motor) is given based on the 400 VAC supply voltage.

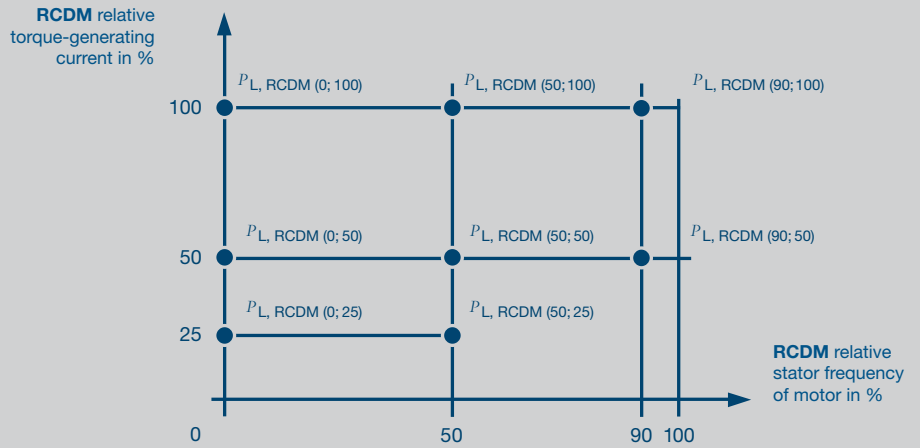
<sup>2)</sup> With 1LA7 asynchronous motor, motor-mounted

<sup>3)</sup> Combined vibration test, part 4, severity 2 in accordance with FN942017

# Drive controller losses in accordance with EN50598-2



INVEOR drive controllers meet the most stringent of energy efficiency requirements.



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)	IE class
			Absolute power loss [W] <sup>1) 2)</sup>								
			Relative losses [%] <sup>1) 2) 3)</sup>								
Size A 0.55 kW	400	1.7	24	25	28	22	22	25	21	24	IE2
			2.07	2.10	2.35	1.87	1.84	2.13	1.77	2.06	
Size A 0.75 kW	400	2.3	32	30	35	24	24	28	24	27	IE2
			1.98	1.89	2.22	1.5	1.5	1.76	1.48	1.71	
Size A 1.1 kW	400	3.1	40	38	43	30	29	33	25	29	IE2
			1.88	1.75	1.98	1.38	1.33	1.53	1.14	1.36	
Size A 1.5 kW	400	4.0	52	48	53	35	35	38	30	34	IE2
			1.88	1.72	1.91	1.27	1.26	1.38	1.07	1.22	
Size B 2.2 kW	400	5.6	71	60	82	53	44	62	36	52	IE2
			1.82	1.54	2.11	1.37	1.14	1.6	0.93	1.34	
Size B 3.0 kW	400	7.5	95	88	100	66	63	76	55	67	IE2
			1.83	1.68	1.92	1.27	1.21	1.45	1.05	1.28	
Size B 4.0 kW	400	9.5	129	118	140	85	82	100	68	86	IE2
			1.96	1.79	2.12	1.3	1.25	1.52	1.03	1.30	
Size C 5.5 kW	400	13.0	178	158	178	105	96	112	68	89	IE2
			1.98	1.75	1.97	1.17	1.06	1.25	0.75	0.98	
Size C 7.5 kW	400	17.8	270	214	241	132	114	140	91	119	IE2
			2.19	1.74	1.95	1.07	0.93	1.13	0.74	0.96	
Size D 11.0 kW	400	28.0	336	303	355	200	185	219	144	171	IE2
			1.73	1.56	1.83	1.03	0.95	1.13	0.74	0.88	
Size D 15.0 kW	400	34.0	419	372	432	236	215	253	165	194	IE2
			1.78	1.58	1.83	1.00	0.91	1.07	0.70	0.83	
Size D 18.5 kW	400	40.0	512	448	536	280	255	302	190	228	IE2
			1.85	1.62	1.93	1.01	0.92	1.09	0.69	0.82	
Size D 22.0 kW	400	48.0	653	556	677	340	296	368	212	274	IE2
			1.96	1.67	2.04	1.02	0.89	1.11	0.64	0.82	

<sup>1)</sup> Loss values were determined at 8 kHz switching frequency  
<sup>2)</sup> Loss values include 10% supplement in accordance with EN 50598 standard  
<sup>3)</sup> Relative losses in relation to the device's rated apparent power

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