

IDX 56 Feature Chart

Overview

maxon's «IDX 56» are compact, high-performance, IP 65-protected, brushless DC drives with either integrated positioning controller or speed controller particularly suitable for the use in harsh environmental conditions. They deliver up to 0.7 Nm of continuous torque and come in a wide range of configurable options that allow full adaption to suit specific needs.

The IDX drives are designed to be commanded and controlled as a slave node in a CANopen or EtherCAT network. They come in three variants «IDX CANopen», «IDX EtherCAT», and «IDX I/O», fully integrate into the maxon EPOS4 environment, and possess outstanding position control and speed control capabilities. Latest technology, such as field-oriented control (FOC), acceleration/velocity feed forward in combination with highest control cycle rates and a broad range of other functionalities allow sophisticated, ease-of-use motion or speed control

If not stated otherwise, data and functionality are valid for all three variants

- [a] nominal values at operating point and $T_a = 40\text{ °C}$
- [b] nominal values at operating point and $T_a = 25\text{ °C}$
- [c] with optional holding brake, the minimal power supply voltage $+V_{CC}$ is 24 VDC
- [d] the stated protection class refers to the motor housing with plugged connectors, adequate shaft sealing must be provided by the customer
- [e] in addition to the drive's mechanical data
- [*] available with future firmware release



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Features	IDX56 M 24 V	IDX56 M 48 V	IDX56 L 24 V	IDX56 L 48 V
Drive data				
Nominal power supply voltage [a]	24 VDC	48 VDC	24 VDC	48 VDC
Nominal speed [a]	4'500 rpm	4'500 rpm	2'750 rpm	3'500 rpm
Nominal torque (max. continuous torque)	424 mNm [b] 376 mNm [a]	516 mNm [b] 458 mNm [a]	794 mNm [b] 704 mNm [a]	778 mNm [b] 690 mNm [a]
Recommended speed control range	From standstill up to nominal speed			
Maximum permissible drive speed	6'000 rpm	6'000 rpm	6'000 rpm	5'000 rpm
Maximum torque (short-time)	888 mNm (<10 s)	1'498 mNm (<10 s)	1'596 mNm (<10 s)	1'997 mNm (<10 s)
Nominal efficiency (without options)	84%	87%	85%	87%
Electrical data				
Nominal supply voltage +V _{CC} [c]	12...48 VDC			
Logic supply voltage +V _C	12...48 VDC			
Absolute supply voltage limits +V _{min} / +V _{max}	10 VDC / 60 VDC			
Pulse width modulation frequency	50 kHz			
Sampling rate PI current controller	25 kHz (40 μs)			
Sampling rate PI speed controller	2.5 kHz (400 μs)			
Sampling rate PID positioning controller	2.5 kHz (400 μs)			
Motor characteristics				
Max. motor voltage	0.9 x +V _{CC}			
Torque constant	39.5 mNm/A	62.4 mNm/A	66.2 mNm/A	83.6 mNm/A
Speed constant	242 rpm/V	153 rpm/V	144 rpm/V	114 rpm/V
Speed / torque gradient	0.367 rpm/mNm	0.359 rpm/mNm	0.208 rpm/mNm	0.202 rpm/mNm

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Mechanical data				
Dimensions (L x W x H)	140 x 56 x 56 mm	140 x 56 x 56 mm	170 x 56 x 56 mm	170 x 56 x 56 mm
Weight (approximate)	1'070 g	1'070 g	1'445 g	1'445 g
Mounting	Flange-mounted (flange «A» or «C» to chose from)			
Rotor inertia of the drive (if equipped, the inertia of the holding brake (→ page 4) must be added)	170 gcm ²	170 gcm ²	265 gcm ²	265 gcm ²
Axial play at axial load	0.14 mm			
Radial play	Preloaded ball bearings			
Max. axial load, dynamic	12 N			
Max. radial load, 12.5 mm from flange	150 N			


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Environment				
Protection class [d]	IP 65			
Max. housing temperature	100 °C			
Temperature – Operation	-30...+40 °C			
Temperature – Storage	-40...+35 °C (condensation not permitted)			
Altitude – Operation	0...1'000 m MSL			
Holding Brake [c] optionally available				
Type	Permanent magnet, integrated into motor casing			
Fall time (release time until torque decreases)	20 ms			
Rise time (engaging time until rated torque is attained)	12 ms			
Max. permissible static torque	1'000 mNm			
Length	20 mm [e]			
Weight	0.23 kg [e]			
Inertia	30 gcm ² [e]			
Encoder				
Type	Absolute single-turn encoder			
Resolution	12 bit single-turn (4'096 increments)			
Position resolution	0.09 °m			
Integral Nonlinearity (INL)	typically <1 °m			
Repeatability (Jitter)	± 0.1 °m			

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Interfaces				
CANopen Slave (optionally available)			max. 1 Mbit/s	
	CANopen Application Layer and Communication Profile		CiA 301	
	CANopen Device Profile for Drives and Motion Control		CiA 402	
EtherCAT Slave (optionally available)			✓	
	IEC 61158 Digital data communication for measurement and control / Fieldbus for use in industrial control systems		Full duplex (100 Mbit/s) as to IEEE 802.3 100 Base T	
	IEC 61800-7 Generic interface and use of profiles for power drive systems		Profile type 1 (CiA 402)	
	CAN application layer over EtherCAT (CoE)		✓	
	File transfer over EtherCAT (FoE)		✓	
	Distributed clocks support		✓	
	Cyclic modes support cycle times down to...		1 ms	
	Process data		PDO mapping (Variable)	
USB 2.0 / USB 3.0			Full speed	
	Gateway function USB-to-CAN		✓	
Inputs & Outputs				
Nominal I/O supply voltage +V _{I/O}			24 VDC	
Absolute min. I/O supply +V _{I/O} (externally supplied)			20 VDC or open	
Absolute max. I/O supply +V _{I/O} (externally supplied)			30 VDC	
I/O supply +V _{I/O} (internally supplied)			19 VDC	
Digital inputs			4 (PLC level +9...+30 VDC)	
Digital outputs			2 (+V _{I/O} / I _L ≤250 mA, externally sourced, each) / (I _L ≤35 mA, internally sourced, combined) / (high-side switch to +V _{I/O})	
Analog inputs			2 (resolution 12-bit, -10...+10 V, 10 kHz, differential)	
Status indicators (LEDs or bi-color LEDs)			Device status: Operation, green LED & Error, red LED NET status: RUN state, green LED & Error, red LED / NET port: Link activity, green LED (with EtherCAT option only)	

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Connections					
X1	CAN IN			Bus connector, 5 pin, M8, B-coded, male	
	EtherCAT IN			Bus connector, 4 pin, M8, A-coded, female	
X2	CAN OUT			Bus connector, 5 pin, M8, B-coded, female	
	EtherCAT OUT			Bus connector, 4 pin, M8, A-coded, female	
X3	I/O			12 pin, M12, A-coded, male	
X4	Supply			5 pin, M12, L-coded, male	
X5	USB			USB Type micro B, female	
Directives & Standards					
Electromagnetic compatibility		Generic: IEC/EN 61000-6-2; IEC/EN 61000-6-4 Applied: IEC/EN 55011 (CISPR11); IEC/EN 61000-4-2; IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6; IEC/EN 61000-4-8			
Environment		IEC/EN 60068-2-6: MIL-STD-810F			
Safety (UL File Number; unassembled PCB)		E76251			
Functionality					
Operating Modes					
CST	Cyclic Synchronous Torque Mode			✓	
CSV	Cyclic Synchronous Velocity Mode			✓	
CSP	Cyclic Synchronous Position Mode			✓ (IDX CANopen and IDX EtherCAT)	
PVM	Profile Velocity Mode			✓ (IDX CANopen and IDX EtherCAT)	
PPM	Profile Position Mode			✓ (IDX CANopen and IDX EtherCAT)	
HMM	Homing Mode			✓ (IDX CANopen and IDX EtherCAT)	
Analog Set Value Functionality		CST / CSV			

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Features					
Feed forward (acceleration/velocity for inertia and friction compensation)				✓	
Field-oriented Control (FOC)				✓	
Velocity observer				✓	
Custom persistent memory				✓	
Advanced automatic control settings (Auto Tuning)				✓	
Digital I/O Functionality					
Inputs (configurable)				✓	
	Touch Probe			✓	(IDX CANopen and IDX EtherCAT)
	Reference switches			✓	(IDX CANopen and IDX EtherCAT)
	Limit switches			✓	(IDX CANopen and IDX EtherCAT)
	Quickstop			✓	
	Drive Enable			✓	
	General purpose			✓	
Outputs (configurable)				✓	
	Holding brake / Set brake			✓	
	Ready/Fault			✓	
	General purpose			✓	
Analog Input Functionality					
Inputs				✓	
	Analog set value			✓	
	General purpose			✓	

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<i>Built-in Protection</i>				
Current limiter (adjustable)			✓	
Overcurrent			✓	
Thermal motor protection			✓	
Thermal controller protection			✓	
Overvoltage			✓	
Undervoltage			✓	
Voltage transients			✓	
Short-circuit of motor winding			✓	
Loss of feedback signal			✓	
Following error			✓	
Status reporting			✓	
Firmware error handling			✓	

Features		IDX56 M 24 V	IDX56 M 48 V	IDX56 L 24 V	IDX56 L 48 V
Software					
Installation Program		EPOS Setup			
Graphical User Interface			EPOS Studio The EPOS video library features video tutorials that provide easy to follow instructions on how to get started and how to setup communication interfaces, motors and sensors, and so on. Explore on Vimeo: → https://vimeo.com/album/4646388		
	Startup		✓		
	Regulation Tuning	✓			
	Firmware Update	✓			
	Motion Commander	✓			
	I/O Monitor	✓			
	Parameters	✓			
	Data Recording	✓			
	Command Analyzer	✓			
	CANopen Wizard	✓			
	Online Help	✓			
	Language	English			
Operating System		Windows 10, 8, 7			
Windows DLL for PC		32-bit / 64-bit			
	CAN interfaces	IXXAT National Instruments Kvaser Vector			
	Programming examples	Microsoft Visual Basic, Visual Basic.NET, Visual C#, Visual C++ Borland C++, Delphi National Instruments LabView, LabWindows/CVI			
Linux Shared Object Library		X86 32-bit/64-bit, ARMv6/v7/v8 32-bit, ARMv8 64-bit			
	CAN interfaces	IXXAT Kvaser			
	Programming examples	C++			

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Accessories (not included in delivery)					
CANopen Cables					
662951	CO M08B05F0 PUR S PK 0150 M8, B-coded female / open end, L=1.5 m	✓	✓	✓	✓
662935	CO M08B05F0 PUR S PK 0300 M8, B-coded female / open end, L=3 m	✓	✓	✓	✓
662933	CO M08B05M0 M8, B-coded male (Termination)	✓	✓	✓	✓
662950	CO M08B05M0 PUR S PK 0150 M8, B-coded male / open end, L=1.5 m	✓	✓	✓	✓
662934	CO M08B05M0 PUR S PK 0300 M8, B-coded male / open end, L=3 m	✓	✓	✓	✓
662959	CO M08B05M0 PUR S PK 0300 M08B05F0 M8, B-coded male / M8, B-coded female, L=3 m	✓	✓	✓	✓
662947	CO M12A05F0 PUR S PK 0015 M08B05M0 M12, A-coded female / M8, B-coded male, L=0.15 m	✓	✓	✓	✓
662946	CO M12A05M0 PUR S PK 0015 M08B05F0 M12, A-coded male / M8, B-coded female, L=0.15 m	✓	✓	✓	✓
EtherCAT Cables					
662961	ET M08A04M0 PUR S GN 0150 M8, A-coded male / open end, L=1.5 m	✓	✓	✓	✓
662956	ET M08A04M0 PUR S GN 0150 R45004M0 M8, A-coded male / RJ45, L=1.5 m	✓	✓	✓	✓
662941	ET M08A04M0 PUR S GN 0300 M8, A-coded male / open end, L=3 m	✓	✓	✓	✓
662960	ET M08A04M0 PUR S GN 0300 M08A04M0 M8, A-coded male / M8, A-coded male, L=3 m	✓	✓	✓	✓
662942	ET M08A04M0 PUR S GN 0300 R45004M0 M8, A-coded male / RJ45, L=3 m	✓	✓	✓	✓

Features		IDX56 M 24 V	IDX56 M 48 V	IDX56 L 24 V	IDX56 L 48 V
I/O Cables					
662957	IO M12A12F0 PUR S BK 0150 M12, A-coded female, straight / open end, L=1.5 m	✓	✓	✓	✓
662954	IO M12A12F0 PUR S BK 0300 M12, A-coded female, straight / open end, L=3 m	✓	✓	✓	✓
662952	IO M12A12F9 PUR S BK 0150 M12, A-coded female, 90° / open end, L=1.5 m	✓	✓	✓	✓
662948	IO M12A12F9 PUR S BK 0300 M12, A-coded female, 90° / open end, L=3 m	✓	✓	✓	✓
Power Cables					
662958	PR M12L05F0 PUR 0 BK 0150 M12, L-coded female, straight / open end, L=1.5 m	✓	✓	✓	✓
662955	PR M12L05F0 PUR 0 BK 0300 M12, L-coded female, straight / open end, L=3 m	✓	✓	✓	✓
662953	PR M12L05F9 PUR 0 BK 0150 M12, L-coded female, 90° / open end, L=1.5 m	✓	✓	✓	✓
662945	PR M12L05F9 PUR 0 BK 0300 M12, L-coded female, 90° / open end, L=3 m	✓	✓	✓	✓
USB Cables					
403968	USB Type A - micro B Cable, L=1.5 m	✓	✓	✓	✓

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