

IDX 56 Feature Chart

Overview

maxon's «IDX 56» are compact, high-performance, IP65-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 0.8 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] From 40 °C and above 1'000 m MSL (Mean Sea Level), a derating of the stated performance data must be expected. The maximum achievable operating points must be determined by testing.
- [f] In addition to the drive's mechanical data
- [*] Available with future firmware release



Features	IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Drive data						
Nominal power supply voltage [a]	24 VDC	48 VDC	24 VDC	48 VDC	24 VDC	48 VDC
Nominal speed [a]	4'400 rpm	4'500 rpm	4'477 rpm	4'500 rpm	2'724 rpm	3'500 rpm
Nominal torque (max. continuous torque)	393 mNm [b] 349 mNm [a]	450 mNm [b] 399 mNm [a]	433 mNm [b] 376 mNm [a]	516 mNm [b] 458 mNm [a]	795 mNm [b] 690 mNm [a]	779 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	6'000 rpm	6'000 rpm	5'000 rpm
Maximum torque (short-time)	775 mNm (<10 s)	1'546 mNm (<10 s)	948 mNm (<10 s)	1'498 mNm (<10 s)	1'589 mNm (<10 s)	2'006 mNm (<10 s)
Nominal efficiency (without options)	86%	86%	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)					
Sampling rate analog input	2.5 kHz (400 μs)					
Motor characteristics						
Max. motor voltage	0.9 x +V _{CC}					
Torque constant	32.3 mNm/A	64.4 mNm/A	39.5 mNm/A	62.4 mNm/A	66.2 mNm/A	83.6 mNm/A
Speed constant	296 rpm/V	148 rpm/V	242 rpm/V	153 rpm/V	144 rpm/V	114 rpm/V
Speed / torque gradient	0.732 rpm/mNm	0.699 rpm/mNm	0.367 rpm/mNm	0.359 rpm/mNm	0.208 rpm/mNm	0.200 rpm/mNm

Features	IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Mechanical data						
Dimensions (L x W x H)	120 x 56 x 56 mm	120 x 56 x 56 mm	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)	574 g	574 g	1'070 g	1'070 g	1'445 g	1'445 g
Mounting	Flange-mounted (flange «A» or «C» to choose from)					
Rotor inertia of the drive (if equipped, the inertia of the holding brake (→ page 4) must be added)	107 gcm ²	107 gcm ²	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					


Features	IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Environment						
Protection class [d]	IP65					
Max. housing temperature	100 °C					
Temperature – Operation	-30...+85 °C [e]					
Temperature – Storage	-40...+35 °C (condensation not permitted)					
Altitude – Operation	0...1'000 m MSL [e]					
Holding Brake [c] (optionally available)						
Type	Spring-loaded brake, integrated into motor casing					
Fall time (release time until brake torque decreases)	85 ms					
Rise time (engaging time until brake torque is attained)	30 ms					
Max. permissible static torque	1'400 mNm					
Backlash	max. ±1 °m					
Length	20 mm [f]					
Weight	0.141 kg [f]					
Inertia (friction disk / hub)	4 / 2 gcm ² [f]					
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					
Type	Absolute multi-turn encoder					
Resolution	14 bit single-turn / 16 bit single-turn					
Position resolution	0.02 °m					
Integral Nonlinearity (INL)	typically <1 °m					
Repeatability (Jitter)	± 0.02 °m					

Features		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Interfaces							
CANopen Slave (optionally available)		max. 1 Mbit/s					
	CANopen Application Layer and Communication Profile	CiA 301					
	CANopen Layer Setting Services and Protocol (LSS)	CiA 305					
	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 (@ V _{CC} ≥ 24 V)					
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)					

Features		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
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)					
Connections							
X1	CAN IN	Bus connector M8, male, 5 poles, B-coded					
	EtherCAT IN	Bus connector M8, female, 4 poles, A-coded					
X2	CAN OUT	Bus connector M8, female, 5 poles, B-coded					
	EtherCAT OUT	Bus connector M8, female, 4 poles, A-coded					
X3	I/O	M12, male, 12 poles, A-coded					
X4	Supply	M12, male, 5 poles, L-coded					
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 55032 (CISPR32); 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		DIN/EN 60068-2-27; DIN/EN 60068-2-64; IEC/EN 60529					
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					

Features	IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
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				✓		
Quickstop				✓		
Drive Enable				✓		
General purpose				✓		
Outputs (configurable)				✓		
Holding brake / Set brake				✓		
Ready/Fault				✓		
General purpose				✓		
Analog Input Functionality						
Inputs				✓		
Analog set value				✓		
General purpose				✓		

Features	IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
<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		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 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++					

Features		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Accessories (not included in delivery)							
CANopen Cables							
662951	CO M08B05F0 PUR S PK 0150 M8, female, 5 poles, B-coded // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662935	CO M08B05F0 PUR S PK 0300 M8, female, 5 poles, B-coded // Open end, L=3 m	✓	✓	✓	✓	✓	✓
662946	CO M12A05M0 PUR S PK 0015 M08B05F0 M8, female, 5 poles, B-coded // M12, male, 5 poles, A-coded, L=0.15 m	✓	✓	✓	✓	✓	✓
662933	CO M08B05M0 M8, male, 5 poles, B-coded, (built-in termination) // Termination	✓	✓	✓	✓	✓	✓
662950	CO M08B05M0 PUR S PK 0150 M8, male, 5 poles, B-coded // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662934	CO M08B05M0 PUR S PK 0300 M8, male, 5 poles, B-coded // Open end, L=3 m	✓	✓	✓	✓	✓	✓
662959	CO M08B05M0 PUR S PK 0300 M08B05F0 M8, male, 5 poles, B-coded // M8, female, 5 poles, B-coded, L=3 m	✓	✓	✓	✓	✓	✓
662947	CO M12A05F0 PUR S PK 0015 M08B05M0 M8, male, 5 poles, B-coded // M12, female, 5 poles, A-coded, L=0.15 m	✓	✓	✓	✓	✓	✓

Features		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
EtherCAT Cables							
662961	ET M08A04M0 PUR S GN 0150 M8, male, 4 poles, A-coded // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662941	ET M08A04M0 PUR S GN 0300 M8, male, 4 poles, A-coded // Open end, L=3 m	✓	✓	✓	✓	✓	✓
662956	ET M08A04M0 PUR S GN 0150 R45004M0 M8, male, 4 poles, A-coded // RJ45, L=1.5 m	✓	✓	✓	✓	✓	✓
662942	ET M08A04M0 PUR S GN 0300 R45004M0 M8, male, 4 poles, A-coded // RJ45, L=3 m	✓	✓	✓	✓	✓	✓
662960	ET M08A04M0 PUR S GN 0300 M08A04M0 M8, male, 4 poles, A-coded // M8, male, 4 poles, A-coded, L=3 m	✓	✓	✓	✓	✓	✓
I/O Cables							
662957	IO M12A12F0 PUR S BK 0150 M12, female, 12 poles, A-coded, straight // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662954	IO M12A12F0 PUR S BK 0300 M12, female, 12 poles, A-coded, straight // Open end, L=3 m	✓	✓	✓	✓	✓	✓
662952	IO M12A12F9 PUR S BK 0150 M12, female, 12 poles, A-coded, 90° // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662948	IO M12A12F9 PUR S BK 0300 M12, female, 12 poles, A-coded, 90° // Open end, L=3 m	✓	✓	✓	✓	✓	✓
Power Cables							
662958	PR M12L05F0 PUR 0 BK 0150 M12, female, 5 poles, L-coded, straight // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662955	PR M12L05F0 PUR 0 BK 0300 M12, female, 5 poles, L-coded, straight // Open end, L=3 m	✓	✓	✓	✓	✓	✓
662953	PR M12L05F9 PUR 0 BK 0150 M12, female, 5 poles, L-coded, 90° // Open end, L=1.5 m	✓	✓	✓	✓	✓	✓
662945	PR M12L05F9 PUR 0 BK 0300 M12, female, 5 poles, L-coded, 90° // Open end, L=3 m	✓	✓	✓	✓	✓	✓

Features		IDX 56 S 24 V	IDX 56 S 48 V	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
<i>USB Cables</i>							
403968	USB Type A - micro B Cable, L=1.5 m	✓	✓	✓	✓	✓	✓

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mmag | IDX 56 Feature Chart | Edition 2022-04 | DocID rel10511

maxon motor ag Brünigstrasse 220 CH-6072 Sachseln	+41 41 666 15 00 www.maxongroup.com
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