

IDX 56 Feature Chart

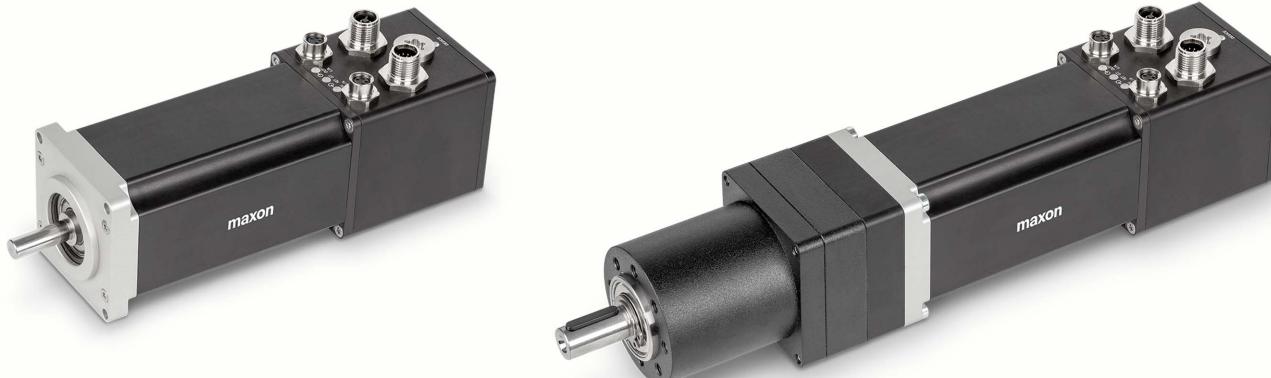
Overview

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

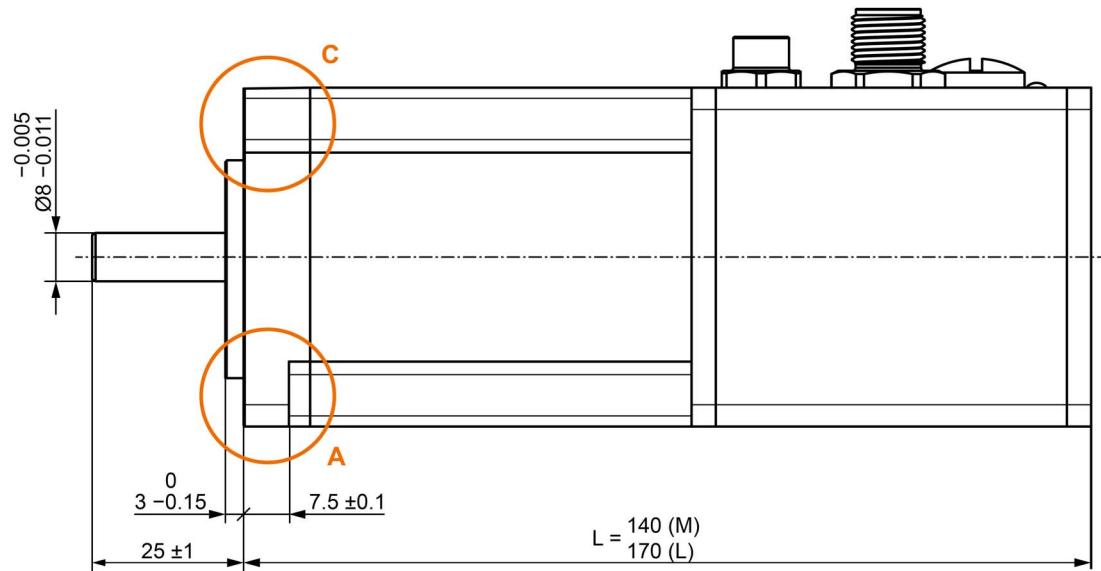
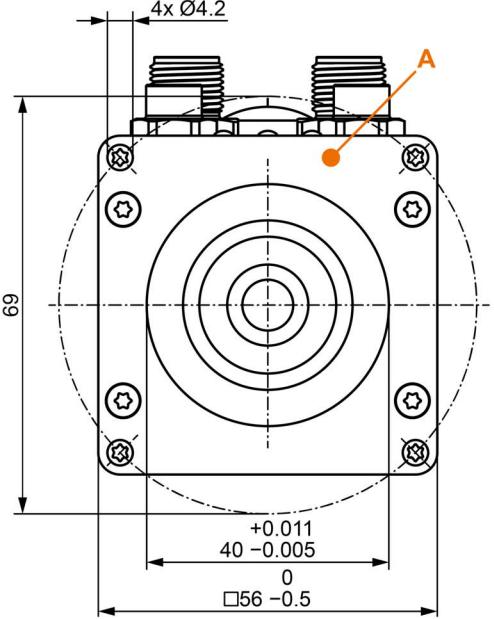
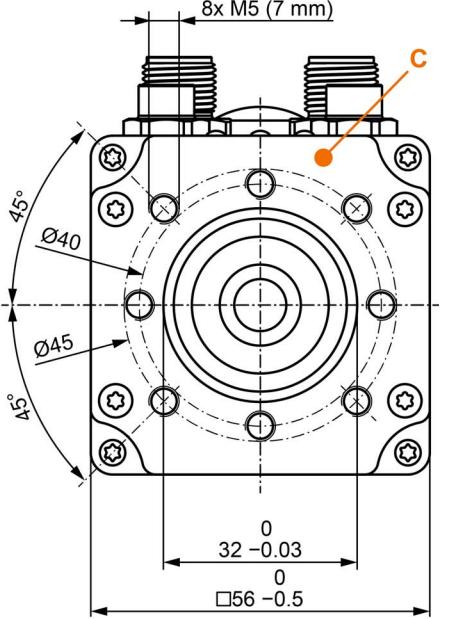
- [a] Nominal values at operating point and $T_a = 40\text{ }^{\circ}\text{C}$
- [b] Nominal values at operating point and $T_a = 25\text{ }^{\circ}\text{C}$
- [c] With optional holding brake, the minimal power supply voltage $+V_{CC}$ is 24 VDC
- [d] The stated protection class refers to the motor housing with plugged connectors, adequate shaft sealing must be provided by the customer
- [e] From 40 $^{\circ}\text{C}$ 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



CANopen
EtherCAT®
I/O ↔



Features	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
Nominal speed [a]	4'477 rpm	4'500 rpm	2'724 rpm	3'500 rpm
Nominal torque (max. continuous torque)	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	5'000 rpm
Maximum torque (short-time)	948 mNm (<10 s)	1'498 mNm (<10 s)	1'589 mNm (<10 s)	2'006 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)			
Sampling rate analog input	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

Features	IDX 56 M 24 V	IDX 56 M 48 V	IDX 56 L 24 V	IDX 56 L 48 V
Mechanical data				
 <p>Dimensions:</p> <ul style="list-style-type: none"> Width: 25 ± 1 mm Shaft diameter: $\varnothing 8 -0.005 / +0.011$ mm Shaft length: $3 -0.15$ mm Shaft shoulder: 7.5 ± 0.1 mm Total length: $L = 140$ (M) or 170 (L) mm 		 <p>Front view dimensions:</p> <ul style="list-style-type: none"> Width: 69 mm Shaft diameter: $40 +0.011 / -0.005$ mm Shaft shoulder: $56 -0.5$ mm Mouting holes: $4 \times \varnothing 4.2$ mm 	 <p>Front view dimensions:</p> <ul style="list-style-type: none"> Width: 32 -0.03 mm Shaft diameter: $45 +0.011 / -0.005$ mm Shaft shoulder: $56 -0.5$ mm Mouting holes: $8 \times M5$ (7 mm) 	
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 choose 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			

Features	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	Permanent magnet, integrated into motor casing		—	
Fall time (reaction time for opening until torque is released)	20 ms		—	
Rise time (reaction time for coupling until holding brake torque is reached)	12 ms		—	
Max. permissible static torque	600 mNm		—	
Length	20 mm [f]		—	
Weight	0.23 kg [f]		—	
Inertia	30 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			

Features	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 (@ $V_{CC} \geq 24$ V)		
Digital inputs		4 (PLC level +9...+30 VDC)		
Digital outputs	2 ($+V_{I/O} / I_L \leq 250$ mA, externally sourced, each) / ($I_L \leq 35$ 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 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 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 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			✓	
Oversupply			✓	
Undervoltage			✓	
Voltage transients			✓	
Short-circuit of motor winding			✓	
Loss of feedback signal			✓	
Following error			✓	
Status reporting			✓	
Firmware error handling			✓	

Features	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	  <p>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</p>			
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 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 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 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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