

IDX 70 Feature Chart

Overview

maxon's «IDX 70» 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 3.2 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



idx.maxongroup.com

Features	IDX 70 S IDX 70 M IDX 70 L		
	24 V	48 V	60 V
Drive data			
Nominal power supply voltage [a]	24 VDC	48 VDC	60 VDC
Nominal speed [a]	3'870 rpm — —	3'800 rpm 3'038 rpm 2'424 rpm	4'000 rpm 3'022 rpm 2'505 rpm
Nominal torque (max. continuous torque)	1'069 mNm [b] 928 mNm [a] — —	1'339 mNm [b] 1'163 mNm [a] 2'096 mNm [b] 1'820 mNm [a] 2'890 mNm [b] 2'510 mNm [a]	1'530 mNm [b] 1'329 mNm [a] 2'441 mNm [b] 2'120 mNm [a] 3'167 mNm [b] 2'750 mNm [a]
Recommended speed control range	From standstill up to nominal speed		
Maximum permissible drive speed	6'000 rpm — —	5'125 rpm 4'000 rpm 3'200 rpm	4'280 rpm 3'195 rpm 2'630 rpm
Maximum torque (short-time)	2'208 mNm (<10 s) — —	4'416 mNm (<10 s) 5'750 mNm (<10 s) 7'268 mNm (<10 s)	5'290 mNm (<10 s) 7'084 mNm (<10 s) 8'602 mNm (<10 s)
Nominal efficiency (without options)	88%		
Electrical data			
Nominal supply voltage +V _{CC} [c]	12...60 VDC		
Logic supply voltage +V _C	12...60 VDC		
Absolute supply voltage limits +V _{min} / +V _{max}	10 VDC / 70 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)		

Features	IDX 70 S IDX 70 M IDX 70 L		
	24 V	48 V	60 V
Motor characteristics			
Max. motor voltage	0.9 x +V _{CC}		
Torque constant	47.7 mNm/A — —	95 mNm/A 124 mNm/A 164 mNm/A	114 mNm/A 153 mNm/A 186 mNm/A
Speed constant	200 rpm/V — —	101 rpm/V 77 rpm/V 58 rpm/V	84 rpm/V 62 rpm/V 51 rpm/V
Speed / torque gradient	0.101 rpm/mNm — —	0.0912 rpm/mNm 0.0443 rpm/mNm 0.254 rpm/mNm	0.0957 rpm/mNm 0.0397 rpm/mNm 0.028 rpm/mNm

Features	IDX 70 S IDX 70 M IDX 70 L		
	24 V	48 V	60 V
Mechanical data			
Dimensions (L x W x H)	141 x 70 x 70 mm 176 x 70 x 70 mm 211 x 70 x 70 mm		
Weight (approximate)	1'600 g 2'300 g 3'000 g		

Features	IDX 70 S IDX 70 M IDX 70 L		
	24 V	48 V	60 V
Mounting	Flange-mounted (flange «A» or «C» to choose from)		
Rotor inertia of the drive (if equipped, the inertia of the holding brake (→page 5) must be added)		568 gcm ² 1'050 gcm ² 1'534 gcm ²	
Axial play at axial load	0.22 mm		
Radial play	Preloaded ball bearings		
Max. axial load, dynamic	22 N		
Max. radial load, 15 mm from flange	300 N		
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)	75 ms		
Rise time (engaging time until brake torque is attained)	75 ms		
Max. permissible static torque	5'000 mNm		
Backlash	max. ±1 °m		
Length	38 mm [f]		
Weight	0.460 kg [f]		
Inertia (friction disk / hub)	11 / 13 gcm ² [f]		


Features	IDX 70 S IDX 70 M IDX 70 L		
	24 V	48 V	60 V
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 multi-turn		
Position resolution	0.02 °m		
Integral Nonlinearity (INL)	typically <1 °m		
Repeatability (Jitter)	± 0.2 °m		

Features	24 V	IDX 70 S	IDX 70 M	IDX 70 L	60 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	✓				

Features		IDX 70 S	IDX 70 M	IDX 70 L
		24 V	48 V	60 V
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)		
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	M 23, male, 6 poles, N-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; E207844		

Features		24 V	48 V	60 V
		IDX 70 S IDX 70 M IDX 70 L		
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				
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		✓	

Features		IDX 70 S IDX 70 M IDX 70 L		
		24 V	48 V	60 V
Outputs (configurable)			✓	
	Holding brake / Set brake		✓	
	Ready/Fault		✓	
	General purpose		✓	
Analog Input Functionality				
Inputs			✓	
	Analog set value		✓	
	General purpose		✓	
Built-in Protection				
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 70 S IDX 70 M IDX 70 L		
		24 V	48 V	60 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 70 S IDX 70 M IDX 70 L		
		24 V	48 V	60 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 70 S IDX 70 M IDX 70 L		
		24 V	48 V	60 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				
711319	PR M230F50 PUR S OG 0300 M23, female, 6 poles, N-coded, straight // Open end, L=3 m	✓	✓	✓
USB Cables				
403968	USB Type A - micro B Cable, L=1.5 m	✓	✓	✓

Copyright

In the present document, registered brand names are not tagged with their respective trademark. It must be understood that the brands (below list is not necessarily concluding) are protected by copyright and/or other intellectual property rights even if their legal trademarks are omitted.

Borland®, Borland C++	© Borland Software Corporation, USA-Rockville MD
CANopen®, CiA®	© CiA CAN in Automation e.V, DE-Nuremberg
EtherCAT®	© EtherCAT Technology Group, DE-Nuremberg, licensed by Beckhoff Automation GmbH, DE-Verl
LabVIEW™, LabWindows™	© National Instruments Corporation, USA-Austin TX
Linux®	© Linus Torvalds (The Linux Foundation, USA-San Francisco CA)
Visual Basic®, Visual C#®, Visual C++®, Windows®	© Microsoft Corporation, USA-Redmond WA

This document is protected by copyright. Any further use (including reproduction, translation, microfilming, and other means of electronic data processing) without prior written approval is not permitted. The mentioned trademarks belong to their respective owners and are protected under intellectual property rights.

© 2022 maxon. All rights reserved. Subject to change without prior notice.
mmag | IDX 70 Feature Chart | Edition 2022-04 | DocID rel10567

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