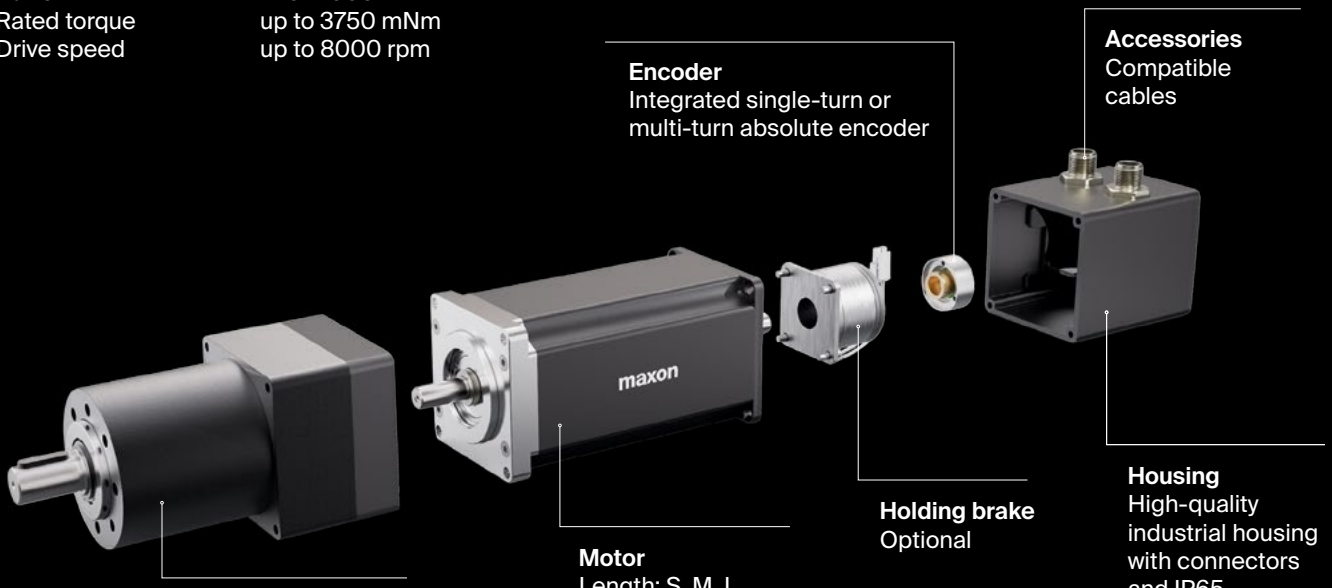
maxon IDX

The compact brushless EC-i motor combined with a high-quality sensor in robust industrial housing is ideally suited to demanding speed and positioning tasks. This motor is also available as a drive with integrated positioning and speed controller.

Key data

Drive ☐	56 ... 70 mm
Drive length	107 ... 193 mm
Power	270 ... 900 W
Rated torque	up to 3750 mNm
Drive speed	up to 8000 rpm



Encoder
Integrated single-turn or multi-turn absolute encoder

Accessories
Compatible cables

Gearheads
Stages: 1–3
Variants: Standard, reduced noise level, ultra performance

Motor
Length: S, M, L
Winding: 24 V, 48 V, 60 V
Flange: A flange, C flange

Holding brake
Optional

Housing
High-quality industrial housing with connectors and IP65 protection class

- → High continuous torque
- → Outstanding energy efficiency
- → Maximum power density
- → Unmatched precision in dynamic motion
- → IP65-protected design
- → Easily configured online

shop.maxongroup.com

Combine

The maxon modular system

The motors, gearheads, sensors, brakes, and controllers of maxon are perfectly matched to each other and can be combined in a number of ways. Our modular system makes it easy to find suitable components for your motor – in the catalog and in the online shop.

shop.maxongroup.com

Gear
Planetary Gearhead
Spur Gearhead
Screw Drive

Motor
DC Motors
EC Motors (BLDC)

Sensor
Encoder
Resolver
DC-Tacho

Controller
Servo Controller
Positioning Control Unit
Motion Control

Accessories

Great choice, easy ordering

The diversity of motors and product combinations offered by maxon is unmatched worldwide. The maxon modular system and the numerous options for windings offer even more possibilities for variation. To make the delivery times as short as possible for our customers, we organized our products into program groups.

Stock program
The market-oriented selection from our extensive product portfolio offers you short delivery times.

Standard program
In the comprehensive standard program, products are included which can be produced and delivered in a short time. The plenitude of versions in this program offer tried and tested standard products for optimized application.

Special program
A wide range of motors and combinations is available on request.

Explanations of maxon terminology EC motor

Dimensional drawings
Presentation of the views according to the projection method E (ISO).  All dimensions in [mm].

Motor Data
The values in lines 2 – 15 are valid when using block commutation.

1 Nominal voltage U_N [Volt]
is the applied voltage between two powered phases in block commutation. See page 64 for the timing diagram of the voltage in the three phases. All nominal data (lines 2 – 9) refer to this voltage. Lower and higher voltages are permissible, provided that limits are not exceeded.

2 No load speed n_0 [rpm] ±10%
is the speed at which the unloaded motor runs with the nominal voltage applied. It is approximately proportional to the applied voltage.

3 No load current I_0 [mA] ±50%
This is the typical current that the unloaded motor draws when operating at nominal voltage. It increases with rising speed owing to bearing friction and iron losses. No load friction depends heavily on temperature. In extended operation, the motor heats up and the no load friction and no load current decrese.

4 Nominal speed n_N [rpm]
is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

5 Nominal torque M_N [mNm]
is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

6 Nominal current I_N [A]
is the current in the active phase in block commutation that generates the nominal torque at the given nominal speed (= max. permissible continuous load current). The maximum winding temperature is reached at 25°C ambient temperature in continuous operation with I_N. I_N decreases as speed increases due to additional losses in the lamination.

7 Stall torque M_H [mNm]
is the linearly calculated load torque for motors that causes the shaft to stall at nominal voltage. With EC-flat and EC-i motors, this torque often cannot be achieved due to saturation effects.

8 Stall current I_A [A]
is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque. With larger motors, I_A cannot often be reached due to the amplifier's current limits.

9 Max. efficiency η_{max} [%]
is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

10 Terminal resistance phase to phase R [Ω]
is determined by the resistance at 25°C between two connections of the default configuration.

11 Terminal inductance phase to phase L [mH]
is the winding inductance between two connections. It is measured at 1 kHz, sinusoidal.

12 Torque constant k_M [mNm/A]
This may also be referred to as «specific torque» and represents the quotient from generated torque and applicable current.

13 Speed constant k_n [rpm/V]
indicates the theoretical no load speed per volt of applied voltage, disregarding friction losses.

14 Speed/torque gradient
Δ_n/Δ_M [rpm/mNm]
The speed/torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque (tolerance ± 20%).
The real characteristic curve depends on the speed for EC motors with slotted winding (EC flat and EC-i); it is steeper at high speeds and flatter at slow speeds. The real gradient at nominal voltage can be approximated by a straight line between no load speed and the nominal operating point (see page 81).

15 Mechanical time constant τ_m [ms]
is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

16 Rotor moment of inertia J_R [gcm²]
is the mass moment of inertia of the rotor, based on the axis of rotation.

17 Thermal resistance housing-ambient R_{th2} [K/W]
and
18 Thermal resistance winding-housing R_{th1} [K/W]
Characteristic values of thermal contact resistance without additional heat sinking. Lines 17 and 18 combined define the maximum heating at a given power loss (load). Thermal resistance R_{th2} on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

19 Thermal time constant winding τ_w [s]
and
20 Thermal time constant motor τ_s [s]
These are the typical reaction times for a temperature change of winding and motor. It can be seen that the motor reacts much more sluggishly in thermal terms than the winding. The values are calculated from the product of thermal capacity and given heat resistances.

21 Ambient temperature [°C]
Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.

22 Max. winding temperature [°C]
Maximum permissible winding temperature.

23 Max. speed n_{max} [rpm]
is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.

24 Axial play [mm]
On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

25 Radial play [mm]
Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

26/27 Max. axial load [N]
Dynamic: axial loading permissible in operation. If different values apply for traction and thrust, the smaller value is given.
Static: maximum axial force that does not cause permanent damage when applied to the front of the shaft at standstill.
Shaft supported: maximum axial force applying to the shaft at standstill if the force is not input at the other shaft end. This is not possible for motors with only one shaft end.

28 Max. radial load [N]
The value is given for a typical distance from the front flange. As the distance increases, this value decreases.

29 Number of pole pairs
Number of north poles of the permanent magnet. The phase streams and commutation signals pass through per revolution p cycles. Servo-controllers require the correct details of the number of pole pairs.

30 Number of phases
All maxon EC motors have three phases.

31 Weight of motor [g]

32 Typical noise level [dBA]
Is the statistical average of the noise level measured in accordance with the maxon standard (10 cm distance radially to the drive, no-load operation at a certain speed. The drive lies freely on a plastic foam mat in the noise chamber).
The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.
The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

33 Max. torque M_{max} [mNm]
Maximum torque the motor can briefly deliver. It is limited by the overload protection of the electronics.

34 Max. current I_{max} [A]
Surge current with which the peak torque is generated at nominal voltage. With an active speed controller, surge current is not proportionate to the torque, but also depends on the supply voltage. As a result, this value only applies at nominal voltage.

35 Type of control
«Speed» means that the drive is fitted with an integral speed controller. «Controlled» means that the drive is fitted with true commutation electronics.

36 Supply voltage $+V_{CC}$ [V]
Range of supply voltages measured in respect of GND at which the drive functions.

37 Speed set value input U_C [V]
Range of analog voltage for set speed value measured in respect of GND. For 2 wire solutions, the supply voltage acts as speed setting at the same time.

38 Scaling Set speed value input k_c [rpm/V]
Set speed value n_c is based on the product $n_c = k_c \cdot U_c$.

39 Speed range
Achievable speeds in the controlled range.

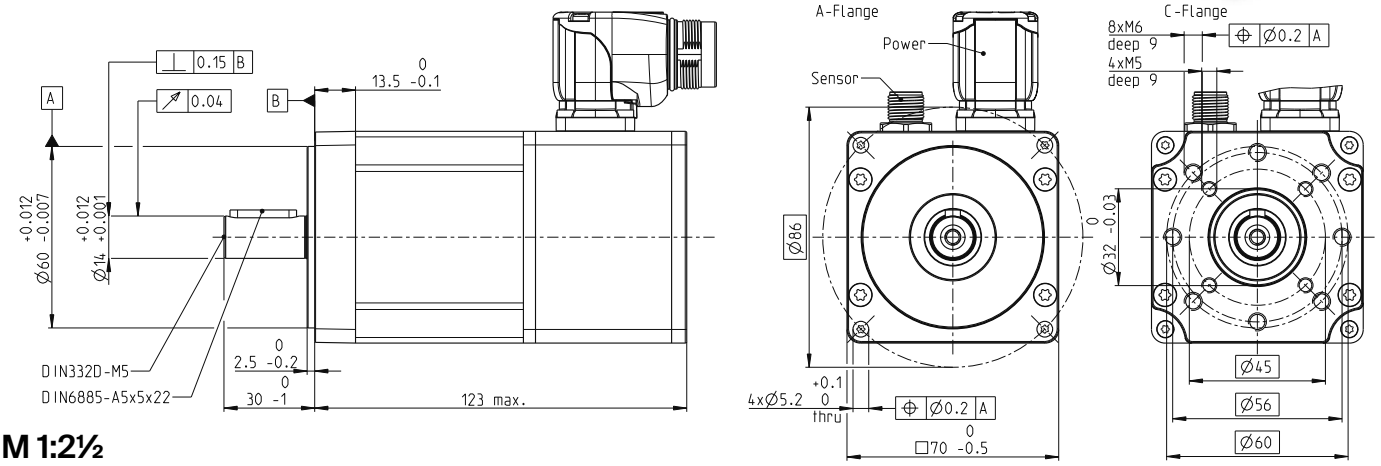
40 Max. acceleration
The set speed value follows a sudden set point change with a ramp. This value indicates the increase in the ramp.

IDX 70 S ☐70 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 600/651 W, 1520 mNm, 6000 rpm

IDX



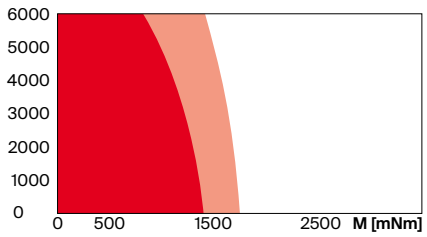
M 1:2½

	Motor Data				
1_	Nominal voltage	V	24	48	60
2_	No load speed	rpm	4770	4790	5000
3_	No load current	mA	1250	629	536
4_	Nominal speed	rpm	4090	4110	4310
5_	Nominal torque	mNm	1520	1510	1430
6_	Nominal current (max. continuous current)	A	29.2	14.6	11.6
7_	Stall torque	mNm	10200	10900	10800
8_	Stall current	A	1000	557	462
9_	Max. efficiency	%	92.9	93.2	93.1
10_	Terminal resistance	Ω	0.024	0.0862	0.13
11_	Terminal inductance	mH	0.058	0.235	0.344
12_	Torque constant	mNm/A	47.7	95	114
13_	Speed constant	rpm/V	200	101	83.9
14_	Speed/torque gradient	rpm/mNm	0.101	0.0912	0.0957
15_	Mechanical time constant	ms	0.598	0.543	0.569
16_	Rotor inertia	gcm²	568	568	568

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	1.73
18_	Thermal resistance winding-housing	K/W	0.61
19_	Thermal time constant winding	s	38.9
20_	Thermal time constant motor	s	969
21_	Ambient temperature	°C	-40...+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	6000
24_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	22
27_	Max. force for press fits (static)	N	270
	(static, shaft supported)	N	
28_	Max. radial load [mm from flange]	N	300 [15]
	Other specifications		
29_	Number of pole pairs		8
30_	Number of phases		3
31_	Weight of motor	g	1595
32_	Typical noise level [rpm]	dBA	55 [3000]
	Protection class without shaft		IP65

Operating Range

n [rpm] winding 48 V



- Continuous operation
- Continuous operation with reduced thermal resistance R_{th2} 50%
- ☐ Short term operation

Modular System Details on catalog page 42

Gear	Stages [opt.]
412_GPX 70 A/UP	1–2
413_GPX 70 LN	1–2
463_GB 12	1
464_GB 9	1
465_GB 65	2

Sensor
515_ENX 22 EASY INT
516_ENX 22 EMT INT

Accessories
591_Brake AB 60 S

Motor Control
557_ESCON2 Module 60/30
557_ESCON2 Compact 60/30
563_EPOS4 Module 50/15
566-567_EPOS4 Compact 50/15
567_EPOS4 70/15

Power Connection (M23, male, 6 poles, N-coded)

Pin 1	Motor winding 1
Pin 2	Motor winding 3
Pin 3	FE
Pin 4	U_{brake} + (optional)
Pin 5	U_{brake} GND (optional)
Pin 6	Motor winding 2

Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	B
Pin 2	NTC	Pin 11	DATA/
Pin 3	V_{CC} 4.75...26 V	Pin 12	DATA
Pin 4	A	Pin 13	CLK
Pin 5	I/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	I	Pin 17	Hall Sensor 2
Pin 9	NTC		

NTC resistor 25°C: 10 kOhm ±1%, beta (25–100°C): 3460 K
Compatible cables available online in the configurator

Configuration

Flange front: A-Flange/C-Flange
Encoder Interface: SSI/BiSS-C
Angle Power Connector: 0°/90°
Shaft: Standard with feather key/small diameter without feather key

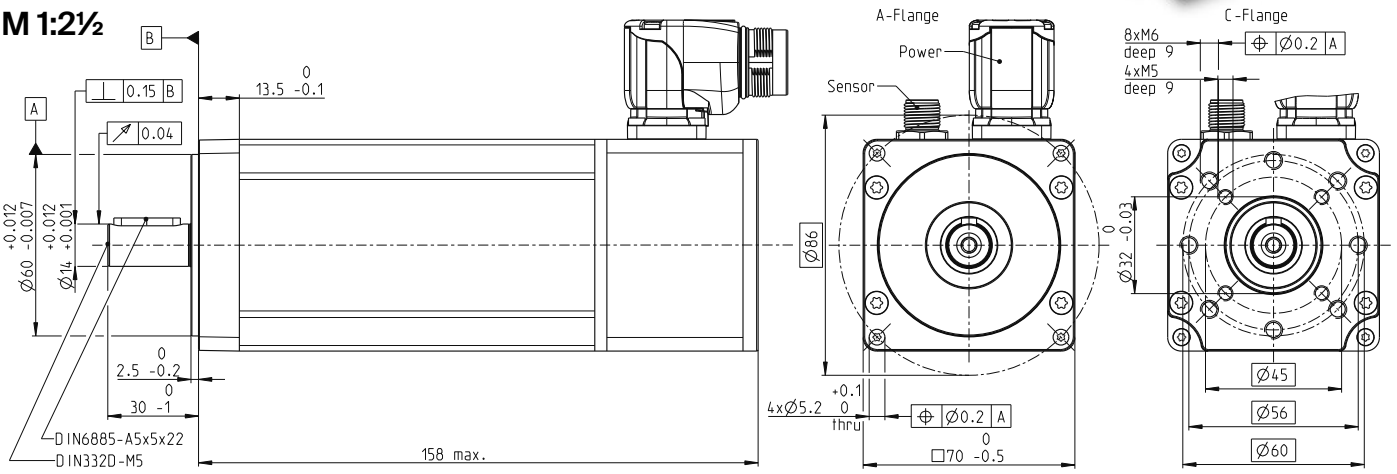
IDX 70 M ☐70 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 800/890 W, 2650 mNm, 4000 rpm

IDX

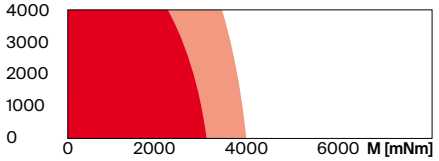
M 1:2½



	Motor Data			
1_	Nominal voltage	V	48	60
2_	No load speed	rpm	3670	3730
3_	No load current	mA	815	668
4_	Nominal speed	rpm	3130	3170
5_	Nominal torque	mNm	2530	2650
6_	Nominal current (max. continuous current)	A	18.6	15.7
7_	Stall torque	mNm	25400	27900
8_	Stall current	A	672	618
9_	Max. efficiency	%	93.0	93.3
10_	Terminal resistance	Ω	0.0715	0.097
11_	Terminal inductance	mH	0.246	0.373
12_	Torque constant	mNm/A	124	153
13_	Speed constant	rpm/V	76.9	62.5
14_	Speed/torque gradient	rpm/mNm	0.0443	0.0397
15_	Mechanical time constant	ms	0.487	0.437
16_	Rotor inertia	gcm²	1050	1050
	Thermal data			
17_	Thermal resistance housing-ambient	K/W	1.35	
18_	Thermal resistance winding-housing	K/W	0.38	
19_	Thermal time constant winding	s	40.7	
20_	Thermal time constant motor	s	1130	
21_	Ambient temperature	°C	-40...+100	
22_	Max. winding temperature	°C	155	
	Mechanical data ball bearings			
23_	Max. speed	rpm	4000	
24_	Axial play	mm	0.22	
	Preload	N	28	
	Direction of force		pull	
25_	Radial play		preloaded	
26_	Max. axial load (dynamic)	N	22	
27_	Max. force for press fits (static)	N	270	
	(static, shaft supported)	N		
28_	Max. radial load [mm from flange]	N	300 [15]	
	Other specifications			
29_	Number of pole pairs		8	
30_	Number of phases		3	
31_	Weight of motor	g	2295	
32_	Typical noise level [rpm]	dBA	60 [3000]	
	Protection class without shaft		IP65	

Operating Range

n [rpm] winding 48 V



- Continuous operation
- Continuous operation with reduced thermal resistance R_{th2} 50%
- ☐ Short term operation

Modular System Details on catalog page 42

Gear	Stages [opt.]
412_GPX 70 A/UP	1–2
413_GPX 70 LN	1–2
463_GB 12	1
464_GB 9	1
465_GB 65	2

Sensor
515_ENX 22 EASY INT
516_ENX 22 EMT INT

Accessories
591_Brake AB 60 S

Motor Control
557_ESCON2 Module 60/30
557_ESCON2 Compact 60/30
563_EPOS4 Module 50/15
566-567_EPOS4 Compact 50/15
567_EPOS4 70/15

Power Connection (M23, male, 6 poles, N-coded)

Pin 1	Motor winding 1
Pin 2	Motor winding 3
Pin 3	FE
Pin 4	U_{brake} + (optional)
Pin 5	U_{brake} GND (optional)
Pin 6	Motor winding 2

Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	B
Pin 2	NTC	Pin 11	DATA/
Pin 3	V_{CC} 4.75...26 V	Pin 12	DATA
Pin 4	A	Pin 13	CLK
Pin 5	I/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	I	Pin 17	Hall Sensor 2
Pin 9	NTC		

NTC resistor 25°C: 10 kOhm ±1%, beta (25–100°C): 3460 K
Compatible cables available online in the configurator

Configuration

Flange front: A-Flange/C-Flange
Encoder Interface: SSI/BiSS-C
Angle Power Connector: 0°/90°
Shaft: Standard with feather key/small diameter without feather key

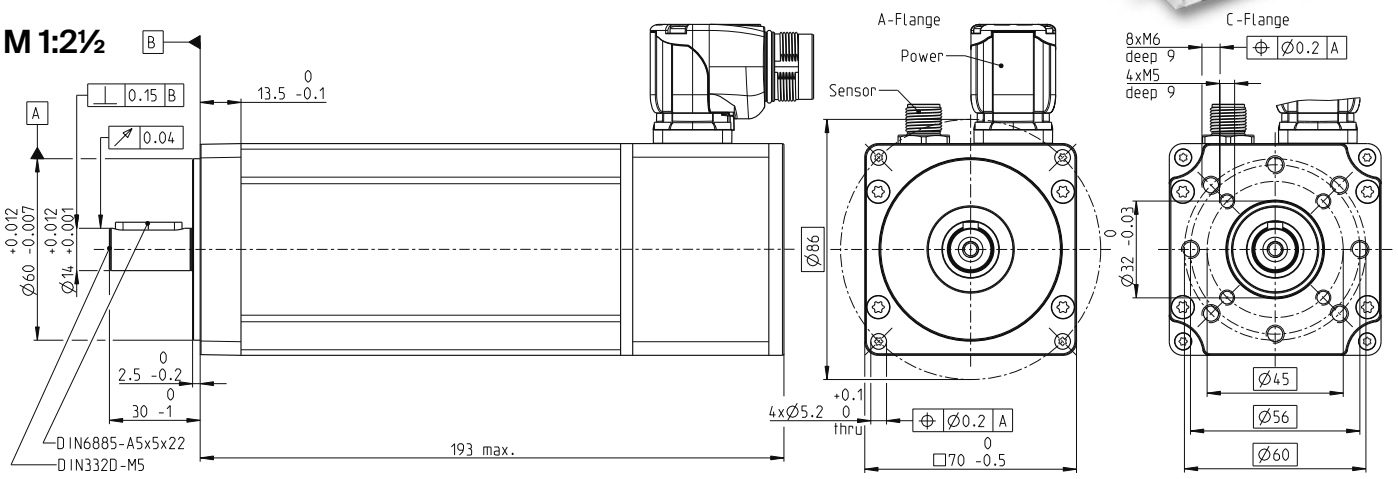
IDX 70 L ☐70 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 900/954 W, 3750 mNm, 3000 rpm

IDX

M 1:2½



	Motor Data			
1_	Nominal voltage	V	48	60
2_	No load speed	rpm	2780	3070
3_	No load current	mA	771	712
4_	Nominal speed	rpm	2430	2710
5_	Nominal torque	mNm	3750	3360
6_	Nominal current (max. continuous current)	A	21.3	17.1
7_	Stall torque	mNm	25800	25400
8_	Stall current	A	669	592
9_	Max. efficiency	%	93.2	93.1
10_	Terminal resistance	Ω	0.0718	0.101
11_	Terminal inductance	mH	0.221	0.287
12_	Torque constant	mNm/A	164	186
13_	Speed constant	rpm/V	58.2	51.4
14_	Speed/torque gradient	rpm/mNm	0.0254	0.028
15_	Mechanical time constant	ms	0.408	0.449
16_	Rotor inertia	gcm²	1530	1530

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	1.21
18_	Thermal resistance winding-housing	K/W	0.28
19_	Thermal time constant winding	s	46.8
20_	Thermal time constant motor	s	1820
21_	Ambient temperature	°C	-40...+100
22_	Max. winding temperature	°C	155

	Mechanical data ball bearings		
23_	Max. speed	rpm	3200
24_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	22
27_	Max. force for press fits (static)	N	270
	(static, shaft supported)	N	
28_	Max. radial load [mm from flange]	N	300 [15]

	Other specifications		
29_	Number of pole pairs		8
30_	Number of phases		3
31_	Weight of motor	g	2995
32_	Typical noise level [rpm]	dBA	65 [3000]
	Protection class without shaft		IP65

Power Connection (M23, male, 6 poles, N-coded)

Pin 1	Motor winding 1
Pin 2	Motor winding 3
Pin 3	FE
Pin 4	U_{brake} + (optional)
Pin 5	U_{brake} GND (optional)
Pin 6	Motor winding 2

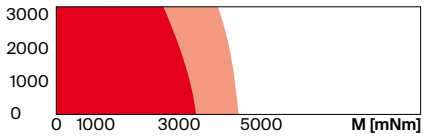
Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	B
Pin 2	NTC	Pin 11	DATA/
Pin 3	V_{CC} 4.75...26 V	Pin 12	DATA
Pin 4	A	Pin 13	CLK
Pin 5	I/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	I	Pin 17	Hall Sensor 2
Pin 9	NTC		

NTC resistor 25°C: 10 kOhm ±1%, beta (25–100°C): 3460 K
Compatible cables available online in the configurator

Operating Range

n [rpm] winding 48 V



- Continuous operation
- Continuous operation with reduced thermal resistance R_{th2} 50%
- Short term operation

Modular System Details on catalog page 42

Gear	Stages [opt.]
464_GB 9	1
465_GB 65	2

Sensor
515_ENX 22 EASY INT
516_ENX 22 EMT INT

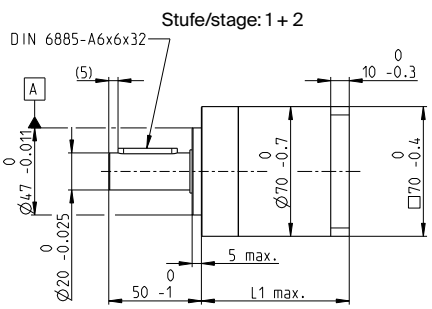
Accessories
591_Brake AB 60 S

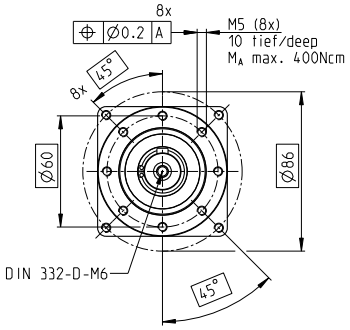
Motor Control
557_ESCON2 Module 60/30
557_ESCON2 Compact 60/30
563_EPOS4 Module 50/15
566-567_EPOS4 Compact 50/15
567_EPOS4 70/15

Configuration

Flange front: A-Flange/C-Flange
Encoder Interface: SSI/BiSS-C
Angle Power Connector: 0°/90°
Shaft: Standard with feather key/small diameter without feather key

GPX 70 ∅70 mm, planetary gearhead



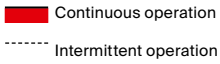


GPX

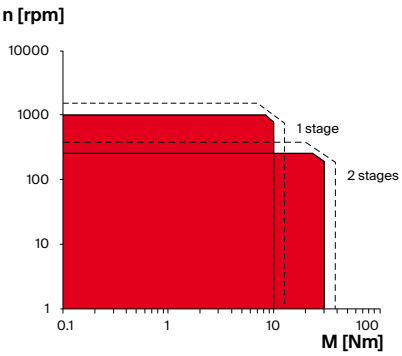
M 1:4

Key Data		A Standard Version	UP Ultra Performance
Max. transmittable power	W	850	1200
Max. continuous torque	Nm	30.0	70.0
Max. continuous input speed	rpm	6000	6000
Ambient temperature	°C	-20...+100	-20...+100
Bearing at output		Ball bearing	Ball bearing

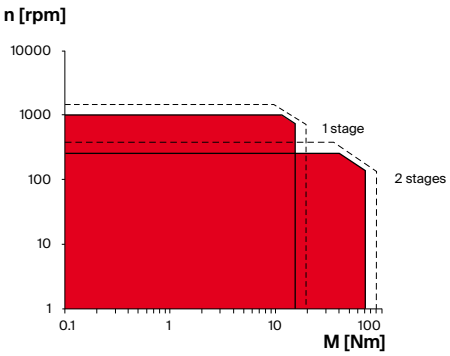
Operating Range (output shaft)



A Standard Version



UP Ultra Performance



Specifications		A Standard Version		UP Ultra Performance	
Number of stages		1	2	1	2
Max. transmittable power (continuous)	W	850	600	1200	1050
Max. transmittable power (intermittent)	W	1063	750	1500	1313
Max. continuous torque	Nm	10.0	30.0	15.0	70.0
Max. intermittent torque	Nm	12.5	37.5	18.8	87.5
Max. continuous input speed	rpm	4000	4000	4000	4000
Max. intermittent input speed	rpm	6000	6000	6000	6000
Max. efficiency	%	95	92	95	92
Average backlash no load	°	0.5	0.5	0.5	0.5
Max. axial load (dynamic)	N	825	825	825	825
Max. permissible radial load, 10 mm from flange	N	1000	1200	1000	1200
Gearhead length L1[1]	mm	58	80	58	80
Weight	g	1015	1450	1025	1475

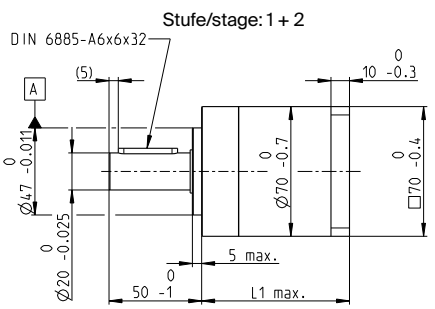
Configuration	A Standard Version		UP Ultra Performance	
Number of stages	1	2	1	2
Reduction	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44
Version	Standard/noise reduced/ultra performance			
Flange	Standard flange			
Shaft				

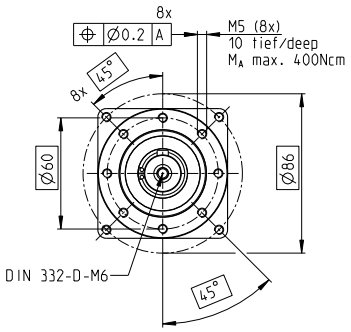
Modular System		Page			Page
EC motor	№ of stages [opt.]		**IDX drive**	№ of stages [opt.]	
IDX 70 S	1–2	248	IDX 70 S	1–2	364
IDX 70 M	1–2	249	IDX 70 M	1–2	365

[1]This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 70 ∅70 mm, planetary gearhead

GPX

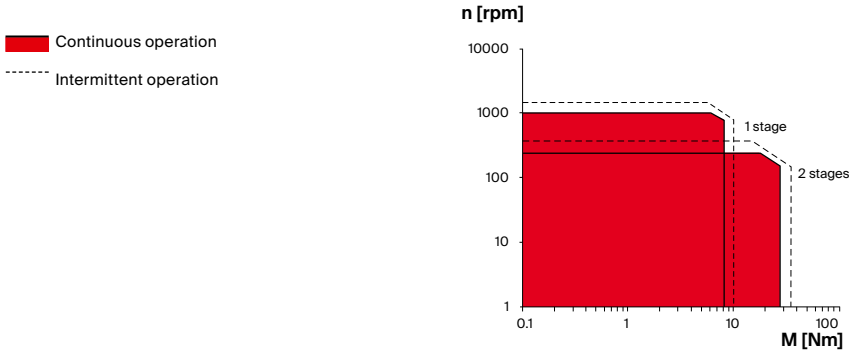




M 1:4

Key Data		LN Noise Reduced
Max. transmittable power	W	700
Max. continuous torque	Nm	27.0
Max. continuous input speed	rpm	6000
Ambient temperature	°C	-20...+85
Bearing at output		Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration

Operating Range (output shaft) — **LN Noise Reduced**



Specifications		LN Noise Reduced	
Number of stages		1	2
Max. transmittable power (continuous)	W	700	450
Max. transmittable power (intermittent)	W	875	563
Max. continuous torque	Nm	8.0	27.0
Max. intermittent torque	Nm	10.0	34.0
Max. continuous input speed	rpm	4000	4000
Max. intermittent input speed	rpm	6000	6000
Max. efficiency	%	95	92
Average backlash no load	°	0.5	0.5
Max. axial load (dynamic)	N	825	825
Max. permissible radial load, 10 mm from flange	N	1000	1200
Gearhead length L1[1]	mm	58	80
Weight	g	945	1380

Configuration	LN Noise Reduced	
Number of stages	1	2
Reduction	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44
Version	Standard/noise reduced/ultra performance	
Flange	Standard flange	
Shaft		

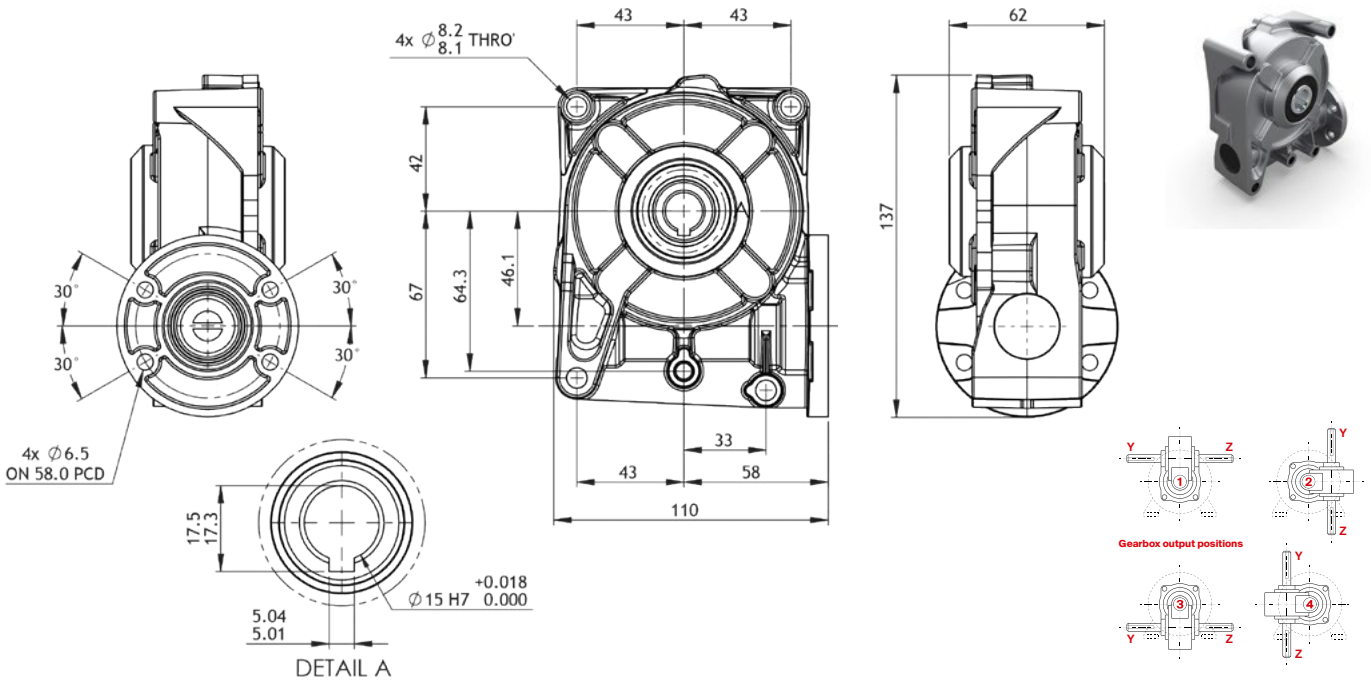
Modular System		Page			Page
EC motor	№ of stages [opt.]		**IDX drive**	№ of stages [opt.]	
IDX 70 S	1–2	248	IDX 70 S	1–2	364
IDX 70 M	1–2	249	IDX 70 M	1–2	365

[1]This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GB 12 Worm Gear

Bronze Version

NEW



Key Data		Bronze version
Max. continuous torque	Nm	30
Ambent temperature	°C	-30...+130
Max. continuous input speed	rpm	4000
Gearhead length[1]	mm	110
Bearing at output		Ball bearing
Weight	kg	1.5

Specifications		Bronze version		
Part numbers (special program on request)		735900	735901	735902
Reduction	X:1	15	30	60
Number of stages		1	1	1
Max. continuous torque	Nm	30	30	30
Max. intermittent torque	Nm	48	48	48
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	75	65	50
Average backlash no load	arc.min	10–25	10–25	10–25
Max. axial load (dynamic)	N	600	600	600
Max. permissible radial load, 12 mm from flange	N	800	800	800

Configuration	Bronze version
Gearhead position to motor	4 positions, all at 90°

Modular System	
EC Motor	Page
IDX 56	245-247
IDX 70 S, M	248-249
EC-i 52	308-309
EC 90 flat	332-337
IDX drive	
IDX 56	361-363
IDX 70 S, M	364-365

Notes

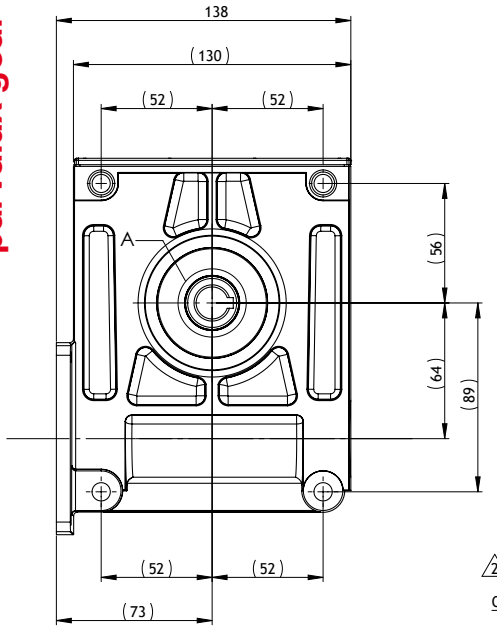
[1]Additional length required for the mounting adapter.
Standard shaft ∅25, length 50 mm with 8 mm keyway 735903

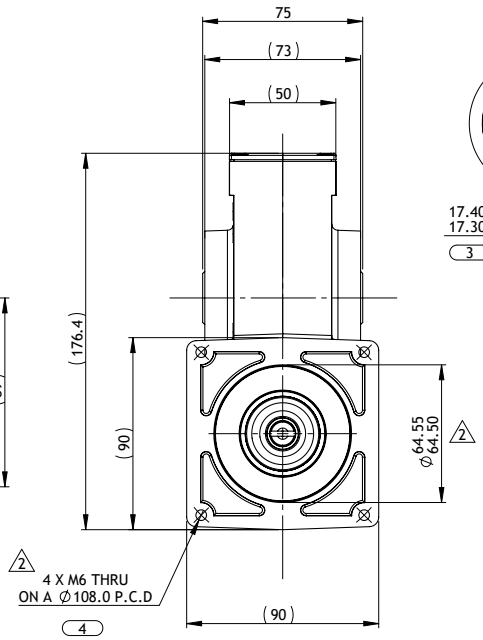
GB 9 Worm Gear

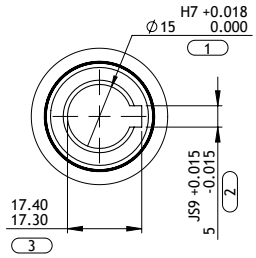
Composite Version

NEW

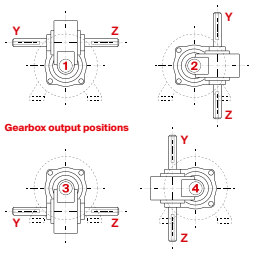
parvalux gear







DETAIL A



Key Data		Composite version
Max. continuous torque	Nm	50
Ambient temperature	°C	-30...+130
Max. continuous input speed	rpm	4000
Gearhead length[1]	mm	138
Bearing at output		Ball bearing
Weight	kg	2.3

Specifications		Composite version		
Part numbers (special program on request)		735894	735895	735896
Reduction	X:1	15	30	60
Number of stages		1	1	1
Max. continuous torque	Nm	50	50	50
Max. intermittent torque	Nm	80	80	80
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	85	75	65
Average backlash no load	arc.min	10–25	10–25	10–25
Max. axial load (dynamic)	N	600	600	600
Max. permissible radial load, 12 mm from flange	N	800	800	800

Configuration	Composite version
Gearhead position to motor	4 positions, all at 90°

Modular System	
EC Motor	Page
EC 90 flat	332-337
IDX 70	248-250
IDX drive	
IDX 70	364-366

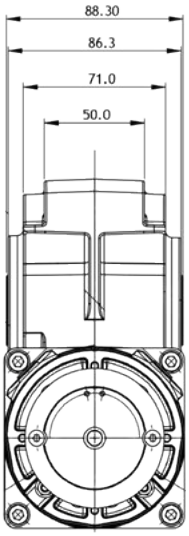
Notes

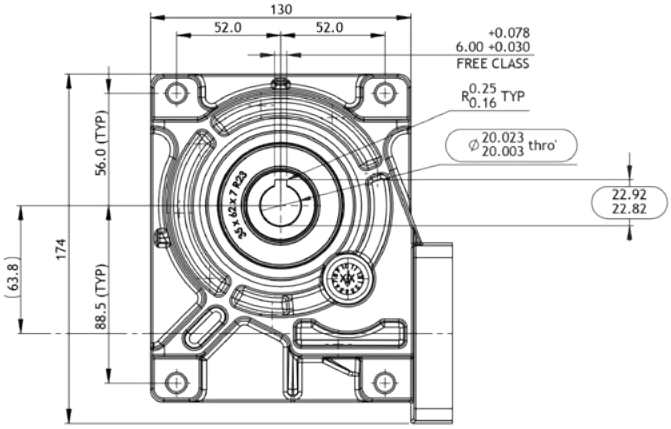
[1]Additional length required for the mounting adapter.
Standard shaft ∅25, length 50 mm with 8 mm keyway 735898

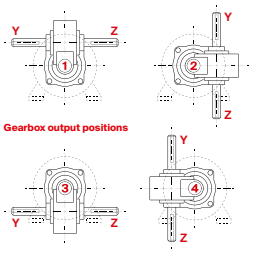
GB 65 Worm Gear

Steel/Bronze Version

NEW







Key Data		Steel/Bronze Version
Max. continuous torque	Nm	120
Ambient temperature	°C	-30...+120
Max. continuous input speed	rpm	4000
Gearhead length[1]	mm	130
Bearing at output		Ball bearing
Weight	kg	3.5

Specifications		Steel/Bronze Version		
Part numbers (special program on request)		848390	848392	848393
Reduction	X:1	80	120	160
Number of stages		2	2	2
Max. continuous torque	Nm	120	120	120
Max. intermittent torque	Nm	300	300	300
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	70	60	55
Average backlash no load	arc.min	35	35	35
Max. axial load (dynamic)	N	1000	1000	1000
Max. permissible radial load, 12 mm from flange	N	3000	3000	3000

Configuration	Steel/Bronze Version
Gearhead position to motor	4 positions, all at 90°

Modular System

EC Motor	Page
EC 90 flat	332-337
IDX 70	248-250
IDX drive	
IDX 70	364-366

Notes

[1]Additional length required for the mounting adapter.

ENX 22 EASY INT Encoder ∅22 mm, 1024 CPT / 4096 steps, Single Turn

Integrated into motor

NEW

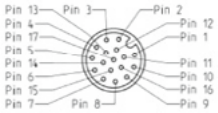
ENX

Key data		EASY incremental and absolute
Number of channels		3
Counts per turn		1024
Steps per turn		4096
Resolution (bit single turn)		12
Encoder length L	mm	0 (integrated into motor)
Ambient temperature	°C	-40 ... +125

Selection criteria	EASY incremental and absolute
Speed and rotation direction detection	■
Speed and position control	■
Compact and robust design	■
High resolution	■
Cost effective	■

■ suitable ▲ suitable to a limited extent ● not suitable

Specifications		EASY incremental and absolute
Supply voltage V_{cc}	V	5 ±0.5
Typical current draw	mA	22
Max. operating frequency	kHz	4000
Max. Speed	rpm	200 000
Connector[1] M12, male, A-coded		Pin 1 GND (ground) Pin 2 Motor NTC Pin 3 $+V_{cc}$ Pin 4 channel A Pin 5 channel $\bar{I}$ Pin 6 channel $\bar{A}$ Pin 7 channel $\bar{B}$ Pin 8 channel I Pin 9 Motor NTC Pin 10 channel B Pin 11 Data_out- Pin 12 Data_out Pin 13 CLK_in Pin 14 CLK_in- Pin 15 Hall 3 Pin 16 Hall 1 Pin 17 Hall 2



Output signal: EIA-Standard RS 422
Output current per channel: ± 20 mA

Configuration	EASY incremental and absolute
Signalprotokoll	BiSS-C, SSI

modular system	Page
EC motor	
IDX 56	245–247
IDX 70	248–250

Notes

[1]Connecting cables available in Online Configurator.

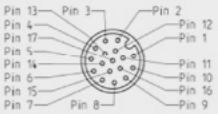
Further technical details can be found in the product information in the online shop under Downloads.

ENX 22 EMT Encoder ∅22 mm, 65 536 turns, Multi Turn 131 072 steps, Single Turn

Key data		EMT absolute differential
Multi-turn: max. no. of turns		65 536
Multi-turn: resolution	bits	16
Single-turn: steps per turns		131 072
Single-turn: resolution	bits	17
Encoder length L[1]	mm	22.7
Ambient temperature	°C	-40...+105
Weight	g	25

Selection criteria	EMT absolute differential
Multi-turn detection	■
Detection of speed and rotation direction	■
Speed and position control	■
Compact and robust design	■
High resolution	■
Economical	▲

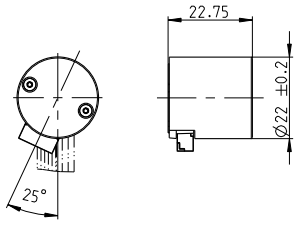
■ suitable ▲ suitable to a limited extent ● not suitable

Specifications		EMT for DCX, EC-4pole and EC-i		EMT integrated into IDX	
Supply voltage V_{cc}	V	5 ± 0.5		5 ± 0.5	
Typical current draw	mA	90		90	
Max. speed	rpm	12 000		12 000	
Data encoding		Binary		Binary	
Min. clock frequency CLK	MHz	BiSS-C: 0.08	SSI: 0.3	BiSS-C: 0.08	SSI: 0.3
Max. clock frequency CLK	MHz	BiSS-C: 5	SSI: 1	BiSS-C: 5	SSI: 1
Timeout	µs	BiSS-C: 18	SSI: 7	BiSS-C: 18	SSI: 7
Setup time after Power On	s	Max. 0.1		Max. 0.1	
Moment of inertia of pulse disk	gcm²	≤ 1.55		≤ 1.55	
Plug manufacturer JST Plug type no. BM08B-NSHSS -TBT Matching connector type no. NSHR-08V-S		Pin 1 GND Pin 2 do not connect Pin 3 do not connect Pin 4 Data+ / SLO+ Pin 5 Data- / SLO- Pin 6 CLK- / MA- Pin 7 CLK+ / MA+ Pin 8 V_{cc} Output signals: EIA standard RS422 Output current per channel: ±20 mA		Pin 1 GND Pin 2 Motor NTC Pin 3 +V_{cc} Pin 9 Motor NTC Pin 11 Data- / SLO- Pin 12 Data+ / SLO+ Pin 13 CLK+ / MA+ Pin 14 CLK- / MA- Other pins not connected Output signals: EIA standard RS422 Output current per channel: ±20 mA	

Configuration	EMT absolute differential
Signal protocol	BiSS-C, SSI

maxon modular system	Page
DC motor	
DCX 22	109–112
DCX 26 L	113–114
DCX 32 L	115
DCX 35 L	116
EC motor	
IDX 56	245–247
IDX 70	248–250
EC-4pole 22	287–288
EC-4pole 30	289/291
EC-i 30	298–301
EC-i 40	302–307
EC-i 52	308–309

Dimensions of standard configuration M 1:2



Connecting cable 300 mm for EMT to EPOS4 708590

Additional information

[1] The length shown here refers to the encoder. An additional intermediate plate is required for motor mounting. For more detailed information, see the combined dimensional drawing.

EC motors: The angle value 0 is calibrated to the commutation phase of coil 1 (equates to Hall signal 1 for motors with Hall sensors, block commutation), see p. 64.

Ordering information: For motors that cannot be configured online, the part numbers 711113 (BiSS-C) and 711112 (SSI) must be used when ordering.

Further technical details can be found in the product information in the online shop under Downloads.

Brake AB 60 S 24 VDC, 5.0 Nm

accessories

Important Information

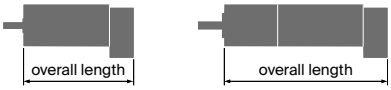
- Spring-loaded brake – single-disc brake with two friction surfaces for direct current. Braked in unpowered condition (dry operation).
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- Not backlash-free (±1° max.).

Stock program
Standard program
Special program (on request)

Part Numbers

x drives

Type



Modular System

+ Drive	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead
IDX 70 S	364					online
IDX 70 S	364	GPX 70	412–413			online
IDX 70 S	364	GB 12	463			online
IDX 70 S	364	GB 9	464			online
IDX 70 S	364	GB 65	465			online
IDX 70 M	365					online
IDX 70 M	365	GPX 70	412–413			online
IDX 70 M	365	GB 12	463			online
IDX 70 M	365	GB 9	464			online
IDX 70 M	365	GB 65	465			online
IDX 70 L	366					online
IDX 70 L	366	GB 9	464			online
IDX 70 L	366	GB 65	465			online

+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead
IDX 70 S	248					online
IDX 70 S	248	GPX 70	412–413			online
IDX 70 S	248	GB 12	463			online
IDX 70 S	248	GB 9	464			online
IDX 70 S	248	GB 65	465			online
IDX 70 M	249					online
IDX 70 M	249	GPX 70	412–413			online
IDX 70 M	249	GB 12	463			online
IDX 70 M	249	GB 9	464			online
IDX 70 M	249	GB 65	465			online
IDX 70 L	250					online
IDX 70 L	250	GB 9	464			online
IDX 70 L	250	GB 65	465			online

Technical Data

Holding torque	5 Nm	Nominal voltage, smoothed		24 VDC -10...+5%
Mass inertia	25 gcm²	Resistance		R_{20} = 41.16 Ω 0...+10%
Max. speed	8800 rpm	Duty cycle		100%
Weight	480 g	Reaction time	– Coupling	≤ 75 ms
Ambient temperature range	-40...+120°C		– Opening	≤ 75 ms

Pin Allocation

online

5 CABLING

CABLES FOR MAXON IDX DRIVES WITH INTEGRATED POSITIONING AND SPEED CONTROLLER

	Power IDX 56	Power IDX 56	Power IDX 70	IO	IO	EtherCAT	EtherCAT
							
Connector 1	M12 female, 5 poles, L-coded straight	M12 female, 5 poles, L-coded 90°	M23 female, 6 poles, N-coded, straight	M12 female, 12 poles, A-coded, straight	M12 female, 12 poles, A-coded, 90°	M8 male, 4 poles, A-coded, straight	M8 male, 4 poles, A-coded, straight
Connector 2	no connector	no connector	no connector	no connector	no connector	no connector	M8, male, 4 poles, A-coded, straight
Part No. L= 1.5 m	662958	662953	—	662957	662952	662961	—
Part No. L= 3.0 m	662955	662945	711319	662954	662948	662941	662960

	EtherCAT	CANopen	CANopen	CANopen	CANopen	CANopen	CANopen
							 (bus termination)
Connector 1	M8 male, 4 poles, A-coded, straight	M8 female, 5 poles, B-coded, straight	M8 male, 5 poles, B-coded, straight	M8 male, 5 poles, B-coded, straight	M12 male, 5 poles, A-coded, straight	M12 female, 5 poles, A-coded, straight	M8 male, 5 poles, B-coded, straight
Connector 2	RJ45	no connector	no connector	M8, female, 5 poles, B-coded, straight	M8 female, 5 poles, B-coded, straight	M8 male, 5 poles, B-coded, straight	—
Part No. L= 1.5 m	662956	662951	662950	—	L = 0.15 m: 662946	L = 0.15 m: 662947	662933
Part No. L= 3.0 m	662942	662935	662934	662959			

CABLES FOR MAXON IDX MOTORS WITHOUT INTEGRATED POSITIONING AND SPEED CONTROLLER

	Power IDX 56	Power IDX 56	Power IDX 70	Sensor	Sensor
					
Connector 1	M12 female, 5 poles, L-coded straight	M12 female, 5 poles, L-coded 90°	M23 female, 6 poles, N-coded, straight	M12 female, 17 poles, A-coded, straight	M12 female, 17 poles, A-coded, 90°
Connector 2	no connector	no connector	no connector	no connector	no connector
Part No. L= 1.5 m	684644	684647	—	—	—
Part No. L= 3.0 m	684646	684648	711319	684650	684651

Note: All IDX 56 are powered by cables with M12 connector, all IDX 70 are powered by cables with M23 connector.
All other connectors (IO, EtherCAT, CANopen and Sensor) are the same on both IDX motor and drive sizes.

cables

CABLES FOR MAXON IDX DRIVES WITH INTEGRATED POSITIONING AND SPEED CONTROLLER [a]

	Power IDX 56	Power IDX 70	IO	CANopen	EtherCAT
					
Cable Manufacturer	Phoenix Contact	Helukabel	Phoenix Contact	Phoenix Contact	Phoenix Contact
Manufacturer Part-No.	1379710	707231	1405789	1408543	1408538
Outer sheath, material	PUR	PUR	PUR	PUR	PUR
Wire 1	+V_{CC}, brown	+V_{CC} · L1	AnIN1+, brown	CAN_V+, red	TX+, yellow
Wire 2	+V_C, white	GND · L3	GND, blue	CAN_SHLD · Drain	RX+, white
Wire 3	GND, blue	FE, green-yellow	AnIN1-, white	CAN_H, white	RX-, blue
Wire 4	—, black	+V_C, brown	AnIN2+, green	CAN_L, blue	TX-, orange
Wire 5	FE, pink [b]	+VI/O, white	DigIN1, pink	CAN_GND, black	—
Wire 6	—	—, L2	AnIN2-, yellow	—	—
Wire 7	—	—	DigOUT1, black	—	—
Wire 8	—	—	DigIN2, grey	—	—
Wire 9	—	—	DigIN3, red	—	—
Wire 10	—	—	DigOUT2, violet	—	—
Wire 11	—	—	DigIN4, grey-pink	—	—
Wire 12	—	—	+VI/O, red-blue	—	—

CABLES FOR MAXON IDX MOTORS WITHOUT INTEGRATED POSITIONING AND SPEED CONTROLLER [a]

	Power IDX 56	Power IDX 70	Sensor	
				
Cable Manufacturer	Phoenix Contact	Helukabel	Phoenix Contact	
Manufacturer Part-No.	1435446	707231	1435447	
Outer sheath, material	PUR	PUR	PUR	
Wire 1	W1, brown	W1 · L1	GND, brown	
Wire 2	W2, white	W3 · L3	NTC, blue	
Wire 3	W3, blue	FE, green-yellow	V_{CC}, white	
Wire 4	U_{Brake} +, black	U_{Brake} +, brown	A, green	
Wire 5	U_{Brake} GND, pink [b]	U_{Brake} GND, white	I/, pink	
Wire 6	—	W2 · L2	A/, yellow	
Wire 7	—	—	B/, black	
Wire 8	—	—	I, grey	
Wire 9	—	—	NTC, red	
Wire 10	—	—	B, violet	[a] maxon IDX cables connected to a maxon IDX Motor (without integrated controller) or maxon IDX Drive (with integrated controller) have the color-signal assignment as indicated in this table.
Wire 11	—	—	DATA/, grey-pink	
Wire 12	—	—	DATA, red-blue	
Wire 13	—	—	CLK, white-green	
Wire 14	—	—	CLK/, brown-green	[b] maxon power cables with production year until 2021 have the wire 5 color grey, cables with production year 2022 and newer have the wire color pink; the production month and year are marked on the cable.
Wire 15	—	—	HS3, white-yellow	
Wire 16	—	—	HS1, yellow-brown	
Wire 17	—	—	HS2, white-grey	