Brushless internal rotor motors ECI series

Drive solutions | Industrial drive engineering 2017-01

ebmpapst

The engineer's choice

GREEN TECH

Information for ECI motors.

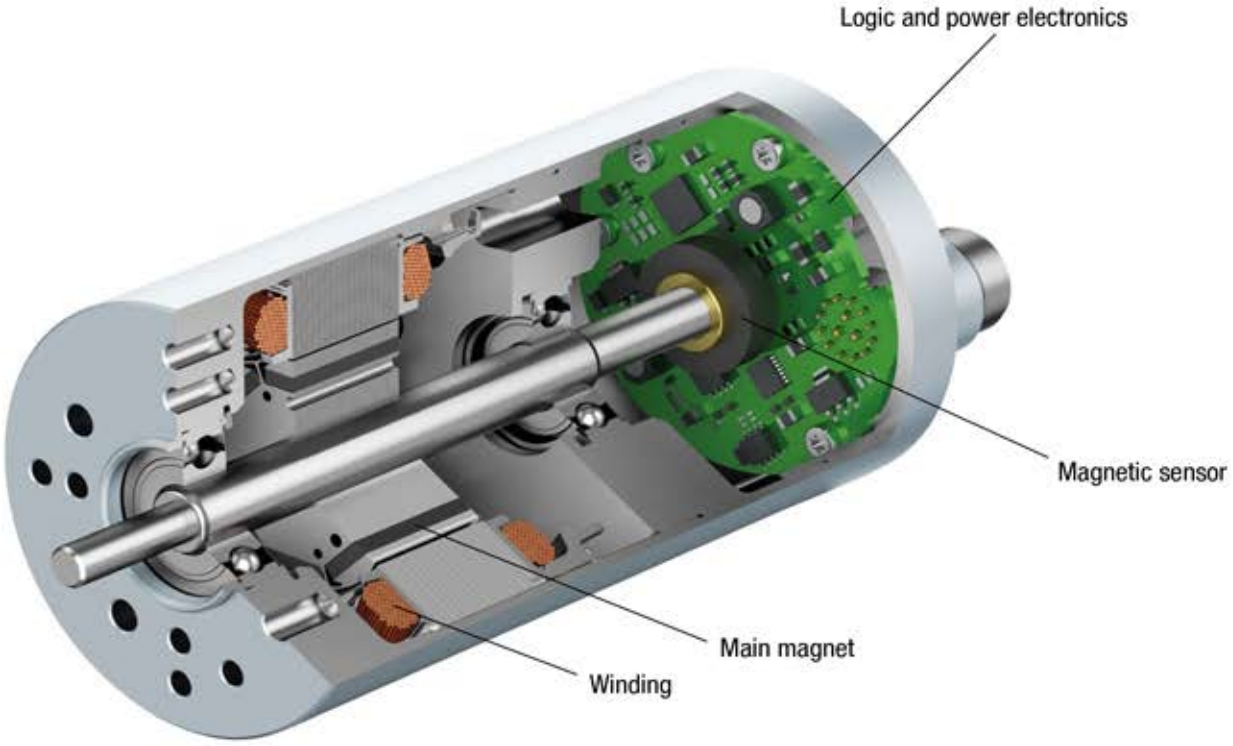
Key figures

- 3-phase, electronically commutated internal rotor motor with high-performance magnet
- Power range between 30 and 750 watts
- High power density realized in a compact design
- High overload capacity
- Long service life
- Very smooth and quiet operation
- Detection of rotor position via hall sensors
- Customer-specific winding layouts
- Winding insulation as per insulation class E
- Protection class IP 54 as per EN 60 034-5: up to IP 65

- Various motor types which can be combined with planetary and crown gearheads
- Optional integrated control electronics
- Optional encoder and brake modules

Approvals

- Support with the accreditation of products in different economic areas and markets
- As an experienced and competent partner we would be happy to support you
- Possible approvals include CE, CCC, UL, CSA, EAC
- Additional approvals on request



The data in this catalog contain product specifications, but are not a guarantee of particular properties.

All information is based on the measuring conditions mentioned below. Operation of motors using reference electronics at an ambient temperature of max. 40°C when attached (thermally conductive) to a free-standing steel plate of the following size: Steel plate 105 x 105 x 10 mm

The **nominal operating point** is the basis for the electromagnetic design of the motor from the point of view of the maximum possible continuous output of the motor and is specified by the nominal values described here.

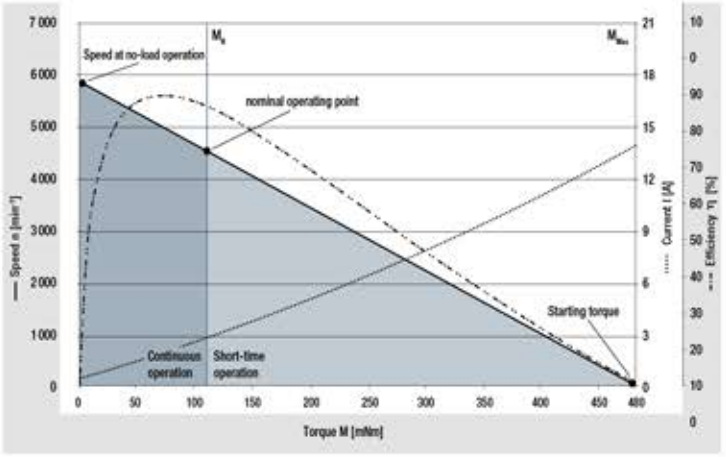
The values mentioned are typical values for the design in question and are also subject to the tolerances included in the specifications or drawings. Unless otherwise stated, the supplements and safety notes contained in the relevant operating and assembly instructions must be kept at all times. Subject to availability and technical alterations.

Nominal output power PN [W]
The output power which the motor can produce continuously; it is calculated from nominal torque and nominal speed. For the electromagnetic design of the motor the determination of the nominal operating point is based on the fact that the nominal output power is close the maximum output power of the motor.

Nominal voltage U_{BN} , U_N , U_B [V DC]
The DC voltage (i.e. DC voltage range) that is applied to the commutation electronics as a system supply voltage. All nominal values listed in the technical tables of the individual motors refer to this voltage. Motor applications are, however, not restricted to this voltage.

Nominal speed n_N [rpm]
The speed at which the motor may be operated continuously while delivering nominal torque at an ambient temperature of 40°C and nominal output torque. It is an operating point on the max. motor curve based on an ideal electronics with negligible losses.

Nominal torque M_N [mNm]
The torque that the motor can deliver continuously at an ambient temperature of 40°C and nominal speed.



The illustrated curves are idealized representations based on the figures in the tables.

Nominal current I_{BN}
The current that is drawn from the system supply when the motor delivers nominal torque at nominal speed.

Speed at no-load operation n_L [rpm]
The speed that takes effect at the nominal voltage and with unloaded motor. The theoretical possible speed at no-load operation can, in some cases, be limited by the mechanical ceiling speed.

No-load current I_{BL} [A]
Is established with nominal voltage and unloaded motor; is largely influenced by the bearing friction. For drive systems that have a separate supply for power and logic, the no-load current is called I_L. This no-load current is the sum of the power supply (I_{ZK}) and the low-power logic supply (I_B).

Permanent stall torque M_{Bn0} [mNm]
Is the maximum permissible torque with which the motor may be permanently loaded when the rotor is locked.

Permissible eff. continuous stall current I_{n0eff} [A]
Is the maximum permissible current which at a stalled motor is allowed to flow into the motor lead as an effective value.

Definitions for ECI motors.

Continuous stall power P_{Bn0} [W]
Is an approximate value for the voltage-independent maximum permitted output (P=U x I) that can be taken from the DC voltage source in holding status.

Permissible peak torque short-term M_{max} [mNm]
Is the torque which the motor can usually deliver in a short time.

Permissible peak current, motor lead I_{max} [A]
Is the current that must flow in to the motor lead as a peak value to achieve the short-time peak torque.

Induced voltage U_{imax} [V/1,000 rpm]
Maximum value of the induced voltage between two motor leads at 1,000 rpm. It is a dimension for the electromagnetic utilization of the motor.

Connection resistance R_v [Ohm]
The winding resistance that is measured at 20°C between any two of three winding terminations.

Connection inductance L_v [mH]
The average inductance that is measured at 20°C between any two of three winding terminations using a sinusoidal wave measuring frequency of 1 kHz.

Rotor moment of inertia J_R [kgm^2x10^{-6}]
The mass moment of inertia of the rotor and necessary dimension for the dynamic characteristics of the motor.

Protection class
Information on the protection class; it describes protection against foreign particles (Point 1) and water (Point 2).

Permissible ambient temperature range T_U [°C]
Defines the minimum and maximum permissible ambient temperature to which the mentioned performance values apply when the motor is in operation. The permissible winding temperature in the motor (115°C for insulation Class E, as per EN 60 034-1) </1125 should not be exceeded.

Motor mass m [kg]
Weight of the delivered unit without additional units or packaging.

Max. shaft load F_{radial}/F_{axial} [N]
The permissible forces are divided into radial and axial load values. They are based on the maximum permissible values for the motor bearing during operation at normal rating and a defined service life expectancy L_{10}.

Service life L_{10}
The values for the L_{10} service life specified in conjunction with the permitted bearing loads have been calculated to DIN ISO 281. In addition to the specified values, this calculation is based on operation of the motor at nominal conditions (nominal torque, nominal speed) and an ambient temperature of max. 40°C. Therefore, the service life information is explicitly not a guarantee of service life, but strictly a theoretical quality figure.

Max. reverse voltage [V DC]
When the braking function is activated and when the set value step change is negative, the motor operates in controlled braking mode. In this operating state, the large part of the braking energy is fed back to the intermediate circuit until the max. reverse voltage is reached and the electronics prevent a further increase beyond this value by chopped braking. This behavior should be given special consideration when selecting the system supply.

Set value input
Speed setting via an analogue interface for DC voltage.
Depending on the drive design, the set speed can be configured in a range from 0 ... n_{max}, where the minimum possible speed value (with limited control quality) is about 0 rpm (sinus commutation)

or approx. 50 to 100 rpm (block commutation). (Relevant only for drives with integrated operating electronics).

Recommended speed range [rpm]
Speed control range within which the speed control accuracy stipulated in the system specification is complied with.

Starting torque [mNm]

Is the torque that can be delivered over a short time when the motor is started based on the electromagnetic motor characteristics and the set current limitation.

Effective torque M_{eff} [mNm]

For cycle operation (e.g. "S5" operating mode – intermittent duty with the effect of the startup losses and the losses due to electrical braking on the heating), the effective torque corresponding to continuous operation ("S1" operating mode) is determined according to the following formula:

$$Meff = \sqrt{\frac{M_{A2} \cdot t_A + M_{L2} \cdot t_B + M_{Br2} \cdot t_{Br}}{t_A + t_B + t_{Br} + t_{St}}}$$

M_A	Starting torque	M_{Br}	Braking
t_A	Acceleration time	t_{Br}	Braking time
M_L	Load torque	t_{St}	Standstill time
t_B	Load period		

At an ambient temperature of 40°C this effective torque must not be greater than the nominal torque MN listed in the catalog for the selected motor. For intermittent operation (operating mode S3 with tr = relative on period) the following permissible load moment applies:

$$M_L = M_N \cdot \sqrt{\frac{100}{t_r}}$$

System selection

When selecting a motor and operating for a drive system, consideration should be given to the fact that the values permitted for the motor should not be exceeded by the electronics. Likewise, the relationship shown in the commutation sequences between the sequence of Hall signals and the corresponding switching times and switching states of the output stage at the phase supply lines must be observed in order to attain optimum operation of the motor.

Please contact the manufacturer if the drives are operated or stored under non standard environmental conditions.

ECI motor.

ECI-42.XX-K1

- Highly dynamic 3-phase internal rotor motor with EC technology
- Low cogging torque
- Robust, noise-optimized ball bearing system for a long service life
- High efficiency and high power density realized in a compact design
- Basic motor with electronic module K1 for operation with external control electronics
- Mechanical design and interfaces designed for modular flexibility
- Protection class IP 40 (higher on request) and connection with wire strands

Nominal data

Type		ECI-42.20-K1-B00	ECI-42.20-K1-D00	ECI-42.40-K1-B00	ECI-42.40-K1-D00
Nominal voltage (U_N)	V DC	24	48	24	48
Nominal speed (n_N)**	rpm	4,000			
Nominal torque (M_N)**	mNm	110	110	220	220
Nominal current (I_N)**	A	2.50	1.30	5.10	2.60
Nominal output power (P_N)**	W	46	46	92	92
Speed at no-load operation (n_L)	rpm	5,900	5,900	5,700	5,700
No-load current (I_L)	A	0.33	0.10	0.40	0.20
Recommended speed control range	rpm	0 ... 5,000			
Permanent stall torque (M_{SD})	mNm	100	100	200	200
Overload protection		To be implemented via the control electronics			
Permissible peak current (I_{max})***	A	14	7	21	11
Motor constant (K_E)	mVs/rad	40.9	84.2	42.8	83.9
Connection resistance (R_y)	Ω	0.85	3.20	0.39	1.50
Connection inductance (L_y)	mH	1.10	4.50	0.50	1.84
Starting torque (M_{max})	mNm	480	480	960	960
Rotor moment of inertia (J_a)	kgm² x10⁻⁶	3.42	3.42	6.70	6.70
Permissible ambient temperature range (T_U)	°C	0 ... +40			
Motor mass (m)	kg	0.33	0.33	0.48	0.48
Order no. (wire interface)*	IP 40	932 4220 122	932 4220 123	932 4240 122	932 4240 123

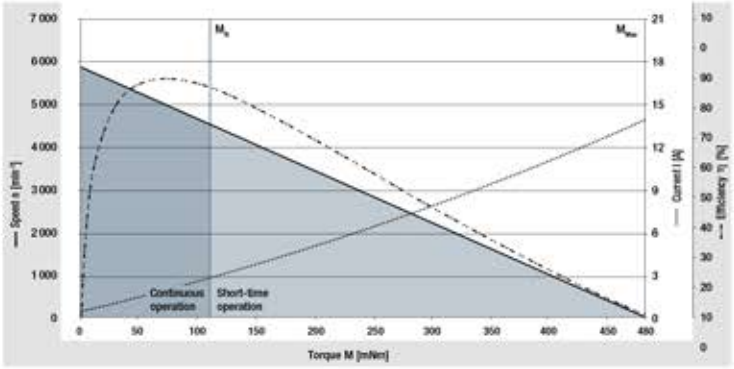
Subject to alterations

Preferred type: ready to ship in 48 hours

* Classification of protection class refers to installed state with sealing on the flange side
** At T_U max. 40°C
*** Permissible time for peak current: max. 1 sec. – to be repeated only after complete cool down

Characteristic curve

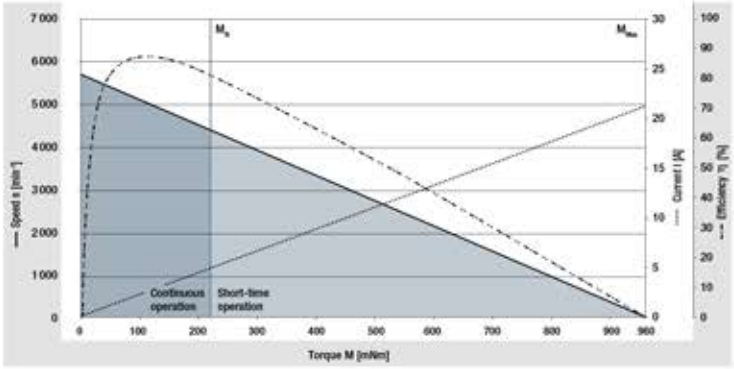
ECI-42.20, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

ECI-42.40, 24 V (at 25°C)

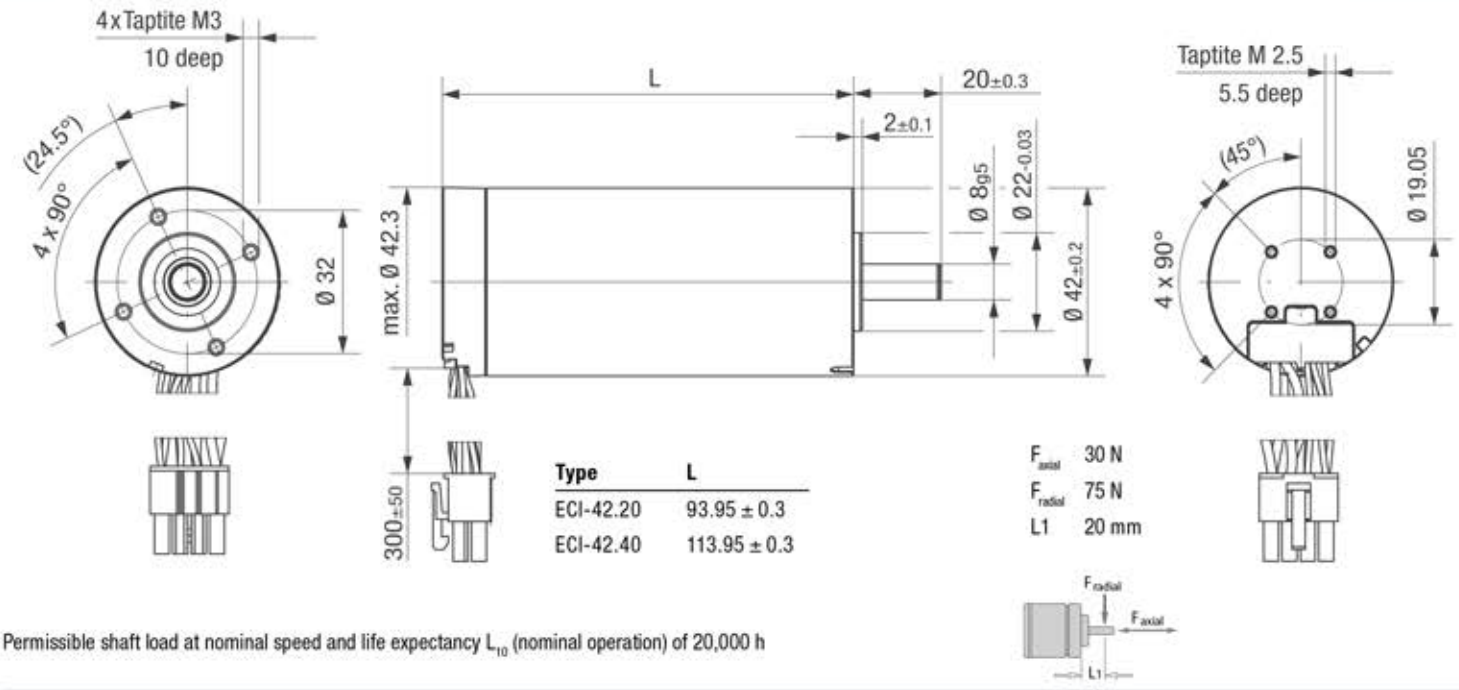


1) Nominal data, see table

Characteristic curve 48 V on request

Technical drawing

All dimensions in mm



Type	L
ECI-42.20	93.95 ± 0.3
ECI-42.40	113.95 ± 0.3

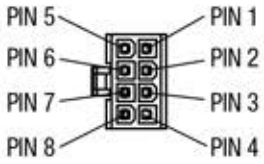
F_{axial}	30 N
F_{radial}	75 N
L1	20 mm

Permissible shaft load at nominal speed and life expectancy L_{10} (nominal operation) of 20,000 h

Electrical connection

Supply wire

No.	Color	Function
1	yellow	Phase W
5	violet	Phase V
6	brown	Phase U



Molex pin no. 39-01-2085

Signal wire

No.	Color	Function
4	green	Hall A
3	white	Hall B
8	gray	Hall C
2	red	UB
7	black	GND

Modular construction kit

Brake system
Spring-applied braking
BFK 457-01 (page 74)

Encoder system
Optical incremental encoder
HEDS 5500 (page 76)

Basic motor

Planetary gearheads
NoiselessPlus 42 (page 48)
Performax® 42 (page 52)
Performax®Plus 42 (page 56)

Crown gearheads
EtaCrown 52 (page 62)
EtaCrown®Plus 42 (page 66)

Recommended external control electronics

VTD-XX.XX-K3	Speed (page 38)
VTD-XX.XX-K4S	Position (page 40)
VTD-60.13-K5SB	Position (page 42)

For motor-gearbox combinations, depending on the choice of the single components, the maximum allowable torque (gearbox) can be exceeded or respectively not reached.

ECI motor.

ECI-63.XX-K1

- Highly dynamic 3-phase internal rotor motor with EC technology
- Low cogging torque
- Robust, noise-optimized ball bearing system for a long service life
- High efficiency and high power density realized in a compact design
- Basic motor with electronic module K1 for operation with external control electronics
- Mechanical design and interfaces designed for modular flexibility
- Protection class IP 40/IP 54 and connection by connector system

Nominal data

Type		ECI-63.20-K1 -B00	ECI-63.20-K1 -D00	ECI-63.40-K1 -B00	ECI-63.40-K1 -D00	ECI-63.60-K1 -B00	ECI-63.60-K1 -D00
Nominal voltage (U_N)	V DC	24	48	24	48	24	48
Nominal speed (n_N)**	rpm	4,000					
Nominal torque (M_N)**	mNm	360	360	670	670	800	880
Nominal current (I_N)**	A	8.50	4.50	14.0	6.50	17.6	8.50
Nominal output power (P_N)**	W	150	150	280	280	335	370
Speed at no-load operation (n_L)	rpm	5,800	6,800	5,900	5,900	6,100	6,000
No-load current (I_L)	A	0.50	0.30	0.70	0.32	1.30	0.45
Recommended speed control range	rpm	0 ... 5,000					
Overload protection		To be implemented via the control electronics					
Starting torque (M_{max})	mNm	1,800	1,800	3,300	3,300	5,300	4,400
Rotor moment of inertia (J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57	57
Permissible peak current (I_{max})***	A	55	30	95	45	150	57
Motor constant (K_E)		41.4	73.3	40.4	83.8	40.4	83.8
Thermal resistance (R_{th})	K/W	3.60	3.60	2.90	2.90	2.50	2.50
Connection resistance (R_V)		0.14	0.42	0.08	0.24	0.04	0.15
Connection inductance (L_V)		0.26	0.88	0.14	0.57	0.09	0.33
Permissible ambient temperature range (T_U)	°C	0 ... +40					
Motor mass (m)	kg	0.90	0.90	1.20	1.20	1.50	1.50
Order no. (wire interface)*	IP 40	932 6320 103	932 6320 105	932 6340 103	932 6340 105	932 6360 106	932 6360 108
Order No. (connector interface)*	IP 54	932 6320 100	932 6320 102	932 6340 100	932 6340 102		932 6360 102

Subject to alterations

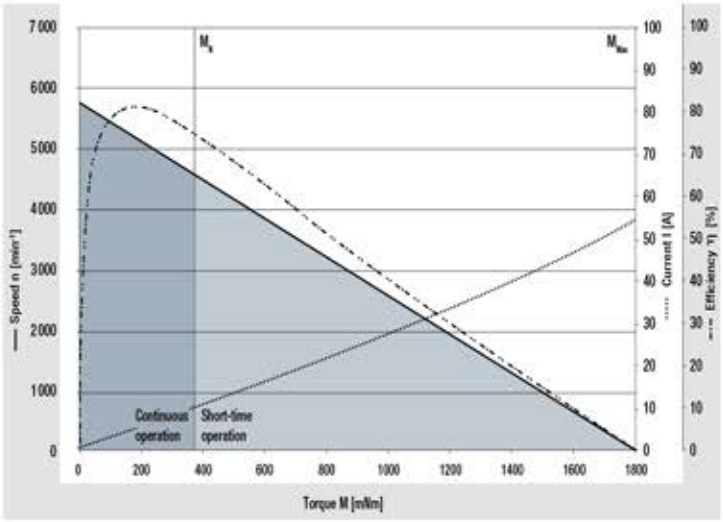
Preferred type: ready to ship in 48 hours

* Classification of protection class refers to installed state with sealing on the flange side

** At T_U max. 40°C

*** Permissible time for peak current: max. 1 sec. – to be repeated only after complete cool down

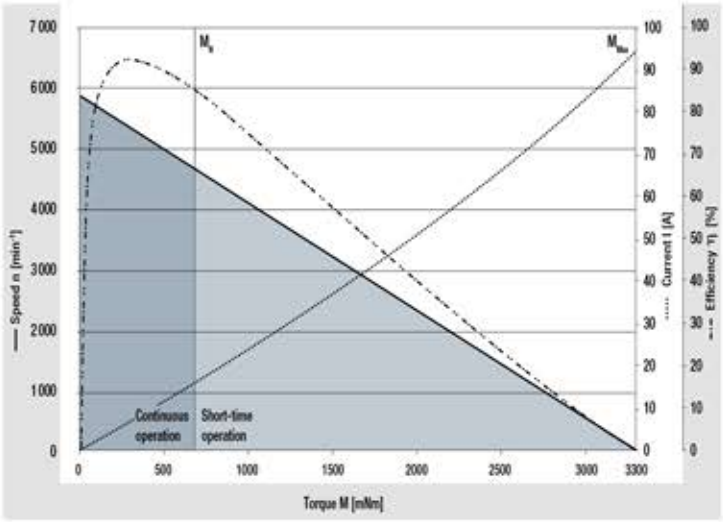
ECI-63.20-K1, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

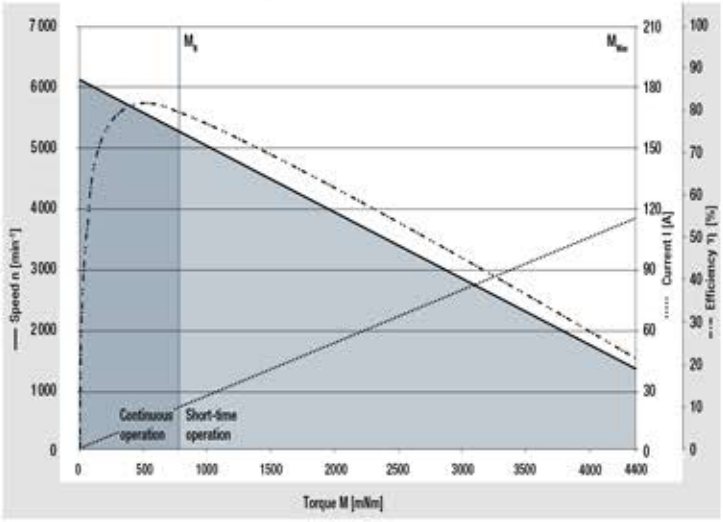
ECI-63.40-K1, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

ECI-63.60-K1, 24 V (at 25°C)

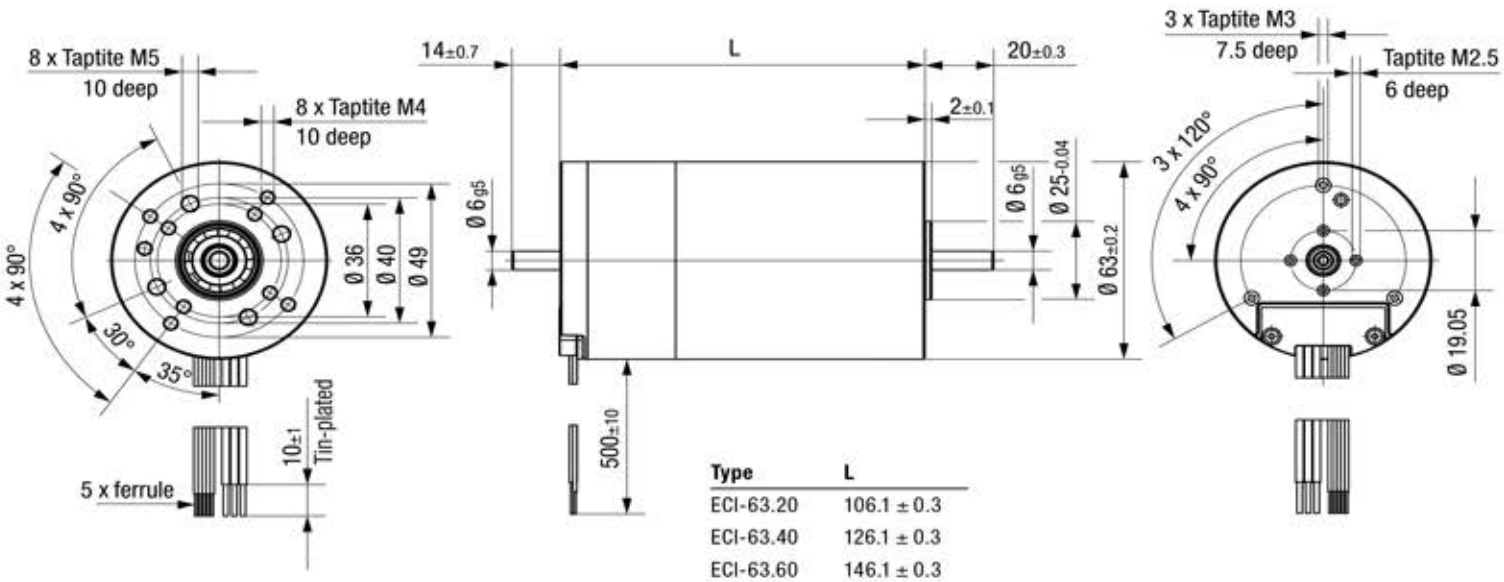


1) Nominal data, see table

Characteristic curve 48 V on request

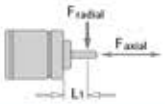
Technical drawing

All dimensions in mm



Type	L
ECI-63.20	106.1 ± 0.3
ECI-63.40	126.1 ± 0.3
ECI-63.60	146.1 ± 0.3

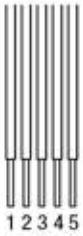
Permissible shaft load at nominal speed and life expectancy L_{10} (nominal operation) of 20,000 h



F_{axial}	150 N
F_{radial}	150 N
L1	20 mm

Electrical connection

Supply wire		
Wire	**Color**	**Function**
1	yellow	Phase W
2	violet	Phase V
3	brown	Phase U



Signal wire		
Wire	**Color**	**Function**
4	green	Hall A
5	white	Hall B
6	gray	Hall C
7	red	UB
8	black	GND

Factory building

Modular construction kit

Brake system
Spring-applied braking
BFK 457-03 (page 74)

Encoder system
Optical incremental encoder
HEDS 5500 (page 76)

Basic motor

Planetary gearheads
NoiselessPlus 63 (page 50)
Performax® 63 (page 54)
Performax®Plus 63 (page 58)
Optimax 63 (page 60)

Recommended external control electronics	
VTD-XX.XX-K4S	Speed (page 40)
VTD-60.13-K5SB	Position (page 42)
VTD-60.35-K5SB	Position (page 44)

Crown gearheads
EtaCrown® 75 (page 64)
EtaCrown®Plus 63 (page 68)

For motor-gearbox combinations, depending on the choice of the single components, the maximum allowable torque (gearbox) can be exceeded or respectively not reached.

ECI motor.

ECI-63.XX-K3

- Drive with completely integrated K3 operation and control electronics
- Integrated speed control
- Interface with analog and digital control inputs
- Output stage enabled via digital hardware enabling
- Field-oriented closed-loop control
- 15-pole plug

Nominal data

Type		ECI-63.20-K3 -B00	ECI-63.20-K3 -D00	ECI-63.40-K3 -B00	ECI-63.40-K3 -D00	ECI-63.60-K3 -D00
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	18 ... 30	18 ... 53	18 ... 30	18 ... 53	18 ... 53
Nominal speed (n_N)	rpm			4,000		
Nominal torque (M_N)**	mNm	425	450	600	750	850
Nominal current (I_N)**	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)**	W	178	188	251	314	356
Speed at no-load operation (n_L)	rpm	5,800	5,800	5,900	5,800	6,000
No-load current (I_L)	A	0.50	0.50	0.90	0.50	0.60
Max. reverse voltage	V DC	35	58	35	58	58
Set value input				x analog		
Recommended speed control range	rpm			0 ... 5,000		
Function for motor protection at stall				thermal		
Overload protection				yes		
Starting torque (M_{max})	mNm	1,480	1,890	1,500	3,000	2,550
Rotor moment of inertia (J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57
Thermal resistance (R_{th})	K/W	3.60	3.60	2.90	2.90	2.50
Permissible ambient temperature range (T_U)	°C			0 ... +40		
Motor mass (m)	kg	0.85	0.85	1.15	1.15	1.50
Order no. (wire interface)*	IP 40	932 6320 303	932 6320 305	932 6340 303	932 6340 305	932 6360 305
Order no. (connector interface)*	IP 54	932 6320 300	932 6320 302	932 6340 300	932 6340 302	932 6360 302

Subject to alterations

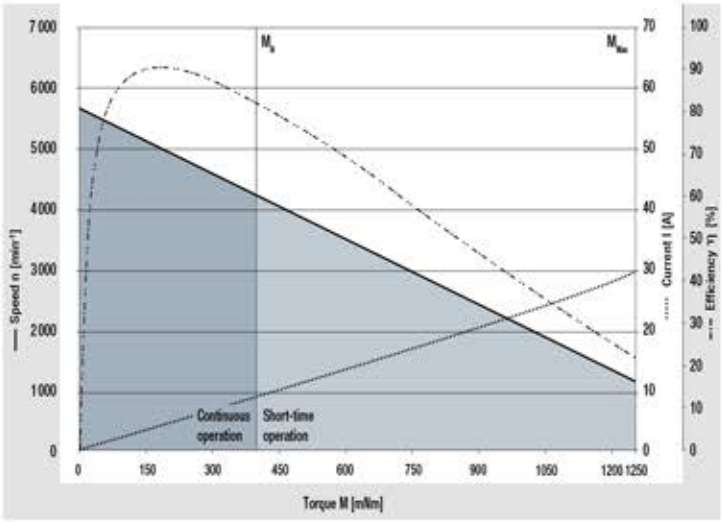
Preferred type: ready to ship in 48 hours

* Classification of protection class refers to installed state with sealing on the flange side

** At T_U max. 40°C

Characteristic curve

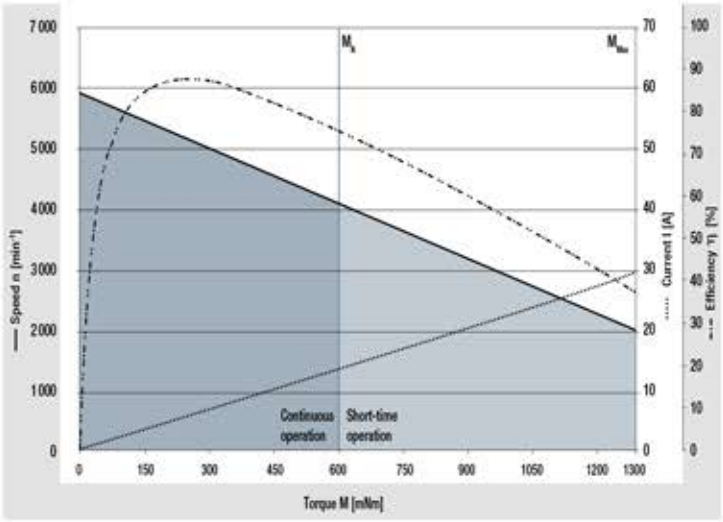
ECI-63.20-K3, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

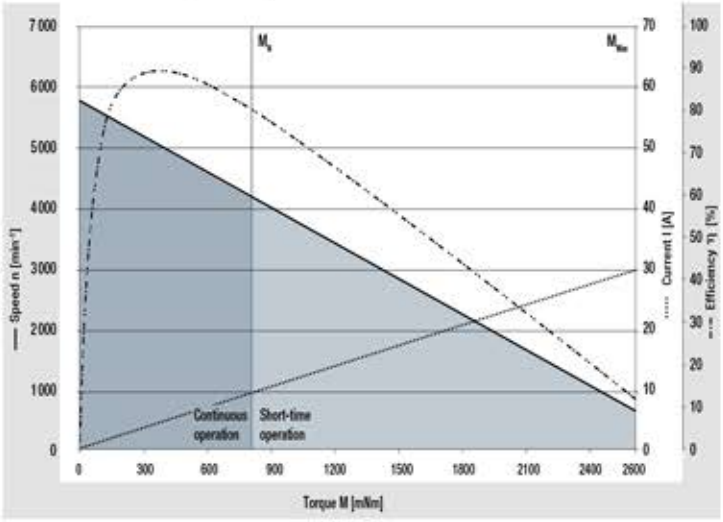
ECI-63.40-K3, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

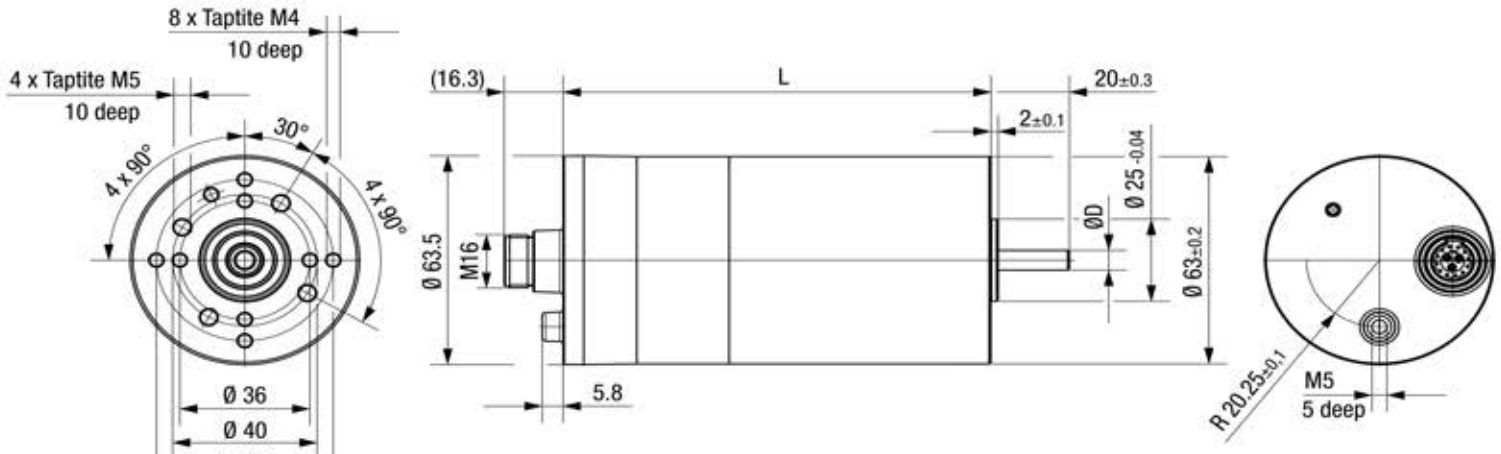
ECI-63.60-K3, 48 V (at 25°C)



1) Nominal data, see table

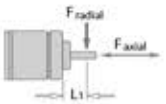
Technical drawing

All dimensions in mm



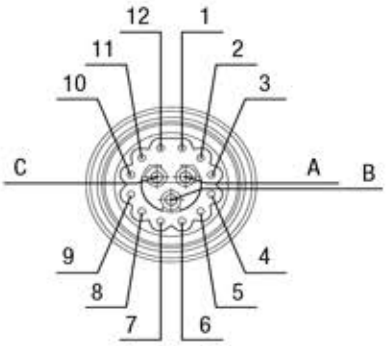
Type	L	Ø D
ECI-63.20	118.5 ± 0.3	6_{g5}
ECI-63.40	138.5 ± 0.3	6_{g5}
ECI-63.60	158.5 ± 0.3	10_{g5}

Permissible shaft load at nominal speed and life expectancy L_{10} (nominal operation) of 20,000 h



F_{axial}	150 N
F_{radial}	150 N
L1	20 mm

Electrical connection

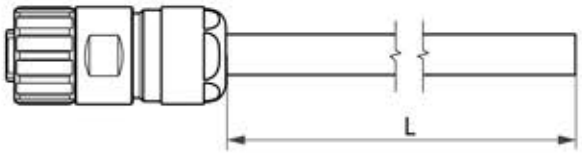


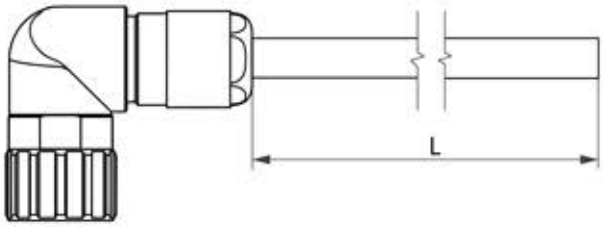
	Wire color	Pin	Configuration	Function	Recommended AWG
Signal	white	1	IN A	NPN 24 V	24
	brown	2	IN B	NPN 24 V	
	green	3	IN 1	NPN 24 V	
	yellow	4	IN 2	NPN 24 V/analog 0 ... 10 V/brake	
	gray	5	OUT 1	PNP 24 V	
	pink	6	OUT 2	PNP 24 V	
	blue	7	OUT 3	PNP 24 V	
	red	8	Analog IN 1	0 ... 10 V (differential)	
	black	9	Analog GND	GND for Analog IN 1 (differential)	
	violet	10	RS485 A (+)	Progr. bus	
	gray/pink	11	RS485 B (–)	Progr. bus	
	red/blue	12	U_{Logic}	Logic power supply (24 V)	
Power	gray	A	Ballast	Ballast resistor	16
	brown	B	U_{ZK}	Power supply	
	black	C	GND	Power/signal GND	

Cable

Type	Length L (mm)	Order no.
Cable (12+3 Pins)	1,000 ±30	992 0160 034
Cable (12+3 Pins)	3,000 ±30	992 0160 035

Type	Length L (mm)	Order no.
Cable (12+3 Pins)	1,000 ±30	992 0160 036
Cable (12+3 Pins)	3,000 ±30	992 0160 037





For self-assembly, cables can be obtained from Hummel:

- Hummel cable connector M16 for cable Ø 8-11 mm, Tightening torque: 5 Nm (Order no. 7.810.500.000)
- Hummel crimp insert series M16, socket 12+3 with special coding (Order no. 7K11886034)
- Hummel crimp contact socket 3 x, power, crimp range 0,5 - 1,5 mm² (Order no. 7.010.981.202)
- Hummel crimp contact socket 12 x, signal, crimp range 0,08 - 0,34 mm² (Order no. 7.010.980.802)

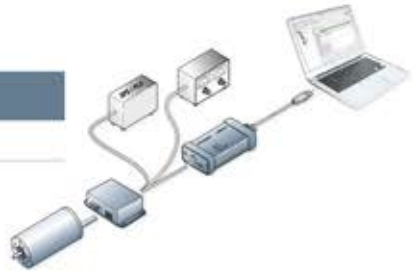
Modular construction kit

Brake system
Spring-applied braking
BFK 457-03 (page 74)

Basic motor

Planetary gearheads
NoiselessPlus 63 (page 50)
Performax® 63 (page 54)
Performax®Plus 63 (page 58)
Optimax 63 (page 60)

Commissioning tool
Kickstart (page 72)



Crown gearheads
EtaCrown® 75 (page 64)
EtaCrown®Plus 63 (page 68)

Cable
Connection cables have to be ordered separately

For motor-gearbox combinations, depending on the choice of the single components, the maximum allowable torque (gearbox) can be exceeded or respectively not reached.

ECI motor.

ECI-63.XX-K4

- Drive with completely integrated 4Q operation and control electronics
- Speed, torque or position mode possible
- Selection of operating modes and parameter setting via RS485
- Extensive interface with various inputs and outputs
- Output stage enabled via digital input
- Integrated brake chopper
- Speed set values from n=0 with holding torque up to 5,000 rpm
- Excellent control behavior via field-oriented control with sine commutation
- High efficiency and high power density realized in a compact design
- User-friendly parameter setting with Kickstart PC software

Nominal data

Type		ECI-63.20-K4 -B00	ECI-63.20-K4 -D00	ECI-63.40-K4 -B00	ECI-63.40-K4 -D00	ECI-63.60-K4 -D00
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	18 ... 30	18 ... 53	18 ... 30	18 ... 53	18 ... 53
Nominal speed (n_N)	rpm	4,000				
Nominal torque (M_N)**	mNm	425	450	600	750	850
Nominal current (I_N)**	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)**	W	178	188	251	314	356
Speed at no-load operation (n_L)	rpm	5,800	5,800	5,900	5,800	6,000
No-load current (I_L)	A	0.50	0.50	0.90	0.50	0.60
Max. reverse voltage	V DC	35	58	35	58	58
Set value input		x analog/PWM/frequency/digital				
Recommended speed control range	rpm	0 ... 5,000				
Function for motor protection at stall		thermal				
Overload protection		yes				
Starting torque (M_{max})	mNm	1,480	1,890	1,500	3,000	2,550
Rotor moment of inertia (J_R)	kgm² x10⁻⁶	19	19	38	38	57
Thermal resistance (R_{th})	K/W	3.60	3.60	2.90	2.90	2.50
Permissible ambient temperature range (T_U)	°C	0 ... +40				
Motor mass (m)	kg	0.85	0.85	1.15	1.15	1.50
Order no. (wire interface)*	IP 40	932 6320 403	932 6320 405	932 6340 403	932 6340 405	932 6360 405
Order no. (connector interface)*	IP 54	932 6320 400	932 6320 402	932 6340 400	932 6340 402	932 6360 402

Subject to alterations

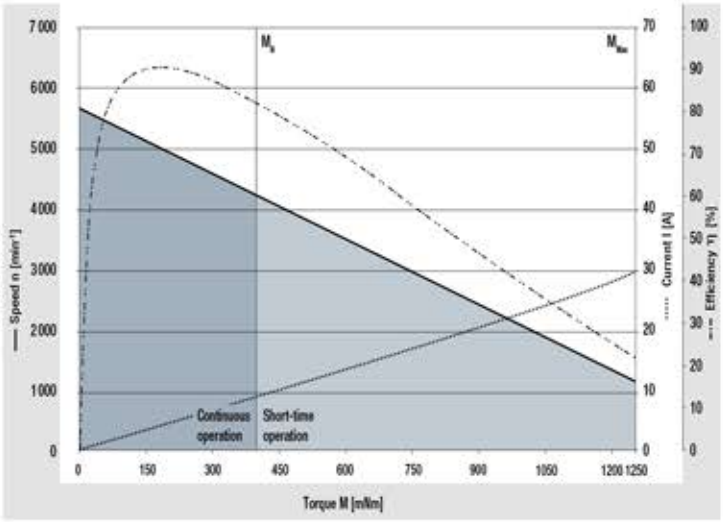
Preferred type: ready to ship in 48 hours

* Classification of protection class refers to installed state with sealing on the flange side

** At T_U max. 40°C

Characteristic curve

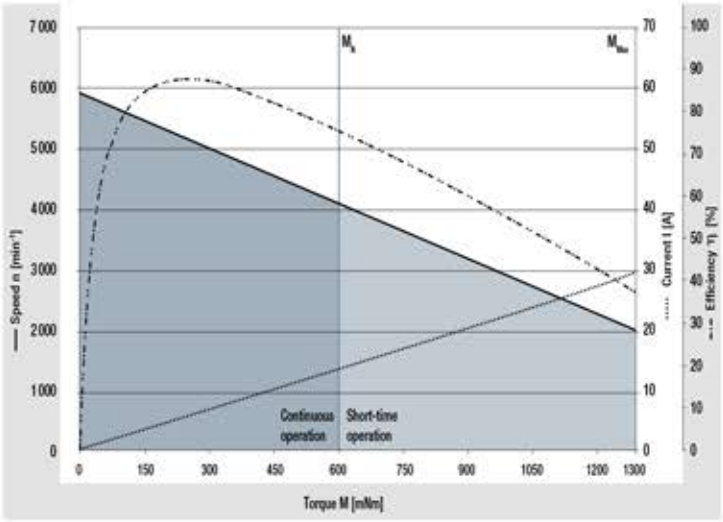
ECI-63.20-K4, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

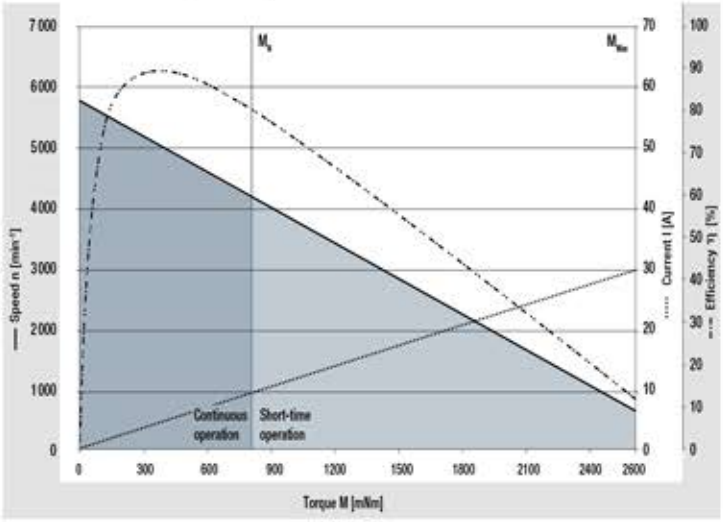
ECI-63.40-K4, 24 V (at 25°C)



1) Nominal data, see table

Characteristic curve 48 V on request

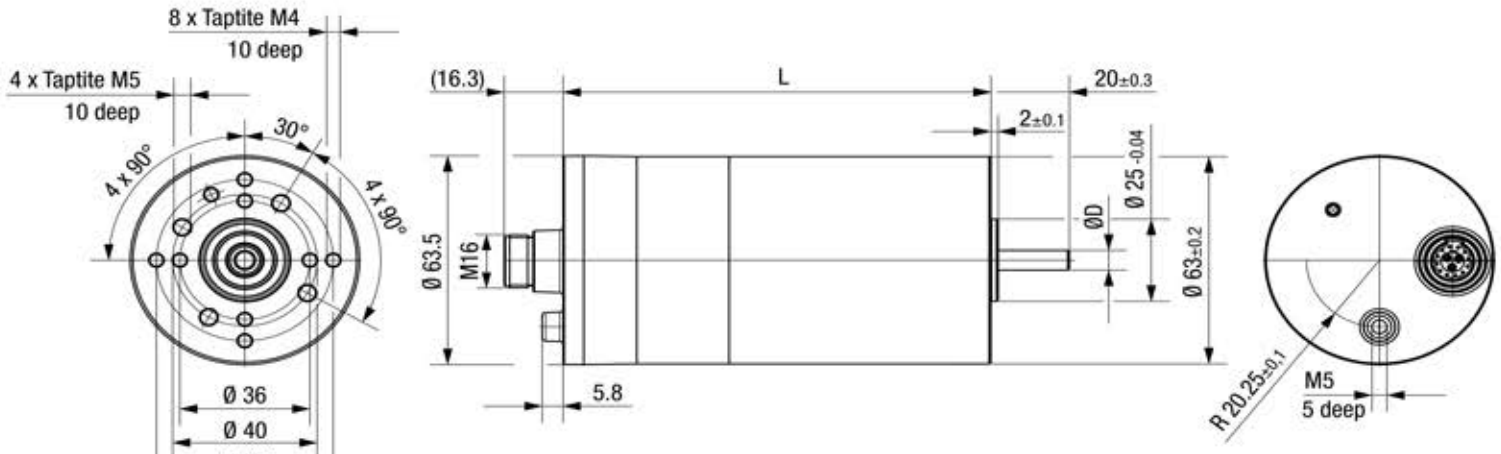
ECI-63.60-K4, 48 V (at 25°C)



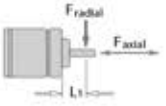
1) Nominal data, see table

Technical drawing

All dimensions in mm



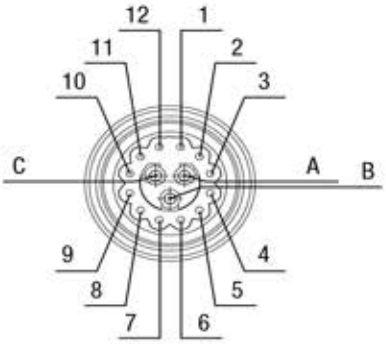
Type	L	Ø D
ECI-63.20	118.5 ± 0.3	6_{g5}
ECI-63.40	138.5 ± 0.3	6_{g5}
ECI-63.60	158.5 ± 0.3	10_{g5}



F_{axial}	150 N
F_{radial}	150 N
L1	20 mm

Permissible shaft load at nominal speed and life expectancy L_{10} (nominal operation) of 20,000 h

Electrical connection

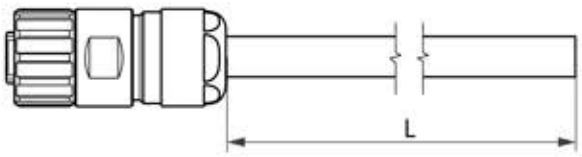


	Wire color	Pin	Configuration	Function	Recommended AWG
Signal	white	1	IN A	NPN 24 V	24
	brown	2	IN B	NPN 24 V	
	green	3	IN 1	NPN 24 V	
	yellow	4	IN 2	NPN 24 V/analog 0 ... 10 V/brake	
	gray	5	OUT 1	PNP 24 V	
	pink	6	OUT 2	PNP 24 V	
	blue	7	OUT 3*	PNP 24 V	
	red	8	Analog IN 1	0 ... 10 V (differential)	
	black	9	Analog GND	GND for Analog IN 1 (differential)	
	violet	10	RS485 A (+)	Progr. bus	
	gray/pink	11	RS485 B (–)	Progr. bus	
	red/blue	12	U_{Logic}	Logic power supply (24 V)	
Power	gray	A	Ballast	Ballast resistor	16
	brown	B	U_{ZK}	Power supply	
	black	C	GND	Power/signal GND	

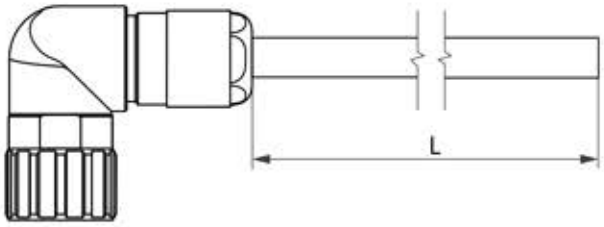
* Output (OUT 3) is only available on ECI-63.XX-K4

Cable

Type	Length L (mm)	Order no.
Cable (12+3 Pins)	1,000 ±30	992 0160 034
Cable (12+3 Pins)	3,000 ±30	992 0160 035



Type	Length L (mm)	Order no.
Cable (12+3 Pins)	1,000 ±30	992 0160 036
Cable (12+3 Pins)	3,000 ±30	992 0160 037



For self-assembly, cables can be obtained from Hummel:

Hummel cable connector M16 for cable Ø 8-11 mm, Tightening torque: 5 Nm (Order no. 7.810.500.000)

Hummel crimp insert series M16, socket 12+3 with special coding (Order no. 7K11886034)

Hummel crimp contact socket 3 x, power, crimp range 0,5 - 1,5 mm² (Order no. 7.010.981.202)

Hummel crimp contact socket 12 x, signal, crimp range 0,08 - 0,34 mm² (Order no. 7.010.980.802)

Modular construction kit

Brake system

Spring-applied braking

BFK 457-03 (page 74)

Basic motor

Planetary gearheads

NoiselessPlus 63 (page 50)

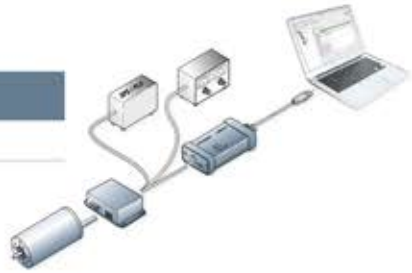
Performax® 63 (page 54)

Performax®Plus 63 (page 58)

Optimax 63 (page 60)

Commissioning tool

Kickstart (page 72)



Crown gearheads

EtaCrown® 75 (page 64)

EtaCrown®Plus 63 (page 68)

Cable

Connection cables have to be ordered separately

For motor-gearbox combinations, depending on the choice of the single components, the maximum allowable torque (gearbox) can be exceeded or respectively not reached.

ECI motor.

ECI-63.XX-K5

- Drive with integrated K5 operation and control electronics with CANopen communication interface
- Sinus commutation of the drives with field-oriented control
- Speed control range down to n=0 rpm with holding torque up to 5,000 rpm possible
- Different operating modes according to DSP 402 (speed, torque, positioning) possible via software
- Electronics in safely sealed housing
- Connectors M16 and M12 in sealed industry standard
- Interface with analog and digital control inputs

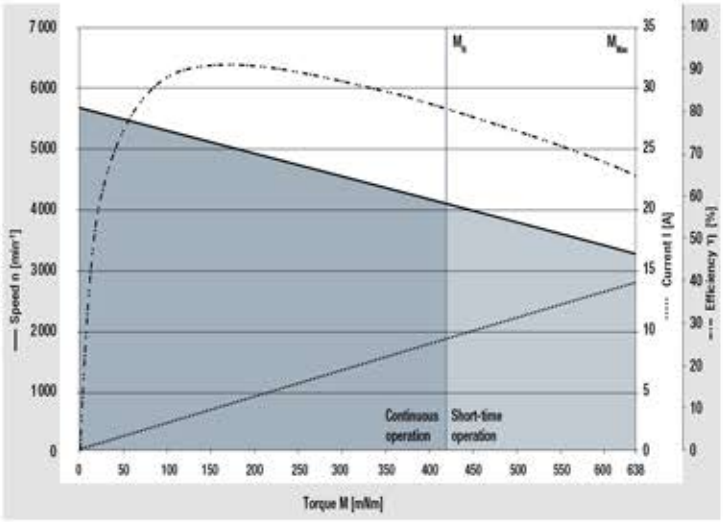
Nominal data

Type		ECI-63.20-K5 -B00	ECI-63.20-K5 -D00	ECI-63.40-K5 -B00	ECI-63.40-K5 -D00	ECI-63.60-K5 -D00
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	18 ... 30	18 ... 52	18 ... 30	18 ... 52	18 ... 52
Nominal speed (n_N)**	rpm	4,000				
Nominal torque (M_N)**	mNm	425	450	600	750	850
Nominal current (I_N)**	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)**	W	178	188	251	314	356
Speed at no-load operation (n_L)	rpm	5,800	5,800	5,900	5,800	6,000
No-load current (I_L)	A	0.50	0.20	0.90	0.46	0.48
Max. reverse voltage	V DC	35	58	35	58	58
Set value input		x analog/PWM/frequency/digital				
Recommended speed control range	Rpm	0 ... 4,000				
Function for motor protection at stall		thermal				
Overload protection		yes				
Starting torque (M_{max})	mNm	1,275	1,350	1,500	2,250	2,550
Rotor moment of inertia (J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57
Thermal resistance (R_{th})	K/W	3.60	3.60	2.90	2.90	2.50
Permissible ambient temperature range (T_U)	°C	0 ... +40				
Motor mass (m)	Kg	0.95	0.95	1.25	1.25	1.55
Order no. (connector interface)*	IP 54	932 6320 550	932 6320 552	932 6340 550	932 6340 552	932 6360 552

Subject to alterations
Series planned 2nd q/2017

* Classification of protection class refers to installed state with sealing on the flange side
** At T_U max. 40°C

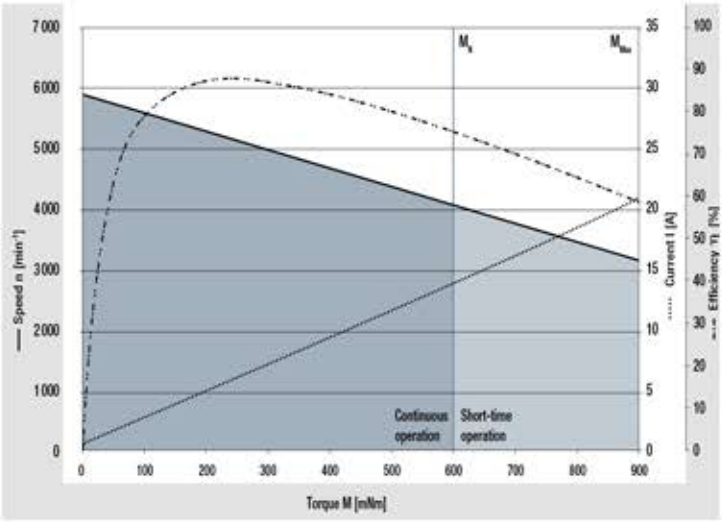
ECI-63.20-K5, 24 V (at 25°C)



[1] Nominal data, see table

Characteristic curve 48 V on request

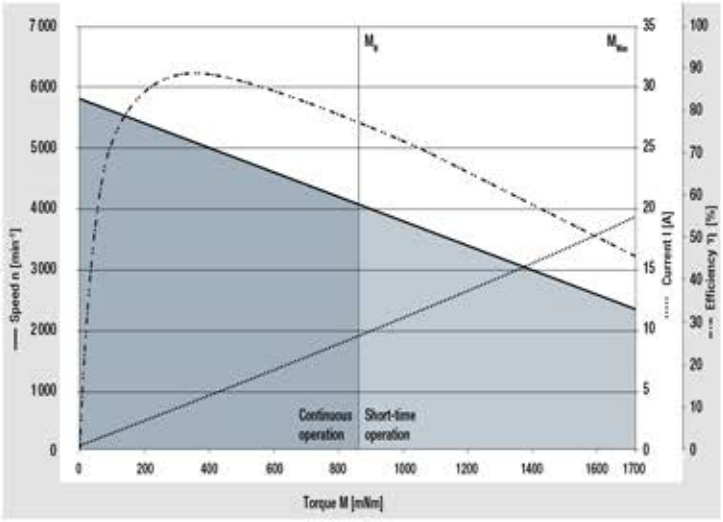
ECI-63.40-K5, 24 V (at 25°C)



[1] Nominal data, see table

Characteristic curve 48 V on request

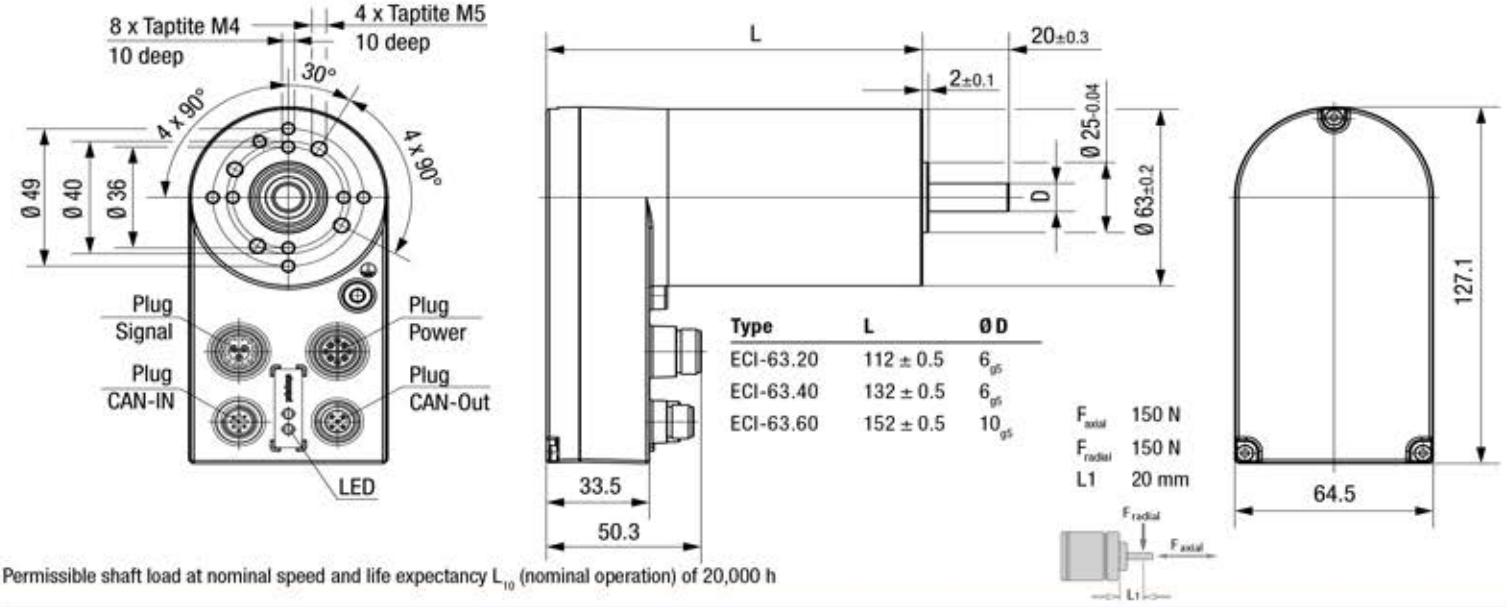
ECI-63.60-K5, 48 V (at 25°C)



[1] Nominal data, see table

Technical drawing

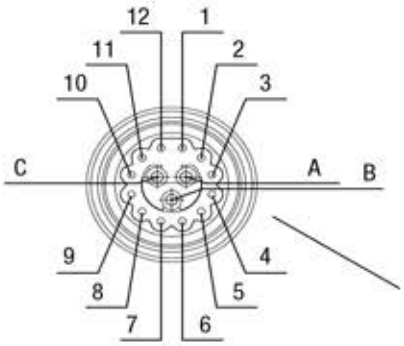
All dimensions in mm

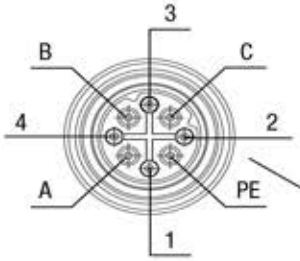


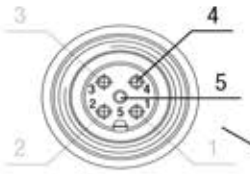
Type	L	Ø D
ECI-63.20	112 ± 0.5	6_{g5}
ECI-63.40	132 ± 0.5	6_{g5}
ECI-63.60	152 ± 0.5	10_{g5}

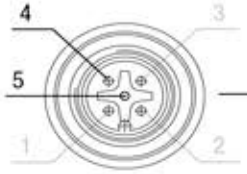
Permissible shaft load at nominal speed and life expectancy L_{10} (nominal operation) of 20,000 h

Electrical connection





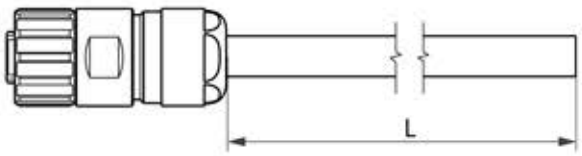




	Wire color	Pin	Configuration	Function	Recommended AWG
Plug Signal	white	1	IN 1	Digital input 1	24
	brown	2	IN 2	Digital input 2	
	green	3	IN 3	Digital input 3	
	yellow	4	IN 4	Digital input 4	
	gray	5	IN 5	Digital input 5	
	pink	6	IN 6	Digital input 6	
	blue	7	IN 7	Digital input 7	
	red	8	OUT 1	Digital output 1	
	black	9	OUT 2	Digital output 2	
	violet	10	Enable	Enable input	
	gray/pink	11	Ain 1+	Analog input 1	
	red/blue	12	Ain 2	Analog input 2	
	gray	A	Ain 1-	Analog input 1 GND	18
	brown	B	U_{Logic}	Power supply for electronics	
	black	C	GND	Mass and reference for Ain 2	
Plug Power	brown	Pin A	U_{ZK}	Power supply (ballast)	16
	gray	Pin B	Ballast	Ballast resistor	
	black	Pin C	GND power	Power supply	
	blue	Pin PE	PE	Earthing (on motor housing)	
	white	Pin 1	CAN H	CAN Bus high signal	24
	brown	Pin 2	CAN L	CAN Bus low signal	
	green	Pin 3	Enable	24 V	
	yellow	Pin 4	U_{Logic}	NPN/PNP 24 V	
Plug CAN Out		Pin 4	CAN H	CAN Bus high signal	24
		Pin 5	CAN L	CAN Bus low signal	
Plug CAN-IN		Pin 4	CAN H	CAN Bus high signal	24
		Pin 5	CAN L	CAN Bus low signal	

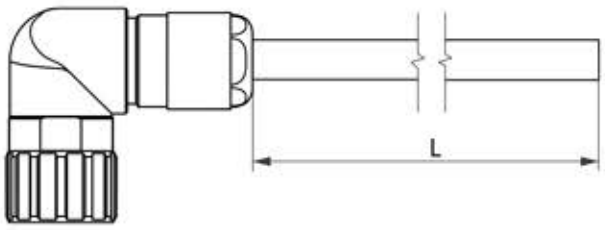
Type	Length L (mm)	Order no.
Cable Signal (12+3 Pins)	1,000 ±30	992 0160 059
Cable Signal (12+3 Pins)	3,000 ±30	992 0160 060
Cable Power (4+3+Pe)*	1,000 ±30	992 0160 055
Cable Power (4+3+Pe)*	3,000 ±30	992 0160 056

* Strands Pin1, Pin2 (CAN_H, CAN_L) not executed.



Type	Length L (mm)	Order no.
Cable Signal (12+3 Pins)	1,000 ±30	992 0160 061
Cable Signal (12+3 Pins)	3,000 ±30	992 0160 062
Cable Power (4+3+Pe)*	1,000 ±30	992 0160 057
Cable Power (4+3+Pe)*	3,000 ±30	992 0160 058

* Strands Pin1, Pin2 (CAN_H, CAN_L) not executed.

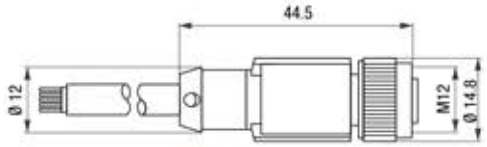


For self-assembly, cables can be obtained from Hummel:

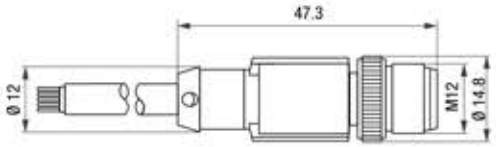
Signal (straight)	1x cable connector M16 for cable Ø 8-11 mm, Order no. 7.810.500.000
	1x crimp insert series M16, socket 12+3 with special coding, Order no. 7K11886034
	3x crimp contact socket power crimp range 0.5-1.5mm², Order no. 7.010.981.202
	12x crimp contact socket signal crimp range 0.08-0.34mm², Order no. 7.010.980.802
Power (straight)	1x cable connector M16 for cable Ø 8-11 mm, Order no. 7.810.500.000
	1x crimp insert series M16, socket 4+3+PE, Order no. 7.003.943.102
	4x crimp contact 1.6 mm²/crimp range 0.34-1.5mm², Order no. 7.010.981.602
	2x crimp contact 0.8 mm²/crimp range 0.08-0.34mm², Order no. 7.010.980.802

Signal (angled)	1x cable connector M16 for cable Ø 8-11 mm, Order no. 7.831.500.000
	1x crimp insert series M16, socket 12+3 with special coding, Order no. 7K11886034
	3x crimp contact socket power crimp range 0.5-1.5mm², Order no. 7.010.981.202
	12x crimp contact socket signal crimp range 0.08-0.34mm², Order no. 7.010.980.802
Power (angled)	1x cable connector M16 for cable Ø 8-11 mm, Order no. 7.831.500.000
	1x crimp insert series M16, socket 4+3+PE, Order no. 7.003.943.102
	4x crimp contact 1.6 mm²/crimp range 0.34-1.5mm², Order no. 7.010.981.602
	2x crimp contact 0.8 mm²/crimp range 0.08-0.34mm², Order no. 7.010.980.802

Length L (mm)	Order no.
5,000 ±30	992 0160 018 (CANopen socket)



Length L (mm)	Order no.
5,000 ±30	992 0160 018 (CANopen plug)



Length L (mm)	Order no.
2,000 ±30	992 0160 019 (CANopen connecting cable)

Modular construction kit

Brake system

On request

Basic motor

Planetary gearheads

NoiselessPlus 63 (page 50)

Performax® 63 (page 54)

Performax®Plus 63 (page 58)

Optimax 63 (page 60)

Commissioning tool

EP-Tools (page 73)

Crown gearheads

EtaCrown® 75 (page 64)

EtaCrown®Plus 63 (page 68)

Cable

Connection cables have to be ordered separately

For motor-gearbox combinations, depending on the choice of the single components, the maximum allowable torque (gearbox) can be exceeded or respectively not reached.