Brushless internal rotor servomotors series ECI

Drive solutions | Industrial drive engineering

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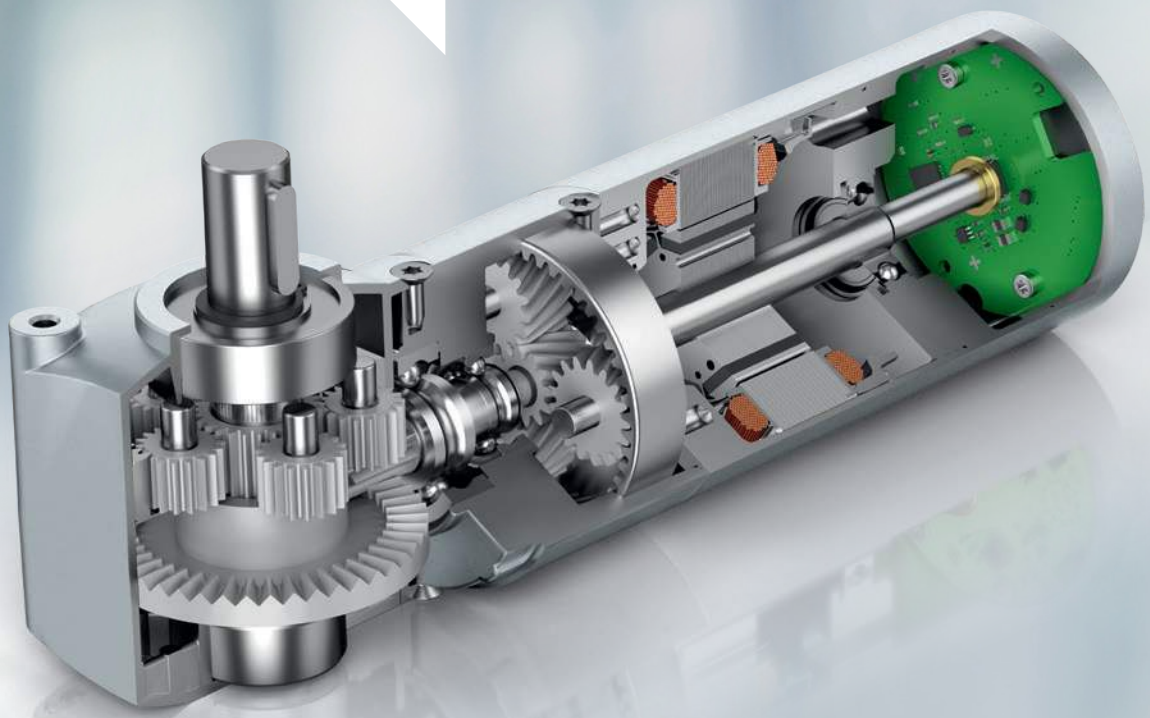
engineering a better life

Product Catalog 2022-06

Drive solutions out of the

modular drive system

Motors with integrated logic & power electronics, optionally with gearbox, encoder & brake.



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Brushless Servomotors ECI series

Contents

GreenIntelligence.
Making Engineers Happy.

Why do our customers look so happy? Because when it comes to digitalization and sustainability, we provide them with a clear competitive edge with GreenIntelligence. The intelligent control and networking of fans and drives makes applications more powerful and efficient. Together with a long product life and highly efficient EC technology, we achieve lasting reductions in energy costs and emissions.

For the wide range of automation tasks needed in industrial drive technology, what you need most is an experienced partner who understands your needs. The drive experts at ebm-papst have detailed applications expertise and, thanks to GreenIntelligence, can offer drive solutions with intelligent networking capabilities that cater for all requirements perfectly.

Here is how much GreenIntelligence *there is in ECI Servomotors:*

+ Integrated logic & power electronics
+ Network functionality
+ Master/slave functionality
+ Condition monitoring
+ Predictive maintenance

ebm-papst. Engineering a better life.

Who we are.

With over 20.000 different products, ebm-papst offers the right solution for just about any challenge. As the logical next stage in the development of our highly-efficient GreenTech EC technology, we believe that industrial digitization offers the greatest future prospects for our customers. With GreenIntelligence, we already represent intelligently interconnected complete solutions that are unrivaled worldwide.

Because we are always committed to making each of our innovative hardware and software solutions more powerful, compact, efficient and sustainable than its predecessor, we have evolved over the years into the global technology leader for ventilation and drive technology.

What drives us.

But our consistent pursuit of efficiency and progress has even deeper roots. After all, there is something that excites us even more than our market position. It is the deep awareness that, with our solutions, we are making the lives of many people around the globe more pleasant, safer and thus better. Therefore, the central driving force in all our thoughts and actions is Engineering a better life. It is the reason why it is worthwhile for us to get up every day and do our best.

More about this at **ebmpapst.com/betterlife**

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What you get out of it.

1. **Technological edge.**
With our EC technology and GreenIntelligence, we combine the highest energy efficiency with the advantages of IIoT and digital networking.

2. **Our sustainable approach.**
We take our responsibility seriously with energy-saving products, environmentally-friendly processes and through social engagement.

3. **System expertise.**
As experts in advanced drive technology, electronics and aerodynamics, we provide perfect system solutions from a single source.

4. **The ebm-papst spirit of invention.**
Over 800 engineers and technicians will develop a solution that precisely fits your needs.

5. **Personal proximity to you.**
Thanks to numerous sales locations worldwide.

6. **Our standard of quality.**
Our quality management is uncompromising, at every step and in every process.

Anna exploits the possibilities of the Industrial Internet of Things throughout the logistics and production processes.

GreenIntelligence helps us turn our commitment to *Engineering a better life* into reality.

What exactly does this mean? Watch the video now:

About ECI Servomotors

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 quiet operation
- Integrated detection of rotor position
- Customer-specific winding layouts
- Winding insulation as per insulation class E
- Protection class up to IP 54 acc. to DIN EN 60529 (optional: IP 65)

- Various motor types which can be combined with planetary and angular gearboxes
- Differentiation of electronics according to classes without integrated electronics (K1) as well as with integrated speed/ positioning function (K3 / K4) up to BUS interfaces (K5)
- Encoder and brake optional

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, UK CA, UL, CSA, EAC
- Additional approvals on request

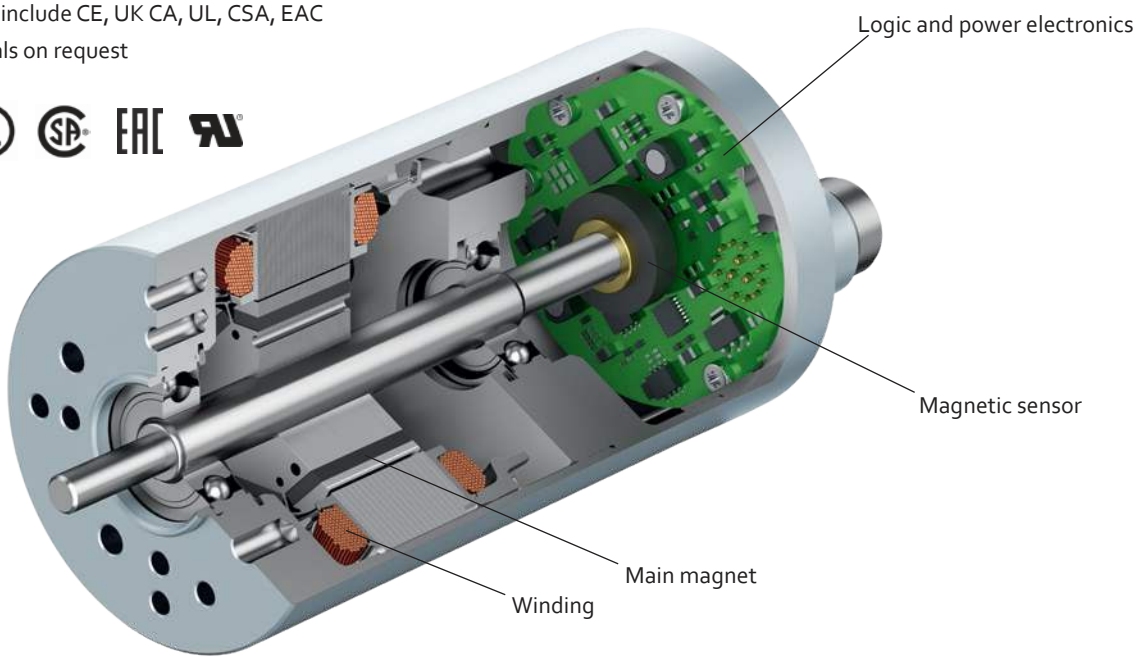
RoHS European Directive EC No. 2011/65/EU (RoHS)

Of course, all current products have been designed for conformity with European Directive 2011/65/EU (RoHS). All older products that do not yet conform to these directives or parts thereof will be consistently redesigned. Thus we can confirm that basically, all of our products listed in this catalog conform to the above-mentioned directive.

REACH Directive (EC Nr. 1907/2006)

The units you purchase from us are products as define d by REACH and thus do not require registration. However, in our own interest and to ensure a high degree of product safety, we track the implementation of REACH and the resulting requirements as part of our duty to provide information.
To comply with the requirements of REACH, we are in contact with all suppliers from whom we obtain chemicals (substances), preparations and components that we use as part of our production process. Within this framework, ebm-papst fulfills the obligations set forth in the REACH regulation.

Also to possible questions to these two topics, we are always at your disposal.



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 metal plate of the following size:

For motor ECI 42: 126 x 126 x 10 mm.
For motor ECI 63: 189 x 189 x 10 mm.
For motor ECI 80: 240 x 240 x 10 mm.

It should be noted that a brake integrated in the motor or a gearbox mounted on the motor will change the specification values.

The **nominal operating point** is the basis for the electro-magnetic design of the motor from the point of view of the maximum possible continuous output of the motor and is specified by the nominal val-ues described here.

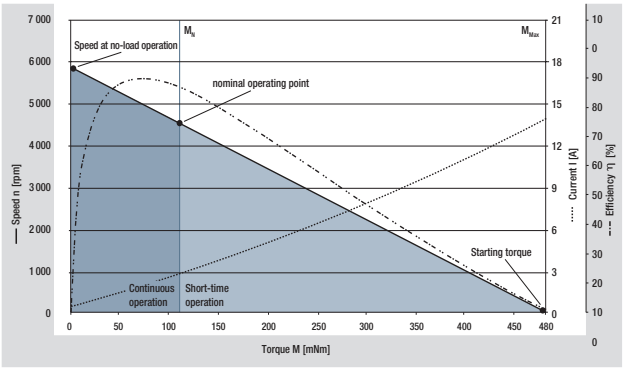
The values mentioned are typical values for the design in question and are also subject to the tolerances included in the specifications or drawings. Unless otherwise stated, the supplements and safety notes contained in the relevant operating and assembly instructions must be kept at all times. Subject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

Nominal output power P_N [W]
The output power which the motor can produce continuously it is calculated from nominal torque and nominal speed. For the electro-magnetic 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.

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} , I_N [A]
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 or controller characteristics.

No-load current I_{BL} , I_L [A]
Is established with nominal voltage and unloaded motor at operating temperature and run-in condition; 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).

Definitions for ECI Servomotors

Permanent stall torque M_{Bn0} , M_{N0} [mNm]
Is the maximum permissible torque with which the motor may be permanently loaded when the rotor is locked.

Permissible peak torque short-term M_{max} [mNm]
Is the torque which the motor can usually deliver for a short time. **(M_A)**

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.
Relevant for drives with external operating electronics (K1).

Motor constant K_e (mVs/rad)
The motor constant is a parameter that characterizes the property of the motor independently of applied voltage and current.

Connection resistance R_v [Ohm]
The winding resistance that is measured at 20°C between any two of three winding terminations.
Relevant for drives with external operating electronics (K1).

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. Relevant for drives with external operating electronics (K1).

Rotor moment of inertia J_R [kgm²x10⁻⁶]
The mass moment of inertia of the rotor and necessary dimension for the dynamic characteristics of the motor.

Protection class (acc. to DIN EN 60529)
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 tempera-ture 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.

Weight 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 calcu-lation 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 val-ue 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 pre-vent a further increase beyond this value by chopped braking. This behavior should be given special consideration when se-lecting the system supply. Relevant for drives with integrated operating electronics (K3, K4, K5).

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 (sine commutation) or approx. 50 to 100 rpm (block commutation). Relevant for drives with integrated operating electronics (K3, K4, K5).

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

Starting torque M_A [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:

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

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:

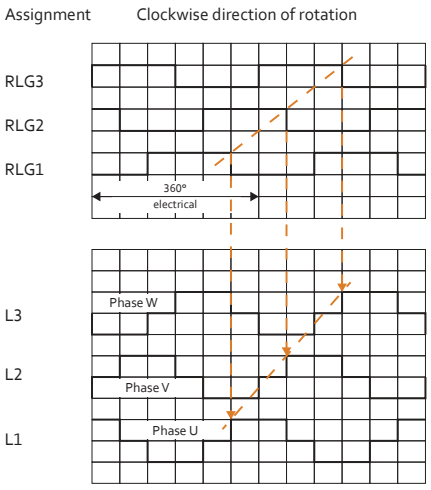
$$M_L = M_N \cdot \sqrt{\frac{100}{t_r}}$$

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.

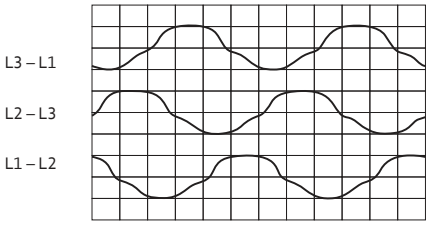
Please contact the manufacturer if the products are operated or stored under non standard environmental conditions.

Commutation sequence
Timing of the signal sequence of the integrated Hall sensors (=RLG) at the respective connections.

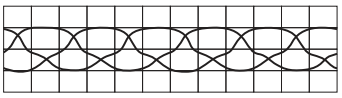
Switching states of the output stage
Necessary correlation between the signal change from the RLG and the corresponding change in the switching state of the output stage transistors related to the phase supply line to the motor.



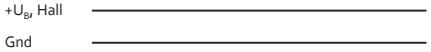
Induced voltages
Idealized representation of the sequence of induced voltages resulting between the respective connections.



Sum of induced voltages

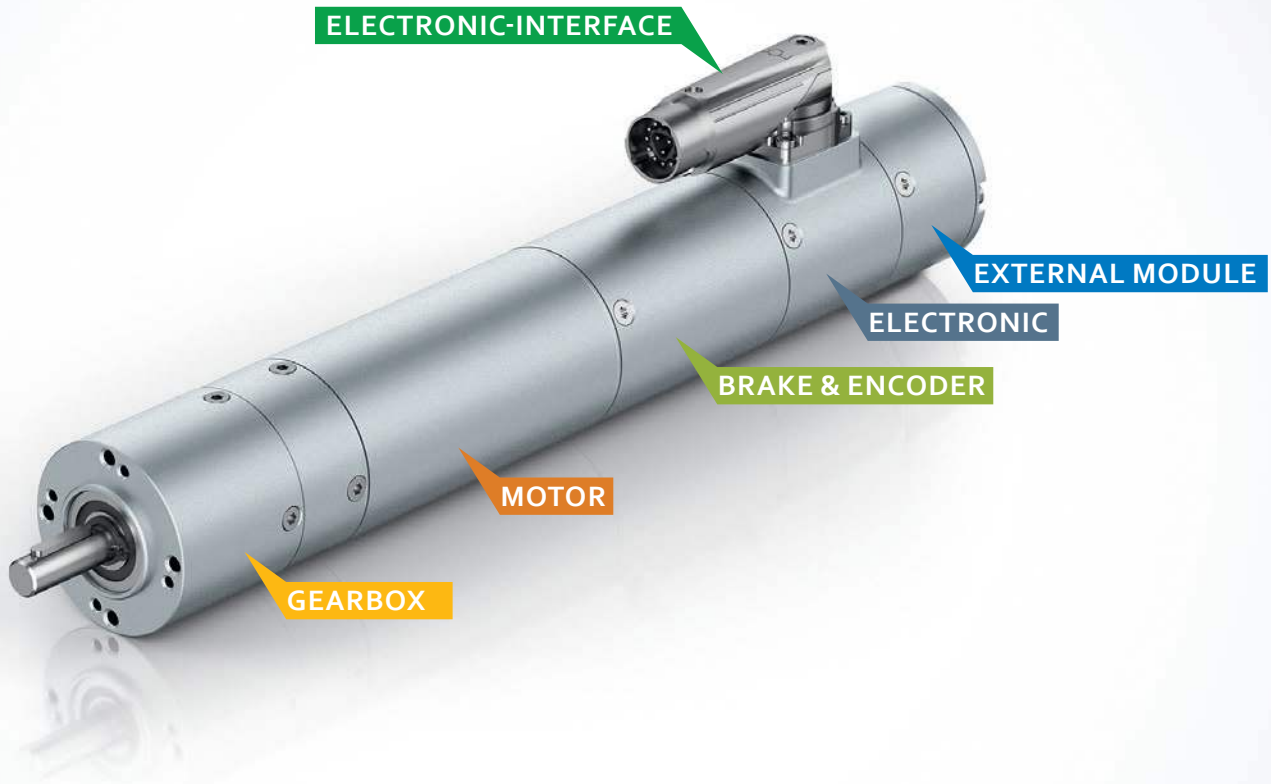


Power supply for Hall sensors
Hall-IC



ECI Servomotors

Overview modular drive system



idt-config.ebmpapst.com

With the free online portal from ebm-papst, you can quickly and easily find the optimal drive solution for your specific requirements and even sample it. Just a few parameters are enough to filter out the most suitable drive solution from our wide range of modules or to configure it yourself.

Brushless internal rotor servomotors series ECI		ECI-42.20-K1 (p. 14)	ECI-42.40-K1 (p. 14)	ECI-63.20-K1 (p. 18)	ECI-63.40-K1 (p. 18)	ECI-63.60-K1 (p. 18)	ECI-63.20-K3/4/5C/5E (from p. 22)	ECI-63.40-K3/4/5C/5E (from p. 22)	ECI-63.60-K3/4/5C/5E (from p. 22)	ECI-80.20-K1 (p. 38)	ECI-80.40-K1 (p. 38)	ECI-80.60-K1 (p. 38)
U_N	V DC	24	24	24	24	24	24	24		24	24	
		48	48	48	48	48	48	48	48	48	48	48
M_N	mNm	110	220	360	670	880	425	600	850	700	1 200	1 800
P	W	46	92	150	280	370	178	251	356	293	503	754
n_N	rpm	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000
l	mm	104	124	120	140	160	112	132	152	123.5	143.5	163.5
d	mm	42	42	63	63	63	63	63	63	80	80	80
Control electronics (integrated)												
K1 (Hall sensor system)		•	○	•	○	○				•	•	•
K3 (Speed)							•	•	•			
K4 (Position)							•	○	○			
K5C (CANopen)							•	•	•			
K5E (EtherCAT)							•	•	•			
Control electronics (external)												
VTD-XX.XX-K3 (Speed) (p. 44)		•	•									
VTD-XX.XX-K4S (Position) (p.46)		•	•	•	•	•				•	•	•
VTD-60.05-K5C-S (CANopen) (p. 48)		•	•									
VTD-60.13-K5C-S (CANopen) (p. 50)		•	•	•	•	•				•	•	•
VTD-60.35-K5C-S (CANopen) (p. 52)				•	•	•				•	•	•
VTD-60.10-K5E-S (EtherCAT) (p. 54)		•	•	•	•	•				•	•	•
VTD-60.35-K5E-S (EtherCAT) (p. 56)				•	•	•				•	•	•
Gearboxes												
NoiselessPlus 42 (Planetary gearbox) (p. 62)		•	•									
NoiselessPlus 63 (Planetary gearbox) (p. 64)				•	•	•	•	•	•			
Performax®Plus 42 (Planetary gearbox) (p. 66)		•	•									
Performax®Plus 63 (Planetary gearbox) (p. 68)				•	•	•	•	•	•			
Optimax®42 (Planetary gearbox) (p. 70)		•	•									
Optimax®63 (Planetary gearbox) (p. 72)				•	•	•	•	•	•			
Optimax®80 (Planetary gearbox) (p. 74)										•	•	•
PE040 (Low-backlash planetary gearbox) (p. 76)		•	•									
PE060 (Low-backlash planetary gearbox) (p. 78)				•	•	•	•	•	•			
PE080 (Low-backlash planetary gearbox) (p. 80)										•	•	•
EtaCrown®52 (Angular gearbox) (p. 82)		•	•									
EtaCrown®75 (Angular gearbox) (p. 84)				•	•	•	•	•	•			
EtaCrown®Plus 42 (Angular gearbox) (p. 86)		•	•									
EtaCrown®Plus 63 (Angular gearbox) (p. 88)				•	•	•	•	•	•			
Brakes												
RFK (Power-off brake, spring-applied) (p. 96)		•	•	•	•	•	•	•	•	•	•	•
Encoder systems												
Magnetic Incremental Encoder IEM 38 (p. 98)		•	•							•	•	•
Magnetic Incremental Encoder IEM 58 (p. 100)				•	•	•						
Absolute encoder multiturn AEM 35 (p. 102)		•	•	•	•	•						

Subject to changes. • Standard type ○ Preferred type: ready to ship in 48 hours

With our **preferred type** products, we offer a selection of motors and gear motors which are available and ready to ship within 48 hours. Preferred typeproducts can be ordered with a maximum order quantity of 20 products per order.

With **standard type** products, we refer to a wide range of motors and gear motors which can be ordered using the stated order numbers with standard delivery times.

Further products for your project requirements are available **on request**. These products are generally available but cannot be ordered by means of an allocated part number. We reserve the right to make changes to the necessary order numbers after technical and economic evaluation of the requirement.

Brushless internal rotor servomotors series ECI

ECI-Servomotors

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ECI-Servomotors

Overview

Servomotor ECI-42.XX-K1

with integrated rotor position sensor

Image of variant with integrated encoder

More at www.ebmpapst.com

Description

- Highly dynamic 3-phase internal rotor motor with EC technology (6-pole)
- 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
- Degree of protection IP 54 and connection via industry-compatible, rotatable plug (optional: cable bushing with PG gland)

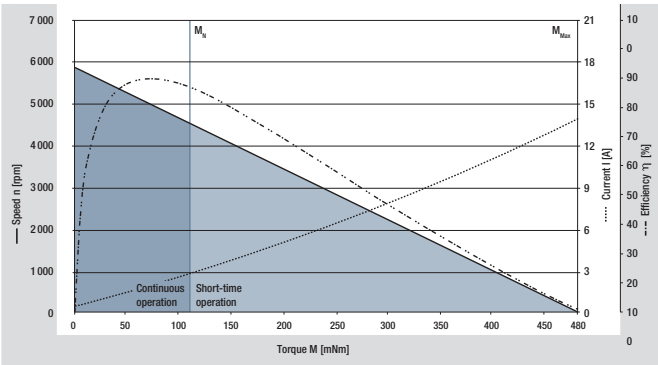
Type		ECI-42.20-K1-B	ECI-42.20-K1-D	ECI-42.40-K1-B	ECI-42.40-K1-D
Characteristic curve		A		B	
Nominal voltage (U_N)	V DC	24	48	24	48
Nominal speed (n_N)[2]	rpm	4 000	4 000	4 000	4 000
Nominal torque (M_N)[2]	mNm	110	110	220	220
Nominal current (I_N)[2]	A	2.50	1.30	5.10	2.60
Nominal output power (P_N)[2]	W	46.0	46.0	92.0	92.0
Starting torque (M_A)	mNm	480	480	960	960
Permissible peak current (I_{max})[3]	A	14.0	7.00	21.0	11.0
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
Permanent stall torque (M_{NO})	mNm	100	100	200	200
Recommended speed control range	rpm	0 ... 5 000	0 ... 5 000	0 ... 5 000	0 ... 5 000
Rotor moment of inertia(J_R)	kgm² x10⁻⁶	3.42	3.42	6.70	6.70
Motor constant (K_E)	mVs/rad	35.2	84.2	42.8	83.9
Connection resistance (R_V)	Ω	0.85	3.20	0.39	1.50
Connection inductance (L_V)	µH	1 100	450	500	184
Overload protection		to be implemented via the control electronics			
Permissible ambient temperature range (T_U)	°C	0 ... +40	0 ... +40	0 ... +40	0 ... +40
Weight	kg	0.50	0.50	0.65	0.65
Part number	IP 54[1]	932 4220 130	932 4220 131	932 4240 130	932 4240 131

[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] At T_U max. 40 °C
[3] Permissible maximum current duration: max. 3 seconds – can be repeated after complete cool down

Preferred type ready to ship in 48 hours.

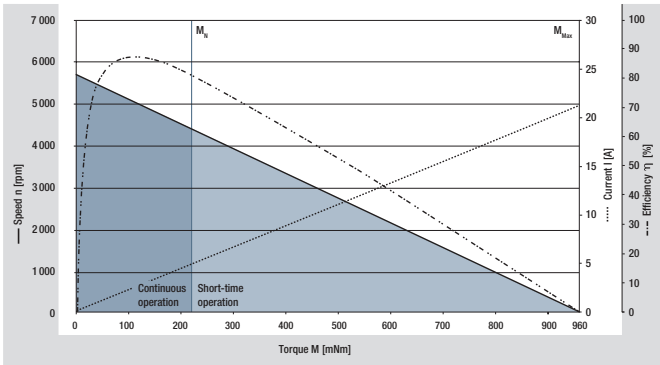
Subject to changes.

A ECI-42.20, 24 V (at 25 °C)



Characteristic curve 48 V on request

B ECI-42.40, 24 V (at 25 °C)



Characteristic curve 48 V on request

Modular drive system

Brake system (integrated)

Brake module ECI 42 RFK 0.3 Nm	Page 96

Encoder system (integrated)

magnetic incremental IEM 38	Page 98
absolute multiturn AEM 35	Page 102

Basic motor

Planetary gearboxes

NoiselessPlus 42	Page 62
Performax®Plus 42	Page 66
Optimax®42	Page 70
PE 040	Page 76

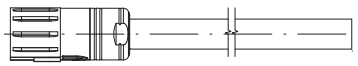
Angular gearboxes

EtaCrown® 52	Page 82
EtaCrown®Plus 42	Page 86

Recommended external control electronics

VTD-XX.XX-K3		Speed	Page 44
VTD-XX.XX-K4S		Position	Page 46
VTD-60.05-K5C-S	(CANopen)	Position	Page 48
VTD-60.13-K5C-S	(CANopen)	Position	Page 50
VTD-60.10-K5E-S	(EtherCAT)	Position	Page 54

Connection cable with plug



optional version with cable bushing (PG gland)

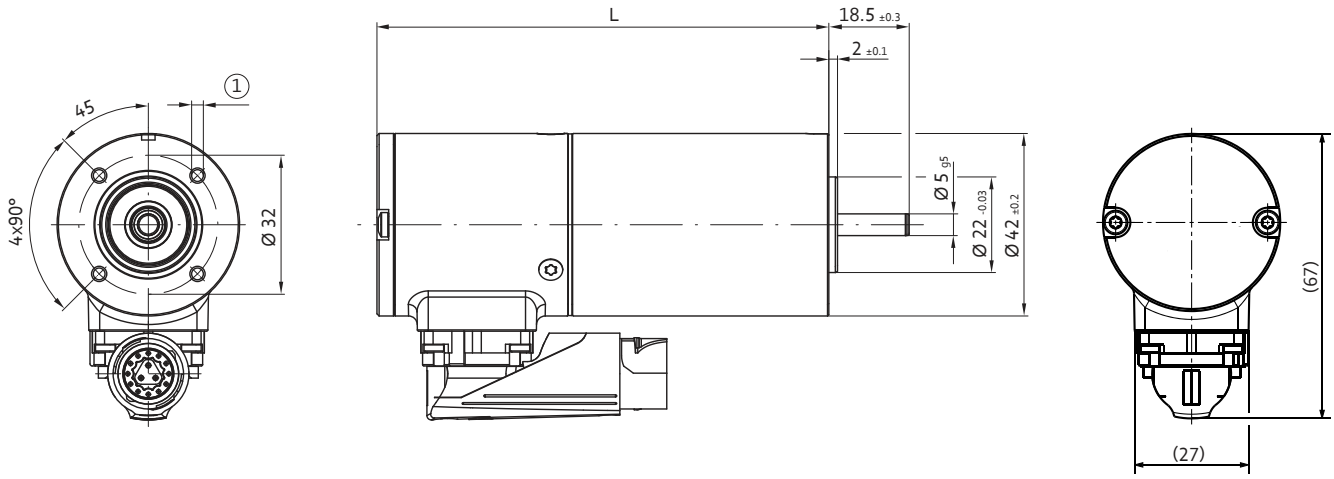
Connection cables have to be ordered separately — Page 17

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

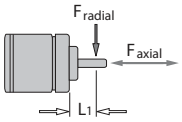
Technical drawing without brake and without encoder

Dimensions in mm

Type	L
ECI-42.20	104±0.4
ECI-42.40	124±0.4



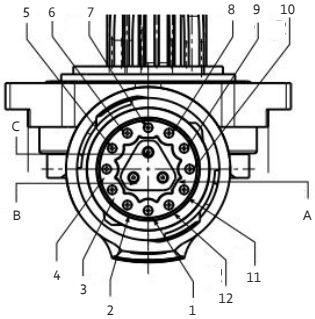
① 4 x for thread-forming screws M3 according to DIN 7500, 9.5 mm deep



Permissible shaft load

F_{axial}:	20 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	100 N	
L_1:	10 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	Hall A	Hall signal 1	24 (0.25 mm²)
	2	brown	Hall B	Hall signal 2	
	3	green	Hall C	Hall signal 3	
	4	yellow	+5V Hall/Enc	Hall and encoder supply	
	5	gray	GND	Ground Encoder/Hall	
	6	pink	empty	empty	
Encoder	7	blue	A	Incremental Encoder - A channel	
	8	red	/A	Incremental Encoder - A channel inverted	
	9	black	B	Incremental Encoder - B channel	
	10	purple	/B	Incremental Encoder - B channel inverted	
	11	gray-pink	Z	Incremental Encoder - Index	
	12	red-blue	/Z	Incremental Encoder - Index inverted	
Power	A	brown	U	Phase L1 (U)	16 (1.5 mm²)
	B	black	V	Phase L2 (V)	
	C	gray	W	Phase L3 (W)	

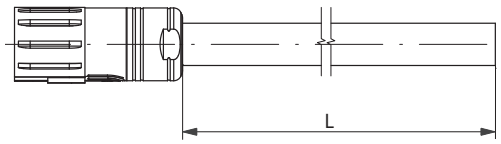
Subject to changes. Colors of the leads when ebm-papst cables are used

Electrical connection with brake see page 97

Electrical connection cable

Dimensions in mm

Type (straight)	L	part number
Cable (12 + 3 Pins)	1 000 ± 30	**992 0160 200**
Cable (12 + 3 Pins)	3 000 ± 30	**992 0160 201**



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

Intercontec plug series 915 with quick fastener Ø 10.5 - 12 mm, (part number ESTA205NN00340003000)

Intercontec crimp contact socket 3 x, power, crimp range 0.5 - 1.5 mm² (part number 60.251.11)

Intercontec crimp contact socket 12 x, signal, crimp range 0.05 - 0.75 mm² (part number 60.252.11)

Servomotor ECI-63.XX-K1

with integrated rotor position sensor

Image of variant with integrated incremental encoder

More at www.ebmpapst.com

Description

- Highly dynamic 3-phase internal rotor motor with EC technology (8-pole)
- Low cogging torque
- Robust and noise-optimized ball bearing system for long service life
- High efficiency and high power density realized in a compact design
- Integrated Hall sensors for operation with external control electronics
- Optionally with magnetic incremental encoder and/or holding brake integrated in motor housing
- Degree of protection IP 54 and connection via industry-compatible, rotatable plug (optional: cable bushing with PG gland)

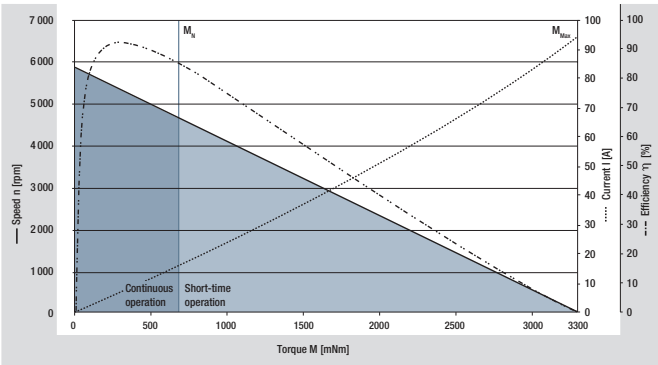
Type		ECI-63.20-K1-B	ECI-63.20-K1-D	ECI-63.40-K1-B	ECI-63.40-K1-D	ECI-63.60-K1-B	ECI-63.60-K1-D
Characteristic curve				A			B
Nominal voltage (U_N)	V DC	24	48	24	48	24	48
Nominal speed (n_N)[2]	rpm	4 000	4 000	4 000	4 000	4 000	4 000
Nominal torque (M_N)[2]	mNm	360	360	670	670	800	880
Nominal current (I_N)[2]	A	8.50	4.50	14.0	6.50	17.6[4]	8.50
Nominal output power (P_N)[2]	W	150	150	280	280	335	370
Starting torque (M_A)	mNm	1 800	1 800	3 300	3 300	5 300	4 400
Permissible peak current (I_{max})[3]	A	55	30	95	45	150	57
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	0 ... 5 000	0 ... 5 000	0 ... 5 000	0 ... 5 000	0 ... 5 000
Rotor moment of inertia(J_R)	$kgm^2 x10^{-6}$	19.0	19.0	38.0	38.0	57.0	57.0
Motor constant (K_E)	mVs/rad	41.4	73.3	40.4	83.8	40.4	83.8
Connection resistance (R_V)	Ω	0.14	0.42	0.08	0.24	0.04	0.15
Connection inductance (L_V)	µH	260	880	140	570	90	330
Overload protection		to be implemented via the control electronics					
Permissible ambient temperature range (T_U)	°C	0 ... +40	0 ... +40	0 ... +40	0 ... +40	0 ... +40	0 ... +40
Weight	kg	1.00	1.00	1.35	1.35	1.70	1.70
Part number	IP 54[1]	932 6320 130	932 6320 131	932 6340 130	932 6340 131	932 6360 130	932 6360 131

[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] At T_U max. 40 °C
[3] Permissible maximum current duration: max. 1 seconds – can be repeated after complete cool down
[4] 14 A phase current in S1 operation at T_U = 40°C must not be exceeded

Preferred type ready to ship in 48 hours.

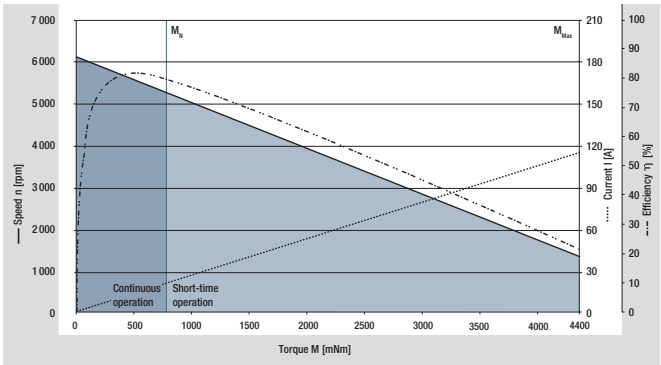
Subject to changes.

A ECI-63.40-K1, 24 V (at 25 °C)



Characteristic curve 48 V on request

B ECI-63.60-K1, 24 V (at 25 °C)



Characteristic curve 48 V on request

Modular drive system

Brake system (integrated)

Brake module ECI 63 RFK 1.0 Nm — Page 96

Basic motor

Planetary gearboxes

NoiselessPlus 63	Page 64
Performax®Plus 63	Page 68
Optimax®63	Page 72
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Encoder system (integrated)

magnetic incremental IEM 58	Page 100
absolute multiturn AEM 35	Page 102

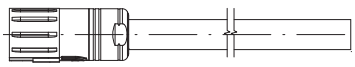
Angular gearboxes

EtaCrown® 75	Page 84
EtaCrown®Plus 63	Page 88

Recommended external control electronics

VTD-XX.XX-K4S	Speed	Page 46
VTD-60.13-K5C-S (CANopen)	Position	Page 50
VTD-60.35-K5C-S (CANopen)	Position	Page 52
VTD-60.10-K5E-S (EtherCAT)	Position	Page 54
VTD-60.35-K5E-S (EtherCAT)	Position	Page 56

Connection cable with plug



optional version with cable bushing (PG gland)

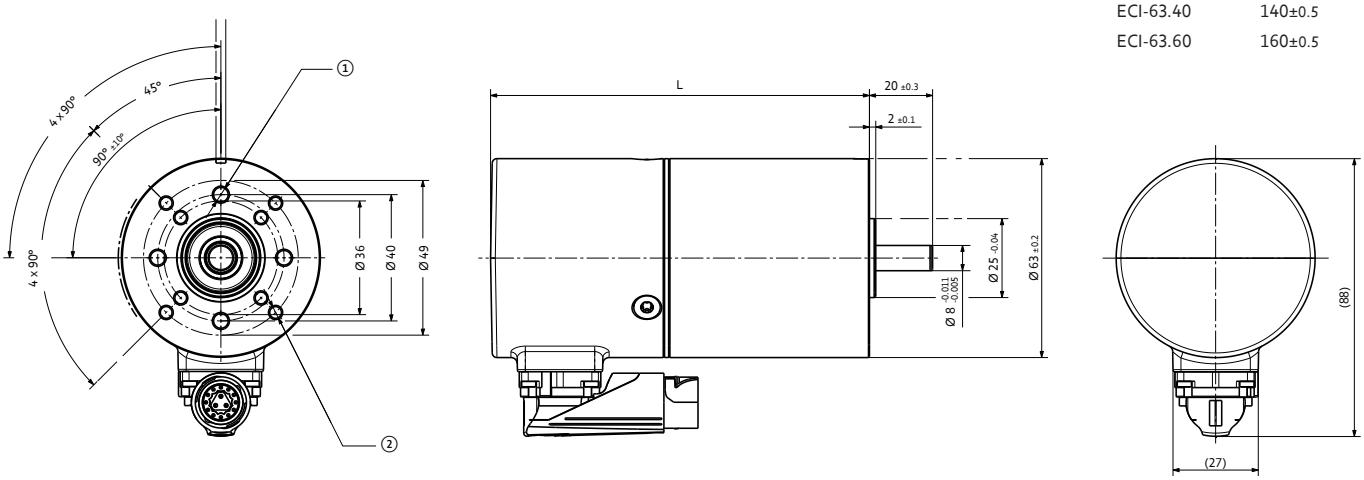
Connection cables have to be ordered separately — Page 21

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

Technical drawing without brake and without encoder

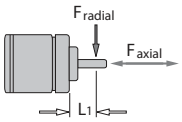
Dimensions in mm

Type	L
ECI-63.20	120±0.5
ECI-63.40	140±0.5
ECI-63.60	160±0.5



① 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

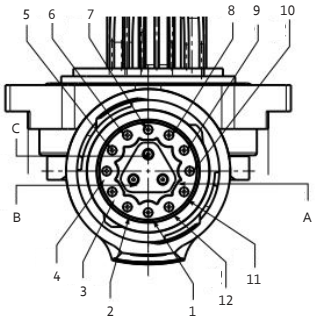
② 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep



Permissible shaft load

F_{axial}:	45 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	98 N	
L_1:	10 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	Hall A	Hall signal 1	24 (0.25 mm²)
	2	brown	Hall B	Hall signal 2	
	3	green	Hall C	Hall signal 3	
	4	yellow	+5V Hall/Enc	Hall and encoder supply	
	5	gray	GND	Ground Encoder/Hall	
	6	pink	empty	empty	
Encoder	7	blue	A	Incremental Encoder - A channel	
	8	red	/A	Incremental Encoder - A channel inverted	
	9	black	B	Incremental Encoder - B channel	
	10	purple	/B	Incremental Encoder - B channel inverted	
	11	gray-pink	Z	Incremental Encoder - Index	
	12	red-blue	/Z	Incremental Encoder - Index inverted	
Power	A	brown	U	Phase L1 (U)	16 (1.5 mm²)
	B	black	V	Phase L2 (V)	
	C	gray	W	Phase L3 (W)	

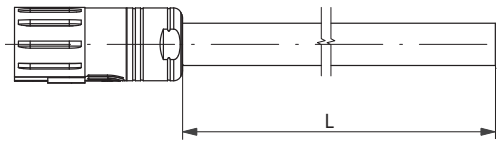
Subject to changes. Colors of the leads when ebm-papst cables are used

Electrical connection with brake see page 97

Electrical connection cable

Dimensions in mm

Type (straight)	L	part number
Cable (12 + 3 Pins)	1 000 ± 30	**992 0160 200**
Cable (12 + 3 Pins)	3 000 ± 30	**992 0160 201**



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

Intercontec plug series 915 with quick fastener Ø 10.5 - 12 mm, (part number ESTA205NN00340003000)

Intercontec crimp contact socket 3 x, power, crimp range 0.5 - 1.5 mm² (part number 60.251.11)

Intercontec crimp contact socket 12 x, signal, crimp range 0.05 - 0.75 mm² (part number 60.252.11)

Servomotor ECI-63.XX-K3

with integrated speed control

Description

- Motor with completely integrated K3 operation and control electronics (8-pole)
- Low cogging torque
- 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

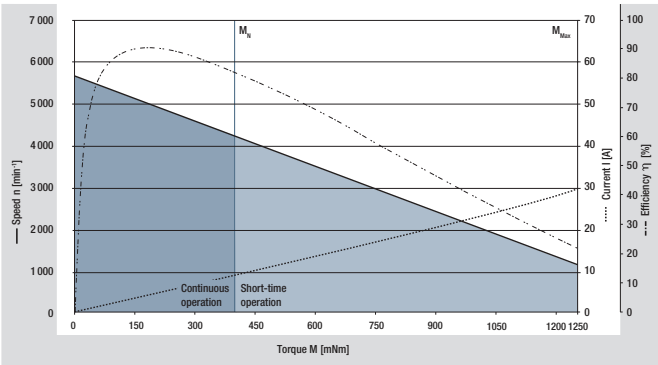
More at www.ebmpapst.com

Type		ECI-63.20-K3-B	ECI-63.20-K3-D	ECI-63.40-K3-B	ECI-63.40-K3-D	ECI-63.60-K3-D
Characteristic curve		A		B		C
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
Max. reverse voltage	V DC	35	58	35	58	58
Nominal speed (n_N)	rpm			4 000		
Nominal torque (M_N)[2]	mNm	425	450	600	600	850
Nominal current (I_N)[2]	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)[2]	W	178	188	251	314	356
Starting torque (M_A)	mNm	1 480	1 890	1 500	3 000	2 550
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
Recommended speed control range	rpm			0 ... 5 000		
Set value input				Analog (0 ... 10V)		
Rotor moment of inertia(J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57
Function for motor protection at stall				thermal		
Overload protection				Integrated		
Permissible ambient temperature range (T_U)	°C			0 ... +40		
Weight	kg	0.85	0.85	1.15	1.15	1.50
Part number (wire interface)	IP 40[1]	on request	on request	on request	on request	on request
Part number (cable routing)	IP 54[1]	on request	on request	on request	on request	on request

[1] The degree of protection refers to the installed condition with sealing on the flange side
The shaft geometry in the IP54 version is different from the displayed sketch
[2] At T_U max. 40 °C

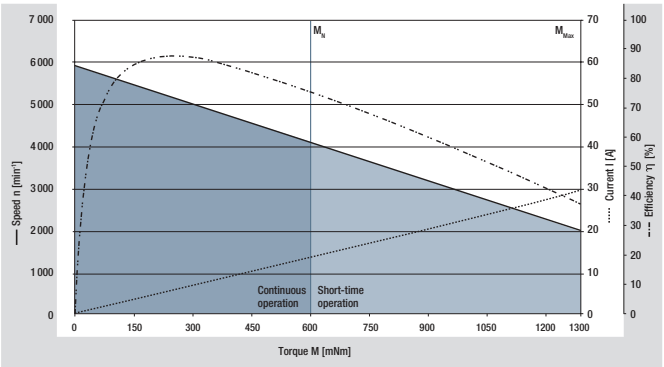
Subject to changes.

A ECI-63.20-K3, 24 V (at 25 °C)



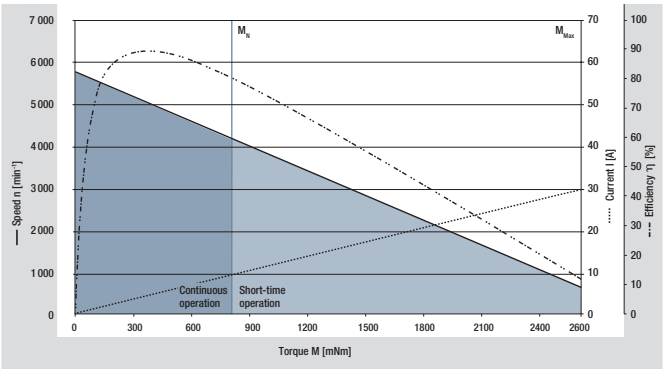
Characteristic curve 48 V on request

B ECI-63.40-K3, 24 V (at 25 °C)



Characteristic curve 48 V on request

C ECI-63.60-K3, 48 V (at 25 °C)



Modular drive system (on request)

Brake system (integrated)

Brake module ECI 63 RFK 1.0 Nm — Page 96

Basic motor

Planetary gearboxes

NoiselessPlus 63	Page 64
Performax®Plus 63	Page 68
Optimax®63	Page 72
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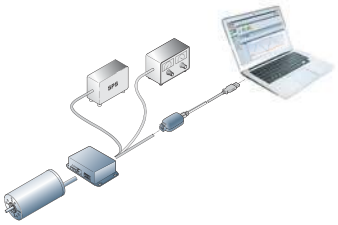
Commissioning tool

"driveSTUDIO" — Page 93



Angular gearboxes

EtaCrown® 75	Page 84
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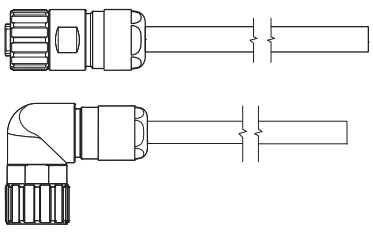
Connection cable with plug



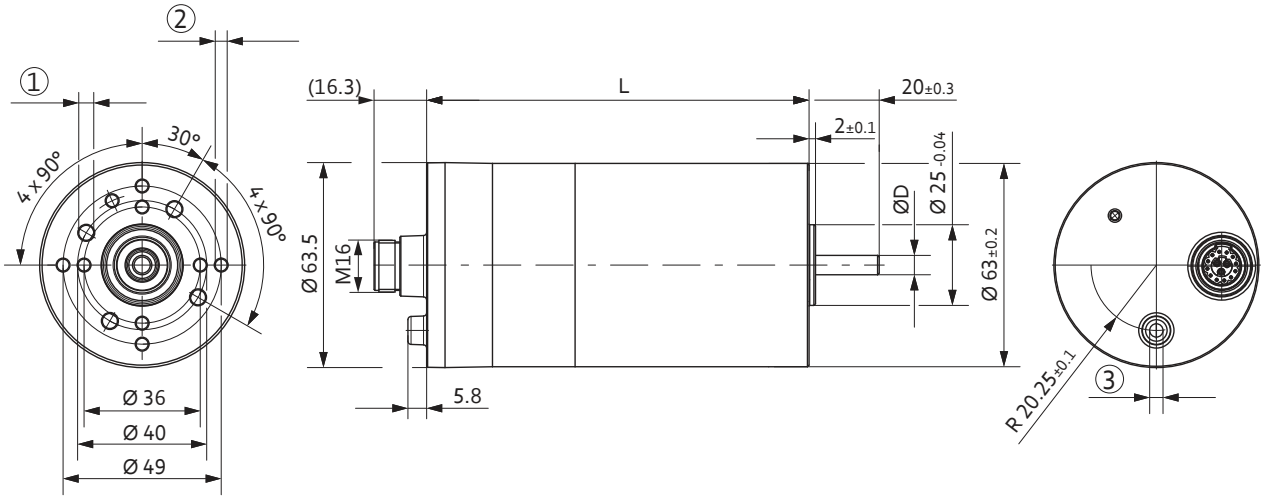
Connection cables have to be ordered separately — Page 25

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

Technical drawing without brake and without encoder

Dimensions in mm

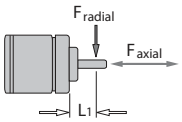
Type	L	ØD
ECI-63.20	118.5±0.4	6_{g5}
ECI-63.40	138.5±0.4	6_{g5}
ECI-63.60	158.5±0.4	10_{g5}



① 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

② 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

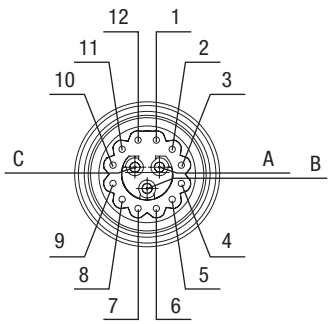
③ M5, 5 mm deep



Permissible shaft load

F_{axial}:	150 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	150 N	
L_1:	20 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	D-IN-A	Digital input A	24 (0.25 mm²)
	2	brown	D-IN-B	Digital input B	
	3	green	D-IN-1	Digital input 1	
	4	yellow	D-IN-2	Digital input 2 Analog 0 ... 10 V / brake	
	5	gray	D-OUT-1	Digital output 1	
	6	pink	D-OUT-2	Digital output 2	
	7	blue	D-OUT-3	Digital output 3	
	8	red	A-IN-1	0 ... 10 V (differential)	
	9	black	A-IN-GND	Ground for analog IN 1 (differential)	
	10	purple	RS485 A (+)	Prog.-bus	
	11	gray/pink	RS485 B (–)	Prog.-bus	
	12	red/blue	U_{Logik}	Logic power supply (24 V)	
Power	A	gray	Ballast	Ballast resistor	16 (1.5 mm²)
	B	brown	U_{ZK}	Power supply	
	C	black	GND	Power / signal ground	

Subject to changes. Colors of the leads when ebm-papst cables are used

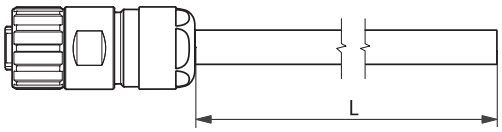
Electrical connection with brake see page 97

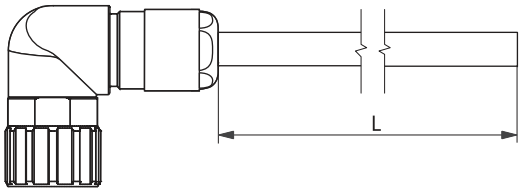
Electrical connection cable

Dimensions in mm

Type (straight)	L	part number
Cable (12 + 3 Pins)	1 000 ± 30	**992 0160 034**
Cable (12 + 3 Pins)	3 000 ± 30	**992 0160 035**

Type (angled)	L	part number
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)

Servomotor ECI-63.XX-K4

with integrated speed, torque or positioning control

More at www.ebmpapst.com

Description

- Motor with integrated 4Q controler (8-pole)
- Speed, torque or position mode possible
- Selection of operating modes and parameter setting via RS485
- Extensive interface with various inputs and outputs
- 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 "driveSTUDIO" PC software

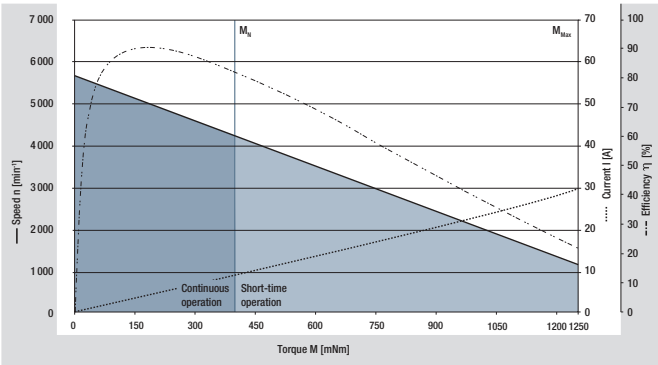
Type		ECI-63.20-K4-B	ECI-63.20-K4-D	ECI-63.40-K4-B	ECI-63.40-K4-D	ECI-63.60-K4 -D
Characteristic curve		A		B		C
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	18 ... 30	18 ... 53	18 ... 30	18 ... 53	18 ... 53
Max. reverse voltage	V DC	35	58	35	58	58
Nominal speed (n_N)	rpm	4 000	4 000	4 000	4 000	4 000
Nominal torque (M_N)[2]	mNm	425	450	600	600	850
Nominal current (I_N)[2]	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)[2]	W	178	188	251	314	356
Starting torque (M_{max})	mNm	1 480	1 890	1 500	3 000	2 550
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
Recommended speed control range	rpm	0 ... 5 00	0 ... 5 000	0 ... 5 000	0 ... 5 000	0 ... 5 000
Set value input		Analog / PWM / Frequency / Digital				
Rotor moment of inertia(J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57
Function for motor protection at stall		thermal				
Overload protection		Integrated				
Permissible ambient temperature range (T_U)	°C	0 ... +40	0 ... +40	0 ... +40	0 ... +40	0 ... +40
Weight	kg	0.85	0.85	1.15	1.15	1.50
Part number (wire interface))	IP 40[1]	932 6320 403	932 6320 405	932 6340 403	932 6340 405	932 6360 405
Part number (cable routing)	IP 54[1]	932 6320 400	932 6320 402	932 6340 400	932 6340 402	932 6360 402

[1] The degree of protection refers to the installed condition with sealing on the flange side
The shaft geometry in the IP54 version is different from the displayed sketch
[2] At T_U max. 40 °C

Preferred type ready to ship in 48 hours.

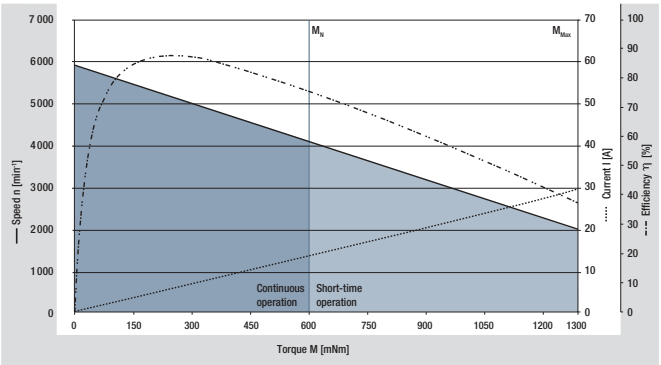
Subject to changes.

A ECI-63.20-K4, 24 V (at 25 °C)



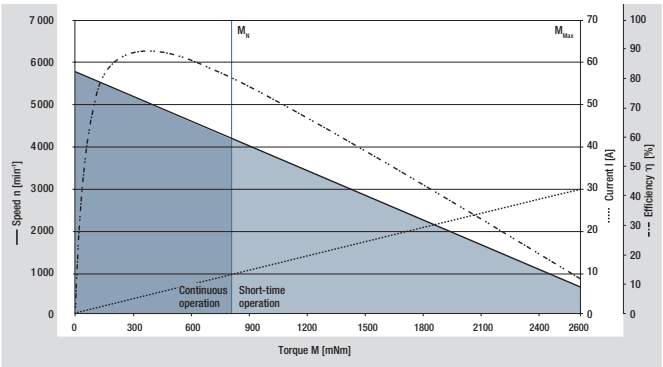
Characteristic curve 48 V on request

B ECI-63.40-K4, 24 V (at 25 °C)



Characteristic curve 48 V on request

C ECI-63.60-K4, 24 V (at 25 °C)



Characteristic curve 48 V on request

Modular drive system

Brake system (integrated)

Brake module ECI 63 RFK 1.0 Nm — Page 96

Basic motor

Planetary gearboxes

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Performax®Plus 63	Page 68
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Commissioning tool

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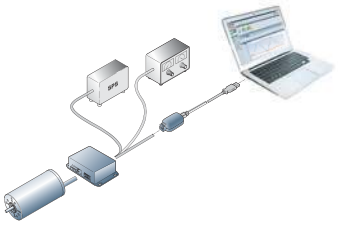

Angular gearboxes

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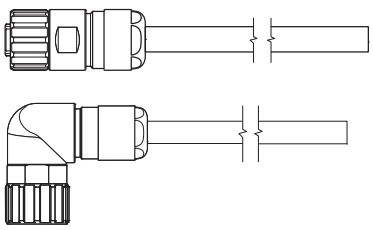
Connection cable with plug



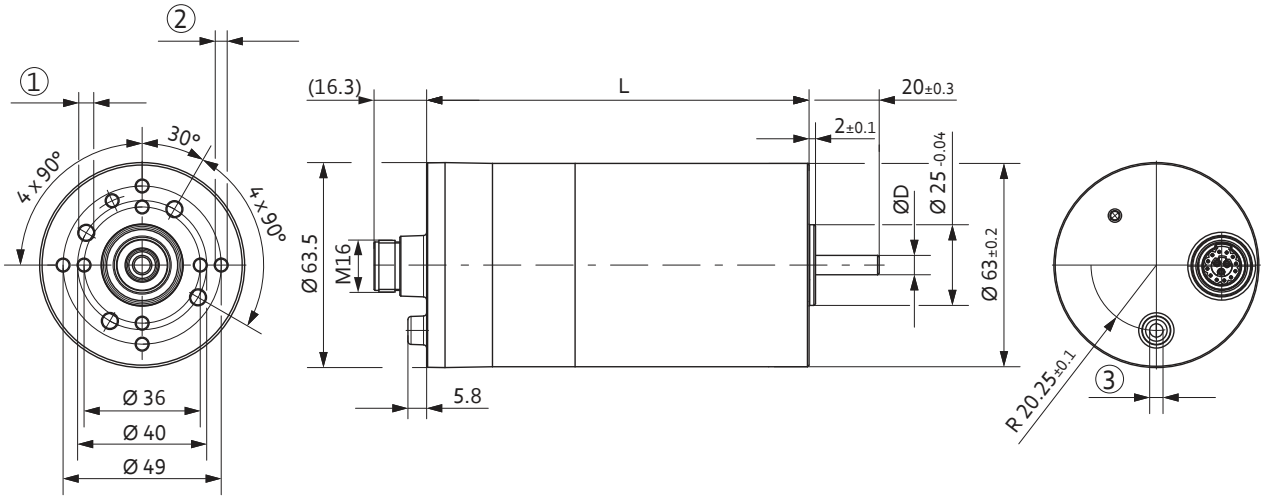
Connection cables have to be ordered separately — Page 29

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

Technical drawing without brake and without encoder

Dimensions in mm

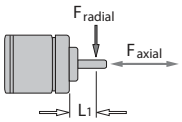
Type	L	ØD
ECI-63.20	118.5±0.4	6_{g5}
ECI-63.40	138.5±0.4	6_{g5}
ECI-63.60	158.5±0.4	10_{g5}



① 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

② 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

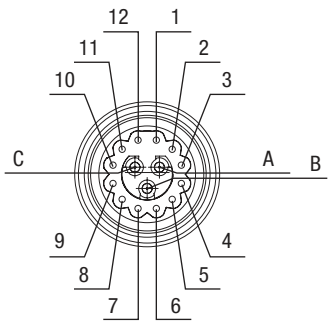
③ M5, 5 mm deep



Permissible shaft load

F_{axial}:	150 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	150 N	
L_1:	20 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	D-IN-A	Digital input A	24 (0.25 mm²)
	2	brown	D-IN-B	Digital input B	
	3	green	D-IN-1	Digital input 1	
	4	yellow	D-IN-2	Digital input 2 Analog 0 ... 10 V / brake	
	5	gray	D-OUT-1	Digital output 1	
	6	pink	D-OUT-2	Digital output 2	
	7	blue	D-OUT-3[1)]	Digital output 3	
	8	red	A-IN-1	0 ... 10 V (differential)	
	9	black	A-IN-GND	Ground for analog IN 1 for differential	
	10	purple	RS485 A (+)	Prog.-bus	
	11	gray/pink	RS485 B (–)	Prog.-bus	
	12	red/blue	U_{Logik}	Logic power supply (24 V)	
Power	A	gray	Ballast	Ballast resistor	16 (1.5 mm²)
	B	brown	U_{ZK}	Power supply	
	C	black	GND	Power / signal ground	

[1)] Output (OUT 3) is only available on ECI-63.XX-K4

Subject to changes. Colors of the leads when ebm-papst cables are used

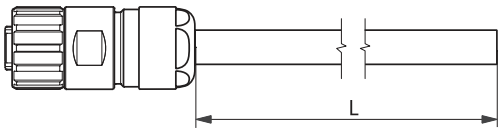
Electrical connection with brake see page 97

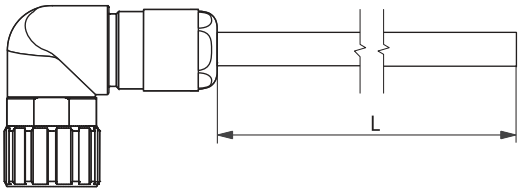
Electrical connection cable

Dimensions in mm

Type (straight)	L	part number
Cable (12 + 3 Pins)	1 000 ± 30	**992 0160 034**
Cable (12 + 3 Pins)	3 000 ± 30	**992 0160 035**

Type (angled)	L	part number
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)

Servomotor ECI-63.XX-K5C

with integrated positioning control and CANopen interface

More at www.ebmpapst.com

Description

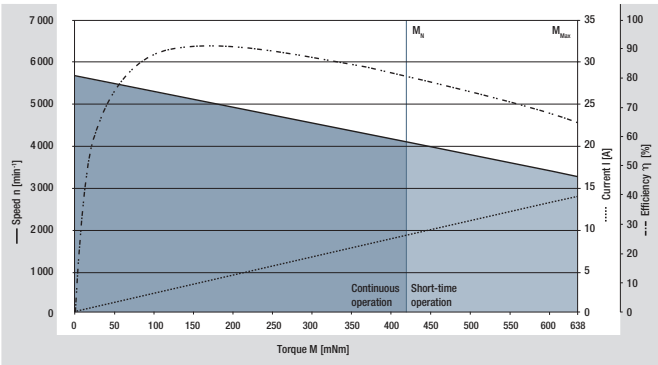
- Motor with integrated K5 operation and control electronics with CANopen communication interface (8-pole)
- Sine commutation of the drives with field-oriented control
- Speed control range down to n = 0 rpm with holding torque up to 5 000 rpm possible
- Different operating modes according to DSP 402 (speed, torque, positioning) possible via software
- Connectors M16 and M12 in sealed industry standard
- Interface with analog and digital control inputs

Type		ECI-63.20-K5C-B	ECI-63.20-K5C-D	ECI-63.40-K5C-B	ECI-63.40-K5C-D	ECI-63.60-K5C-D
Characteristic curve		A		B		C
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	8 ... 30	18 ... 52	8 ... 30	18 ... 52	18 ... 52
Max. reverse voltage	V DC	35	58	35	58	58
Nominal speed (n_N)[2]	rpm			4 000		
Nominal torque (M_N)[2]	mNm	425	450	600	600	850
Nominal current (I_N)[2]	A	8.50	5.40	12.3	7.20	8.60
Nominal output power (P_N)[2]	W	178	188	251	314	356
Starting torque (M_A)	mNm	1 275	1 350	1 500	2 250	2 550
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
Recommended speed control range	rpm			0 ... 4 000		
Rotor moment of inertia(J_R)	$kgm^2 x10^{-6}$	19	19	38	38	57
Function for motor protection at stall				thermal		
Overload protection				Integrated		
Permissible ambient temperature range (T_U)	°C			0 ... +40		
Weight	kg	0.95	0.95	1.25	1.25	1.55
Part number	IP 54[1]	932 6320 550	932 6320 552	932 6340 550	932 6340 552	932 6360 552

[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] At T_U max. 40 °C

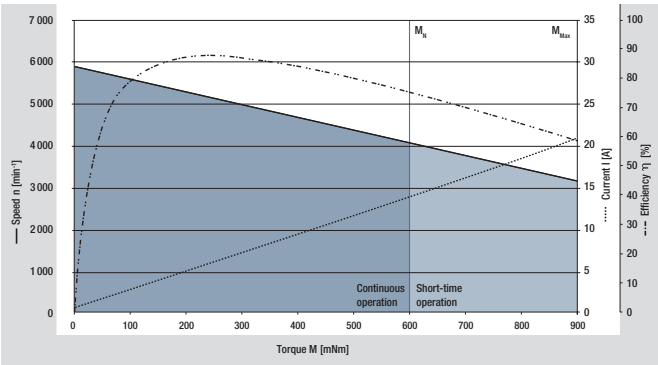
Subject to changes.

A ECI-63.20-K5C, 24 V (at 25 °C)



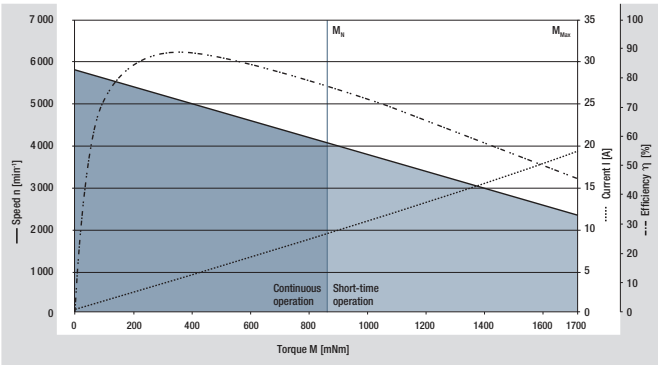
Characteristic curve 48 V on request

B ECI-63.40-K5C, 24 V (at 25 °C)



Characteristic curve 48 V on request

C ECI-63.60-K5C, 48 V (at 25 °C)

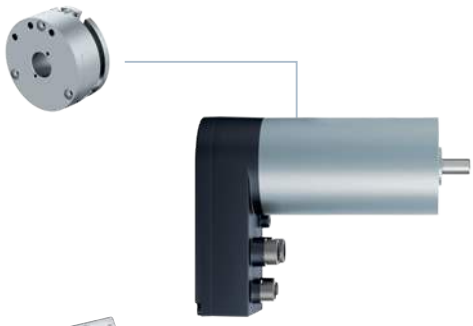


Modular drive system

Brake system (integrated)

Brake module ECI 63 RFK 1.0 Nm — Page 96

Basic motor



Planetary gearboxes

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Commissioning tool

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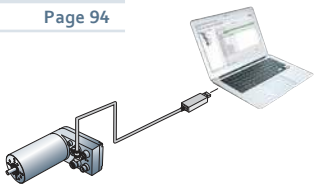

Angular gearboxes

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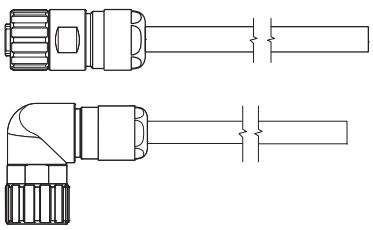
Connection cable with plug



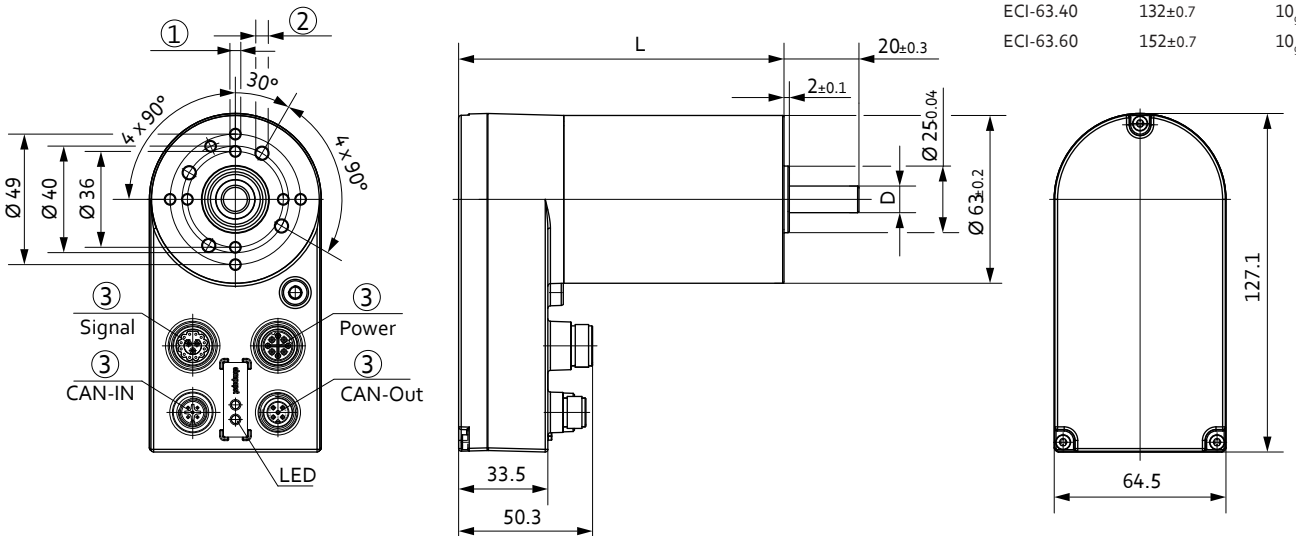
Connection cables have to be ordered separately — Page 33

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

Technical drawing without brake and without encoder

Dimensions in mm

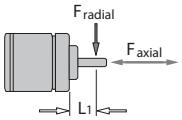
Type	L	ØD
ECI-63.20	112±0.7	10_{g5}
ECI-63.40	132±0.7	10_{g5}
ECI-63.60	152±0.7	10_{g5}



① 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

② 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

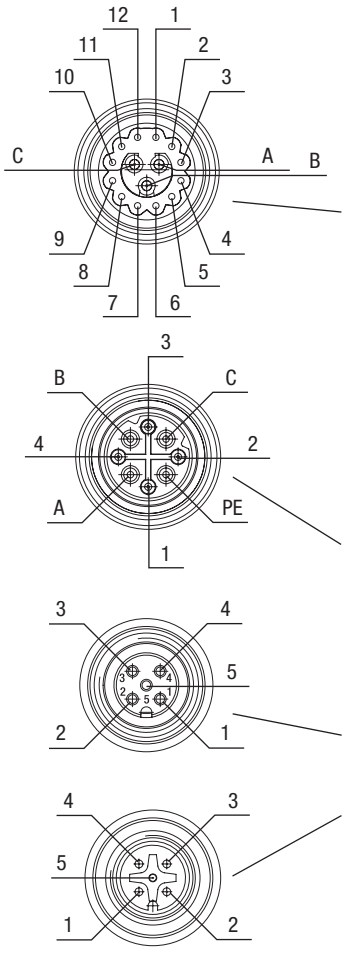
③ Plug



Permissible shaft load

F_{axial}:	150 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	150 N	
L_1:	20 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	D-IN-1	Digital input 1	24 (0.25 mm²)
	2	brown	D-IN-2	Digital input 2	
	3	green	D-IN-3	Digital input 3	
	4	yellow	D-IN-4	Digital input 4	
	5	gray	D-IN-5	Digital input 5	
	6	pink	D-IN-6	Digital input 6	
	7	blue	D-IN-7	Digital input 7	
	8	red	D-OUT-1	Digital output 1	
	9	black	D-OUT-2	Digital output 2	
	10	purple	Enable	Enable input	
	11	gray/pink	A-IN-1+	Analog input 1	
	12	red/blue	A-IN-2	Analog input 2	
	A	gray	A-IN-1-	Analog input 1 GND	18 (1 mm²)
	B	brown	U_{Logik}	Logic power supply	
	C	black	GND	Ground and reference for A-IN-2	
Power	A	brown	U_{ZK}	Power supply (Ballast)	16 (1.5 mm²)
	B	gray	Ballast	Ballast resistor	
	C	black	GND-Power	Power supply	
	FE	blue	FE	Functional earth	
	1	white	CAN H	CAN Bus high signal	24 (0.25 mm²)
	2	brown	CAN L	CAN Bus low signal	
	3	green	Enable	Enable input	
	4	yellow	U_{Logik}	Logic power supply	
CAN-Out	4		CAN H	CAN Bus high signal	24 (0.25 mm²)
	5		CAN L	CAN Bus low signal	
CAN-IN	4		CAN H	CAN Bus high signal	24 (0.25 mm²)
	5		CAN L	CAN Bus low signal	

Subject to changes. Colors of the leads when ebm-papst cables are used

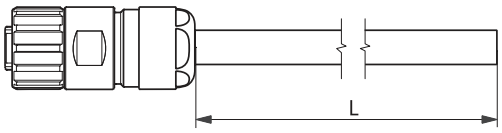
Electrical connection with brake see page 97

Electrical connection cable

Dimensions in mm

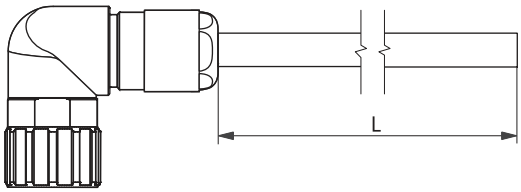
Type (straight)	L	part number
Cable Signal (12 + 3 Pins)	1 000 ± 30	992 0160 059
Cable Signal (12 + 3 Pins)	3 000 ± 30	992 0160 060
Cable Power (4 + 3 + FE)*	1 000 ± 30	992 0160 055
Cable Power (4 + 3 + FE)*	3 000 ± 30	992 0160 056

* Wires Pin 1, Pin 2 (CAN_H, CAN_L) not executed



Type (angled)	L	part number
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 + FE)*	1 000 ± 30	992 0160 057
Cable Power (4 + 3 + FE)*	3 000 ± 30	992 0160 058

* Wires Pin 1, Pin 2 (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

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

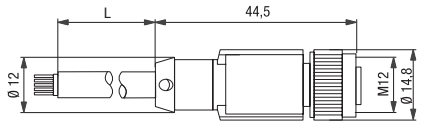
Power straight

- 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

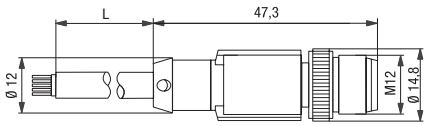
Power angled

- 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

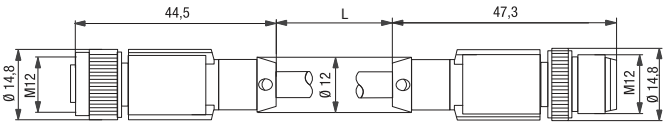
Type	L	part number
CANopen socket	5 000 ± 30	992 0160 017



Type	L	part number
CANopen plug	5 000 ± 30	992 0160 018



Type	L	part number
CANopen connecting cable	2 000 ± 30	992 0160 019



Servomotor ECI-63.XX-K5E

with integrated positioning control and EtherCAT interface

More at www.ebmpapst.com

Description

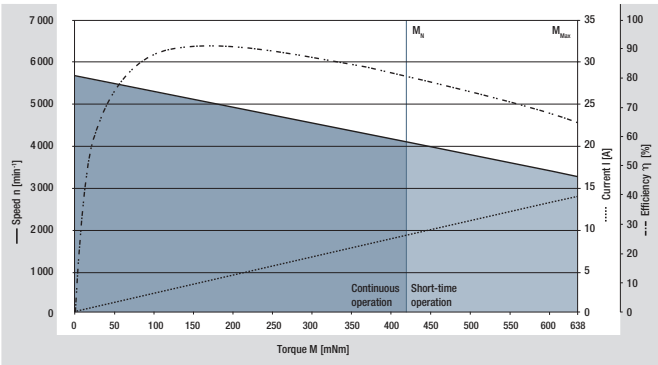
- Drive with integrated operating and control electronics for operation in EtherCAT networks (8-pole)
- CoE (CAN over EtherCAT) supports different operating modes in accordance with DS 402
- Integration as a slave into EtherCAT networks via TwinCAT
- Can be operated as NC axis
- Separate interface enables diagnostics in parallel to BUS operation
- Status LEDs on drive housing
- Safe Torque Off switch-off (optional)

Type		ECI-63.20-K5E-B	ECI-63.20-K5E-D	ECI-63.40-K5E-B	ECI-63.40-K5E-D	ECI-63.60-K5E-D
Characteristic curve		A		B		C
Nominal voltage (U_N)	V DC	24	48	24	48	48
Permissible supply voltage range (U_{ZK})	V DC	8 ... 30	18 ... 52	8 ... 30	18 ... 52	18 ... 52
Max. reverse voltage	V DC	35	58	35	58	58
Nominal speed (n_N)[2]	rpm			4 000		
Nominal torque (M_N)[2]	mNm	425	450	600	600	850
Nominal current (I_N)[2]	A	8.50	5.40	12.30	7.20	8.60
Nominal output power (P_N)[2]	W	178	188	251	314	356
Starting torque (M_A)	mNm	1 275	1 350	1 500	2 250	2 550
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
Recommended speed control range	rpm			0 ... 4 000		
Rotor moment of inertia(J_R)	kgm² x10^{-6}	19	19	38	38	57
Function for motor protection at stall				thermal		
Overload protection				Integrated		
Permissible ambient temperature range (T_U)	°C			0 ... +40		
Weight	kg	1.15	1.15	1.55	1.55	1.90
Part number	IP 54[1]	932 6320 530	932 6320 531	932 6340 530	932 6340 531	932 6360 531

[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] At T_U max. 40 °C

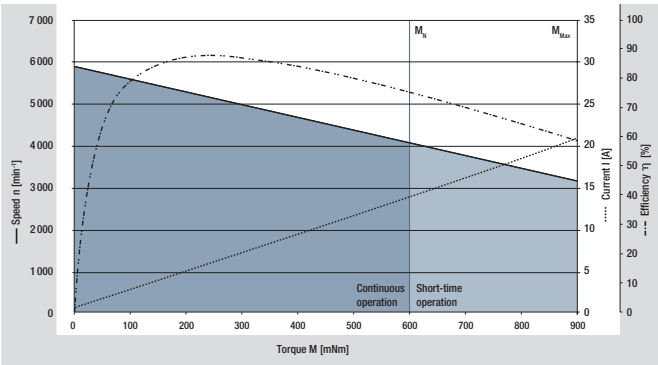
Subject to changes.

A ECI-63.20-K5E, 24 V (at 25 °C)



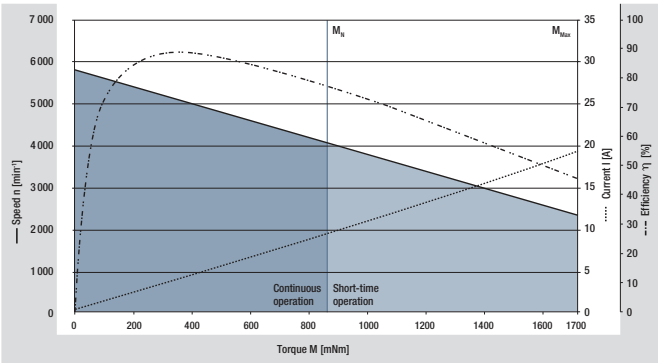
Characteristic curve 48 V on request

B ECI-63.40-K5E, 24 V (at 25 °C)



Characteristic curve 48 V on request

C ECI-63.60-K5E, 48 V (at 25 °C)



Modular drive system

Brake system (integrated)

Brake module ECI 63 RFK 1.0 Nm — Page 96

Basic motor

Planetary gearboxes

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Commissioning tool

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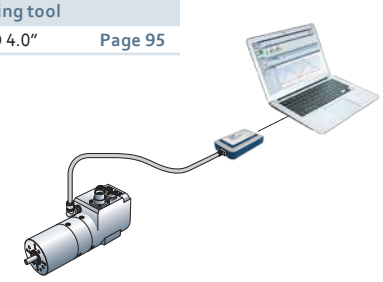

Angular gearboxes

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EtaCrown®Plus 63	Page 88

Connection cable with plug

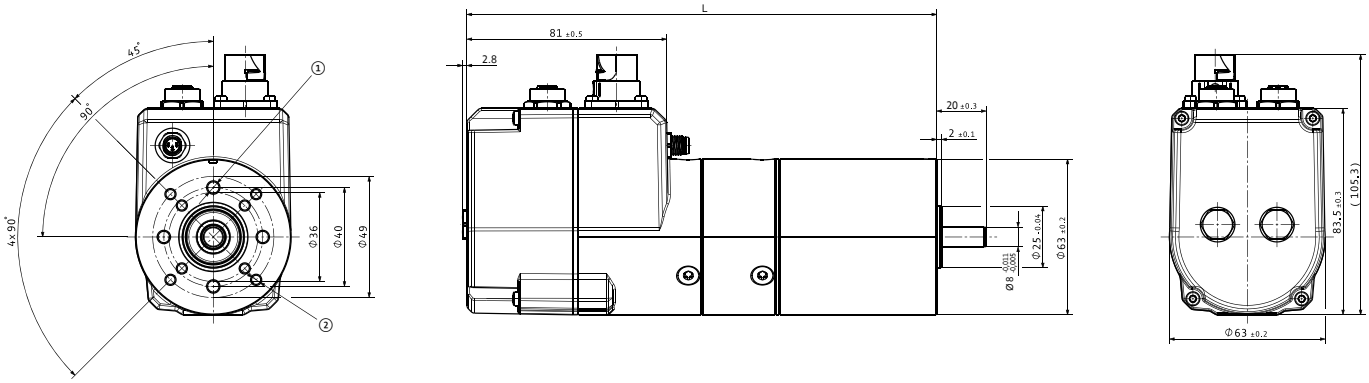
Connection cables have to be ordered separately — Page 37

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

Technical drawing without brake and without encoder

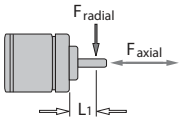
Dimensions in mm

Type	L
ECI-63.20	190±0.4
ECI-63.40	210±0.4
ECI-63.60	230±0.4



① 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

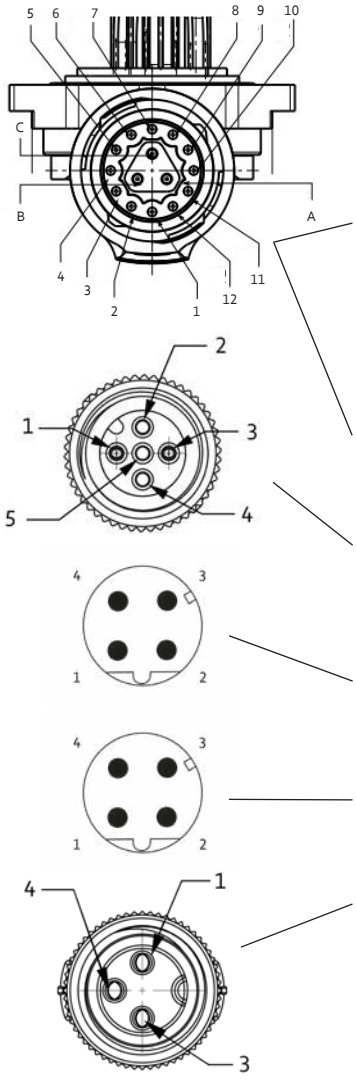
② 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep



Permissible shaft load

F_{axial}:	45 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	98 N	
L_1:	10 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	D-IN-A	Digital input A	24 (0.25mm²)
	2	brown	D-IN-B	Digital input B	
	3	green	D-IN-1	Digital input 1	
	4	yellow	D-IN-2	Digital input 2	
	5	gray	D-Out-1	Digital I/O 1	
	6	pink	D-Out-2	Digital I/O 2	
	7	blue	D-Out-3	Digital output 3	
	8	red	A-IN-1	Analog input 1	
	9	black	A-IN-GND	Analog input GND	
	10	purple	CAN-H	CAN Bus high signal	
	11	gray-pink	CAN-L	CAN Bus low signal	
	12	red-blue	U_{Logik}	Logic power supply	
Power	A	brown	U_{ZK}	Power supply	16 (1.5mm²)
	B	black	GND	Ground	
	C	gray	Ballast	Ballast resistor	
STO	1	brown	STO_M	Safe Torque Off 0V	22 (0.34 mm²)
	2	white	empty	empty	
	3	blue	STO_P	Safe Torque Off 24V	
	4	black	empty	empty	
	5	gray	empty	empty	
BUS-IN	1	yellow	TX+	Transmission Data +	22 (0.34 mm²)
	2	white	RX+	Receive Data +	
	3	orange	TX-	Transmission Data -	
	4	blue	RX-	Receive Data -	
BUS-OUT	1	yellow	TX+	Transmission Data +	22 (0.34 mm²)
	2	white	RX+	Receive Data +	
	3	orange	TX-	Transmission Data -	
	4	blue	RX-	Receive Data -	
Diagnosis	1	brown	GND	Ground	24 (0.25mm²)
	3	blue	CAN-H	CAN Bus high signal	
	4	black	CAN-L	CAN Bus low signal	

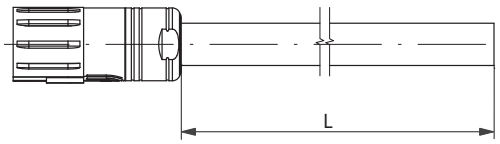
Subject to changes. Colors of the leads when ebm-papst cables are used

Electrical connection with brake see page 97

Electrical connection cable

Dimensions in mm

Type (straight)	L	part number
Cable (12 + 3 Pins)	1 000 ± 30	**992 0160 200**
Cable (12 + 3 Pins)	3 000 ± 30	**992 0160 201**
Cable (12 + 3 Pins)	10 000 ± 30	**992 0160 202**



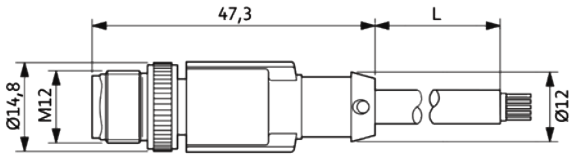
For self-assembly, cables can be obtained from Intercontec:

Intercontec plug series 915 with quick fastener Ø 10.5 - 12 mm, (part number ESTA205NN00340003000)

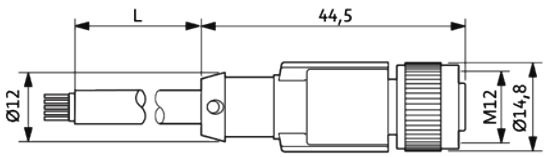
Intercontec crimp contact socket 3 x, power, crimp range 0.5 - 1.5 mm² (part number 60.251.11)

Intercontec crimp contact socket 12 x, signal, crimp range 0.05 - 0.75 mm² (part number 60.252.11)

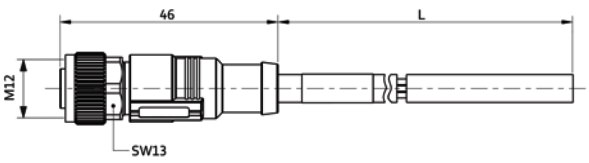
Type	L	part number
EtherCAT plug	1 000 ± 15	**831 5120 006**
EtherCAT plug	2 000 ± 45	**831 5120 007**
EtherCAT plug	5 000 ± 45	**831 5120 008**



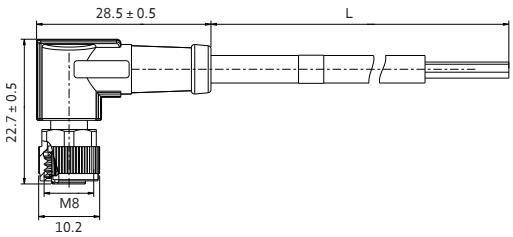
Type	L	part number
EtherCAT socket	1 000 ± 15	**831 5120 009**
EtherCAT socket	2 000 ± 45	**831 5120 010**
EtherCAT socket	5 000 ± 45	**831 5120 011**



Type	L	part number
STO cable	1 000 ± 50	**992 0160 400**
STO cable	3 000 ± 50	**992 0160 410**



Type	L	part number
Diagnostic cable	3 000 ± 10	**992 0160 510**



Servomotor ECI-80.XX-K1

More at www.ebmpapst.com

Description

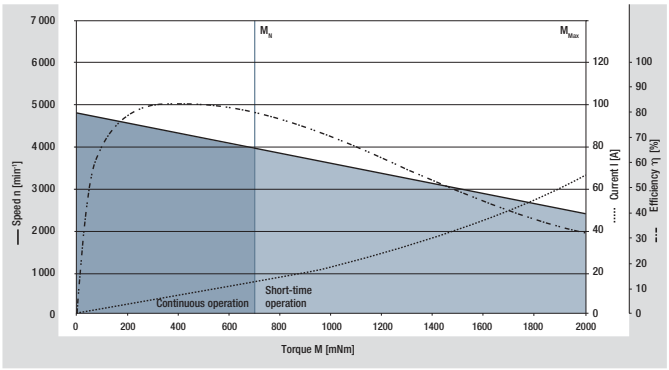
- Highly dynamic 3-phase internal rotor motor in EC technology (8-pole)
- Low cogging torque
- Robust, noise-optimized ball bearing system for a long service life
- High efficiency and high power density realized in a compact design
- Basic motor with electronic module K1 for operation with external control electronics
- Mechanical design and interfaces designed for modular flexibility
- Protection class IP 54 and connection via industrial-suited, rotatable plug

Type		ECI-80.20-K1-B	ECI-80.20-K1-D	ECI-80.40-K1-B	ECI-80.40-K1-D	ECI-80.60-K1-D
Characteristic curve		A		B		C
Nominal voltage (U_N)	V DC	24	48	24	48	48
Nominal speed (n_N)[2]	rpm			4 000		
Nominal torque (M_N)[2]	mNm	700	700	1 200	1 200	1 800
Nominal current (I_N)[2]	A	13.5	7.5	25.0[4]	12.0	18.5
Nominal output power (P_N)[2]	W	293	293	503	503	754
Starting torque (M_A)	mNm	2 400	2 500	3 900	5 000	5 600
Permissible peak current (I_{max})[3]	A	100	60	100	100	100
Speed at no-load operation (n_L)	rpm	4 800	4 800	4 700	4 850	6 100
No-load current (I_L)	A	1.00	1.00	1.50	0.90	1.00
Permanent stall torque (M_{NO})	mNm	700	700	1 200	1 200	1 800
Recommended speed control range	rpm			0 ... 4 000		
Rotor moment of inertia(J_R)	$kgm^2 x10^{-6}$	54	54	104	104	155
Motor constant (K_E)	mVs/rad	47.2	94.0	48.2	96.0	72.2
Connection resistance (R_V)	Ω	0.07	0.30	0.03	0.10	0.04
Connection inductance (L_V)	µH	300	1 300	200	600	200
Overload protection				to be implemented via the control electronics		
Permissible ambient temperature range (T_U)	°C			-30 ... +40		
Weight	kg	1.85	1.85	2.35	2.35	2.80
Part number	IP 54[1]	on request	on request	831 5121 051	on request	831 5121 052

[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] At T_U max. 40 °C
[3] Permissible maximum current duration: max. 5 seconds – can be repeated after complete cool down
[4] 20 A phase current in S1 operation at T_U=40°C must not be exceeded

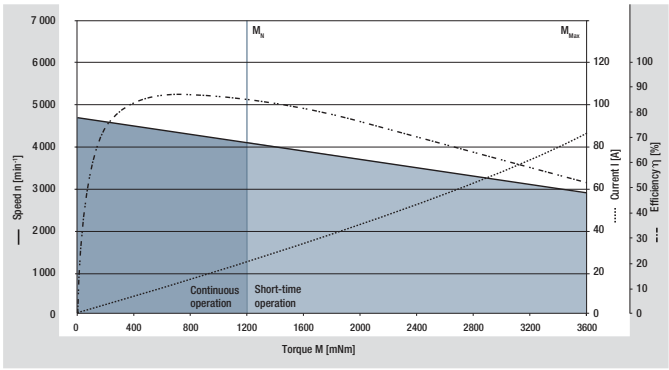
Subject to changes.

A ECI-80.20-K1, 24 V (at 25 °C)



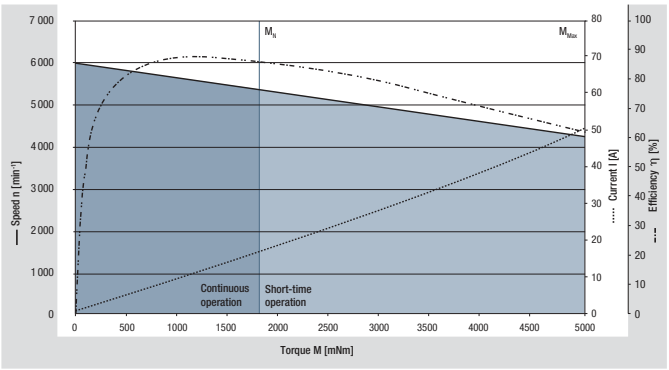
Characteristic curve 48 V on request

B ECI-80.40-K1, 24 V (at 25 °C)



Characteristic curve 48 V on request

C ECI-80.60-K1, 48 V (at 25 °C)

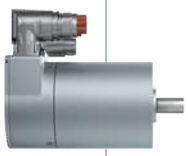


Modular drive system

Brake system (integrated)

Brake module
ECI 80
RFK 2.0 Nm — Page 96

Basic motor



Planetary gearboxes

Optimax®80	Page 74
PE080	Page 80

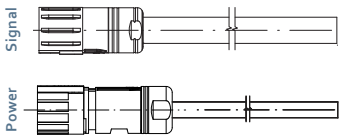
Encoder system (integrated)

magnetic
inkremental IEM 38 — Page 98

Recommended external control electronics

VTD-XX.XX-K4S		Speed Page 46
VTD-60.13-K5C-S	(CANopen)	Position Page 50
VTD-60.35-K5C-S	(CANopen)	Position Page 52
VTD-60.10-K5E-S	(EtherCAT)	Position Page 54
VTD-60.35-K5E-S	(EtherCAT)	Position Page 56

Connection cable with plug



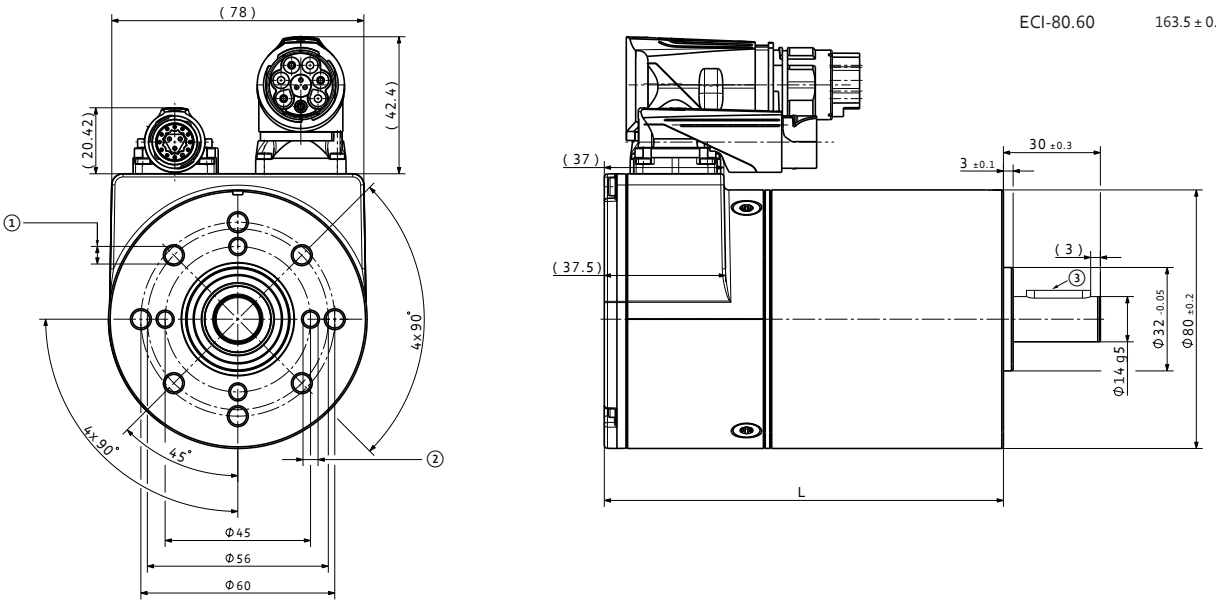
Connection cables have to be ordered separately — Page 41

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

Technical drawing without brake and without encoder

Dimensions in mm

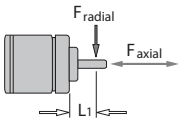
Type	L
ECI-80.20	123.5 ± 0.4
ECI-80.40	143.5 ± 0.4
ECI-80.60	163.5 ± 0.4



① 8 x for thread-forming screws M6 according to DIN 7500, 13 mm deep

② 4 x for thread-forming screws M5 according to DIN 7500, 13 mm deep

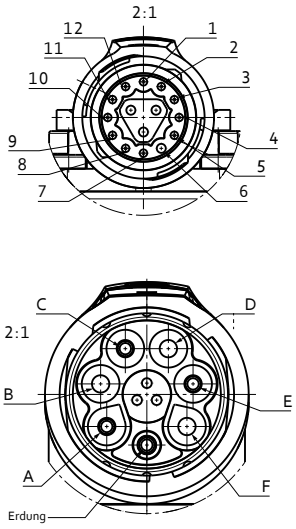
③ Feather key A5 x 5 x 20 DIN 6885



Permissible shaft load

F_{axial}:	70 N	Permissible simultaneous shaft loads at rated speed and service life expectancy L_{10} (in rated operation) from 20 000 h (at T_U max. 40 °C)
F_{radial}:	330 N	
L_1:	15 mm	

Electrical connection without brake



	Pin	Wire color	Configuration	Function	rec. AWG
Signal	1	white	H A	Hall Signal A	24 (0.25 mm²)
	2	brown	H B	Hall Signal B	
	3	green	H C	Hall Signal C	
	4	yellow	+5V	Supply voltage	
	5	gray	GND	Ground	
	6	pink	empty	empty	
Encoder	7	blue	A	Encoder Channel A	
	8	red	/A	Encoder Channel A inverted	
	9	black	B	Encoder Channel B	
	10	purple	/B	Encoder Channel B inverted	
	11	gray-pink	Z	Encoder Index	
	12	red-blue	/Z	Encoder Index inverted	
Power	A	brown	W	Winding connector W	12 (3.31 mm²)
	B				
	C	black	V	Winding connector V	
	D				
	E	gray	U	Winding connector U	
	F				

Subject to changes. Colors of the individual wires when using ebm-papst connection cables.

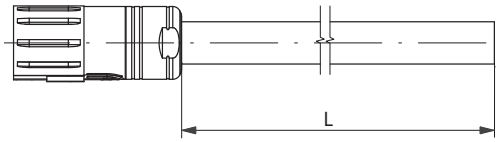
Electrical connection with brake see page 97

Electrical connection cable

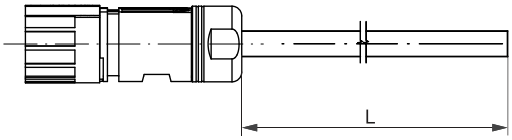
Dimensions in mm

Type (straight)	L	part number
Cable Signal (12 + 3 Pins)	1 000 ± 30	**992 0160 200**
Cable Signal (12 + 3 Pins)	3 000 ± 30	**992 0160 201**
Cable Power (3 Pins + FE)	1 000 ± 30	**821 7201 118**
Cable Power (3 Pins + FE)	3 000 ± 30	**821 7201 122**

Signal



Power



Signal

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

Intercontec plug series 915 with quick fastener Ø 10.5 - 12 mm, (part number ESTA205NN00340003000)

Intercontec crimp contact socket 12 x, Signal, crimp range 0.05 - 0.75 mm² (part number 60.252.11)

Power

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

Intercontec plug series 723 with quick fastener Ø 28 mm (part number H51A202NN00550100000)

Intercontec crimp contact socket 4 x, Power + FE, crimp range 2.5 - 4.0 mm² (part number 60.272.11)

Brushless internal rotor servomotors series ECI

Control electronics

ebmpapst

engineering a better life

Control electronics

Overview

Control electronics VTD-XX.XX-K3

with speed control function

More at www.ebmpapst.com

Description

- Motor commutation and speed control via microcontroller
- Control parameters are each specifically designed for the motor
- Four-quadrant controller
- Speed setting via analog nominal value 0 ... 10 V DC
- Speed actual value processing and output
- Setting of the operating mode via two control inputs
- Monitoring function for output current and voltage

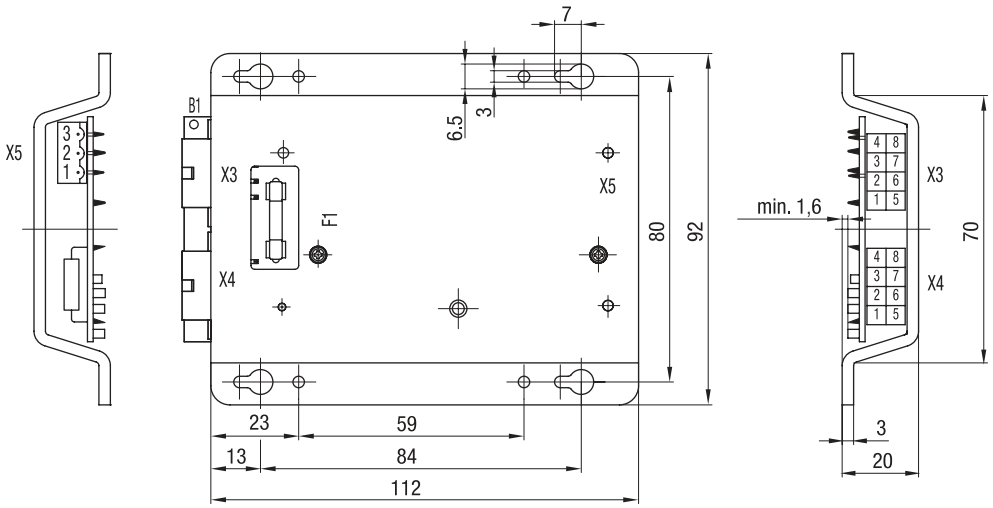
Type		VTD-24.XX-K3	VTD-48.XX-K3
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	18 ... 30	30 ... 52
Permissible continuous output current[1)]	A	3 - 12 depending on model	3 - 6 depending on model
Maximum commutation frequency	kHz	2	2
Switching frequency	kHz	20	20
Minimum Connection inductance	mH	0.1	0.1
Digital inputs	Number	2	2
Digital outputs	Number	1	1
Analog inputs	Number	1	1
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	0 ... +40	0 ... +40
Permissible ambient humidity[2)]	%	5 ... 93	5 ... 93
Protection class		IP 00	IP 00
Weight	kg	0.2	0.2
Part number		on request	on request

[1)] Applicable at rated temperature T_U = 40 °C
[2)] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Cable set (incl. mating connector) included in delivery

Electrical connection

	Control plug X3		Motor plug X4		Capacitor plug X5	
Pin	Configuration	Function	Configuration	Function	Configuration	Function
1	A	Operating mode A	L3	Motor phase 3	U+	Capacitor connector
2	$+U_B$	Supply voltage	+U-Hall	Hall sensor supply	U-	Capacitor connector
3	n.c.	Not allocated	RLG2	Hall signal 2	BR	Braking resistor
4	S+	Set value input	RLG1	Hall signal 1		
5	B	Operating mode B	L2	Motor phase 2		
6	Ist	Actual speed value	L1	Motor phase 1		
7	GND	Ground Supply voltage	GND-Hall	Ground Hall sensor supply		
8	S-	Ground Set value input	RLG3	Hall signal 3		

Subject to changes.

Accessories

Type	part number
Control plug X3	
Motor plug X4	on request
Capacitor plug X5	

Control electronics VTD-XX.XX-K4S

with speed, torque and positioning mode

More at www.ebmpapst.com

Description

- Operating electronics for driving 3-phase BLDC motors
  up to 1 000 watt output power
- Four-quadrant controller
- Speed, torque and positioning mode
- Selection of operating modes and parameter setting via RS 485
- User-friendly parameter setting with "driveSTUDIO" software
- Integrated brake ballast-control
- Device status notification by two LEDs
- Mating connectors are included in delivery

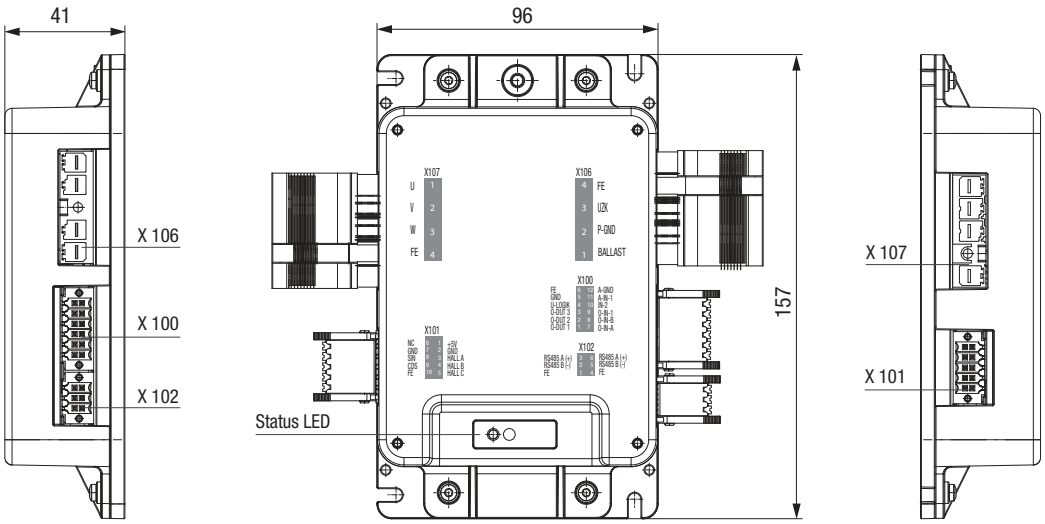
Type		VTD-24.40-K4S	VTD-48.20-K4S
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	18 ... 30	18 ... 53
Maximum output current (max. 5 sec.)[1]	A	100	100
Permissible continuous output current[1]	A	40	20
Nominal voltage (Logic power supply U_L)	V DC	24	24
Logic current draw (at 24 V DC)[2]	mA	< 100	< 100
Maximum commutation frequency	kHz	2	2
Switching frequency	kHz	20	20
Minimum Connection inductance	mH	0.10	0.10
Digital inputs	Number	4	4
Digital outputs	Number	3	3
Analog inputs	Number	1	1
Parameterization interface		RS485	RS485
Efficiency (in optimum working range)	%	> 95	> 95
Permissible ambient temperature range (T_U)	°C	-30 ... +40	-30 ... +40
Permissible ambient humidity[3]	%	5 ... 85	5 ... 85
Protection class		IP 20	IP 20
Weight	kg	approx. 0.50	approx. 0.50
part number		994 2440 000	994 4820 000

[1] Applicable at rated temperature T_U = 25 °C, Derating at deviating (higher) temperatures
[2] Current draw without current requirement of digital outputs
[3] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Mating connectors are included in delivery

Electrical connection

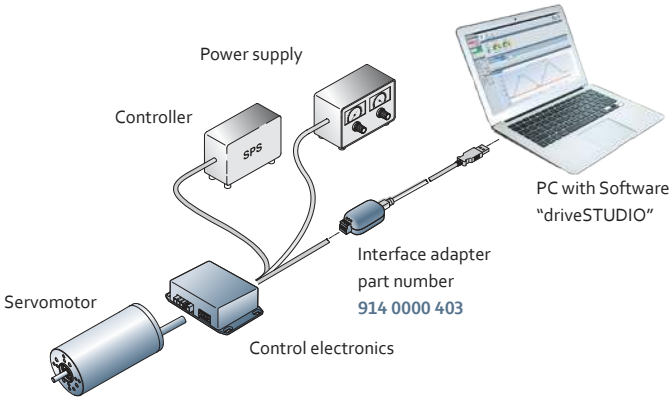
	X100 Signals Logic supply		X101 Hall sensors		X102 Parameterization interface		X106 Power supply, controller		X107 Power supply, motor	
Pin	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function
1	D-OUT-1	Digital output 1	+U Hall (5V)	Hall sensor supply	FE	Functional earth	Ballast	Ballast resistor	U	Winding connector U
2	D-OUT-2	Digital output 2	GND	Ground Hall sensor	RS485 B (-)	Parameterization interface	P-GND	Ground Power supply	V	Winding connector V
3	D-OUT-3	Digital output 3	Hall A	Hall Signal A	RS485 A (+)	Parameterization interface	U_{ZK}	Power supply	W	Winding connector W
4	U_{Logik}	Logic power supply	Hall B	Hall Signal B	FE	Functional earth	FE	Functional earth	FE	Functional earth
5	GND	Ground Logic power supply	Hall C	Hall Signal C	RS485 B (-)	Parameterization interface				
6	FE	Functional earth	$+U_{sin/cos}$ (5V)	Supply voltage Encoder	RS485 A (+)	Parameterization interface				
7	D-IN-A	Digital input A	GND	Ground Encoder						
8	D-IN-B	Digital input B	SIN	SIN Signal Encoder						
9	D-IN-1	Digital input 1	COS	COS Signal Encoder						
10	D-IN-2	Digital input 2	FE	Functional earth						
11	A-IN-1	Analog input 1								
12	A-IN-GND	Analog input 1 Ground								
AWG	22 (0.34 mm²)		22 (0.34 mm²)		22 (0.34 mm²)		8 (10 mm² bei 40A)		8 (10 mm² bei 40A)	

Subject to changes.

Accessories

Commissioning tool

"driveSTUDIO" (Page 93)



Arrangement Commissioning

Control electronics VTD-60.05-K5C-S

with speed, torque and positioning mode

More at www.ebmpapst.com

Description

- Compact four-quadrant controller for BLDC motors
- CANopen interface (Protocol DS301, Device profile DS402)
- Integrated digital inputs and outputs as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status notification by 3 LEDs (Power, Status, Error)
- Freely programmable due to built in MPU (Motion Process Unit)

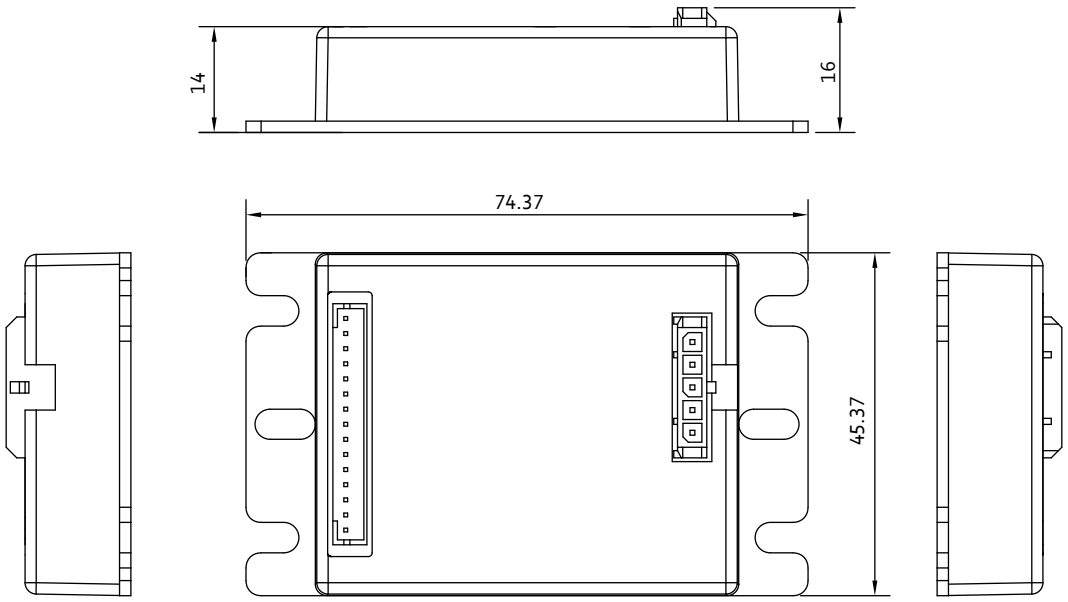
Type		VTD-60.05-K5C-S	
Nominal voltage (Power supply U_N)	V DC	24	60
Permissible supply voltage range (U)	V DC	9...60	9...60
Maximum output current	A	15	15
Permissible continuous output current[1]	A	5	4.3
Nominal voltage (Logic power supply U_L)	V DC	9...30	9...30
Logic current draw (bei 24 V DC)[2]	mA	typ. 40	typ. 40
Maximum commutation frequency (per track)	kHz	10	10
Switching frequency[3]	kHz	32	32
Minimum Connection inductance	mH	0.2	0.2
Digital inputs	Number	2	2
Digital outputs	Number	1	1
Analog inputs	Number	1	1
Parameterization interface		CANopen	CANopen
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	-25...40	-25...40
Permissible ambient humidity[4]	%	5...90	5...90
Protection class		IP 20	IP 20
Weight	kg	approx. 0.03	approx. 0.03
part number		8315 121 028	8315 121 028

[1] Cable with maximum possible cable cross-section, PWM frequency 32 kHz (asymmetric), Ambient temperature 40 °C, I/O's and 5V output, effective current: 5 A --> 4.1 Aeff, 4.3 A --> 3.5 Aeff
[2] Output stage off, 5V Output (encoder supply) is unloaded
[3] Standard value, other values can be set
[4] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Cable set (incl. mating connector) included in delivery

Electrical connection

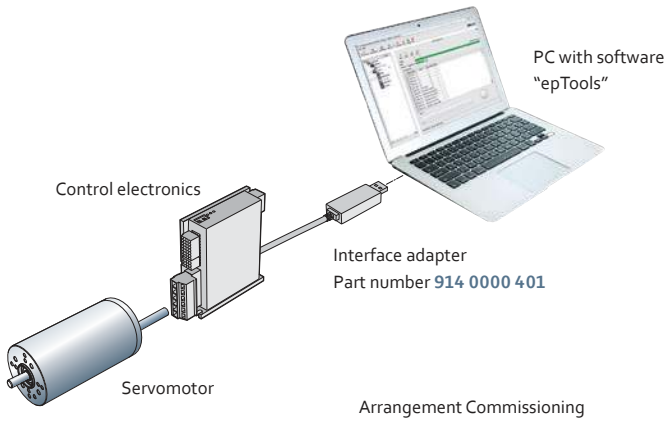
	X1	Hall sensors, Rotation encoder, I/O's and CAN	X2	Motor
Pin	Configuration	Function	Configuration	Function
1	GND	Ground Encoder supply	+Up	Supply voltage Power
2	+U5V	5 V Encoder supply (Hall and rotation encoder)	GND	Ground Power
3	B	Incremental Encoder - B channel	Ma	Motor phase A
4	A	Incremental Encoder - A channel	Mb	Motor phase B
5	H3/Inx	Hall sensor signal 3 / Incremental Encoder - Index	Mc	Motor phase C
6	H2	Hall sensor signal 2		
7	H1	Hall sensor signal 1		
8	CAN Lo	CAN Low		
9	CAN Hi	CAN High		
10	Din2/Dout0	Digital input 2 / Digital output 0		
11	Din1	Digital input 1		
12	Din0	Digital input 0		
13	Ain0	Analog input 0		
14	GND	Ground Electronics		
15	+Ue	Supply voltage Electronics		

Subject to changes.

Accessories

Type	part number
Cable set	**8315 121 035**

Commissioning tool
"epTools" (Page 94)



Arrangement Commissioning

Control electronics VTD-60.13-K5C-S

with speed, torque and positioning mode

More at www.ebmpapst.com

Description

- Compact four-quadrant controller for BLDC motors
- CANopen interface (Protocol DS301, Device profile DS402)
- Integrated digital inputs and outputs as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status notification by 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- Freely programmable due to built in MPU (Motion Process Unit)

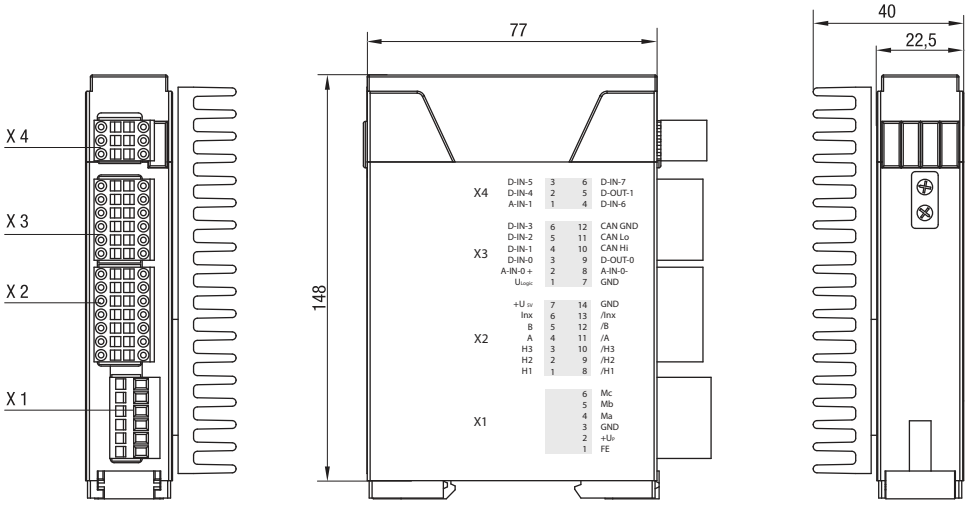
Type		VTD-60.13-K5C-S	
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	9 ... 60	9 ... 60
Maximum output current[1]	A	50	50
Permissible continuous output current[1]	A	12.5 (at 24V)	12.5 (at 24V)
Nominal voltage (Logic power supply U_L)	V DC	9 ... 30	9 ... 30
Logic current draw (bei 24 V DC)[2]	mA	60	60
Maximum commutation frequency (per track)	kHz	10	10
Switching frequency	kHz	32	32
Minimum Connection inductance	mH	0.20	0.20
Digital inputs	Number	8	8
Digital outputs	Number	2	2
Analog inputs	Number	2	2
Parameterization interface		CANopen	CANopen
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	0 ... +70	0 ... +70
Permissible ambient humidity[3]	%	5 ... 85	5 ... 85
Protection class		IP 20	IP 20
Weight	kg	approx. 0.31	approx. 0.31
part number		994 6013 000	994 6013 000

[1] Applicable at rated temperature T_U = 25 °C, Derating at deviating (higher) temperatures
[2] Current draw without current requirement of digital outputs
[3] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Mating connectors are included in delivery

Electrical connection

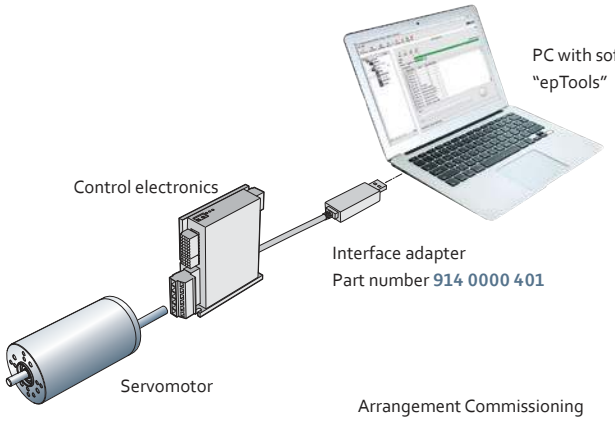
	Motor X1		Hall sensors and encoder X2		I/O's and CAN X3		I/O's X4	
Pin	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function
1	FE	Functional earth	Hall 1	Hall signal 1	U_{Logik}	Logic power supply	A-IN-1	Analog input 1
2	+Up	Power supply	Hall 2	Hall signal 2	A-IN-0 +	Analog input 0, plus	D-IN-4	Digital input 4
3	GND	Ground	Hall 3	Hall signal 3	D-IN-0	Digital input 0	D-IN-5	Digital input 5
4	Ma	Phase A	A	Incremental Encoder - A channel	D-IN-1	Digital input 1	D-IN-6	Digital input 6
5	Mb	Phase B	B	Incremental Encoder - B channel	D-IN-2	Digital input 2	D-OUT-1	Digital output 1
6	Mc	Phase C	Inx	Incremental Encoder - Index	D-IN-3	Digital input 3	D-IN-7	Digital input 7
7			$+U_{5V}$	5V Encoder supply (Hall and rotation encoder)	GND	Ground Electronics		
8			/H1	Hall signal 1 inverted	A-IN-0 -	Analog input 0, minus		
9			/H2	Hall signal 2 inverted	D-OUT-0	Digital output 0		
10			/H3	Hall signal 3 inverted	CAN Hi	CAN Bus high Signal		
11			/A	Incremental Encoder - A channel inverted	CAN Lo	CAN Bus low Signal		
12			/B	Incremental Encoder - B channel inverted	CAN GND	CAN Ground		
13			/Inx	Incremental Encoder - Index inverted				
14			GND	Encoder Ground				

Subject to changes.

Accessories

Commissioning tool

"epTools" (Page 94)



Arrangement Commissioning

Control electronics VTD-60.35-K5C-S

with speed, torque and positioning mode

More at www.ebmpapst.com

Description

- Compact four-quadrant controller for BLDC motors
- CANopen interface (Protocol DS301, Device profile DS402)
- Integrated digital inputs and outputs as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status notification by 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- Freely programmable due to built in MPU (Motion Process Unit)

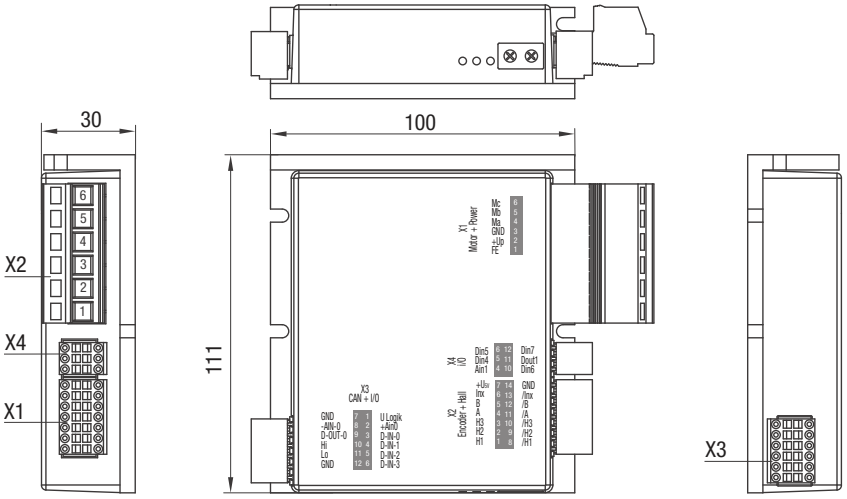
Type		VTD-60.35-K5C-S	
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	9 ... 60	9 ... 60
Maximum output current[1]	A	100	100
Permissible continuous output current[1]	A	35 (at 24V)	35 (at 24V)
Nominal voltage (Logic power supply U_L)	V DC	9 ... 30	9 ... 30
Logic current draw (bei 24 V DC)[2]	mA	70	70
Maximum commutation frequency (per track)	kHz	10	10
Switching frequency	kHz	32	32
Minimum Connection inductance	mH	0.20	0.20
Digital inputs	Number	8	8
Digital outputs	Number	2	2
Analog inputs	Number	2	2
Parameterization interface		CANopen	CANopen
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	0 ... +70	0 ... +70
Permissible ambient humidity[3]	%	5 ... 85	5 ... 85
Protection class		IP 20	IP 20
Weight	kg	approx. 0.38	approx. 0.38
part number		994 6035 000	994 6035 000

[1] Applicable at rated temperature T_U = 25 °C, Derating at deviating (higher) temperatures
[2] Current draw without current requirement of digital outputs
[3] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Mating connectors are included in delivery

Electrical connection

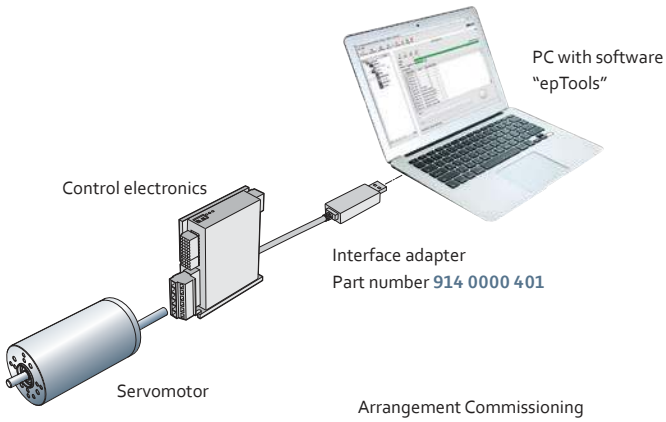
	X1	Motor	X2	Hall sensors and encoder	X3	I/O's and CAN	X4	I/O's
Pin	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function
1	FE	Functional earth	H1	Hall signal 1	U_{Logik}	Logic power supply	A-IN-1	Analog input 1
2	+Up	Supply voltage Power	H2	Hall signal 2	A-IN-0 +	Analog input 0, plus	D-IN-4	Digital input 4
3	GND	Ground	H3	Hall signal 3	D-IN-0	Digital input 0	D-IN-5	Digital input 5
4	Ma	Phase A	A	Incremental Encoder - A channel	D-IN-1	Digital input 1	D-IN-6	Digital input 6
5	Mb	Phase B	B	Incremental Encoder - B channel	D-IN-2	Digital input 2	D-OUT-1	Digital output 1
6	Mc	Phase C	Inx	Incremental Encoder - Index	D-IN-3	Digital input 3	D-IN-7	Digital input 7
7			$+U_{5V}$	5V Encoder supply (Hall and rotation encoder)	GND	Ground Electronics		
8			/H1	Hall signal 1 inverted	A-IN-0 -	Analog input 0, minus		
9			/H2	Hall signal 2 inverted	D-OUT-0	Digital output 0		
10			/H3	Hall signal 3 inverted	CAN Hi	CAN Bus high Signal		
11			/A	Incremental Encoder - A channel inverted	CAN Lo	CAN Bus low Signal		
12			/B	Incremental Encoder - B channel inverted	CAN GND	Ground CAN		
13			/Inx	Incremental Encoder - Index inverted				
14			GND	Ground Encoder supply				

Subject to changes.

Accessories

Commissioning tool

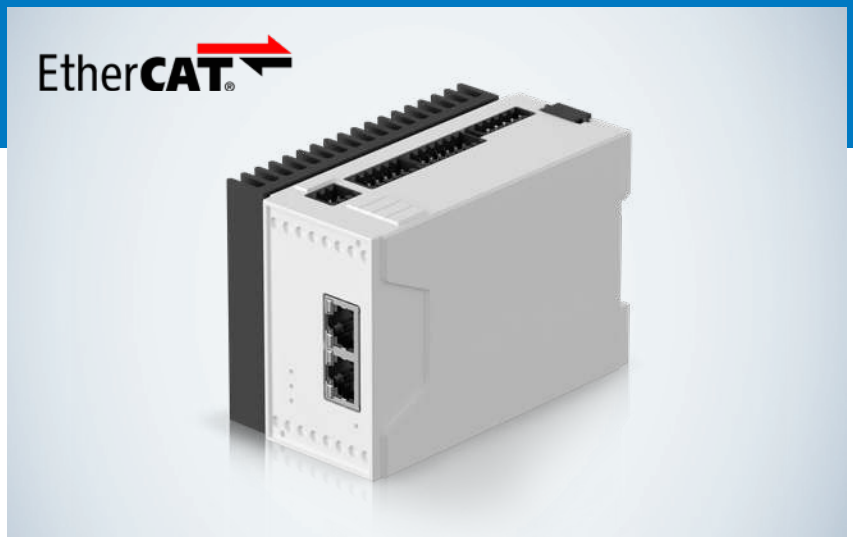
"epTools" (Page 94)



Arrangement Commissioning

Control electronics VTD-60.10-K5E-S

with speed, torque and positioning mode



More at www.ebmpapst.com

Description

- Compact four-quadrant controller for BLDC motors
- EtherCAT interface (CoE: CANopen over EtherCAT)
- Hex switch for setting the device node ID
- Integrated digital inputs and outputs as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status notification by 3 LEDs (Power, Status, Error)
- Parameterization interface CANopen
- Freely programmable due to built in MPU (Motion Process Unit)

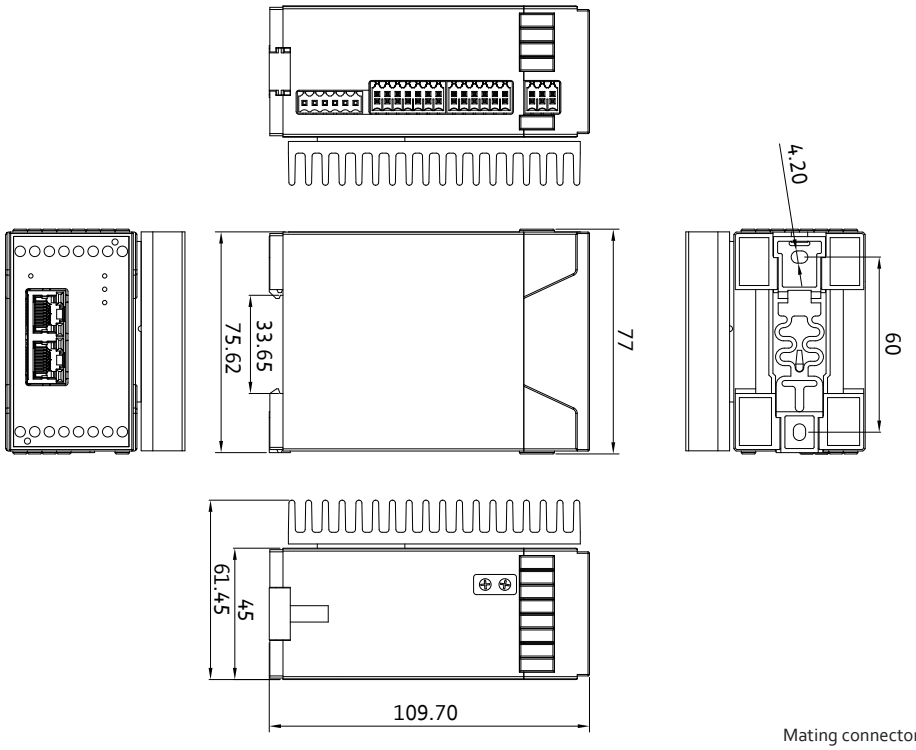
Type		VTD-60.10-K5E-S	
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	9...60	9...60
Maximum output current	A	50	50
Permissible continuous output current[1]	A	10	8.5
Nominal voltage (Logic power supply U_L)	V DC	9...30	9...30
Logic current draw (bei 24 V DC)[2]	mA	typ. 90	typ. 90
Maximum commutation frequency (per track)	kHz	10	10
Switching frequency[3]	kHz	32	32
Minimum Connection inductance	mH	0.2	0.2
Digital inputs	Number	8	8
Digital outputs	Number	2	2
Analog inputs	Number	2	2
Parameterization interface		CANopen	CANopen
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	-25...70	-25...70
Permissible ambient humidity[4]	%	5...90	5...90
Protection class		IP 20	IP 20
Weight	kg	approx. 0.17	approx. 0.17
part number		8315 121 030	8315 121 030

[1] Cable with maximum possible cable cross-section, PWM frequency 32 kHz, Ambient temperature 40 °C (t >40 °C Derating), Effective current: 10 A --> 8.2 Aeff, 8.5 A --> 6.9 Aeff
[2] Output stage off, 5V Output (encoder supply) is unloaded
[3] Standard value, other values can be set
[4] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Mating connectors are included in delivery

Electrical connection

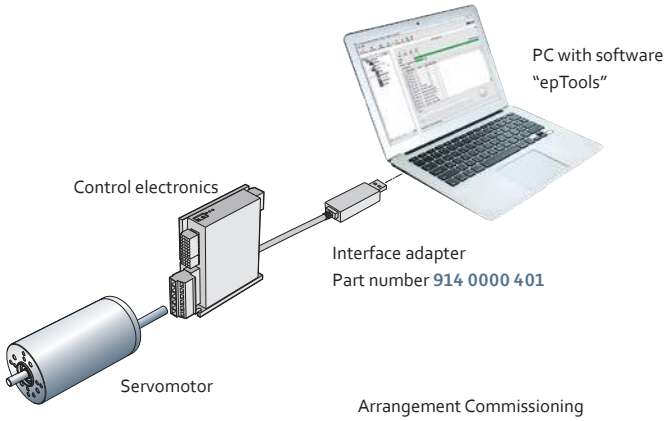
	X1	Motor	X2	Hall sensors and encoder	X3	I/O's und CAN	X4	I/O's
Pin	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function
1	FE	Functional earth	H1	Hall sensor signal 1	+Ue24V	Supply voltage Electronics	Ain1	Analog input 1
2	+Up	Supply voltage Power	H2	Hall sensor signal 2	+Ain0	Analog input 0, plus	Din4	Digital input 4
3	GND	Ground Power	H3	Hall sensor signal 3	Din0	Digital input 0	Din5	Digital input 5
4	Ma	Motor phase A	A	Incremental Encoder - A channel	Din1	Digital input 1	Din6	Digital input 6
5	Mb	Motor phase B	B	Incremental Encoder - B channel	Din2	Digital input 2	Dout1	Digital output 1
6	Mc	Motor phase C	Inx	Incremental Encoder - Index	Din3	Digital input 3	Din7	Digital input 7
7			+U5V	5 V Encoder supply (Hall and rotation encoder)	GND	Ground Electronics		
8			/H1	Hall sensor signal 1 inverted	-Ain0	Analog input 0, minus		
9			/H2	Hall sensor signal 2 inverted	Dout0	Digital output 0	X5	EtherCAT - In Port
10			/H3	Hall sensor signal 3 inverted	CAN Hi	CAN High	In	In
11			/A	Incremental Encoder - A channel inverted	CAN Lo	CAN Low		
12			/B	Incremental Encoder - B channel inverted	CAN GND	Ground für CAN	X6	EtherCAT - Out Port
13			/Inx	Incremental Encoder - Index inverted			Out	Out
14			GND	Ground Encoder supply				

Subject to changes.

Accessories

Commissioning tool

"epTools" (Page 94)



Arrangement Commissioning

Control electronics VTD-60.35-K5E-S

with speed, torque and positioning mode

More at www.ebmpapst.com

Description

- Compact four-quadrant controller for BLDC motors
- EtherCAT Interface (CoE: CANopen over EtherCAT)
- Hex switch for setting the device node ID
- Integrated digital inputs and outputs as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status notification by 3 LEDs (Power, Status, Error)
- Parameterization interface CANopen
- Freely programmable due to built in MPU (Motion Process Unit)

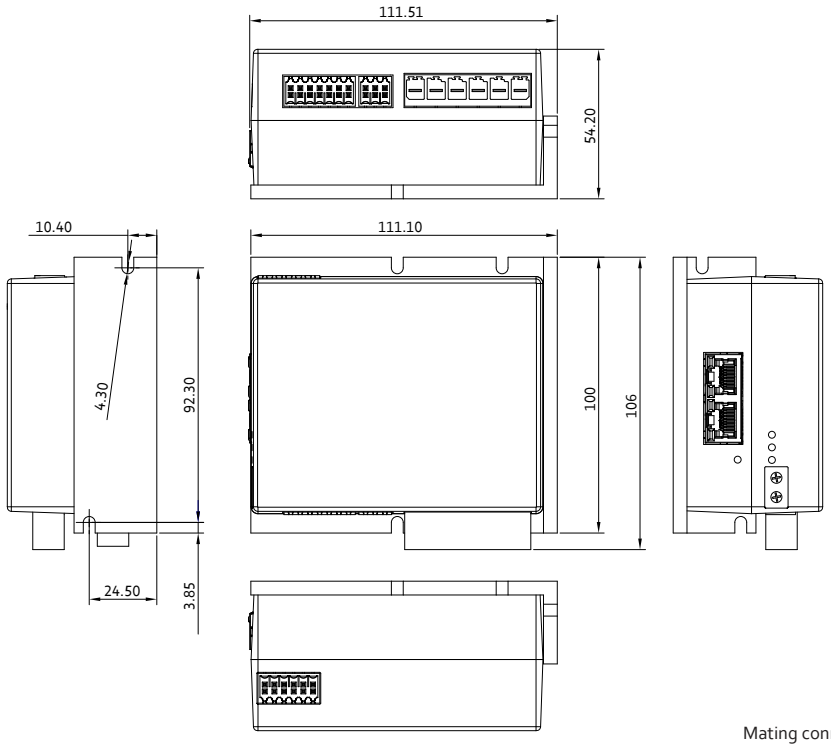
Type		VTD-60.35-K5E-S	
Nominal voltage (Power supply U_N)	V DC	24	48
Permissible supply voltage range (U)	V DC	9...60	9...60
Maximum output current	A	100	100
Permissible continuous output current[1]	A	35	26
Nominal voltage (Logic power supply U_L)	V DC	9...30	9...30
Logic current draw (bei 24 V DC)[2]	mA	typ. 100	typ. 100
Maximum commutation frequency (per track)	kHz	10	10
Switching frequency[3]	kHz	32	32
Minimum Connection inductance	mH	0.2	0.2
Digital inputs	Number	8	8
Digital outputs	Number	2	2
Analog inputs	Number	2	2
Parameterization interface		CANopen	CANopen
Efficiency (in optimum working range)	%	95	95
Permissible ambient temperature range (T_U)	°C	-25...70	-25...70
Permissible ambient humidity[4]	%	5...90	5...90
Protection class		IP 20	IP 20
Weight	kg	approx. 0.58	approx. 0.58
part number		8315 121 031	8315 121 031

[1] Cable with maximum possible cable cross-section, PWM frequency 25 kHz, Ambient temperature 40 °C (t >40 °C Derating), Effective current: 35 A --> 28.5 Aeff, 26 A --> 21.2 Aeff
[2] Output stage off, 5V Output (encoder supply) is unloaded
[3] Standard value, other values can be set
[4] Condensation not permitted

Subject to changes.

Technical drawing

Dimensions in mm



Mating connectors are included in delivery

Electrical connection

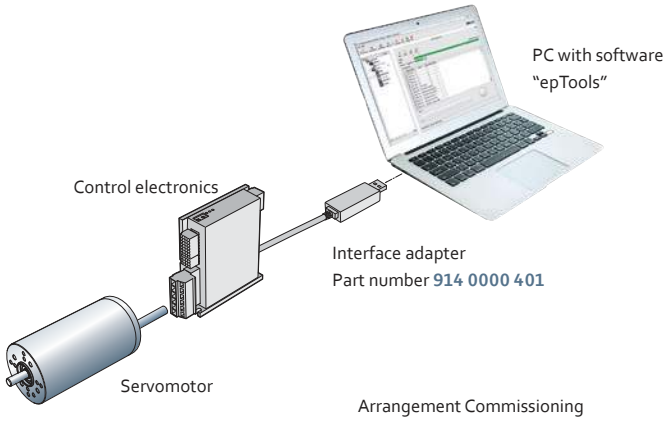
	X1	Motor	X2	Hall sensors and encoder	X3	I/O's und CAN	X4	I/O's
Pin	Configuration	Function	Configuration	Function	Configuration	Function	Configuration	Function
1	FE	Functional earth	H1	Hall sensor signal 1	+Ue24V	Supply voltage Electronics	Ain1	Analog input 1
2	+Up	Supply voltage Power	H2	Hall sensor signal 2	+Ain0	Analog input 0, plus	Din4	Digital input 4
3	GND	Ground Power	H3	Hall sensor signal 3	Din0	Digital input 0	Din5	Digital input 5
4	Ma	Motor phase A	A	Incremental Encoder - A channel	Din1	Digital input 1	Din6	Digital input 6
5	Mb	Motor phase B	B	Incremental Encoder - B channel	Din2	Digital input 2	Dout1	Digital output 1
6	Mc	Motor phase C	Inx	Incremental Encoder - Index	Din3	Digital input 3	Din7	Digital input 7
7			+U5V	5 V Encoder supply (Hall and rotation encoder)	GND	Ground Electronics		
8			/H1	Hall sensor signal 1 inverted	-Ain0	Analog input 0, minus		
9			/H2	Hall sensor signal 2 inverted	Dout0	Digital output 0	X5	EtherCAT - In Port
10			/H3	Hall sensor signal 3 inverted	CAN Hi	CAN High	In	In
11			/A	Incremental Encoder - A channel inverted	CAN Lo	CAN Low		
12			/B	Incremental Encoder - B channel inverted	CAN GND	Ground für CAN	X6	EtherCAT - Out Port
13			/Inx	Incremental Encoder - Index inverted			Out	Out
14			GND	Ground Encoder supply				

Subject to changes.

Accessories

Commissioning tool

"epTools" (Page 94)



Arrangement Commissioning

Brushless Servomotors ECI series

Gearboxes

ebmpapst

engineering a better life

Gearboxes

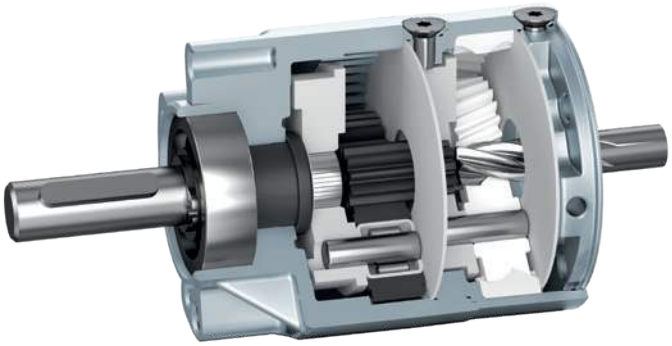
Overview

Information about gearboxes

In the gearbox product range, we offer different types of transmission technologies. These include planetary and angular gearboxes, which are individually adapted to your requirements according to the principle of the modular drive system. Our experts are ready to assist you as your competent partner in selecting the right gearbox technology.
Contact us now at www.ebmpapst.com/contact

Planetary gearbox

– Higher reduction ratios within first and second stage
– Very quiet operation
– Extraordinarily high performance
– Compact design
– No offset axle
– Comprehensive range of products with four model types
  - Noiseless Plus – unique quiet operation
  - Performax®Plus – extreme performance
  - Optimax® – robust and long lifetime
  - PE – low-backlash



Angular gearboxes

– Outstanding efficiency
– Large reduction ratio range
– No self-locking
– Highest power density
– No offset axle
– Two different model ranges
  - EtaCrown®
  - EtaCrown® Plus

The output shafts of the ebm-papst gearboxes are generally made of hardened and ground case-hardened steel, meaning that they are particularly durable. Torque is transmitted via a keyway connection as standard. For projects we offer alternative shaft designs and geometries.

The comprehensive product range of **planetary gearboxes** is used when high power densities are required.

When it comes to achieving high efficiency with minimal noise, the **NoiselessPlus** is the impressive, obvious choice. Its exemplary smooth operation is achieved thanks to extremely sturdy, helical planetary wheels made of high-strength plastic.

Performax®Plus delivers smooth operation and high performance. Helical planetary wheels made of high-strength plastic ensure excellent smooth operation in the first stage. The combination with a hardened ring gear in the output stage means that high outputs can be achieved.

Optimax® offers maximum robustness at the highest power density. Straight-toothed planetary wheels made of high-strength steel in the first and second gear stage allow high peak loads and also ensure that the transmission has a long life. If there are increased noise requirements, high-strength plastic planetary wheels can be implemented in the input stage as an option.

ebm-papst impresses with innovative **crown gearbox** technology in its family of angular gearboxes.

The **EtaCrown®** is a convincing offering with its wide reduction range and compact design. Space can always be saved during installation thanks to zero axle misalignment with a symmetrical structure. High radial loads can also be incorporated via a double ball bearing on the output shaft.

The **EtaCrown®Plus** requires minimum assembly space while achieving maximum power. Thanks to a downstream planetary stage, it can achieve significantly higher torques compared to the EtaCrown® of the same size.

EtaCrown® 52.2 and 75.2

EtaCrown®Plus 42.3 and 63.3

NoiselessPlus 42.1 and 63.1

Performax®Plus 42.2 and 63.2

Optimax® 42.1, 63.1 and 80.1

Low-backlash planetary gearbox PE040.1, PE060.1 and PE080.1

Planetary gearbox NoiselessPlus 42

Image of 1-stage gearbox

More at www.ebmpapst.com

Description

- Very quiet operation due to helical-tooth gear stages
- Toothed parts made of plastic with optimized sliding properties ensure smooth operation
- Higher reduction ratios within first and second gear stage
- High radial loads due to double ball bearing in the output shaft
- Flexible connection to customer applications (shaft variants, centering and fastening)

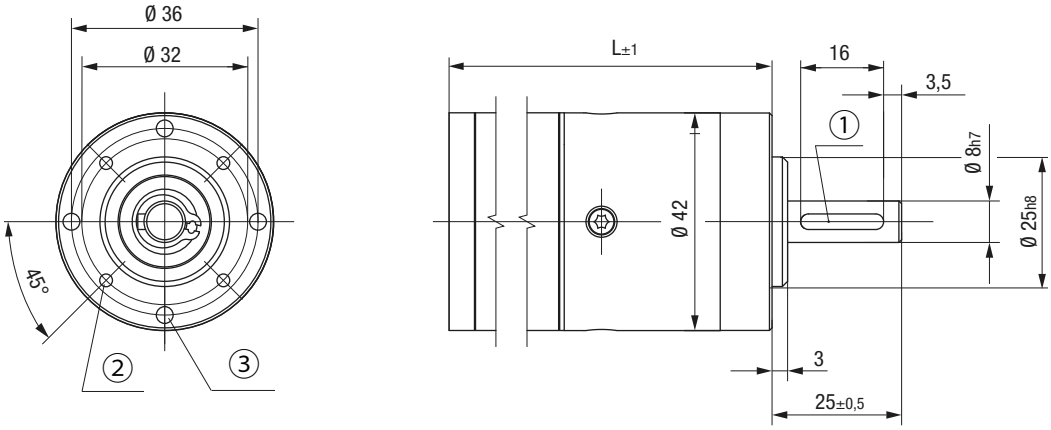
Type		NoiselessPlus 42.1				NoiselessPlus 42.2				
Reduction ratio		4.3	6.0	11.0	21.0	26.0	47.6	66.0	121	231
No. of stages		1	1	1	1	2	2	2	2	2
Efficiency		0.90	0.90	0.90	0.90	0.81	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000								
Rated output torque (M_{ab})	Nm	2.52	1.96	1.10	0.38	4.00	4.28	4.94	3.02	3.66
Short term torque (M_{max})	Nm	6.30	4.90	2.75	0.95	10.0	10.7	12.4	7.55	9.15
Gear play	°	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Perm. operating temperature range	°C	-20 ... +80								
Operating mode		S1								
Protection class[1)]		IP 50								
Weight	kg	0.22	0.22	0.22	0.22	0.25	0.25	0.25	0.25	0.25
Shaft load radial / axial	N	50 / 350	80 / 350	175 / 350	220 / 350	250 / 350	520 / 350	680 / 350	900 / 350	1000 / 350
Service life	h	10 000								
Lubrication		Maintenance free grease lubrication for life								
Installation position		any								
Length	mm	40.1	40.1	40.1	40.1	67.1	67.1	67.1	67.1	67.1

[1)] The degree of protection refers to the installed condition with sealing on the flange side
Subject to changes.

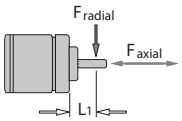
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① Feather key DIN 6885 A-3x3x16
② 4 x M3, 8 deep
③ 4 x M4, 8 deep



Permissible shaft load

F_{axial}:	350 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 10 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	see table	
L_1:	12.5 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios				Length L	2-stage reduction ratios				
		1-stage	4.3	6.0*	11.0*	21.0*	2-stage	26.0	47.6*	66.0*	121*	231*
ECI-42.20-NP42	24V	144.1	•	x	x	x	171.1	•	x	x	x	x
	48V		•	x	x	x		•	x	x	x	x
ECI-42.40-NP42	24V	164.1	•	x	x	x	191.1	•	x	x	x	x
	48V		•	x	x	x		•	x	x	x	x

Subject to changes. *Construction length can differ.

• standard X on request

Planetary gearbox NoiselessPlus 63

Image of 1-stage gearbox

More at www.ebmpapst.com

Description

- Very quiet operation due to helical-tooth gear stages
- Toothed parts made of plastic with optimized sliding properties ensure smooth operation
- Higher reduction ratios within first and second gear stage
- High radial loads due to double ball bearing in the output shaft
- Flexible connection to customer applications (shaft variants, centering and fastening)

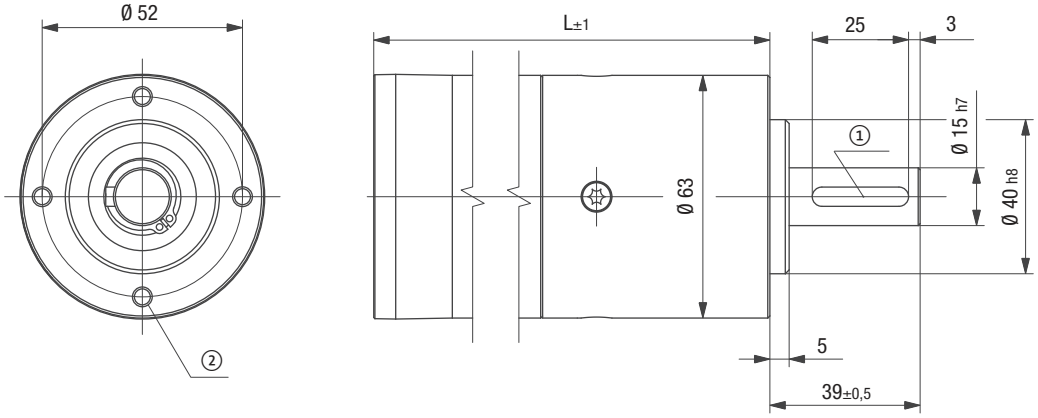
Type		NoiselessPlus 63.1			NoiselessPlus 63.2				
Reduction ratio		4.3	6.0	11.0	21.0	26.0	47.6	66.0	121
No. of stages		1	1	1	1	2	2	2	2
Efficiency		0.90	0.90	0.90	0.90	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000							
Rated output torque (M_{ab})	Nm	8.99	7.13	3.98	1.32	12.6	14.7	17.5	10.6
Short term torque (M_{max})	Nm	22.5	17.8	9.95	3.30	31.5	36.8	43.8	26.5
Gear play	°	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Perm. operating temperature range	°C	-20 ... +80							
Operating mode		S1							
Protection class[1)]		IP 50							
Weight	kg	0.56	0.56	0.56	0.56	0.80	0.80	0.80	0.80
Shaft load radial / axial	N	50 / 1 000	50 / 1 000	50 / 1 000	100 / 1 000	780 / 1 000	1 000 / 1 000	1 100 / 1 000	1 550 / 1 000
Service life	h	10 000							
Lubrication		Maintenance free grease lubrication for life							
Installation position		any							
Length	mm	59	59	59	59	91.4	91.4	91.4	91.4

[1)] The degree of protection refers to the installed condition with sealing on the flange side
Subject to changes.

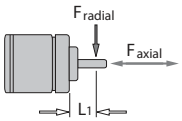
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① Feather key DIN 6885 A-5x5x25
② 4 x M5, 10 deep



Permissible shaft load

F_{axial}: 1000 N
F_{radial}: see table
L_1: 19 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 10 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios				Length L	2-stage reduction ratios			
		1-stage	4.3	6.0*	11.0*	21.0*	2-stage	26.0	47.6*	66.0*	121*
ECI-63.20-K1-NP63	24V	179	•	X	X	X	211.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI-63.40-K1-NP63	24V	199	•	X	X	X	231.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI-63.60-K1-NP63	24V	219	•	X	X	X	251.4	•	X	X	X
	48V			X	X	X			X	X	X
ECI-63.20-K4-NP63	24V	177.5	•	X	X	X	209.9	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI-63.40-K4-NP63	24V	197.5	•	X	X	X	229.9	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI-63.60-K4-NP63	48V	217.5	•	X	X	X	249.9	•	X	X	X
ECI 63.20-K5C-NP63	24V	171	•	X	X	X	203.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI 63.40-K5C-NP63	24V	191	•	X	X	X	223.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI 63.60-K5C-NP63	48V	211	•	X	X	X	243.4	•	X	X	X
ECI 63.20-K5E-NP63	24V	249	•	X	X	X	281.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI 63.40-K5E-NP63	24V	269	•	X	X	X	301.4	•	X	X	X
	48V		•	X	X	X		•	X	X	X
ECI 63.60-K5E-NP63	48V	289	•	X	X	X	321.4	•	X	X	X

Subject to changes. *Construction length can differ.

• standard X on request

Planetary gearbox Performax®Plus 42

Image of 2-stage gearbox

More at www.ebmpapst.com

Description

- High torques thanks to large gearing width in the first gear stage
- Good shock resistance due to housing made of case-hardened steel with linear tooth profile in the output stage
- Very quiet operation due to helical teeth in the first gear stage
- Planetary wheels made of plastic with optimized sliding properties in the first stage ensure smooth operation
- Large effective diameter thanks to radial screw connection

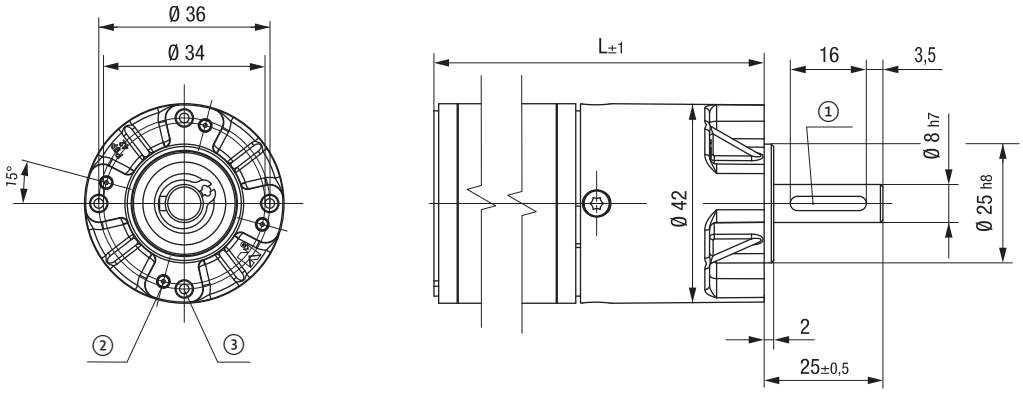
Type		Performax®Plus 42.1			Performax®Plus 42.2		
Reduction ratio		3.2	5.0	9.0	21.3	30.0	54.0
No. of stages		1	1	1	2	2	2
Efficiency		0.90	0.90	0.90	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000					
Rated output torque (M_{ab})	Nm	2.60	2.00	1.12	3.80	5.40	6.70
Short term torque (M_{max})	Nm	6.50	5.00	2.80	9.50	13.50	16.80
Gear play	°	<0.7	<0.7	<0.7	<1.2	<1.2	<1.2
Perm. operating temperature range	°C	-20 ... +80					
Operating mode		S1					
Protection class[1)]		IP 50					
Weight	kg	0.22	0.22	0.22	0.33	0.33	0.33
Shaft load radial / axial	N	250 / 150					
Service life	h	5 000					
Lubrication		Maintenance free grease lubrication for life					
Installation position		any					
Length	mm	39.3	39.3	39.3	54.8	54.8	54.8

[1)] The degree of protection refers to the installed condition with sealing on the flange side
Subject to changes.

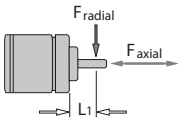
Technical drawing

Image of 1-stage gearbox / 2-stage design completely cylindrical

Dimensions in mm



① Feather key DIN 6885 A-3x3x16
② 4 x M3, 8 deep
③ 4 x M4, 8 deep



Permissible shaft load

F_{axial}:	150 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	250 N	
L_1:	12.5 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios			Length L	2-stage reduction ratios		
		1-stage	3.2	5.0	9.0*	2-stage	21.3	30.0	54.0*
ECI-42.20-K1-PP42	24V	143.3	•	•	•	158.8	•	•	•
	48V		•	•	•		•	•	•
ECI-42.40-K1-PP42	24V	163.3	•	○	X	178.8	•	○	X
	48V		•	•	X		•	•	X

Subject to changes. *Construction length can differ.

• standard ○ Preferred type X on request

Planetary gearbox Performax®Plus 63

Image of 2-stage gearbox

More at www.ebmpapst.com

Description

- High torques thanks to large gearing width in the first gear stage
- Good shock resistance due to housing made of case-hardened steel with linear tooth profile in the output stage
- Very quiet operation due to helical teeth in the first gear stage
- Planetary wheels made of plastic with optimized sliding properties in the first stage ensure smooth operation
- Large effective diameter thanks to radial screw connection

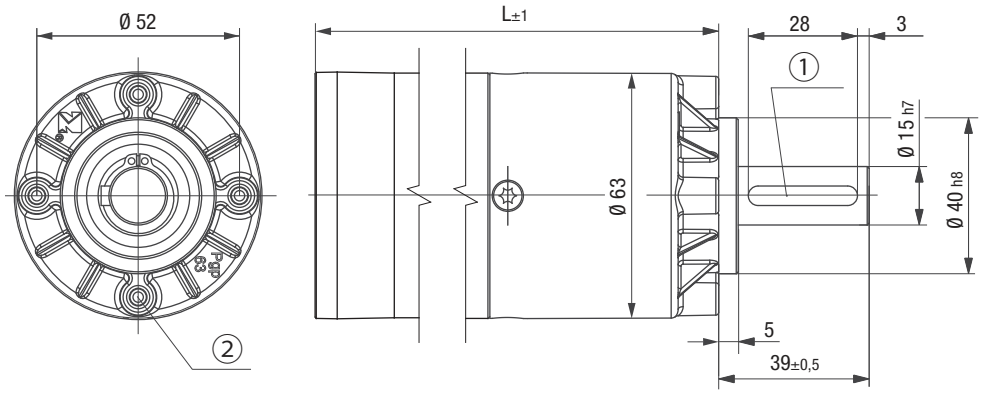
Type		Performax®Plus 63.1					Performax®Plus 63.2					
Reduction ratio		3.2	5.0	9.0	17.0	21.3	30.0	38.3	54.0	72.3	102	204
No. of stages		1	1	1	1	2	2	2	2	2	2	2
Efficiency		0.90	0.90	0.90	0.90	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000										
Rated output torque (M_{ab})	Nm	6.50	11.9	7.60	4.40	45.2	64.0	28.9	41.0	16.9	23.9	27.4
Short term torque (M_{max})	Nm	16.3	29.8	19.0	11.0	113	160	72.3	102.5	42.3	59.8	68.5
Gear play	°	<0.7	<0.7	<0.7	<0.7	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Perm. operating temperature range	°C	-20 ... +80										
Operating mode		S1										
Protection class[1)]		IP 50										
Weight	kg	0.66	0.66	0.66	0.66	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Shaft load radial / axial	N	350 / 500										
Service life	h	5 000										
Lubrication		Maintenance free grease lubrication for life										
Installation position		any										
Length	mm	57.7	57.7	57.7	57.7	79.1	79.1	79.1	79.1	79.1	79.1	79.1

[1)] The degree of protection refers to the installed condition with sealing on the flange side
Subject to changes.

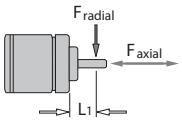
Technical drawing

Image of 1-stage gearbox / 2-stage design completely cylindrical

Dimensions in mm



① Feather key DIN 6885 A-5x5x28
② 4 x M5, 10 deep



Permissible shaft load

F_{axial}:	500 N
F_{radial}:	350 N
L_1:	19 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios				Length L	2-stage reduction ratios						
		1-stage	3.2	5.0	9.0*	17.0*	2-stage	21.3	30.0	38.3	54.0*	72.3*	102*	204*
ECI-63.20-K1-PP63	24V	177.7	•	•	•	X	199.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.40-K1-PP63	24V	197.7	•	•	•	X	219.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.60-K1-PP63	24V	217.7	•	•	•	X	239.1	•	•	•	•	X	X	X
	48V			•	•	X			•	•	•	X	X	X
ECI-63.20-K4-PP63	24V	176.2	•	•	•	X	197.6	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.40-K4-PP63	24V	196.2	•	○	•	X	217.6	•	○	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.60-K4-PP63	48V	216.2	•	○	•	X	237.6	•	○	•	•	X	X	X
ECI-63.20-K5C-PP63	24V	169.7	•	•	•	X	191.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.40-K5C-PP63	24V	189.7	•	•	•	X	211.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.60-K5C-PP63	48V	209.7	•	•	•	X	231.1	•	•	•	•	X	X	X
ECI-63.20-K5E-PP63	24V	247.7	•	•	•	X	269.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.40-K5E-PP63	24V	267.7	•	•	•	X	289.1	•	•	•	•	X	X	X
	48V		•	•	•	X		•	•	•	•	X	X	X
ECI-63.60-K5E-PP63	48V	287.7	•	•	•	X	309.1	•	•	•	•	X	X	X

Subject to changes. *Construction length can differ.

• standard ○ preferred type X on request

Planetary gearbox Optimax®42

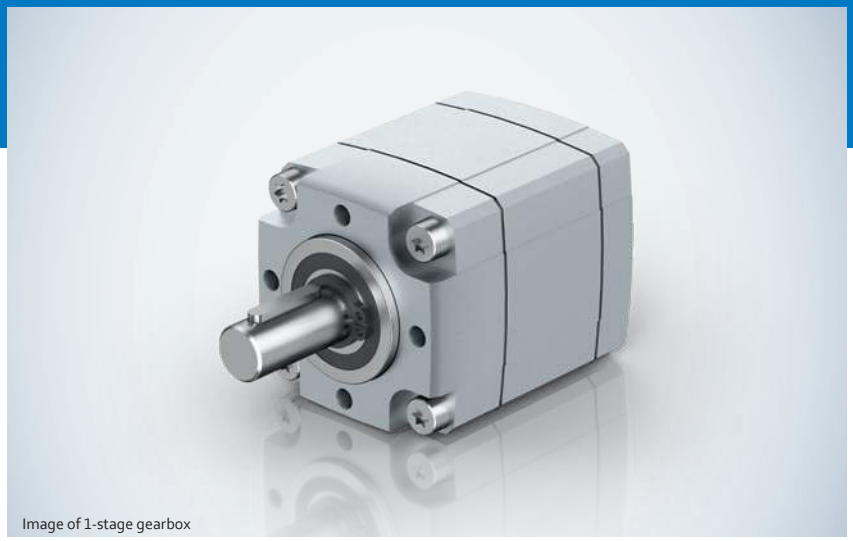


Image of 1-stage gearbox

Description

- Extreme high overload capability to cope with peak torques
- Robust gearbox concept for extended service life
- Modular design and interfaces for maximum flexibility within ebm-papst modular system
- High efficiency in compact design
- Noise optimized version with planetary wheels made from high-strength plastic
- Protection Class IP 54

More at www.ebmpapst.com

Type		Optimax®42.1			Optimax®42.2			
Reduction ratio		3.0	5.0	9.0	9.0	15.0	25.0	45.0
No. of stages		1	1	1	2	2	2	2
Efficiency		0.90	0.90	0.90	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm				6 000			
Rated output torque (M_{ab}) [1]	Nm	16[2] (5.3)[3]	16[2] (5.3)[3]	10[2] (2.5)[3]	27[2] (14)[3]	27[2] (23)[3]	27[2] (23)[3]	23[2] (11)[3]
Short term torque (M_{max})	Nm	48[2] (16)[3]	48[2] (16)[3]	30[2] (7.5)[3]	81[2] (42)[3]	81[2] (69)[3]	81[2] (69)[3]	69[2] (32)[3]
Gear play	°	< 0.9	< 0.9	< 0.9	< 1.2	< 1.2	< 1.2	< 1.2
Perm. operating temperature range	°C				-30 ... +90			
Operating mode					S1/S3[4]			
Protection class[5]					IP 54			
Weight	kg	0.45	0.45	0.45	0.70	0.70	0.70	0.70
Shaft load radial / axial	N				210 / 210			
Service life	h				10 000			
Lubrication					Maintenance free grease lubrication for life			
Installation position					any			
Length	mm	51.2	51.2	51.2	72.2	72.2	72.2	72.2

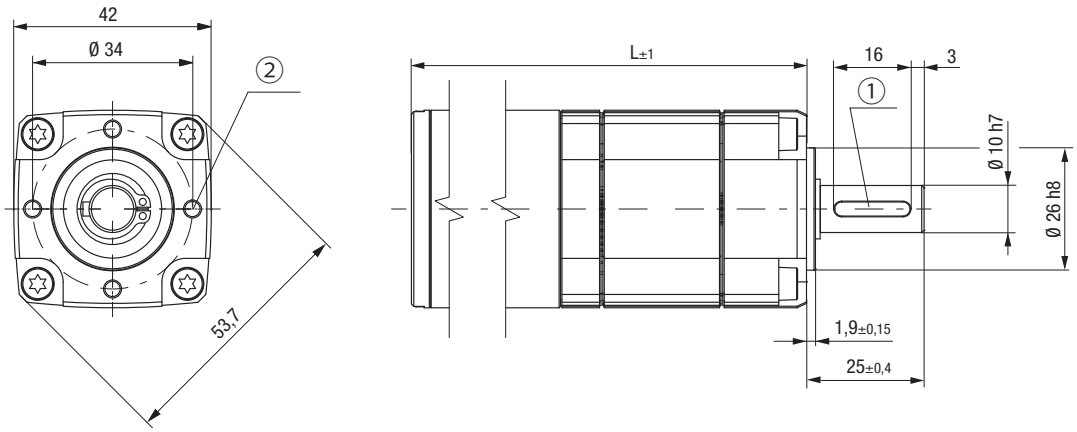
[1] In S1 operation
[2] Default: made of high-strength steel / Value applies to planet gears (first stage)
[3] Optional: made of high-strength plastic / Value applies to planet gears (first stage)
[4] $M_{eff} = M_{ab}$
[5] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

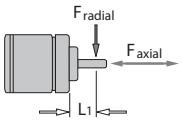
Technical drawing

Image of 1-stage gearbox

Maßangaben in mm



① Feather key DIN 6885 A-3x3x16
② 4 x M4, 10 deep



Permissible shaft load

F_{axial}:	210 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 10 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	210 N	
L_1:	12 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios			Length L	2-stage reduction ratios			
	1-stage		3.0	5.0	9.0*	2-stage	9.0	15.0	25.0	45.0*
ECI-42.20-K1-O42	24V	155.2	•	•	•	176.2	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-42.40-K1-O42	24V	175.2	•	○	•	196.2	•	•	○	•
	48V		•	•	•		•	•	•	•

Subject to changes. *Construction length can differ.

• standard ○ preferred type

Planetary gearbox Optimax®63

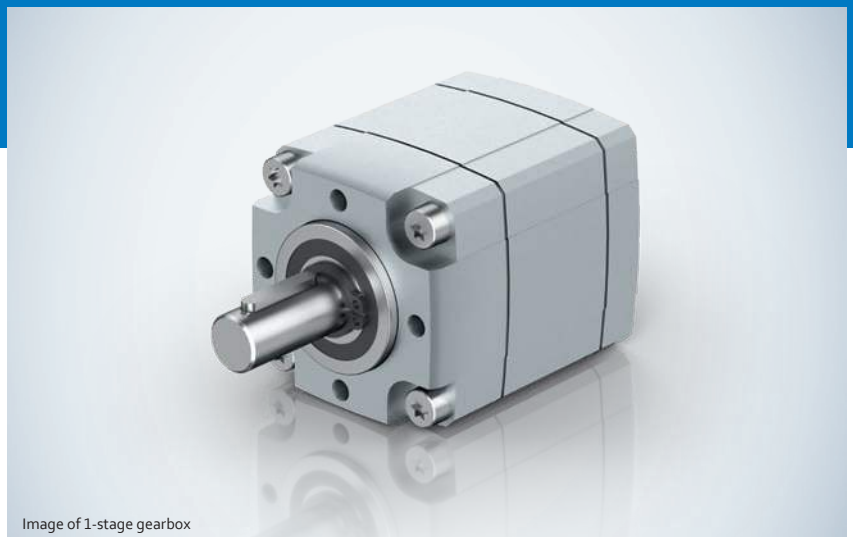


Image of 1-stage gearbox

Description

- Extreme high overload capability to cope with peak torques
- Robust gearbox concept for extended service life
- Modular design and interfaces for maximum flexibility within ebm-papst modular system
- High efficiency in compact design
- Noise optimized version with planetary wheels made from high-strength plastic
- Protection Class IP 54

More at www.ebmpapst.com

Type		Optimax®63.1			Optimax®63.2			
Reduction ratio		3.0	5.0	9.0	9.0	15.0	25.0	45.0
No. of stages		1	1	1	2	2	2	2
Efficiency		0.90	0.90	0.90	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000						
Rated output torque (M_{ab}) [1]	Nm	40.0[2] (13.0)[3]	40.0[2] (13.0)[3]	25.0[2] (6.00)[3]	68.0[2] (35.0)[3]	68.0[2] (35.0)[3]	68.0[2] (35.0)[3]	58.0[2] (27.0)[3]
Short term torque (M_{max})	Nm	120[2] (39.0)[3]	120[2] (39.0)[3]	75.0[2] (18.0)[3]	81.0[2] (42)[3]	150[2] (105)[3]	150[2] (105)[3]	150[2] (81.0)[3]
Gear play	°	< 0.7	< 0.7	< 0.7	< 1.2	< 1.2	< 1.2	< 1.2
Perm. operating temperature range	°C	-30 ... +90						
Operating mode		S1/S3[4]						
Protection class[5]		IP 54						
Weight	kg	1.30	1.30	1.30	1.90	1.90	1.90	1.90
Shaft load radial / axial	N	500 / 500						
Service life	h	10 000						
Lubrication		Maintenance free grease lubrication for life						
Installation position		any						
Length	mm	71.7	71.7	71.7	102.9	102.9	102.9	102.9

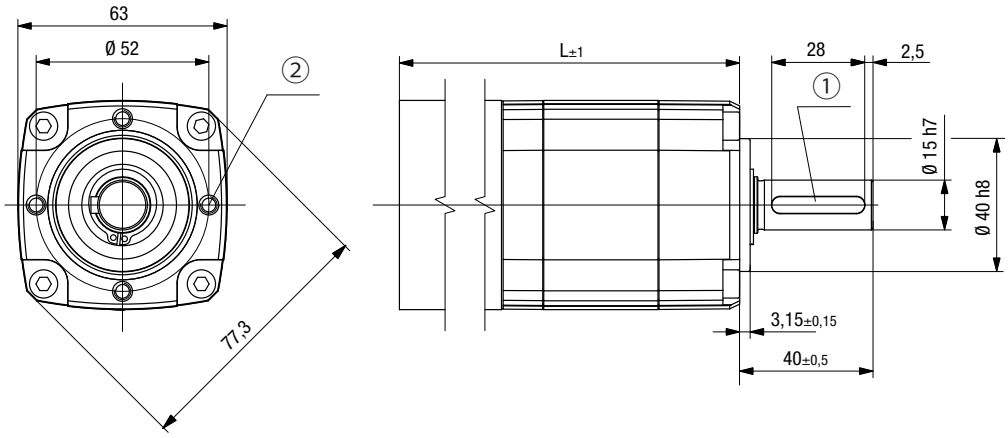
[1] In S1 operation
[2] Default: made of high-strength steel / Value applies to planet gears (first stage)
[3] Optional: made of high-strength plastic / Value applies to planet gears (first stage)
[4] $M_{eff} = M_{ab}$
[5] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

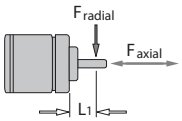
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① Feather key DIN 6885 A-5x5x28
② 4 x M5, 15 deep



Permissible shaft load

F_{axial}:	500 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 10 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	500 N	
L_1:	20 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios			Length L	2-stage reduction ratios			
		1-stage	3.0	5.0	9.0*	2-stage	9.0	15.0	25.0	45.0*
ECI-63.20-K1-O63	24V	191.7	•	•	•	222.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.40-K1-O63	24V	211.7	•	•	•	242.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.60-K1-O63	24V	231.7	•	•	•	262.9	•	•	•	•
	48V			•	•			•	•	•
ECI-63.20-K4-O63	24V	190.2	•	•	•	221.4	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.40-K4-O63	24V	210.2	•	○	•	241.4	•	•	○	•
	48V		•	•	•		•	•	•	•
ECI-63.60-K4-O63	48V	230.2	•	○	•	261.4	•	•	○	•
ECI-63.20-K5C-O63	24V	183.7	•	•	•	214.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.40-K5C-O63	24V	203.7	•	•	•	234.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.60-K5C-O63	48V	223.7	•	•	•	254.9	•	•	•	•
ECI-63.20-K5E-O63	24V	261.7	•	•	•	292.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.40-K5E-O63	24V	281.7	•	•	•	312.9	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-63.60-K5E-O63	48V	301.7	•	•	•	332.9	•	•	•	•

Subject to changes. *Construction length can differ.

• standard ○ preferred type

Planetary gearbox Optimax®80

Image of 1-stage gearbox

Description

- Extreme high overload capability to cope with peak torques
- Robust gearbox concept for extended service life
- Modular design and interfaces for maximum flexibility within ebm-papst modular system
- High efficiency in compact design
- Planetary wheels in both stages made of high-strength steel
- Protection Class IP 54

More at www.ebmpapst.com

Type		Optimax®80.1			Optimax®80.2			
Reduction ratio		3.00	5.00	9.00	9.00	15.0	25.0	45.0
No. of stages		1	1	1	2	2	2	2
Efficiency		0.90	0.90	0.90	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm				6 000			
Rated output torque (M_{ab}) [1]	Nm	70	70	44	115	115	115	100
Short term torque (M_{max})	Nm	210	210	132	345	345	345	300
Gear play	°	< 0.7	< 0.7	< 0.7	< 1.2	< 1.2	< 1.2	< 1.2
Perm. operating temperature range	°C				-30 ... +90			
Operating mode					S1/S3[2]			
Protection class[3]					IP 54			
Weight	kg	1.8	1.8	1.8	2.6	2.6	2.6	2.6
Shaft load radial / axial	N				1 300 / 500			
Service life	h				10 000			
Lubrication					Maintenance free grease lubrication for life			
Installation position					any			
Length	mm	82.9	82.9	82.9	140.6	140.6	140.6	140.6

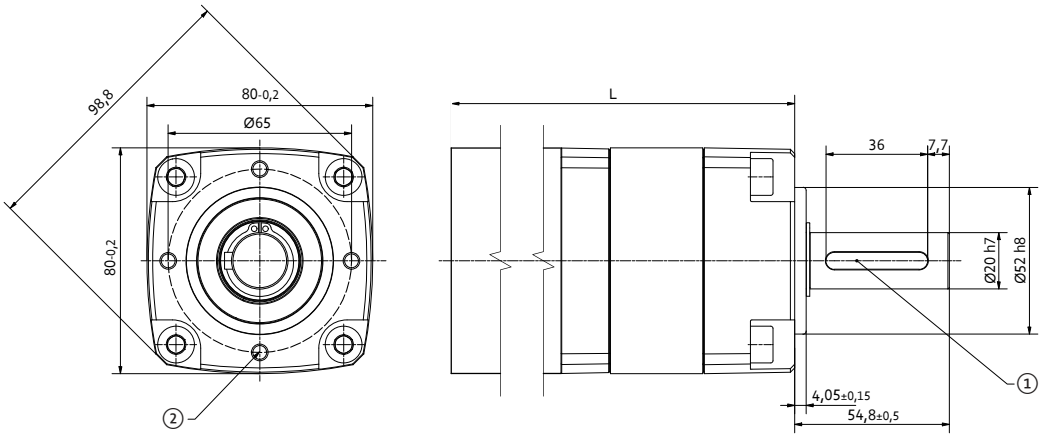
[1] In S1 operation
[2] $M_{eff} = M_{ab}$
[3] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

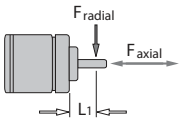
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① Feather key DIN 6885 A-6x6x36
② 4 x M6, 16 deep



Permissible shaft load

F_{axial}:	500 N
F_{radial}:	1 300 N
L_1:	27 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 10 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios			Length L	2-stage reduction ratios			
		1-stage	3.0	5.0	9.0*	2-stage	9.0	15.0	25.0	45.0*
ECI-80.20-K1-O80	24V	206.4	•	•	•	264.1	•	•	•	•
	48V		•	•	•		•	•	•	•
ECI-80.40-K1-O80	24V	226.4	•	○	•	284.1	•	•	○	•
	48V		•	•	•		•	•	•	•
ECI-80.60-K1-O80	48V	246.4	•	○	•	304.1	•	•	○	•

Subject to changes. *Construction length can differ.

• standard ○ preferred type

Gearboxes

Low-backlash planetary gearbox PE040

Image of 1-stage gearbox

Description

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- Low backlash
- High efficiency and low-noise operation due to high toothed flank quality, needle-bearing planetary gears and high-quality lubricant
- High torsional stiffness and high emergency stop torque

More at www.ebmpapst.com

Type		PE040.1		PE040.2	
Reduction ratio[1]		5	8	25	40
No. of stages		1	1	2	2
Efficiency		0.96	0.96	0.94	0.94
Max. input speed (n_1)	rpm		6 500		
Rated output torque (M_{ab})	Nm	16	7	21	21
Short term torque (M_{max})[2]	Nm	25.6	11.62	33.6	33.6
Emergency stop torque (M_{not})[3]	Nm	32	14	42	42
Gear play	°	0.15	0.15	0.18	0.18
Perm. operating temperature range	°C		-25...+90		
Operating mode			S1		
Protection class[4]			IP 65		
Weight	kg	0.4	0.4	0.5	0.5
Shaft load radial / axial	N		165 / 165		
Service life	h		30 000		
Lubrication			Maintenance free grease lubrication for life		
Installation position			any		
Length	mm	78.4	78.4	92.9	92.9

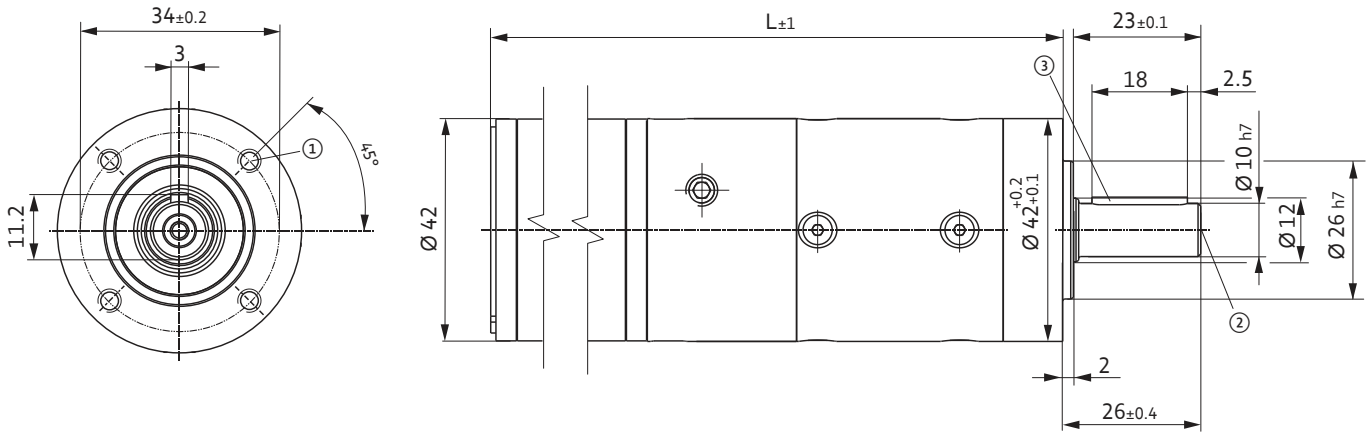
[1] Further reductions and 3-stage versions on request
[2] Permissible for 30,000 load cycles
[3] Permissible 1,000 times during the entire service life
[4] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

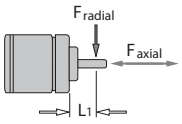
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① 4 x M4 / 6 deep
② 1 x M3 / 9 deep / DIN 332
③ Feather key DIN 6885 A-3x3x18



Permissible shaft load

F_{axial}:	165 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 30 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	165 N	
L_1:	13 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios		Length L	2-stage reduction ratios	
		1-stage	5	8	2-stage	25	40
ECI-42.20-K1-PE040	24V	182.4	•	X	196.9	•	X
	48V		•	X		•	X
ECI-42.40-K1-PE040	24V	202.4	•	X	216.9	•	X
	48V		•	X		•	X

Subject to changes.

• Standard X on request

Low-backlash planetary gearbox PE060

Image of 1-stage gearbox

Description

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- Low backlash
- High efficiency and low-noise operation due to high toothed flank quality, needle-bearing planetary gears and high-quality lubricant
- High torsional stiffness and high emergency stop torque

More at www.ebmpapst.com

Typ		PE060.1		PE060.2	
Reduction ratio[1]		5	8	25	40
No. of stages		1	1	2	2
Efficiency		0.96	0.96	0.94	0.94
Max. input speed (n_1)	rpm		6 500		
Rated output torque (M_{ab})	Nm	40	20	46	46
Max. Beschleunigungsmoment (M_{max})[2]	Nm	64	32	73.6	73.6
Emergency stop torque (M_{not})[3]	Nm	80	40	92	92
Gear play	°	0.15	0.15	0.18	0.18
Perm. operating temperature range	°C		-25 ... +90		
Operating mode			S1		
Protection class[4]			IP 65		
Weight	kg	1.0	1.0	1.2	1.2
Shaft load radial / axial	N		350 / 450		
Service life	h		30 000		
Lubrication			Maintenance free grease lubrication for life		
Installation position			any		
Length	mm	88	88	103.35	103.35

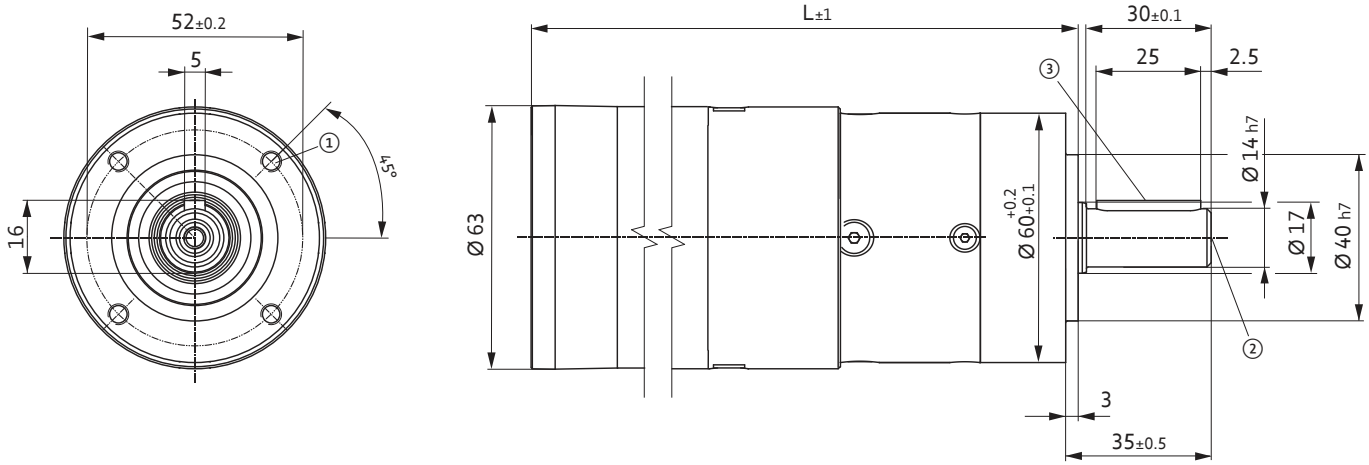
[1] Further reductions and 3-stage versions on request
[2] Permissible for 30,000 load cycles
[3] Permissible 1,000 times during the entire service life
[4] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

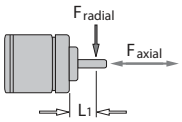
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① 4 x M5 / 8 deep
② 1 x M5 / DIN 332
③ Feather key DIN 6885 A-5x5x25



Permissible shaft load

F_{axial}:	450 N
F_{radial}:	350 N
L_1:	17.5 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 30 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios		Length L	2-stage reduction ratios	
		1-stage	5	8	2-stage	25	40
ECI-63.20-K1-PE060	24V	208	•	X	223.4	•	X
	48V		•	X		•	X
ECI-63.40-K1-PE060	24V	228	•	X	243.35	•	X
	48V		•	X		•	X
ECI-63.60-K1-PE060	24V	248	•	X	263.35	•	X
	48V		•	X		•	X
ECI-63.20-K4-PE060	24V	206.5	•	X	221.85	•	X
	48V		•	X		•	X
ECI-63.40-K4-PE060	24V	226.5	•	X	241.85	•	X
	48V		•	X		•	X
ECI-63.60-K4-PE060	48V	246.5	•	X	261.85	•	X
ECI-63.20-K5C-PE060	24V	200	•	X	215.4	•	X
	48V		•	X		•	X
ECI-63.40-K5C-PE060	24V	220	•	X	235.35	•	X
	48V		•	X		•	X
ECI-63.60-K5C-PE060	48V	240	•	X	255.35	•	X
ECI-63.20-K5E-PE060	24V	278	•	X	293.35	•	X
	48V		•	X		•	X
ECI-63.40-K5E-PE060	24V	298	•	X	313.35	•	X
	48V		•	X		•	X
ECI-63.60-K5E-PE060	48V	318	•	X	333.35	•	X

Subject to changes.

• standard X on request

Low-backlash planetary gearbox PE080

Image of 1-stage gearbox

Description

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- Low backlash
- High efficiency and low-noise operation due to high toothed flank quality, needle-bearing planetary gears and high-quality lubricant
- High torsional stiffness and high emergency stop torque

More at www.ebmpapst.com

Typ		PE080.1		PE080.2	
Reduction ratio[1]		5	8	25	40
No. of stages		1	1	2	2
Efficiency		0.96	0.96	0.94	0.94
Max. input speed (n_1)	rpm		6 500		
Rated output torque (M_{ab})	Nm	115	55	125	125
Max. Beschleunigungsmoment (M_{max})[2]	Nm	184	88	200	200
Emergency stop torque (M_{not})[3]	Nm	230	110	250	250
Gear play	°	0.15	0.15	0.18	0.18
Perm. operating temperature range	°C		-25 ... +90		
Operating mode			S1		
Protection class[4]			IP 65		
Weight	kg	2.3	2.3	2.8	2.8
Shaft load radial / axial	N		750 / 900		
Service life	h		30 000		
Lubrication			Maintenance free grease lubrication for life		
Installation position			any		
Length	mm	112.1	112.1	126.6	126.6

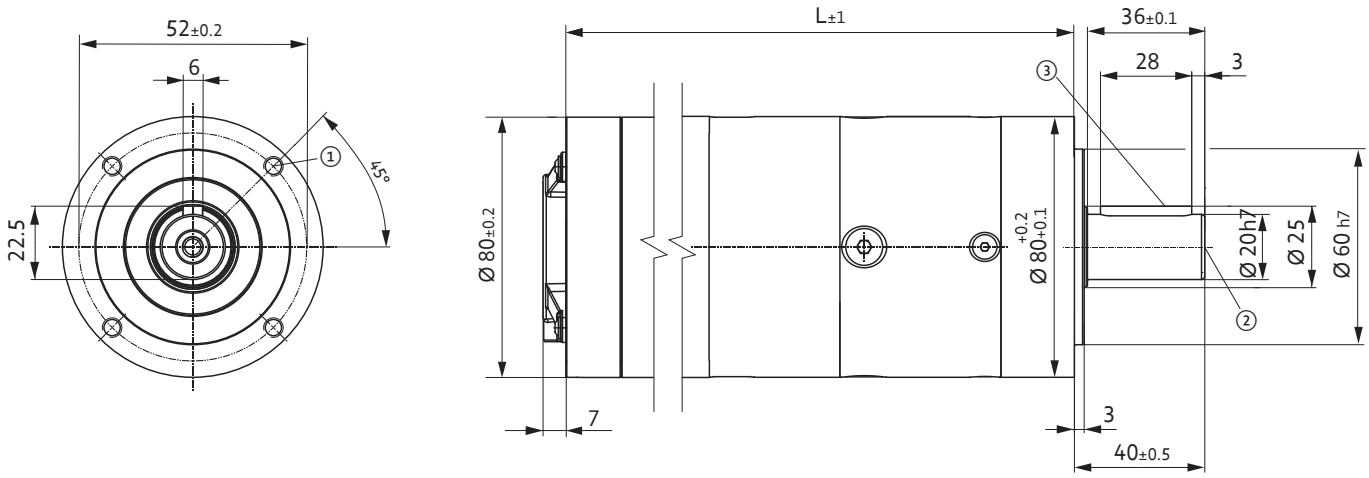
[1] Further reductions and 3-stage versions on request
[2] Permissible for 30,000 load cycles
[3] Permissible 1,000 times during the entire service life
[4] The degree of protection refers to the installed condition with sealing on the flange side

Subject to changes.

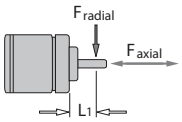
Technical drawing

Image of 1-stage gearbox

Dimensions in mm



① 4 x M6 / 10 deep
② 1 x M6 / DIN 332
③ Feather key DIN 6885 A-6x6x28



Permissible shaft load

F_{axial}:	900 N
F_{radial}:	750 N
L_1:	20 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 30 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios		Length L	2-stage reduction ratios	
		1-stage	5	8	2-stage	25	40
ECI-80.20-K1-PE080	24V	235.6	•	•	250.1	•	•
	48V		•	•		•	•
ECI-80.40-K1-PE080	24V	255.6	•	○	270.1	•	•
	48V		•	•		•	•
ECI-80.60-K1-PE080	48V	275.6	•	○	290.1	•	•

Subject to changes.

• standard ○ preferred type

Angular gearbox EtaCrown® 52

Image of 2-stage gearbox

More at www.ebmpapst.com

Description

- Maximum safety in design and operation, as well as optimal vandalism protection; no automatic lock due to high efficiency of the crown wheel technology
- Space-saving installation due to zero offset axle and symmetrical structure
- Flexible application possibilities with various optional shaft outlets and available shaft geometries
- Wide reduction range by means of upstream / downstream planetary stage
- High radial loads due to double ball bearing in the output shaft

Type9		EtaCrown® 52.1		EtaCrown® 52.2			
Reduction ratio		4.1	6.7	21.2	33.3	60.0	113
No. of stages		1	1	2	2	2	2
Efficiency		0.90	0.90	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000					
Rated output torque (M_{ab})	Nm	0.28	0.40	1.23	1.54	1.80	2.15
Short term torque (M_{max})	Nm	0.70	1.00	3.08	3.85	4.50	5.38
Gear play	°	<0.55	<0.55	<1.1	<1.1	<1.1	<1.1
Perm. operating temperature range	°C	-20 ... +80					
Operating mode		S1					
Protection class[1)]		IP 50					
Weight	kg	0.40	0.40	0.65	0.65	0.65	0.65
Shaft load radial / axial[2)]	N	240 / 150	240 / 150	300 / 150	300 / 150	300 / 150	300 / 150
Service life	h	5 000					
Lubrication		Maintenance free grease lubrication for life					
Installation position		any					
Length	mm	65.9	65.9	98.6	98.6	98.6	98.6

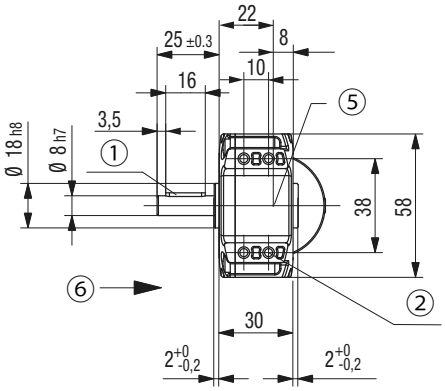
[1)] The degree of protection refers to the installed condition with sealing on the flange side
[2)] Max. axial and centrifugal load and max. torque must not occur simultaneously

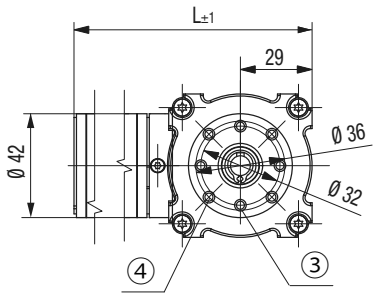
Subject to changes.

Technical drawing

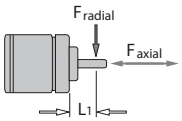
Image of 1-stage gearbox with right shaft end (W05)

Dimensions in mm





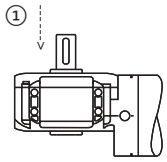
① Feather key DIN 6885 A-3x3x16
② 4 x M4, 6.5 deep (on all front faces)
③ 8 x M4, 6.5 deep (both sides)
④ Without hole at the opposite side
⑤ Motor centre point
⑥ Preferred direction of load



Permissible shaft load

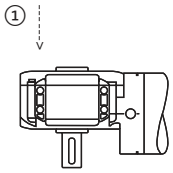
F_{axial}:	150 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	see table	
L_1:	12.5 mm	

Shaft end, right (W05) (standard)

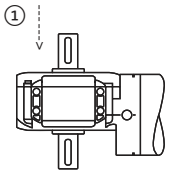


① Preferred direction of load

Shaft end, left (W06)



Shaft end, both sides (W07)



Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios		Length L	2-stage reduction ratios			
		1-stage	4.1	6.7*	2-stage	21.2	33.3	60.0*	113*
ECI-42.20-K1-E52	24V	169.9	X	X	202.6	•	•	X	X
	48V		X	X		•	•	X	X
ECI-42.40-K1-E52	24V	189.9	X	X	222.6	○	○	X	X
	48V		X	X		•	•	X	X

Subject to changes. *Construction length can differ.

• standard ○ preferred type X on request

Angular gearbox EtaCrown® 75

Image of 2-stage gearbox

More at www.ebmpapst.com

Description

- Maximum safety in design and operation, as well as optimal vandalism protection; no automatic lock due to high efficiency of the crown wheel technology
- Space-saving installation due to zero offset axle and symmetrical structure
- Flexible application possibilities with various optional shaft outlets and available shaft geometries
- Wide reduction range by means of upstream / downstream planetary stage
- High radial loads due to double ball bearing in the output shaft

Type		EtaCrown® 75.1			EtaCrown® 75.2			
Reduction ratio		4.1	6.7	13	20.3	33.3	60.0	113
No. of stages		1	1	2	2	2	2	2
Efficiency		0.90	0.90	0.81	0.81	0.81	0.81	0.81
Max. input speed (n_1)	rpm	6 000						
Rated output torque (M_{ab})	Nm	6.00	5.00	13.70	16.50	13.70	13.70	13.70
Short term torque (M_{max})	Nm	15.00	12.50	34.25	41.25	34.25	34.25	34.25
Gear play	°	<0.55	<0.55	<1.1	<1.1	<1.1	<1.1	<1.1
Perm. operating temperature range	°C	-20 ... +80						
Operating mode		S1						
Protection class[1]		IP 50						
Weight	kg	0.90	0.90	1.30	1.30	1.30	1.30	1.30
Shaft load radial / axial[2]	N	400 / 500	400 / 500	500 / 500	600 /500	700 / 500	700 / 500	700 / 500
Service life	h	5 000						
Lubrication		Maintenance free grease lubrication for life						
Installation position		any						
Length	mm	91	91	133	133	133	133	133

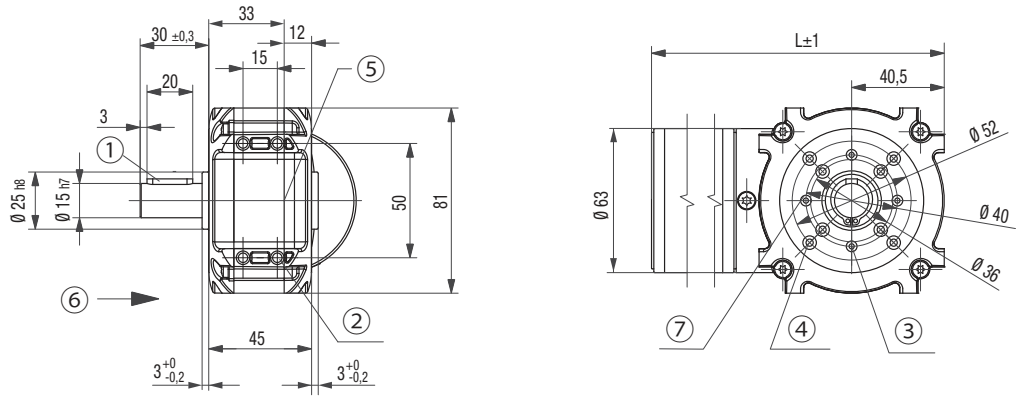
[1] The degree of protection refers to the installed condition with sealing on the flange side
[2] Max. axial and centrifugal load and max. torque must not occur simultaneously

Subject to changes.

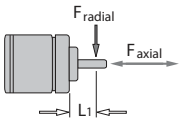
Technical drawing

Image of 1-stage gearbox with right shaft end (W05)

Dimensions in mm

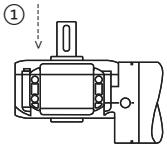
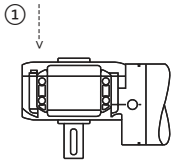
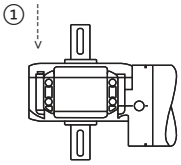
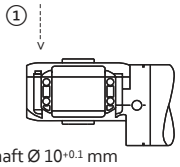


① Feather key DIN 6885 A-5x5x20
② 4 x M5, 6.5 deep (on all front faces)
③ 4 x M4, 6.5 deep (both sides)
④ 8x M5, 6.5 deep
⑤ Motor centre point
⑥ Preferred direction of load
⑦ Without hole at the opposite side



Permissible shaft load

F_{axial}:	500 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	see table	
L_1:	15 mm	

Shaft end, right (W05) (standard)	Shaft end, left (W06)	Shaft end, both sides (W07)	Hollow shaft (W08)
			
① Preferred direction of load			Hollow shaft Ø $10^{+0.1}$ mm

Length motor / gearbox combinations

Dimensions in mm

		Length L	1-stage reduction ratios		Length L	2-stage reduction ratios				
		1-stage	4.1	6.7*	2-stage	13	20.3	33.3	60.0*	113*
ECI-63.20-K1-E75	24V	211	•	X	253	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.40-K1-E75	24V	231	•	X	273	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.60-K1-E75	24V	251	•	X	293	•	•	X	X	X
	48V		•	X		•	•	X	X	X
ECI-63.20-K4-E75	24V	209.5	•	X	251.5	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.40-K4-E75	24V	229.5	○	X	271.5	•	○	○	X	X
	48V		•	X		•	•	•	X	X
ECI-63.60-K4-E75	48V	249.5	○	X	291.5	•	○	○	X	X
ECI-63.20-K5C-E75	24V	203	•	X	245	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.40-K5C-E75	24V	223	•	X	265	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.60-K5C-E75	48V	243	•	X	285	•	•	X	X	X
ECI-63.20-K5E-E75	24V	281	•	X	323	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.40-K5E-E75	24V	301	•	X	343	•	•	•	X	X
	48V		•	X		•	•	•	X	X
ECI-63.60-K5E-E75	48V	321	•	X	363	•	•	X	X	X

Subject to changes. *Construction length can differ.

• standard ○ preferred type X on request

Angular gearbox EtaCrown®Plus 42

Image of 3-stage gearbox

More at www.ebmpapst.com

Description

- Compact design due to combination of the crown wheel and planetary stage in one housing
- No automatic lock due to high efficiency of the crown wheel technology
- High torques by using 5 straight toothed planetary gears made of case-hardened sintered steel in the integrated planetary gear stage
- Wide reduction range thanks to possibility of an upstream planetary stage
- Improved quiet operation thanks to the optimized design of the crown wheel stage when using an upstream helical planetary gear stage made of plastic with optimized sliding properties

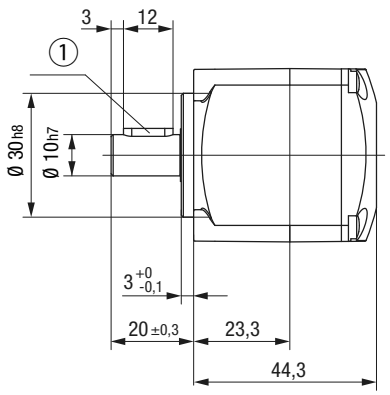
Type		EtaCrown®Plus 42.3			
Reduction ratio		54.0	84.8	153	289
No. of stages		3			
Efficiency		0.73			
Max. input speed (n_1)	rpm	6 000			
Rated output torque (M_{ab})	Nm	10.00	10.00	6.70	8.40
Short term torque (M_{max})	Nm	25.0	25.0	16.8	21.0
Gear play	°	<0.7 ... <1.2			
Perm. operating temperature range	°C	-20 ... +80			
Operating mode		S1			
Protection class		IP 50			
Weight	kg	0.5			
Shaft load radial / axial	N	300 / 200			
Service life	h	5 000			
Lubrication		Maintenance free grease lubrication for life			
Installation position		any			
Length	mm	83.8			

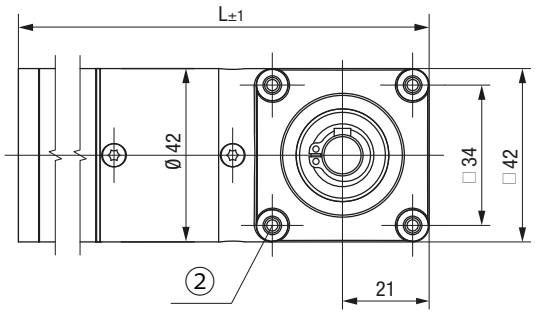
Subject to changes.

Technical drawing

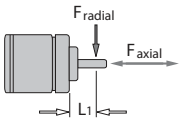
Image of 3-stage gearbox

Dimensions in mm





① Feather key DIN 6885 A-4x4x12
② 4 x M4, 8 deep



Permissible shaft load

F_{axial}:	200 N	At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)
F_{radial}:	300 N	
L_1:	10 mm	

Length motor / gearbox combinations

Dimensions in mm

		Length L	3-stage reduction ratios			
		3-stage	54.0	84.8	153*	289*
ECI-42.20-K1-EP42	24V	187.8	•	•	x	x
	48V		•	•	x	x
ECI-42.40-K1-EP42	24V	207.8	○	○	x	x
	48V		•	•	x	x

Subject to changes. *Construction length can differ.

• standard ○ preferred type x on request

Gearboxes

Angular gearbox EtaCrown®Plus 63

Image of 3-stage gearbox

More at www.ebmpapst.com

Description

- Compact design due to combination of the crown wheel and planetary stage in one housing
- No automatic lock due to high efficiency of the crown wheel technology
- High torques by using 5 straight toothed planetary gears made of case-hardened sintered steel in the integrated planetary gear stage
- Wide reduction range thanks to possibility of an upstream planetary stage
- Improved quiet operation thanks to the optimized design of the crown wheel stage when using an upstream helical planetary gear stage made of plastic with optimized sliding properties

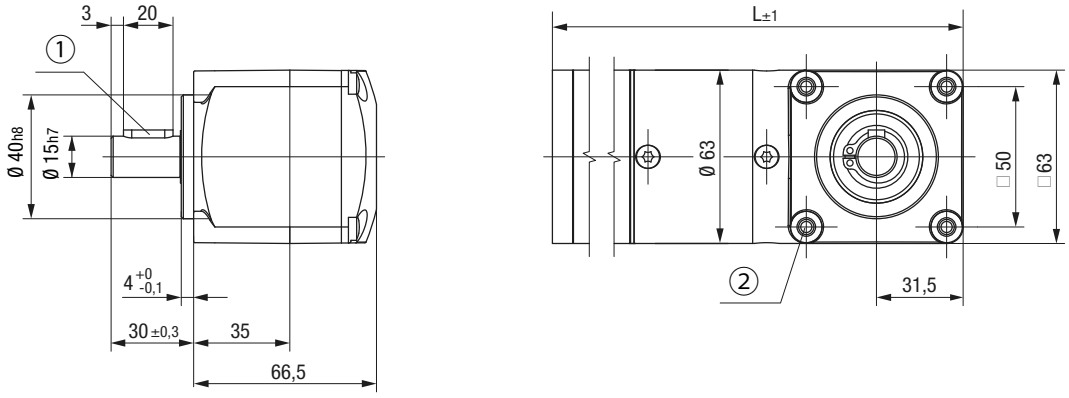
Type		EtaCrown®Plus 63.2		EtaCrown®Plus 63.3		
Reduction ratio		17	54.0	84.8	153	289
No. of stages		2	3	3	3	3
Efficiency		0.81	0.73	0.73	0.73	0.73
Max. input speed (n_1)	rpm			6 000		
Rated output torque (M_{ab})	Nm	8.0	27.0	27.0	25.00	17.00
Short term torque (M_{max})	Nm	20.00	67.50	67.50	62.50	42.50
Gear play	°	<0.7	<1.2	<1.2	<1.2	<1.2
Perm. operating temperature range	°C			-20 ... +80		
Operating mode				S1		
Protection class				IP 50		
Weight	kg	1.7	1.8	1.8	1.8	1.8
Shaft load radial / axial	N			700 / 500		
Service life	h			5 000		
Lubrication				Maintenance free grease lubrication for life		
Installation position				any		
Length	mm	116.3	116.3	116.3	116.3	116.3

Subject to changes.

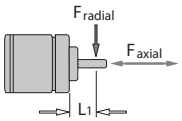
Technical drawing

Image of 3-stage gearbox

Dimensions in mm



① Feather key DIN 6885 A-5x5x20
② 4 x M5, 10 deep



Permissible shaft load

F_{axial}:	500 N
F_{radial}:	700 N
L_1:	15 mm

At rated speed, operating factor C_B=1 and a service life expectancy L_{10} from 5 000 h (at T_U max. 40°C in rated operation)

Length motor / gearbox combinations

Dimensions in mm

		Length L	2-stage reduction ratios	Length L	3-stage reduction ratios			
		2-stage	17	3-stage	54.0	84.8	153*	289*
ECI-63.20-K1-EP63	24V	236.3	•	236.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.40-K1-EP63	24V	256.3	•	256.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.60-K1-EP63	24V	276.3	•	276.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.20-K4-EP63	24V	234.8	•	234.8	•	•	X	X
	48V		•		•	•	X	X
ECI-63.40-K4-EP63	24V	254.8	•	254.8	○	○	X	X
	48V		•		•	•	X	X
ECI-63.60-K4-EP63	48V	274.8	•	274.8	○	○	X	X
ECI-63.20-K5C-EP63	24V	228.3	•	228.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.40-K5C-EP63	24V	248.3	•	248.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.60-K5C-EP63	48V	268.3	•	268.3	•	•	X	X
ECI-63.20-K5E-EP63	24V	306.3	•	306.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.40-K5E-EP63	24V	326.3	•	326.3	•	•	X	X
	48V		•		•	•	X	X
ECI-63.60-K5E-EP63	48V	346.3	•	346.3	•	•	X	X

Subject to changes. *Construction length can differ.

• standard ○ preferred type X on request

Brushless Servomotors ECI series

Accessories

ebmpapst

engineering a better life

Accessories

Overview

Overview Accessories

Commissioning tools, brakes, encoder

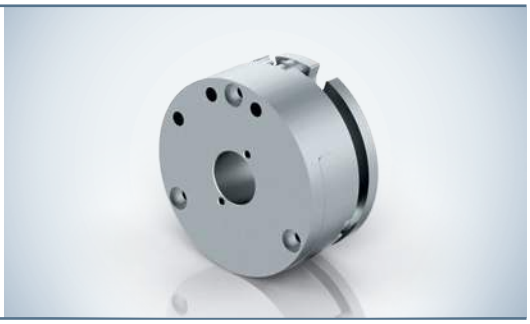
In addition to the gearbox and motor modules, our modular drive system offers numerous other integrated components such as brakes and encoders. We are your competent partner and will be glad to support you in selecting the best drive solution for your application. Contact us now at www.ebmpapst.com/contact

Commissioning tools and accessories

- *"driveSTUDIO"*
  for I/O controlled K4 drives and controllers
- *"epTools"*
  for drives and controllers with CANopen interface (K5C)
- *"driveSTUDIO 4.0"*
  for K5E drives - diagnostics parallel to ongoing BUS operation

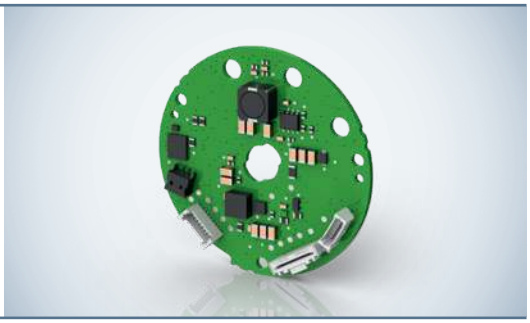
Integrated brake modules

- Fail-safe brake based on spring force principle
- Special feature of ECI 63 K1 /K5E:
  - Reduced power requirement for maintaining the open state
  - Innovative braking concept offers dimensions optimized for installation space



Magnetic incremental encoder

- *IEM 38*
  Integrated magnetic 3-channel incremental encoder with up to 12 bits
- *IEM 58*
  Integrated magnetic 3-channel incremental encoder with up to 12 bits



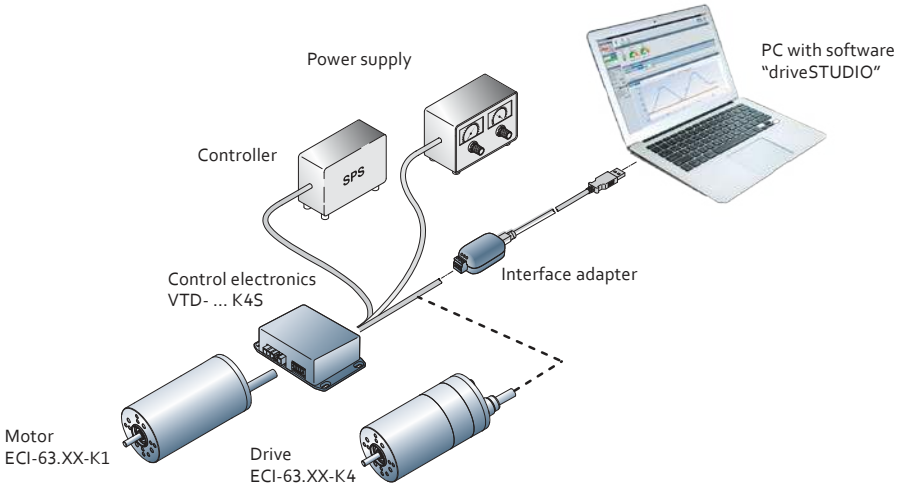
Absolute encoder multiturn

- *AEM 35*
  Battery-less counter buffering using the Wiegand effect

Commissioning tools

K4

Parameterization and commissioning



The RS485 interface serves as an interface for parameterization and diagnosis. It can be operated using the freely available "driveSTUDIO" PC software. This requires a PC and the ebm-papst USB-RS485 adapter. Download your detailed operating manual and the PC software "driveSTUDIO" at **www.ebmpapst.com**.

Interface adapter for "driveSTUDIO" PC software	part number
USB-RS485-adapter	**914 0000 403**

Electrical connection	
PIN	Configuration
A	RS485+
B	RS485-
X	--

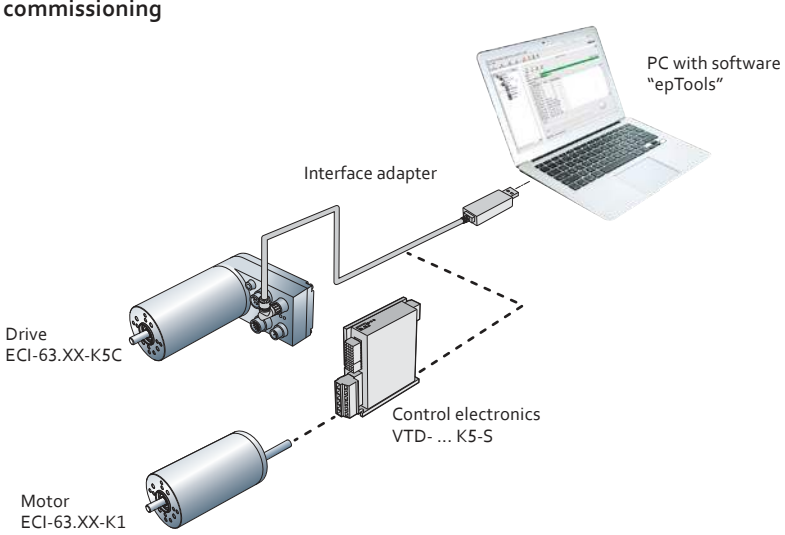
Functional description of the LED displays

LED name	Color	Display	Function assignment
TxD	red	flashes	Flashes with outgoing message
		does not light up	No outgoing message
RxD	green	flashes	Flashes with outgoing message
		does not light up	No outgoing message
ON	orange	lights up	Normal operation

Commissioning tools

K5C and VTD-…-K5-S

Parameterization and commissioning



The CAN interface serves as an interface for parameterization, process and diagnosis. This requires a PC and the ebm-papst USB CAN adapter. It can be operated using the freely available “epTools” PC software. Download your detailed operating manual and the PC software “epTools” at **www.ebmpapst.com**.

Interface adapter for “ep-Tools” PC software	part number
USB-CAN-adapter	**914 0000 401**

Electrical connection	
X1	Configuration
1	res.
2	CAN Hi
3	CAN Lo
4	res.
5	CAN GND

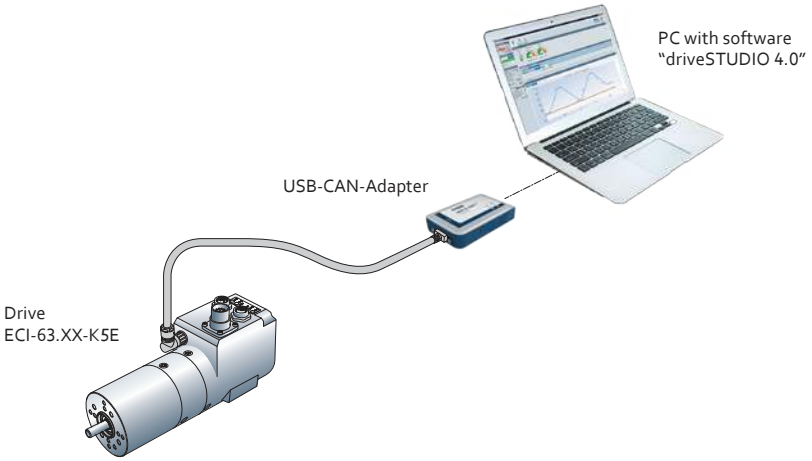
Functional description of the LED displays

LED name	Color	Display	Function assignment
LED0 “Power”	green	lights up	Normal operation
		does not light up	No power supply
		flashes	Bootloader mode (no firmware)
LED1 “State”	yellow	does not light up	Normal operation
		flashes	Bootloader mode (flashes with incoming message)
LED2 “Error”	red	lights up	Error
		does not light up	No error (normal operation)
LED3 “Rx”	green	flashes	Flashes with incoming message
		does not light up	No incoming message
LED4 “Tx”	yellow	flashes	Flashes with outgoing message
		does not light up	No outgoing message

Commissioning tools

K5E

Parameterization and commissioning



The CAN interfac serves as an interface for parameterization, process and diagnosis. This requires a PC and the ixxat USB CAN adapter. It can be operated with the PC software "driveSTUDIO 4.0" available on request. Download your detailed operating manual and the PC software “driveSTUDIO 4.0” at **www.ebmpapst.com**.

Interface adapter for “driveSTUDIO 4.0” PC software	part number
USB CAN adapter	**821 7201 222**

Electrical connection	
X1	Configuration
7	CAN-High
2	CAN-Low
3/6	CAN-GND
5	CAN-Shield

Functional description of the LED displays

LED name	Color	Display	Function assignment
USB LED	-	OFF	No communication
	green	ON	Communication possible
	red	flashing	Status changes between power saving and active
CAN LED	-	OFF	No communication
	green	flashing	Communication present
	red	flashing	Controller in Status error
	red	ON	Bus Off Controller is in status Bus Off

Brake

integrated brake modules

Image of integrated brake for ECI 63 K3/K4/K5C

More at www.ebmpapst.com

Description

- Fail-safe brake based on spring force principle
- Single-disk brake with two friction contact surfaces
- Braking torque effective in powerless state
- Braking force is eliminated by electro-magnetic force
- Holding brake with emergency stop function
- Currentless-operated brake with high power density
- Reduced inertia for optimum dynamics
- Special feature of ECI 63 K1 /K5E:
  - Reduced power requirement for maintaining the open state
  - Innovative braking concept offers dimensions optimized for installation space

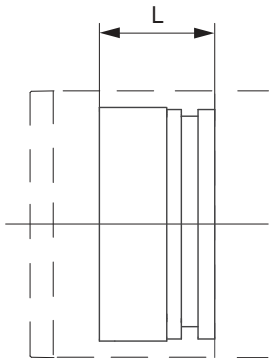
Type		Brake module ECI 42 RFK 0.3 Nm	Brake module ECI 63 K3/K4/K5C RFK 1.0 Nm	Brake module ECI 63 K1/K5E RFK 1.0 Nm	Brake module ECI 80 RFK 2.0 Nm
Nominal voltage	V DC	24	24	24	24
Nominal power	W	6.0	9.0	1.1	11.4
Braking torque[1)]	Nm	0.3	1.0	1.0	2.0
Engagement time	ms	25	20	25	10
Disengagement time	ms	85	60	85	58
Protection class	IP	54 (implemented via installation in the drive)			
Weight	kg	0.16	0.33	0.24	0.40

[1)] Value in run-in state

Subject to changes.

Technical drawing Image of integrated brake module

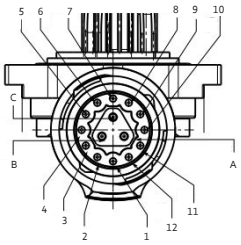
Dimensions in mm



Brake module	L
ECI 42 RFK 0.3 Nm	57.0
ECI 63 K3/K4/K5C RFK 1.0 Nm	45.4
ECI 63 K1/K5E RFK 1.0 Nm	60.0
ECI 80 RFK 2.0 Nm	42.5

Length for combined mounting with encoder on request

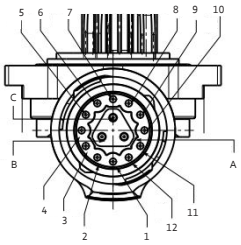
Electrical connection integrated brake module ECI 42



Pin	Color	Configuration	Function
5	gray	GND	Ground Hall / encoder / brake
6	pink	+24V Brake	Brake supply

Colors of the leads when ebm-papst cables are used.
Subject to changes.

Electrical connection integrated brake module ECI 63 K1/K5E

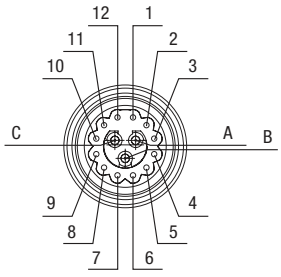


Special feature of ECI 63 K5E: Brake control via software

Pin	Color	Configuration	Function
5	gray	GND	Ground Hall / encoder / brake
6	pink	+24V Brake	Brake supply

Colors of the leads when ebm-papst cables are used.
Subject to changes.

Electrical connection integrated brake module ECI 63 K3/K4/K5C

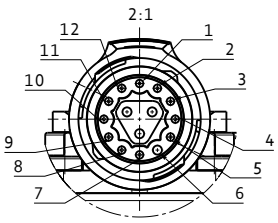


Special feature of ECI 63 K5C: Brake control via software

Pin	Color	Configuration	Function
4	yellow	+24V Brake	Brake supply
C	black	GND	Ground Hall / encoder / brake

Colors of the leads when ebm-papst cables are used.
Subject to changes.

Electrical connection integrated brake module ECI 80



Pin	Color	Configuration	Function
5	gray	GND	Ground Hall / encoder / brake
6	pink	+24V Brake	Brake supply

Colors of the leads when ebm-papst cables are used.
Subject to changes.

Magnetic incremental encoder

IEM 38

Image of integrated icremental encoder

Description

- Magnetic 3 channal incremental encoder
- A resolution of 12 Bit is attained by appropriate evaluation
- The encoder is contactless and wearfree
- Additional resolutions and interfaces on request

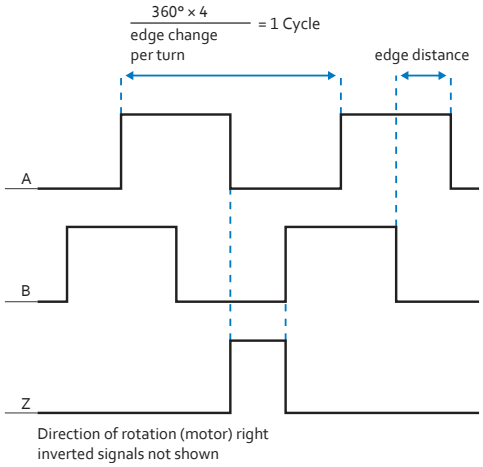
More at www.ebmpapst.com

Type		IEM 38
Type of measured value		incremental
Type of measuring method		magnetic
Resolution	PPR[1]	1.024
	CPR[2]	4.096
Output signal A, B, Z[3]		A, /A, B, /B, Z, /Z (RS 422)
max. signal frequency (f)	kHz	4.000
Supply voltage (U_B)	V DC	+5 ± 10%
Power consumption (I_B)	mA	max. 30
Precision	°	± 0.35
Protection class	IP	54 (implemented via installation in the drive)
Permissible ambient temperature range (T_U)	°C	-40 ... +125

[1] PPR = Period per revolution; signal pulse from one rising edge to the next rising edge on a channel = 1 cycle
[2] CPR = Counts per revolution; edge change during quadrature evaluation = 1 edge interval; [3] A and B channel with 90° phase offset

Subject to changes.

Signal processing

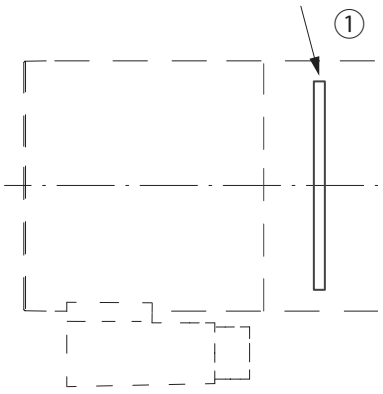


Direction of rotation (motor) right
inverted signals not shown

Technical drawing

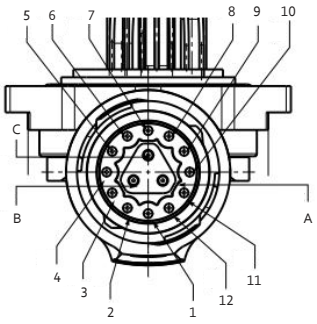
Dimensions in mm

Image of integrated incremental encoder IEM 38 for ECI 42 K1



① Installing the encoder extends the length of the drive housing by 57 mm
Length for combined mounting with brake on request

Electrical connection integrated incremental encoder IEM 38



	Pin	Wire color	Assignment	Function
	4	yellow	+5V Hall/Enc	Hall and encoder supply
	5	gray	GND	Ground Hall / encoder
	6	pink	empty	empty
Encoder	7	blue	A	Encoder Channel A
	8	red	/A	Encoder Channel A inverted
	9	black	B	Encoder Channel B
	10	purple	/B	Encoder Channel B inverted
	11	gray-pink	Z	Encoder Index
	12	red-blue	/Z	Encoder Index inverted

Subject to changes. Colors of the leads when ebm-papst cables are used

Magnetic incremental encoder

IEM 58

Description

- Magnetic 3 channal incremental encoder
- A resolution of 12 Bit is attained by appropriate evaluation
- The encoder is contactless and wearfree
- Additional resolutions and interfaces on request

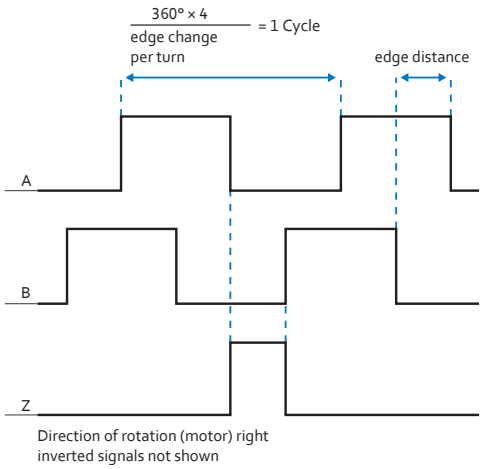
More at www.ebmpapst.com

Type		IEM 58
Type of measured value		incremental
Type of measuring method		magnetic
Resolution	PPR[1)]	1.024
	CPR[2)]	4.096
Output signal A, B, Z[3)]		A, /A, B, /B, Z, /Z (RS 422)
max. signal frequency (f)	kHz	120
Supply voltage (U_B)	V DC	5 ... 24
Power consumption (I_B)	mA	max. 20
Precision[4)]	°	± 0.5
Protection class	IP	54 (implemented via installation in the drive)
Permissible ambient temperature range (T_U)	°C	-30 ... +105

[1)] PPR = Period per revolution; signal pulse from one rising edge to the next rising edge on a channel = 1 cycle
[2)] CPR = Counts per revolution; edge change during quadrature evaluation = 1 edge interval; [3)] A and B channel with 90° phase offset; [4)] Value applies to operation at T_U = 40 °C

Subject to changes.

Signal processing

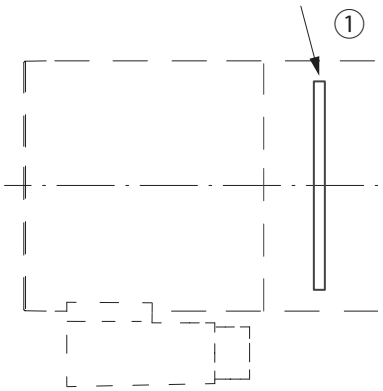


Direction of rotation (motor) right
inverted signals not shown

Technical drawing

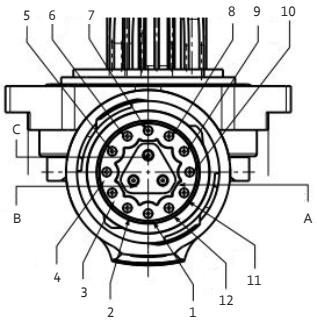
Dimensions in mm

Image of integrated incremental encoder IEM 58 for ECI 63 K1



① Installing the encoder does not extend the length of the drive.
Length for combined mounting with brake on request

Electrical connection integrated encremental encoder IEM 58



	Pin	Wire color	Assignment	Function
	4	yellow	+5V Hall/Enc	Hall and encoder supply
	5	gray	GND	Ground Hall / Encoder
	6	pink	empty	empty
Encoder	7	blue	A	Encoder Channel A
	8	red	/A	Encoder Channel A inverted
	9	black	B	Encoder Channel B
	10	purple	/B	Encoder Channel B inverted
	11	gray-pink	Z	Encoder Index
	12	red-blue	/Z	Encoder Index inverted

Subject to changes. Colors of the leads when ebm-papst cables are used

Absolute encoder multiturn

AEM 35

Description

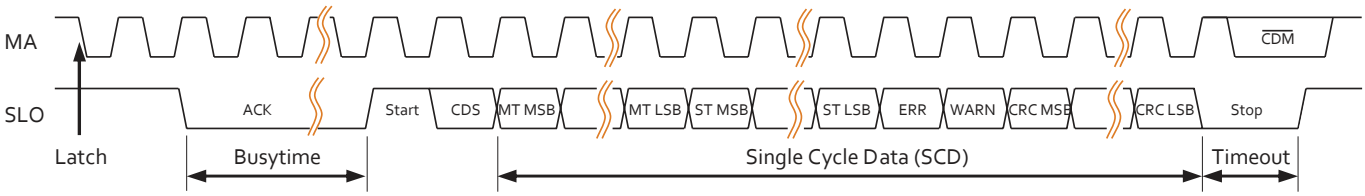
- Magnetic absolute encoder multiturn; optional: singleturn
- A resolution of up to 17 Bit (singleturn) or 16 Bit (multiturn) is attained by appropriate evaluation
- The encoder is contactless and wearfree
- Battery-less counter buffering using the Wiegand effect
- Additional resolutions and interfaces on request

More at www.ebmpapst.com

Type		AEM 35
Type of measured value		absolute multiturn
Type of measuring method		magnetic
Resolution (singleturn)	Bit	17
Resolution (multiturn)	Bit	16
Counter buffering		Energy-Harvesting (without battery, without gearbox)
Interface		BISS C (optional: SSI)
max. signal frequency (f)	kHz	10.000
Supply voltage (U_B)	V DC	5 ... 15
Power consumption (I_B)	mA	60
Precision	°	±0.5
Protection class	IP	54 (implemented via installation in the drive)
Permissible ambient temperature range (T_U)	°C	-40 ... +105

Subject to changes.

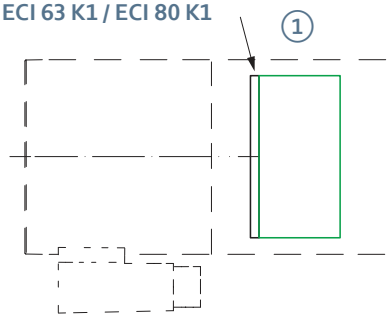
Interface BISS *C*



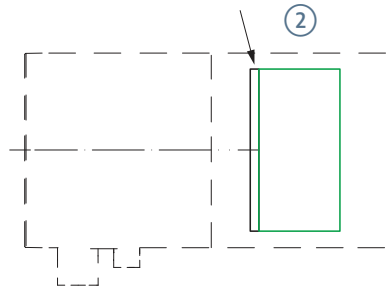
Technical drawing

Dimensions in mm

Shown with integrated AEM 35 absolute encoder
for ECI 42 K1 / ECI 63 K1 / ECI 80 K1



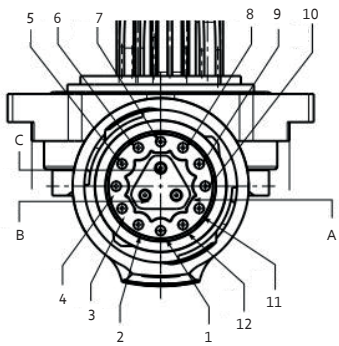
Shown with integrated AEM 35 absolute encoder
for ECI 63 K5E



Total length of drive with integrated AEM 35		ECI-42.20	ECI-42.40	ECI-63.20	ECI-63.40	ECI-6360	ECI-80.20	ECI-80.40	ECI-80.60
	mm								
①	K1	161	181	180	200	220	190	210	230
①	K1 with brake	191	211	200	220	240	220	240	260
②	K4			190	210	230			
②	K4 with brake			210	230	250			
②	K5E			220	240	260			
②	K5E with brake			240	260	280			

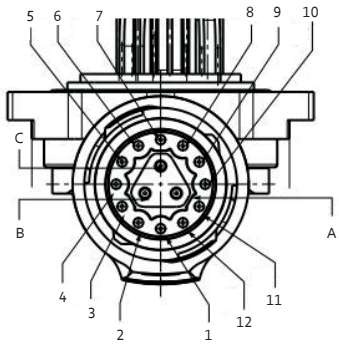
Subject to change.

Electrical connection integrated absolute encoder AEM 35



EC42. xx K1 without brake		Pin	Wire color	Connection	Function	Recomm. AWG
Signal		1	White	Hall A	Hall sensor signal 1	24 (0.25 mm²)
		2	Brown	Hall B	Hall sensor signal 2	
		3	Green	Hall C	Hall sensor signal 3	
		4	Yellow	+5V Hall	Hall supply	
		5	Gray	GND	Ground of encoder/Hall	
Encoder		6	Pink	Blank	Blank	
		7	Blue	Blank	Blank	
		8	Red	SLO + (Data +)	Slave Output Line +	
		9	Black	SLO – (Data –)	Slave Output Line –	
		10	Purple	MA + (CLK +)	Clock Signal Master +	
		11	Gray/pink	+5V ENC (VCC)	Encoder supply	
		12	Red/blue	MA – (CLK –)	Clock Signal Master –	
Power		A	Brown	U	Phase L1 (U)	16 (1.5 mm²)
		B	Black	V	Phase L2 (V)	
		C	Gray	W	Phase L3 (W)	

Subject to change. Colors of the leads when ebm-papst cables are used



EC63. xx K1 without brake		Pin	Wire color	Connection	Function	Recomm. AWG
Signal		1	White	Hall A	Hall sensor signal 1	24 (0.25 mm²)
		2	Brown	Hall B	Hall sensor signal 2	
		3	Green	Hall C	Hall sensor signal 3	
		4	Yellow	+5V Hall	Hall supply	
		5	Gray	GND	Ground of Hall	
Encoder		6	Pink	Blank	Blank	
		7	Blue	GND	Ground of encoder	
		8	Red	SLO + (Data +)	Slave Output Line +	
		9	Black	SLO – (Data –)	Slave Output Line –	
		10	Purple	MA + (CLK +)	Clock Signal Master +	
		11	Gray/pink	+5V ENC (VCC)	Encoder supply	
		12	Red/blue	MA – (CLK –)	Clock Signal Master –	
Power		A	Brown	U	Phase L1 (U)	16 (1.5 mm²)
		B	Black	V	Phase L2 (V)	
		C	Gray	W	Phase L3 (W)	

Subject to change. Colors of the leads when ebm-papst cables are used

ECI 63.xx K5E
Absolute encoder signals are processed within the drive and exchanged with a higher-level PLC via the bus interface.

ECI 80.xx K1
Available on request.

Operating factor, lifetime, efficiency

Operating factor C_B

To achieve a uniform lifetime for the gearboxes and motors, the necessary torques M must be increased by the respective operating factor C_B under the various operating loads so as not to exceed the maximum permissible gearbox torque

Operating modes

Load			Operating period in h/days					
			3 h	8 h	24 h	3 h	8 h	24 h
even	gradual	sudden	up to 10 switching ops./h			over 10 switching ops./h		
One rotation direction •			1.00	1.00	1.20	1.00	1.20	1.52
Rotation direction change •			1.00	1.30	1.59	1.20	1.59	1.92
One rotation direction	•		1.11	1.30	1.59	1.30	1.52	1.82
Rotation direction change	•		1.41	1.72	2.00	1.59	1.89	2.33
One rotation direction		•	1.20	1.52	1.82	1.52	1.82	2.22
Rotation direction change		•	1.59	2.00	2.33	2.00	2.33	2.86

Operating mode

It is necessary to define the operating mode under which a gear motor can be operated with certain nominal values in order to avoid over-loading the motor and/or the gearbox. The values stated in this cata-log refer to S1 operation (continuous operation). This means that the gear motor can be constantly operated with the stated values, but can also have a higher load placed on it for a short time. Please contact us if you require more information about this: **www.ebmpapst.com/contact**.

Service life

Service life is limited by the various components in the drive. If frequently overloaded, the gearbox components are subjected to more wear than under nominal load. Extreme ambient and operating conditions cause a reduction in the lifetime guaranteed for operation under oper-ating ratio $C_B = 1$.

Efficiency η (eta)

The efficiency per gear stage is at least 90%. Depending on the tooth configuration and on the manufacturing quality, far better levels of efficiency can also be achieved. The following overall efficiencies were obtained for multi-stage gearboxes:

Overall efficiency	
for 1-stage gearbox	$\eta = 0.9$
for 2-stage gearbox	$\eta = 0.9^2 = 0.81$
for 3-stage gearbox	$\eta = 0.9^3 = 0.73$
for 4-stage gearbox	$\eta = 0.9^4 = 0.66$
for 5-stage gearbox	$\eta = 0.9^5 = 0.59$

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ebmpapst

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Always find the right contact person!

www.ebmpapst.com/contact

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