

K4 drive systems  
Brilliantly versatile

**ebmpapst**

The engineer's choice



## Company profile: ebm-papst

*The entire scope of ventilation and drive technology: this is the world of ebm-papst. More than 11.000 people – in Germany and throughout the world – develop, produce and sell our motors and fans. Our global presence and our unique range of products based on a quality standard that surpasses every other have made us what we are: world market leader in motors and fans. Expertly knowing what our customers need and incessantly striving to arrive at the perfect application solution for a wide variety of different industries is what determines our daily work.*

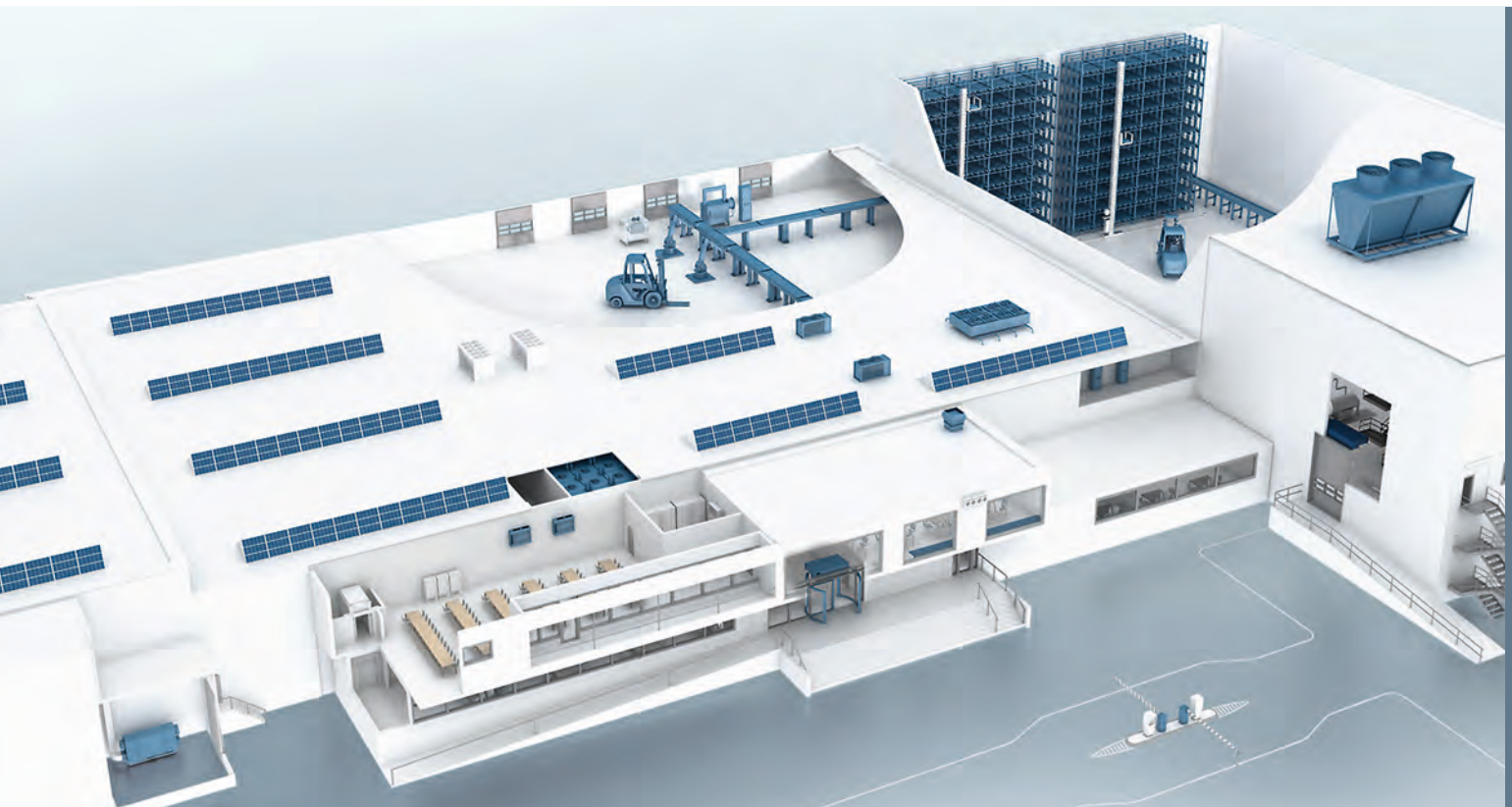
*Those who know us know the high standards we apply to our work and know our creed: to be as close to our customers as possible and to simply be the best in terms of innovation and reliability.*



ebmpapst

# Contents

Company profile: ebm-papst	2
The K4 can do almost anything	4
Commissioning K4 motors	5
VARIODRIVE Compact-Motor VDC-3-49.15-K4	6
ECl 63.20 with electronic-module K4	8
ECl 63.40 with electronic-module K4	10
ECl 63.60 with electronic-module K4	12
ECl brake module	14
Connection description – K4	15
Overview of gearbox types	16
A versatile solution	17



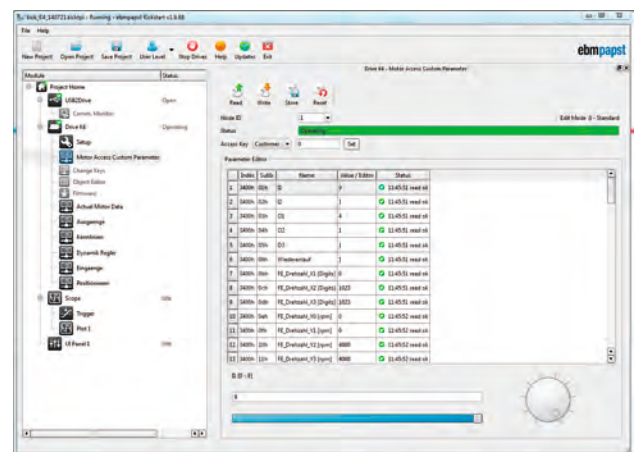
# The K4 can do almost anything ...

Our ECI series works according to a modular principle that is as simple as it is ingenious. You choose the appropriate GreenTech EC drives and enhance it by adding components, such as gearboxes, brakes and/or internal electronics modules. We assemble everything together for you into a compact system, with all the components perfectly integrated. In this way, you receive a drive system that is customized, cost-effective and adapted to address your specific application needs.

The K4 series provides endless options, featuring a fully integrated electronic control unit offering multiple analog and digital interfaces that can be configured via an RS485 interface. The integrated controls and interface provides ease and flexibility in adapting the drive to the most complex applications. We have managed to deliver all of this capability with a minimal increase in package size in relation to a drive without an integrated electronic control unit. This drive series is available in stack lengths of 15 to 60 mm with continuous rated outputs from 100 to 400 watts.

## Versatile and resourceful:

- User-friendly programming and controllability through the intelligent "Kickstart" PC software

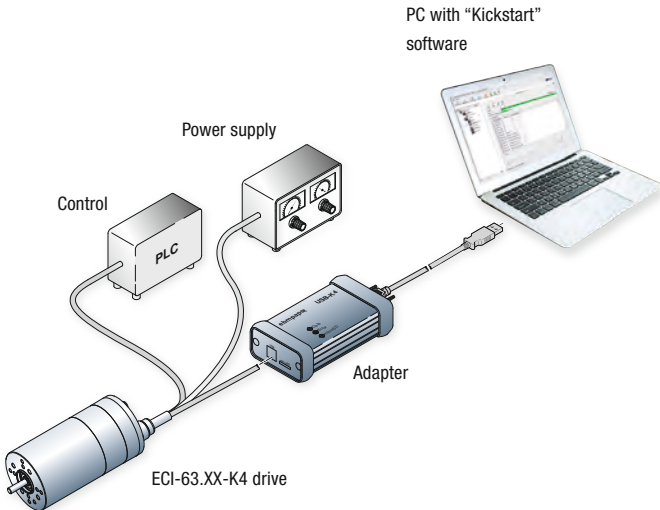


- Three different operating modes (speed, positioning or torque mode)
- Dynamic drives with outstanding overload capacity



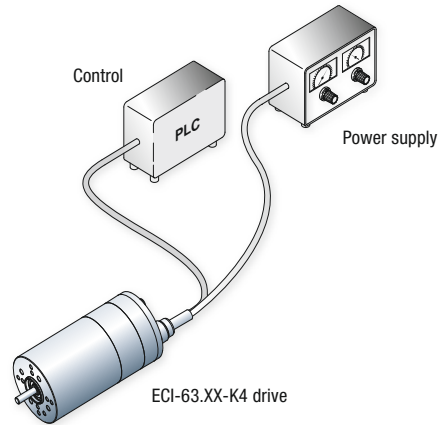
# Commissioning K4 motors

## Parameterisation and commissioning



## Automatic operation

Automatic operation with stored parameters and integrated control



The RS485 interface serves as an interface for parameterisation and diagnosis. It can be operated using the freely available “Kickstart” PC software. This requires a PC and the ebm-papst USB-CAN-RS485 adapter. The adapter is available as an accessory and can be ordered using the part number 914 0000 400.



Interface adapter for “Kickstart” PC software	Order No.
USB-CAN-RS485-Adapter	914 0000 400

Load your detailed operating manual and the PC software “Kickstart” under [www.ebmpapst.com](http://www.ebmpapst.com) or the adjacent QR-Code:



### Functional description of the LED displays

LED name	Colour	Function assignment
Data	red	• No assignment.
	green	• Active data transfer via the USB-CAN-RS485 adapter.
Error	red	• No response following request to K4. • Receipt of a faulty data package.
	green	• Received data is ok.
microSD	red	• No assignment.
	green	• Access to the memory card.

# VARIODRIVE Compact-motor

VDC-3-49.15-K4



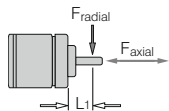
- Drive with completely integrated 4Q operation and K4 control electronics
- Speed, position or torque mode possible
- Selection of operation mode and parameterization via RS485
- Extensive interface with numerous inputs and outputs
- Output stage enabled via digital input
- Integrated brake chopper function
- Speed command signal from  $n = 0$  with holding torque until 4 500 rpm
- Excellent control behavior via field-oriented control with sine commutation
- High efficiency and high power density realized in a compact design
- Robust mechanical design with aluminium cover and sealed plug system
- User-friendly parameterization with "Kickstart" PC software

## Nominal data

Type		VDC-3-49.15-K4 B00	VDC-3-49.15-K4 D00
Nominal voltage ( $U_N$ )	V DC	24	48
Permissible supply voltage range ( $U_{ZK}$ )	V DC	20 ... 28	40 ... 53
Nominal speed ( $n_N$ )	min <sup>-1</sup>	4 000**	4 000**
Nominal torque ( $M_N$ )	mNm	235**	300**
Nominal current ( $I_N$ )	A	5**	3.2**
Nominal output power ( $P_N$ )	W	100**	125**
Free-running speed ( $n_L$ )	min <sup>-1</sup>	5 000	5 000
Free-running current ( $I_L$ )	A	1.0	0.6
Max. reverse voltage	V DC	35	58
Set value input		analog / PWM / frequency / digital	analog / PWM / frequency / digital
Recommended speed control range	min <sup>-1</sup>	0 ... 4 500	0 ... 4 500
Function for motor protection at stall		thermal	thermal
Overload protection		yes	yes
Starting torque ( $M_{max}$ )	mNm	850	1500
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x 10 <sup>-6</sup>	108	108
Heat resistance ( $R_{th}$ )	K/W	3.3	3.3
Ambient temperature range ( $T_U$ )	°C	-30 ... +40	-30 ... +40
Motor mass (m)	kg	0.59	0.59
Order No. (IP 54)*		937 4915 400	937 4915 402

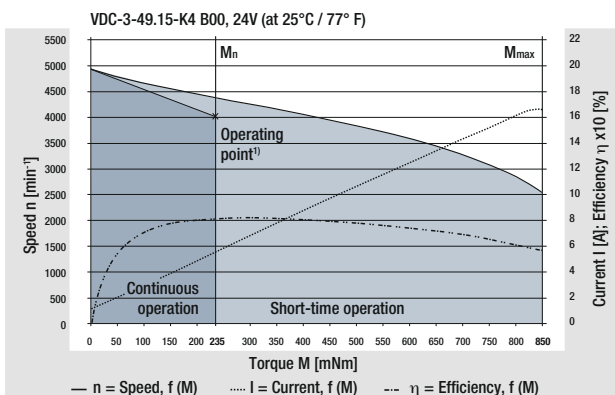
subject to alterations

\* Classification of protection class refers to installed state with sealing on the flange side  
 \*\* at  $T_U$  max. 40 °C / 104 °F

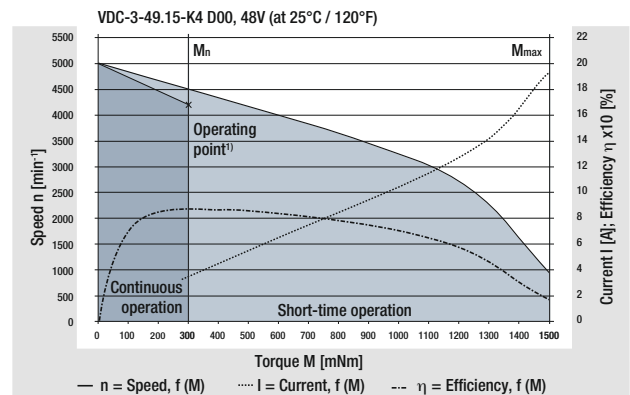


$F_{axial}$  20 N  
 $F_{radial}$  60 N  
 $L_1 = 10$  mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  of 20 000 h\*\*



<sup>1)</sup> Nominal data, see table above

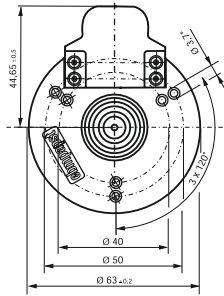


<sup>1)</sup> Nominal data, see table above

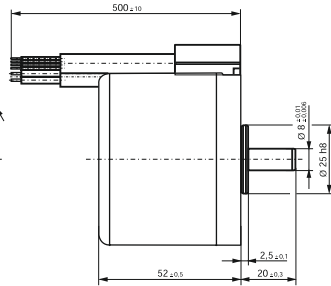
# VARIODRIVE Compact-motor

VDC-3-49.15-K4

## Basic motor



## Wire interface



Tapped blind holes for thread-forming screws  
in accordance to DIN 7500.  
max. screw depth 9,5 mm  
max. screw-in torque 3 Nm

Protective cap in aluminium natural.

## Gear motors

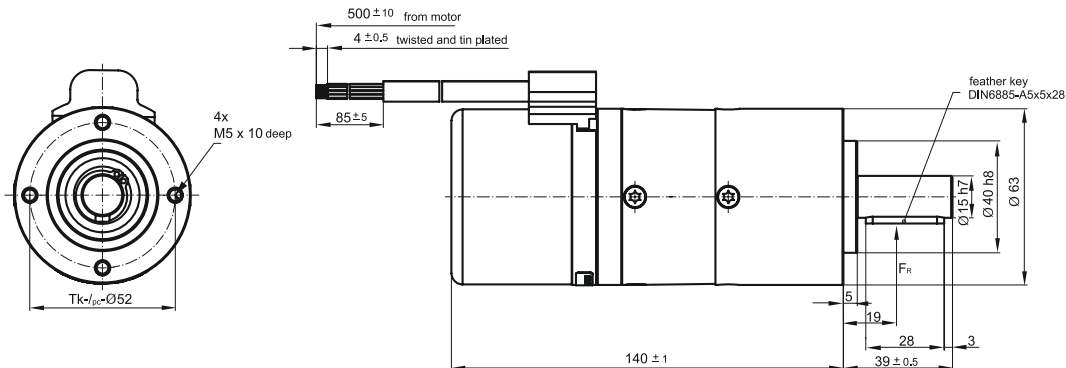
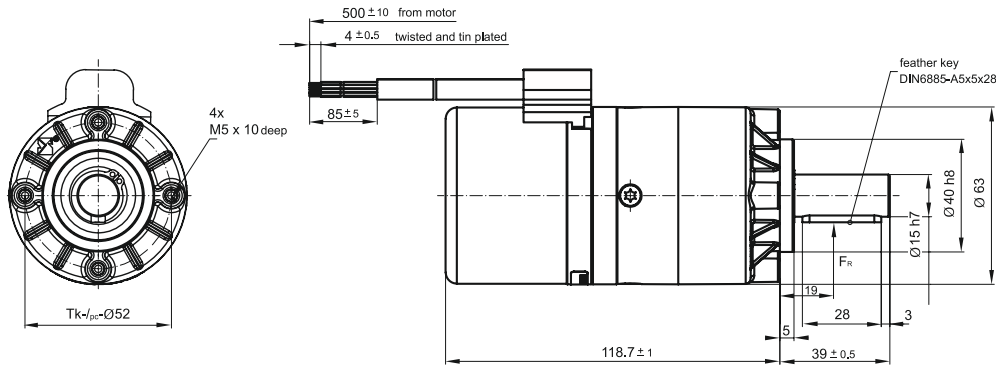
### Technical data / product series

### VDC-3-49.15-K4 with Performax® PLUS 63 (preferred type)

Ratio / number of stages	i / Number of stages	5:1 / 1	5:1 / 1	30:1 / 2	30:1 / 2
Nominal voltage-motor	V DC	24	48	24	48
Output torque in S1 operation ( $M_{ab}$ )	Nm	1.0	1.4	5.7	7.3
Nominal output speed ( $n_{ab}$ )	min <sup>-1</sup>	800	800	133	133
Output power ( $P_{ab}$ )	W	90	112,5	80	101
Nominal current	A	5	3.2	5	3.2
Mass (m)	kg	1.25	1.25	1.64	1.64
Order No. (IP 40)		947 4915 420	947 4915 422	947 4915 421	947 4915 423

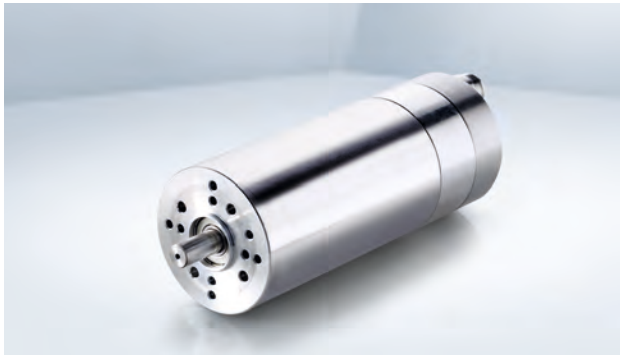
subject to alterations

## VDC-3-49.15-K4 PXP 63.1



# ECI 63.20

with electronic module K4



- Drive with completely integrated 4Q drive- and control electronics K4
- Speed-, position- or torque mode possible
- Selection of operation mode and parameterisation via RS485
- Extensive interface with numerous inputs and outputs
- Release of powerstage via digital input „hardware enable“
- Integrated brake chopper function
- Speed command signal from  $n = 0$  with holding torque until 5 000 rpm possible
- Excellent control behavior via field-oriented control with sine commutation
- User-friendly parameterization with “Kickstart” PC software

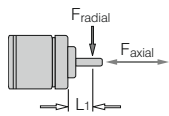
## Nominal data

Type		ECI-63.20-K4-B00	ECI-63.20-K4-D00
Nominal voltage ( $U_N$ )	V DC	24	48
Permissible supply voltage range ( $U_{ZK}$ )	V DC	20 ... 28	40 ... 53
Nominal speed ( $n_N$ )	min <sup>-1</sup>	4 000**	4 000**
Nominal torque ( $M_N$ )	mNm	425**	450**
Nominal current ( $I_N$ )	A	8.5**	5.4**
Nominal output power ( $P_N$ )	W	178**	188**
Free-running speed ( $n_L$ )	min <sup>-1</sup>	5 600	6 200
Free-running current ( $I_L$ )	A	0.5	0.30
Max. reverse voltage	V DC	35	58
Set value input		analog / PWM / frequency / digital	analog / PWM / frequency / digital
Recommended speed control range	min <sup>-1</sup>	0 ... 5 000	0 ... 5 000
Function for motor protection at stall		thermal	thermal
Overload protection		yes	yes
Starting torque ( $M_{max}$ )	mNm	1 250	1 800
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x 10 <sup>-6</sup>	19	19
Heat resistance ( $R_{th}$ )	K/W	3.6	3.6
Ambient temperature range ( $T_U$ )	°C	0 ... +40	0 ... +40
Motor mass (m)	kg	0.85	0.85
Order No. (IP 40)	Wire interface	932 6320 403	932 6320 405
Order No. (IP 54)*	Connector interface	932 6320 400	932 6320 402

subject to alterations

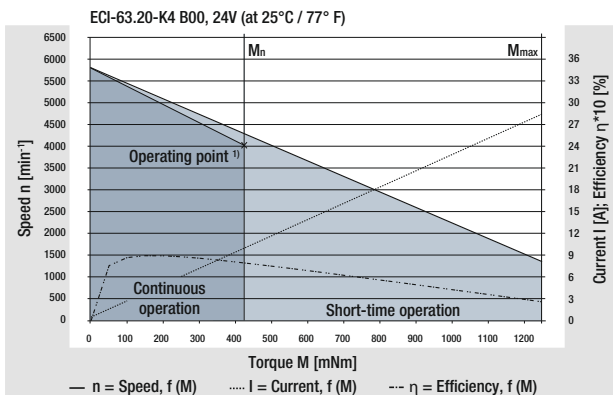
\* Classification of protection class refers to installed state with sealing on the flange side

\*\* at  $T_U$  max. 40 °C / 104 °F

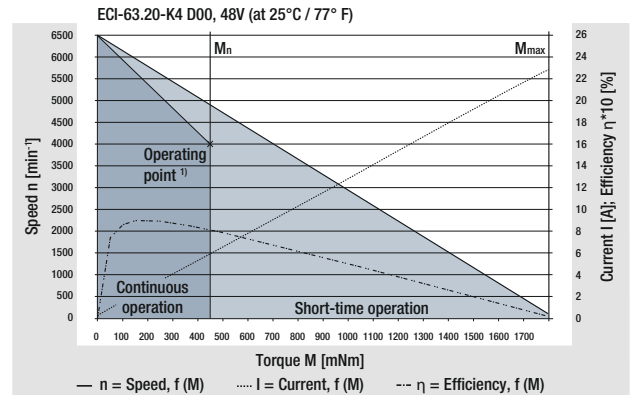


$F_{axial}$  150 N  
 $F_{radial}$  150 N  
 $L_1 = 20$  mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  of 20 000 h\*\*



<sup>1)</sup> Nominal data, see table above



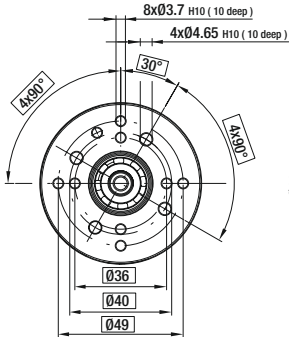
<sup>1)</sup> Nominal data, see table above



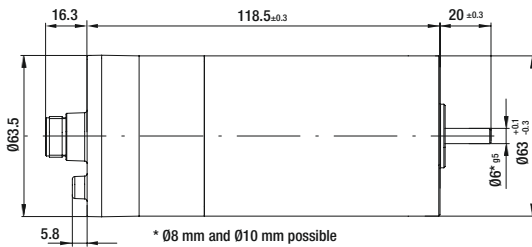
# ECI 63.20

with electronic module K4

## Basic motor

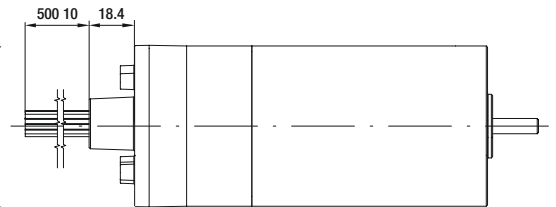


## Connector interface (M16)



## Wire interface

(Cable harness must be ordered separately)

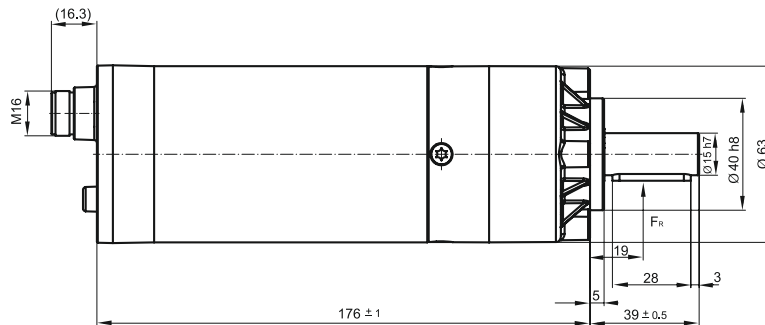
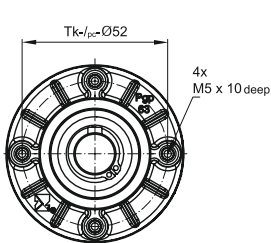


## Gear motors

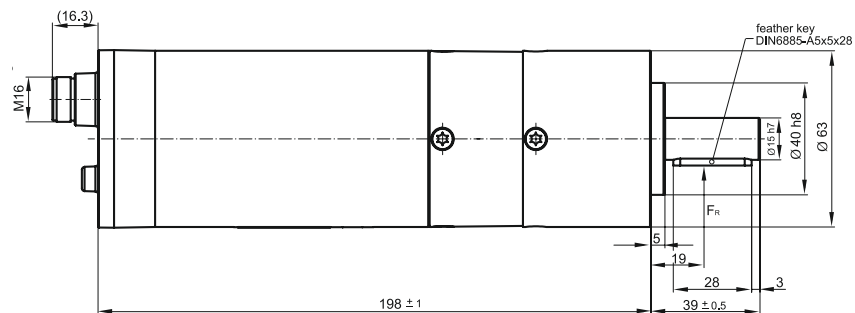
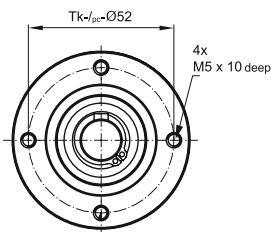
Technical data / product series		ECI-63.20-K4 with Performax® PLUS 63 (preferred type)			
Ratio / number of stages	i / Number of stages	5:1 / 1	5:1 / 1	30:1 / 2	30:1 / 2
Nominal voltage-motor	V DC	24	48	24	48
Output torque in S1 operation ( $M_{ab}$ )	Nm	1.9	2	10.3	10.9
Nominal output speed ( $n_{ab}$ )	min <sup>-1</sup>	800	800	133	133
Output power ( $P_{ab}$ )	W	160	169	144	152
Nominal current	A	8.5	5.4	8.5	5.4
Mass (m)	kg	1.5	1.5	1.9	1.9
Order No. (IP 40)		942 6320 420	942 6320 422	942 6320 421	942 6320 423

subject to alterations

## ECI-63.20-K4 PXP 63.1

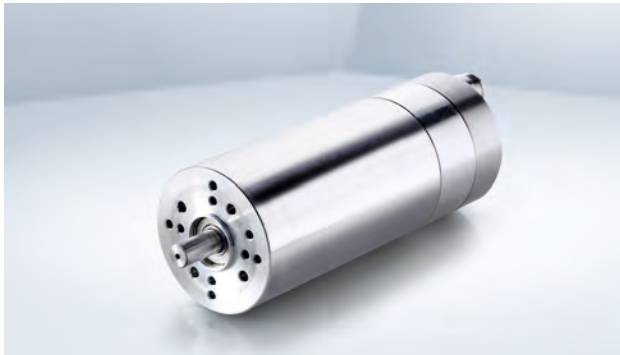


## ECI-63.20-K4 PXP 63.2



# ECI 63.40

with electronic module K4



- Drive with completely integrated 4Q drive- and control electronics K4
- Speed-, position- or torque mode possible
- Selection of operation mode and parameterisation via RS485
- Extensive interface with numerous inputs and outputs
- Release of powerstage via digital input „hardware enable“
- Integrated brake chopper function
- Speed command signal from  $n = 0$  with holding torque until 5 000 rpm possible
- Excellent control behavior via field-oriented control with sine commutation
- User-friendly parameterization with “Kickstart” PC software

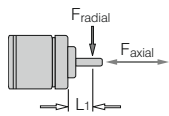
## Nominal data

Type		ECI-63.40-K4-B00	ECI-63.40-K4-D00
Nominal voltage ( $U_N$ )	V DC	24	48
Permissible supply voltage range ( $U_{ZK}$ )	V DC	20 ... 28	40 ... 53
Nominal speed ( $n_N$ )	min <sup>-1</sup>	4 000**	4 000**
Nominal torque ( $M_N$ )	mNm	600**	750**
Nominal current ( $I_N$ )	A	12.3**	7.3**
Nominal output power ( $P_N$ )	W	251**	314**
Free-running speed ( $n_L$ )	min <sup>-1</sup>	5 900	5 800
Free-running current ( $I_L$ )	A	0.9	0.46
Max. reverse voltage	V DC	35	58
Set value input		analog / PWM / frequency / digital	analog / PWM / frequency / digital
Recommended speed control range	min <sup>-1</sup>	0 ... 5 000	0 ... 5 000
Function for motor protection at stall		thermal	thermal
Overload protection		yes	yes
Starting torque ( $M_{max}$ )	mNm	1 300	2 700
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x 10 <sup>-6</sup>	38	38
Heat resistance ( $R_{th}$ )	K/W	2.9	2.9
Ambient temperature range ( $T_U$ )	°C	0 ... +40	0 ... +40
Motor mass (m)	kg	1.15	1.15
Order No. (IP 40)	Wire interface	932 6340 403	932 6340 405
Order No. (IP 54)*	Connector interface	932 6340 400	932 6340 402

subject to alterations

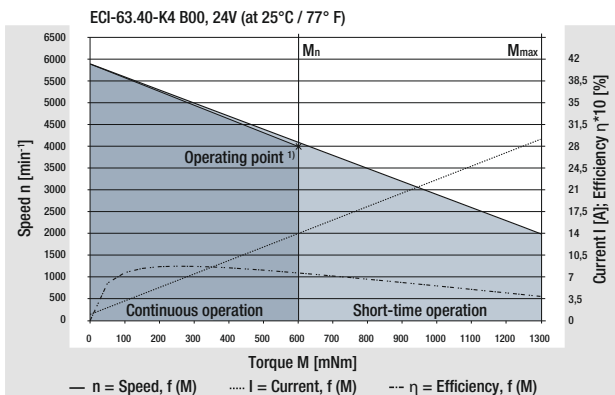
\* Classification of protection class refers to installed state with sealing on the flange side

\*\* at  $T_U$  max. 40 °C / 104 °F

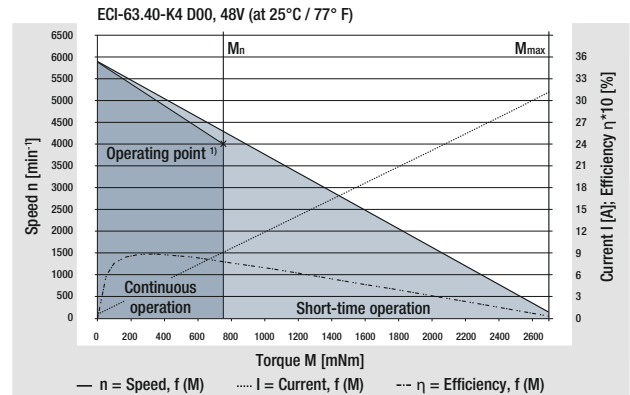


$F_{axial}$  150 N  
 $F_{radial}$  150 N  
 $L_1 = 20$  mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  of 20 000 h\*\*



<sup>1)</sup> Nominal data, see table above

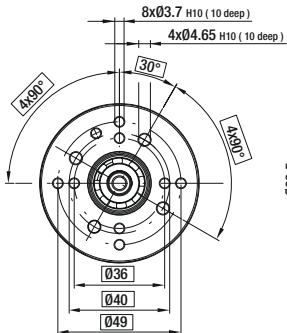


<sup>1)</sup> Nominal data, see table above

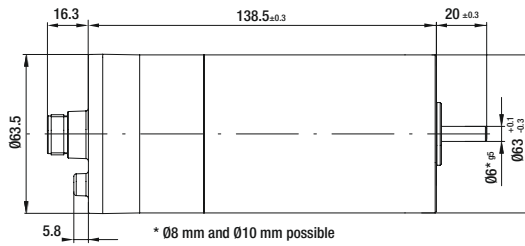
# ECI 63.40

with electronic module K4

## Basic motor

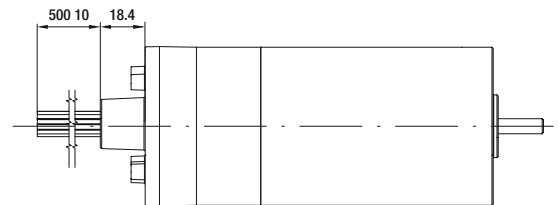


## Connector interface (M16)



## Wire interface

(Cable harness must be ordered separately)

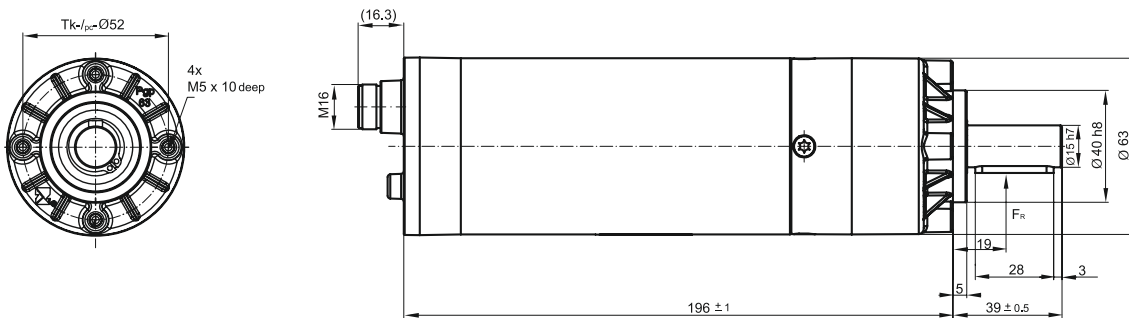


## Gear motors

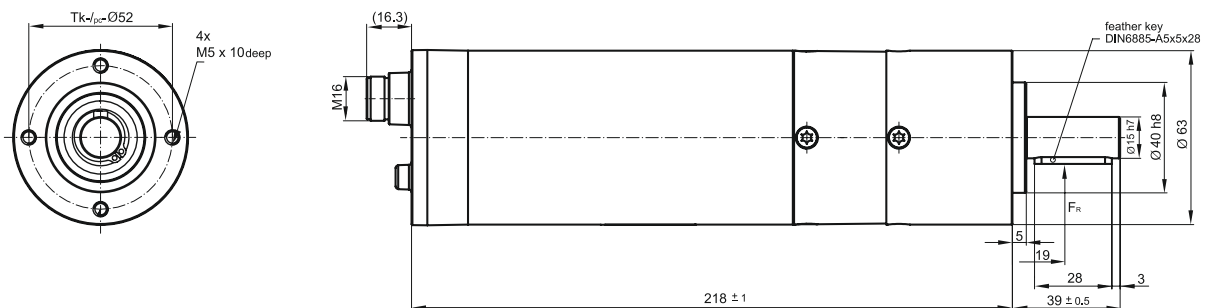
Technical data / product series		ECI-63.40-K4 with Performax® PLUS 63 (preferred type)			
ratio/number of stages	i/Number of stages	5:1/1	5:1/1	30:1/2	30:1/2
nominal voltage-motor	V DC	24	48	24	48
Output torque in S1 operation ( $M_{ab}$ )	Nm	2.7	3,3	14.6	18.2
Nominal output speed ( $n_{ab}$ )	min <sup>-1</sup>	800	800	133	133
Output power ( $P_{ab}$ )	W	226	283	203	254
Nominal current	A	12.3	7.2	12.3	7.2
Mass (m)	kg	1.8	1.8	2.2	2.2
Order No. (IP 40)		942 6340 420	942 6340 422	942 6340 421	942 6340 423

subject to alterations

## ECI-63.40-K4 PXP 63.1

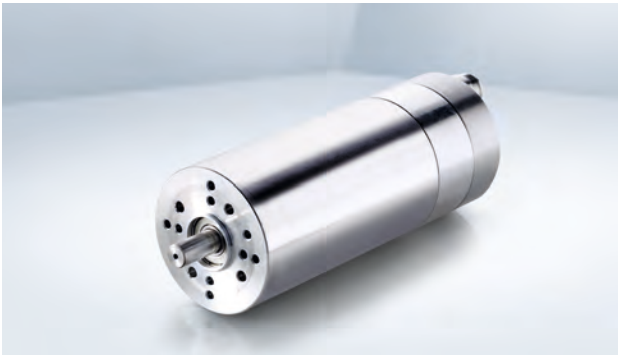


## ECI-63.40-K4 PXP 63.2



# ECI 63.60

with electronic module K4



- Drive with completely integrated 4Q drive- and control electronics K4
- Speed-, position- or torque mode possible
- Selection of operation mode and parameterisation via RS485
- Extensive interface with numerous inputs and outputs
- Release of powerstage via digital input „hardware enable“
- Integrated brake chopper function
- Speed command signal from n = 0 with holding torque until 5 000 rpm possible
- Excellent control behavior via field-oriented control with sine commutation
- User-friendly parameterization with “Kickstart” PC software

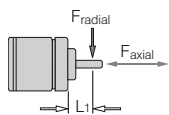
## Nominal data

Type	ECI-63.60-K4-D00	
Nominal voltage ( $U_N$ )	V DC	48
Permissible supply voltage range ( $U_{ZK}$ )	V DC	40 ... 53
Nominal speed ( $n_N$ )	min <sup>-1</sup>	4 000**
Nominal torque ( $M_N$ )	mNm	850**
Nominal current ( $I_N$ )	A	8.6**
Nominal output power ( $P_N$ )	W	356**
Free-running speed ( $n_L$ )	min <sup>-1</sup>	5 800
Free-running current ( $I_L$ )	A	0.6
Max. reverse voltage	V DC	58
Set value input		analog / PWM / frequency / digital
Recommended speed control range	min <sup>-1</sup>	0 ... 5 000
Function for motor protection at stall		thermal
Overload protection		yes
Starting torque ( $M_{max}$ )	mNm	2 600
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x 10 <sup>-6</sup>	57
Heat resistance ( $R_{th}$ )	K/W	2.5
Ambient temperature range ( $T_U$ )	°C	0 ... +40
Motor mass (m)	kg	1.5
Order No. (IP 40)	Wire interface	932 6360 405
Order No. (IP 54)*	Connector interface	932 6360 402

subject to alterations

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

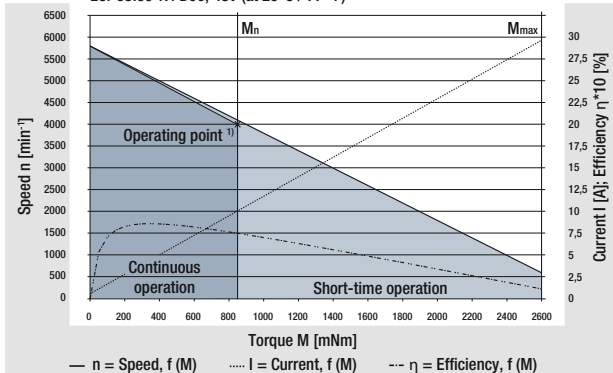
\*\* at  $T_U$  max. 40 °C / 104 °F



$F_{axial}$  150 N  
 $F_{radial}$  150 N  
 $L_1 = 20$  mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  of 20 000 h\*\*

ECI-63.60-K4 D00, 48V (at 25°C / 77° F)

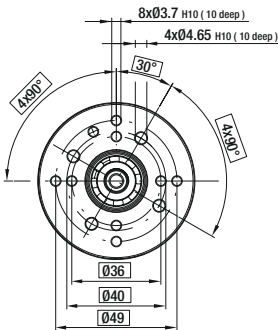


<sup>1)</sup> Nominal data, see table above

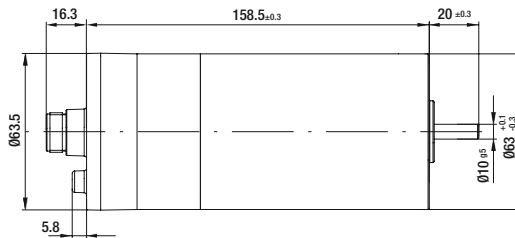
# ECI 63.60

with electronic module K4

**Basic motor**

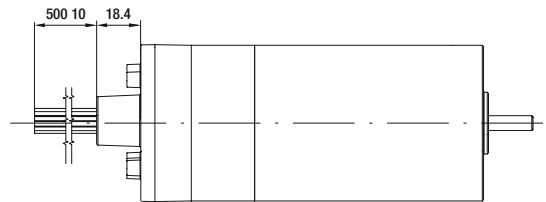


**Connector interface (M16)**



**Wire interface**

(Cable harness must be ordered separately)

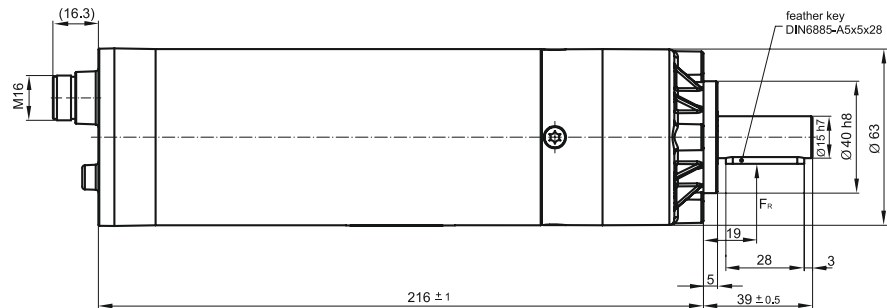
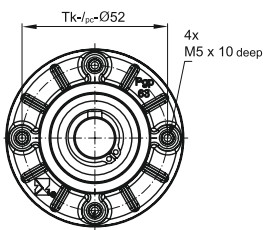


**Gear motors**

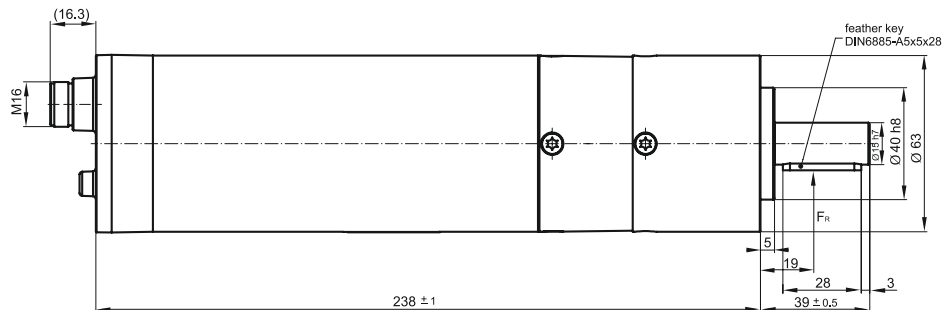
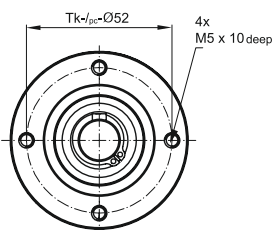
Technical data / product series		ECI-63.60-K4 with Performax® PLUS 63 (preferred type)	
Ratio / number of stages	i / Number of stages	5:1 / 1	30:1 / 2
Nominal voltage-motor	V DC	48	48
Output torque in S1 operation ( $M_{ab}$ )	Nm	3.9	20.6
Nominal output speed ( $n_{ab}$ )	min <sup>-1</sup>	800	133
Output power ( $P_{ab}$ )	W	320	288
Nominal current	A	8.6	8.6
Mass (m)	kg	2.2	2.5
Order No. (IP 40)		942 6360 422	942 6360 423

subject to alterations

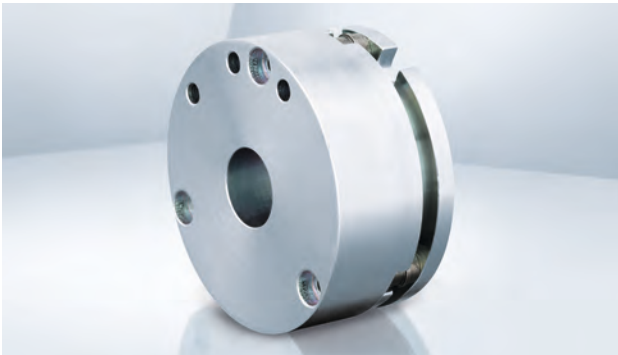
**ECI-63.60-K4 PXP 63.1**



**ECI-63.60-K4 PXP 63.2**



# ECI brake module



- Module installed between basic motor and electronics module
- Holding brake with emergency stop function
- Currentless-operated brake, released electromagnetically
- Braking torque applied by spring force
- Reduced inertia for optimum dynamics

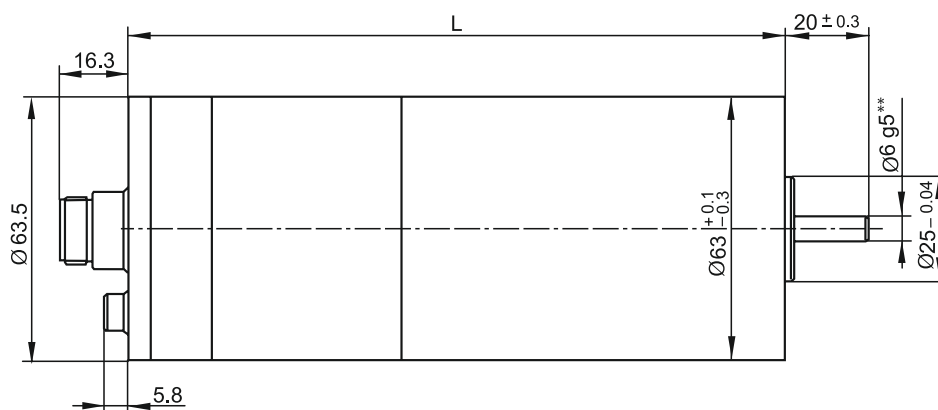
## Nominal data

Type		BFK*
Nominal voltage ( $U_N$ )	V DC	24
Permissible supply voltage range ( $U_{ZK}$ )	V DC	22 – 26
Nominal power ( $P_N$ )	W	10
Braking torque	Nm	1
Closing time	ms	50
Release time	ms	50
Internal version	Protection class	IP 54
Ambient temperature range	°C	0 ... +40
Mass	kg	0.33

subject to alterations

\* Max. 150 emergency stops possible

## ECI-63.XX-K4 with BFK (integrated configuration)

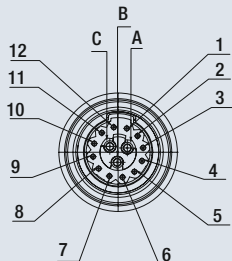


\*\* Ø 8 and Ø 10 mm possible

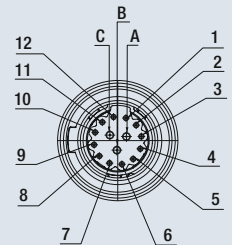
Type	Length L (mm)
ECI-63.20-K4	138.3 ± 0.4
ECI-63.40-K4	158.3 ± 0.4
ECI-63.60-K4	178.3 ± 0.4

# Connection description – K4

## Connector interface ECI-63.XX-K4 (socket on motor)



## Wire interface ECI-63.XX-K4 (socket on motor)



## Cable connection VDC-3-49.15-K4 (mounted)



Power  
AWG 16

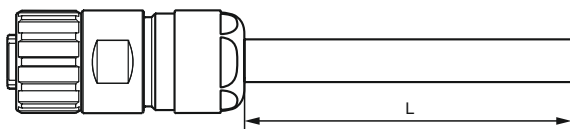
Signal  
AWG 24

	Wire	Pin	Configuration	Function	AWG
Signal	white	1	IN A	NPN 24V	24
	brown	2	IN B	NPN 24V	
	green	3	IN 1	NPN 24V	
	yellow	4	IN 2	NPN 24V / analog 0...10V / brake	
	grey	5	OUT 1	PNP 24V	
	pink	6	OUT 2	PNP 24V	
	blue	7	OUT 3*	PNP 24V	
	red	8	analog IN 1	0...10V (differential)	
	black	9	analog GND	GND for analog IN 1 (differential)	
	violet	10	RS485 A (+)	Progr. bus	
	grey/pink	11	RS485 B (-)	Progr. bus	
	red/blue	12	U <sub>Logic</sub>	Logic power supply + (24V)	
Power	grey	A	Ballast	Ballast resistor	16
	brown	B	U <sub>ZK</sub>	Power supply	
	black	C	GND	Power-/ Signal-GND	

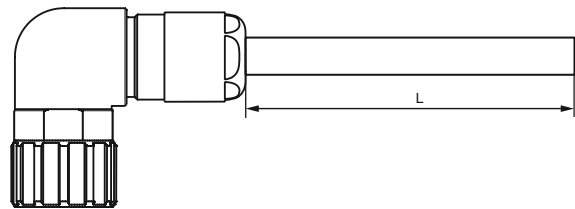
\* Output (OUT 3) is only available on ECI-63.XX-K4

## Connection type for ECI-63.XX-K4

Connector interface – straight connector



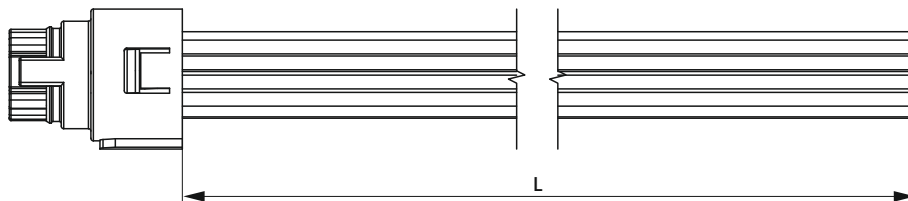
Connector interface – angled connector



Length L	Order No.
1 000 ±30	992 0160 034
3 000 ±30	992 0160 035

Length L	Order No.
1 000 ±30	992 0160 036
3 000 ±30	992 0160 037

Wire interface



Length L	Order No.
500 ±5	992 040 0001

# Overview of gearbox types



				<b>Performax® Plus 63.1</b> <b>i = 5:1</b>	<b>Performax® Plus 63.2</b> <b>i = 30:1</b>
				<b>Order No.</b>	<b>Order No.</b>
VDC	24 V	K4	VDC-3-49.15-K4 B00 (24V)	947 4915 420	947 4915 421
	48 V	K4	VDC-3-49.15-K4 D00 (48V)	947 4915 422	947 4915 423
ECI	24 V	K4	ECI-63.20-K4 B00 (24V)	942 6320 420	942 6320 421
			ECI-63.40-K4 B00 (24V)	942 6340 420	942 6340 421
	48 V	K4	ECI-63.20-K4 D00 (48V)	942 6320 422	942 6320 423
			ECI-63.40-K4 D00 (48V)	942 6340 422	942 6340 423
			ECI-63.60-K4 D00 (48V)	942 6360 422	942 6360 423

## Compact Performax® Plus gearbox with K4 motor – The energy-efficient drive solution with drive

The high-performance Performax® Plus planetary gearbox is a technologically outstanding expansion to the Performax® product series and extends the power range to include applications that need particularly high output powers. It is perfectly suited for use in raw, challenging conditions and impresses with its extremely high torques and extra robust design. With nearly twice as much torque, achieved through larger tooth widths in the input stage and ring gear toothing made from hardened steel in the output stage, the Performax® Plus gearboxes pack a real punch.

The level of performance that characterises the entire Performax® series is based on a design solution in which ebm-papst ZEITLAUF makes best use of the construction space available in the gearbox.

Radially mounting the individual housing components makes the maximum useable diameter available for the ring gear toothing. Solutions with axial mounting, as used by many competitors, limit the space available for the toothing. This means that only a relatively small ring gear diameter is possible, therefore only allowing limited loads to be transferred. In gear reductions, too, the Performax® series is leading the way in technology. Gear reductions of up to 17:1 in a single stage are unique performance criteria in the drive market, with maximum power yield in minimal space. In addition, the gear reductions can be staged harmoniously and purposefully divided more finely, above all in the small reductions range. The ideally suited HRL radial load stage also allows extra high radial loads to be absorbed. Depending on the output speed, it can convey centrifugal forces of up to 2,000 N.

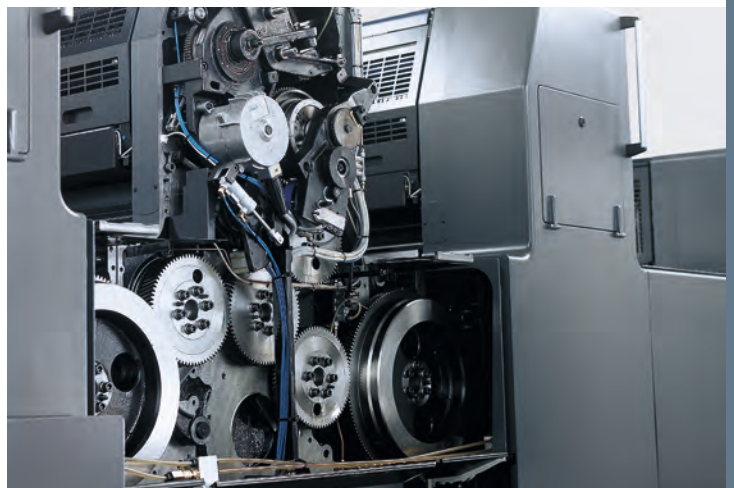


## A versatile solution



### The K4 can do almost anything ...

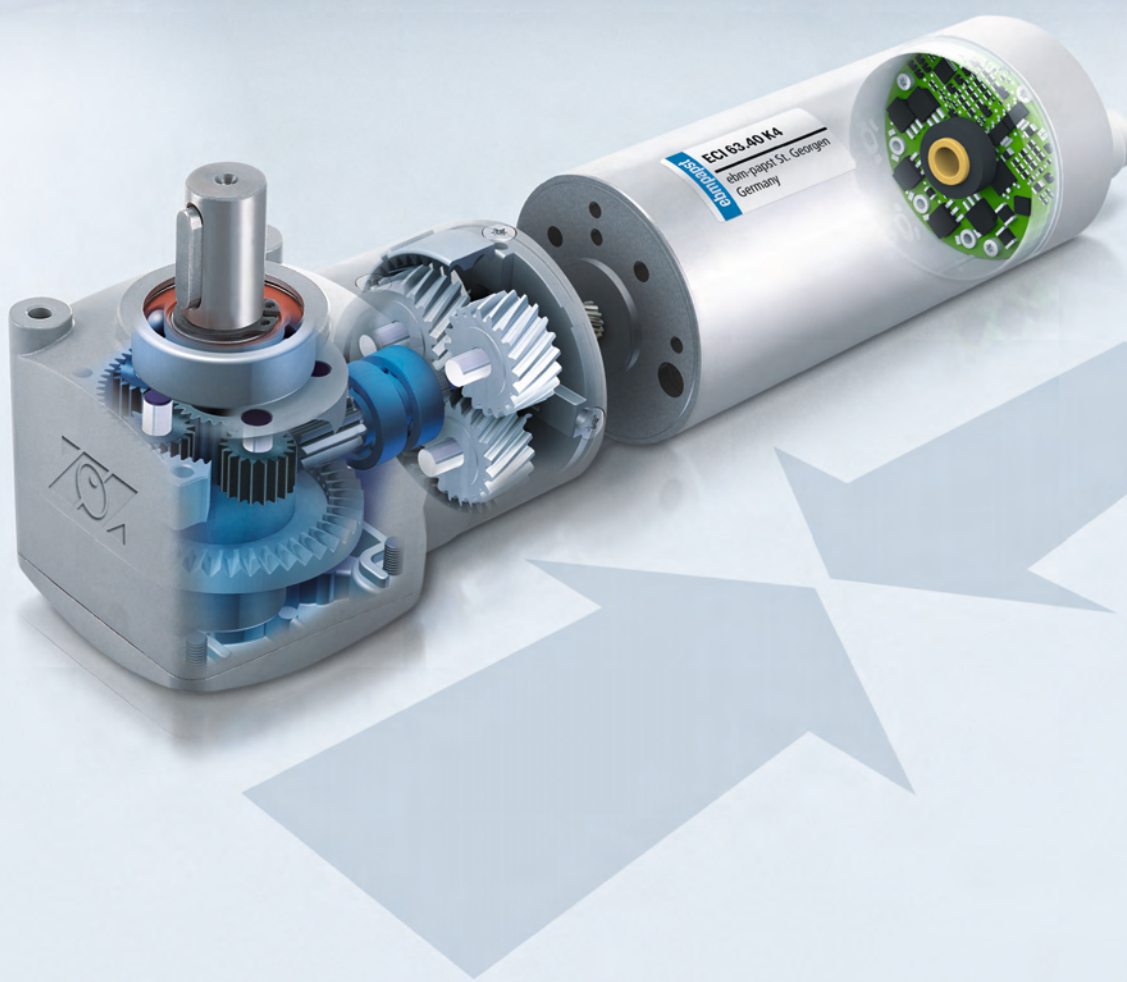
- Medical technology (pump drives, various lifting and adjusting equipment)
- Textile technology (various winding or spool drives)
- Intralogistics systems (conveyor, storage and sorting systems)
- Industrial automation
- Packaging technology



# Notes



Better together.



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2013

What happens when two strong partners join forces together? In the best case, unmatched synergies, like those resulting from the integration of drive specialist Zeitlauf GmbH antriebstechnik & Co KG in the ebm-papst Group. Together, we offer you optimised drive solutions consisting of gearbox, motor and software-based control system. What do you gain from this? Even greater options and system expertise in drive engineering – and all from a single source! Visit our website: [www.ebmpapst.com](http://www.ebmpapst.com)

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