Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Contact us

VDC-3-49.15-K4
ECI-63.XX-K4

Operating manual

ebmpapst
The engineer's choice

GREEN
TECH

Imprint

Dated 2015-02

Disclaimer

Contents of the operating manual

This operating manual has been compiled with the greatest possible care. Nonetheless, ebm-papst does not provide any guarantee for the up-to-dateness, correctness, completeness or quality of the information provided. Liability claims against ebm-papst, which relate to material or non-material damage or losses, and which were caused by use or non-use of the information provided or by use of incorrect and incomplete information, are excluded, provided ebm-papst is not verifiably culpable of deliberate or grossly negligent act.

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Use

The safety regulations must be noted and followed when using the motors. Read through this operating manual carefully, before you start working on the drive system. Please note and follow the hazard signs and warnings to avoid personal risk and malfunctions.

This operating manual is to be treated as part of the drive system.
If the drive system is sold or passed on the operating manual must be handed over with it.

Copies can be made of the safety, assembly and installation instructions and passed on for the purpose of informing about potential hazards and their prevention.

Subject to change without notice.

The respective current version of this operating manual is available on the ebm-papst internet site: www.ebmpapst.com

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1 Introduction

1.1 Foreword

This operating manual describes the possible uses, the assembly and/or installation, operation and programming of the products listed on the front page.

All the safety instructions listed under Chapter 2 must be followed at all times during the installation and operation of the drive system; outside of Germany the relevant laws, directives, guidelines and regulations of the respective country also apply.

Read through this operating manual carefully before starting any work on the drive system. Note and follow the following warnings in order to avoid personal risk or product malfunctions.

This operating manual is to be thought of and handled as part of the drive system and must be handed over with the drive system if it is sold or passed on.

The safety instructions can be copied and passed on to provide information about potential hazards and their prevention.

Depending on the version or revision status of the products, differences may exist compared to this operating manual. The user must check this before using the manual and take into account any such differences.

1.2 Target group

This operating manual is solely directed at qualified and trained skilled personnel with knowledge of electronics and mechanics.

1.3 Notation used in this document

In this operating manual the significance of texts is denoted by different presentation forms.

Descriptive text is presented without preceding symbol.

- Text with a preceding dot (•) indicates a list which is introduced by a heading.
    - Text with a preceding dash (–) is on a lower level below the list with a dot.

Underlined blue text denotes a cross-reference, which can be clicked in the PDF document. The part of the document named in the text is then displayed.

```
Text in Courier font
```
is used to represent command sequences in software programs.

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1.4 Warnings and notes

Warnings and notices are always positioned before the instruction, implementation of which can result in a hazard or property damage.

The following **warnings** are used in this document:

DANGER

Hazard.

This notice denotes a hazard with high risk, which will result in imminent fatality or serious physical injuries if it is not avoided.

▶ This arrow indicates the appropriate precaution to take to avert the hazard.

WARNING

Hazard.

This notice denotes a hazard with moderate risk, which can possibly result in fatality or serious physical injuries if it is not avoided.

▶ This arrow indicates the appropriate precaution to take to avert the hazard.

CAUTION

Hazard.

This notice denotes a hazard with low risk, which can result in minor or moderate physical injuries or property to damage if it is not avoided.

▶ This arrow indicates the appropriate precaution to take to avert the hazard.

Notices contain information, which are particularly important in the corresponding position or which facilitate the described operating steps, are highlighted as follows:

NOTE

This notice gives you use recommendations and helpful tips.

1.5 Picture symbols

The following pictograms, where applicable in combination, are used on the ebm-papst products and packagings as hazard warnings.

General warning.

High voltage sign (Electric shock).

Hot surface warning sign.

Crushing hazard / hand injury warning sign.

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2 Safety Instructions

The VDC-3-49.15-K4 and ECI-63.XX-K4 drive systems have been developed to the latest electronic and electrical engineering standards as well as recognised guidelines for the safety and protection of users.

The drive systems may only be operated and serviced by authorised skilled personnel, who have read through and understood the complete operating manual. The drive systems must be used with the necessary care, in compliance with all safety instructions described in this operating manual and the local company-specific regulations.

Read all safety information and instructions and keep notices and the operating manual in the same place as the drive systems.

2.1   General safety instructions

- Before starting work, disconnect the drive system or the design application using suitable devices provided and secure it against being switched back on again.
- Before opening the units or entering the danger zone, safely bring all drives to a standstill and secure them against being switched back on again.
- Do not make any changes, add attachments or make modifications to the drive system without ebm-papst's approval.
- If the motor is subjected to unapproved loads, check it for damage and if necessary repair or replace it.
- Do not commission or start up the design application until it has been fully checked for compliance with all relevant legal requirements, directives and guidelines and the safety provisions relevant for its intended use (e.g. accident prevention regulations and technical standards).
- Re-assess any safety risks caused by the drive system after it has been installed in the design application.

2.2   Documentation

In addition to this operating manual, the "Kickstart" PC software is required for making settings and parameterisation (configuration) of the motors. The "ebm-papst Kickstart" software manual describes how it functions.

2.3   Standards, guidelines and directives

- The product does not fall under the Low Voltage Directive 2006/95/EC, as the nominal operating voltage is not within the voltage range from 75 V DC and 1500 V DC.
- The Machinery Directive MD is applicable, as the product is "partly completed machinery" in accordance with Article 2, paragraph g), MD 2006/42/EC. A "CE" marking does not have to be provided on the rating plate. However, a Declaration of Incorporation must be drawn up in accordance with Annex II, Part 1, Section B, MD 2006/42/EC.

2.4   Personnel qualifications

- Only qualified electricians may install the drive system and carry out the trial run and work on the electrical system.
- The drive system may only be transported, unpacked, operated and serviced by instructed and authorised skilled personnel.

2.5   Personal safety

- Provide adequate safeguards / contact protection.
- Wear suitable clothing.
- Do not wear loose clothing or jewellery.
- Keep hair, clothing and gloves away from rotating components.
- Wear personal protective equipment (hearing protection, thermal protection gloves).

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2.6   Electrical / electromagnetic safety

- Check the electrical equipment of the drive system regularly.
- Only use cables and connectors approved by ebm-papst.
- Remove defective cables and loose connections immediately.
- Take suitable measures to avoid impermissible electromagnetic interference emissions.
- Take suitable measures against high-frequency EMC radiation.
- Ensure EMC capability in the terminal device / installation state.
- Use control devices to control the electromagnetic radiation.

2.7   Mechanical safety

- Only carry out work when the system / machine is at a standstill.
- Provide adequate cooling of the drive.
- Remove protective devices and guards on the drive system and design application only for the purpose of carrying out repair and assembly work.

2.8   Intended use

- The drives of the VDC-3-49.15-K4 and ECI-63.XX-K4 series are intended for installation in stationary industrial design applications and machines and may only be operated electrically when installed!
- Commissioning or starting up is therefore prohibited until it has been established that the drive system together with the design application, in which the drive is installed, satisfy the safety and protection requirements of the Machinery Directive.
- This product is not intended for consumers! Use in a home environment is not planned, without further testing and deployment of appropriately adapted EMC protection measures!
- The electronic module is an installation product. It is only intended for use within other equipment or units and has no independent function. It is not intended for passing on to end users or consumers.
- All motor - electronic combinations must be qualified by the end manufacturer within their intended application and validated for overload and blocking safety. The application manufacturer is responsible for the end product and must ensure that adequate safety precautions are taken.

2.8.1   Type-related exclusion

Due to its type or design, the drive system must not be used in the following areas of use; this could result in and hazards and equipment damage:

- In case of special fail-safe requirements.
- In aircraft and space vehicles.
- In rail and motor vehicles.
- In boats and ships.
- In potentially explosive atmospheres (EX protection area).
- For operation near flammable materials or components.
- For use as a safety component or for carrying out safety-relevant functions.

2.9 Maintenance / repair

- The control electronics are maintenance-free for the period of the planned life.

- Repairs on the product may only be made by qualified personnel or ebm-papst.

2.10 Cleaning

Damage or malfunction if the unit is cleaned by

- cleaning with a water spray or high-pressure (jet) cleaner.

- Use of acids, alkalis and solvent-based cleaning agents.

- Use of pointed and sharp-edged objects.

2.11 Transport / storage

- Transport the motor only in its original packaging.

- Secure the transport goods.

- Do not exceed the vibration values, temperature and climate ranges during the whole transport (refer to technical data from page 16).

- Store the drive system, dry and protected in its original packaging, in a clean environment.

- Do not store the drive system for longer than 1 year.

- Keep to the specified ambient temperature range (refer to technical data from page 16).

2.12 Disposal

On disposing of the product, note and follow all legal and local regulations and requirements applicable in your country.

2.13 Liability and warranty

ebm-papst GmbH & Co. KG does not accept any liability or provide any warranty whatsoever for incidents due to

- Failure to follow this operating manual.

- Incorrect handling and use of the drive system.

- Improper handling.

- Incorrect storage.

- Unsecured transport.

- Use of accessories and spare parts of other manufacturers without the express and written approval of ebm-papst GmbH & Co. KG.

- Changes to the drive system without the express and written approval of ebm-papst GmbH & Co. KG.

3 Product Description

3.1 Description VDC-3-49.15-K4

The VDC-3-49.15-K4 motor is a 3-phase EC drive with a multi-pole magnetised neodymium magnet. The electronically commuted external-rotor motor has an astonishingly high power density and a compact design. Excellent control action is achieved due to the field-orientated control with sinus commutation. The VDC-3-49.15-K4 has fully integrated control electronics with high-performance DSP and extensive interfaces. This enables particularly flexible control of the drive and the drive can therefore be adapted to different applications. The integrated temperature cut-out provides reliable protection against overload.

Rated wattages from 100 to 150 watt are available to choose from.

3.2 Description of the ECI-63.XX modular system K4

The ECI-63.20-K4, 63.40-K4 and 63.60-K4 motors are EC drives. The Series ECI electronically commutated internal rotor motors excel with large power density and dynamic performance. The ECI-63.XX modular system K4 has fully integrated class 4 control electronics with several analog and digital interfaces. These can be parameterised via an RS485 interface. This enables particularly flexible control of the drive and the drive can therefore be adapted to different applications.

Nominal outputs from 150 to 400 W with corresponding packet lengths from 20 to 60 mm are available to choose from.

3.3 Description of the electronic classes

ebm-papst uses the designation "K class" to describe the functional scope of an ebm-papst motor system. The higher the digit the greater the functional scope. Of the planned classes 1 – 6, to date classes K1, K4 and K5 are in use.

Overview of the electronic classes
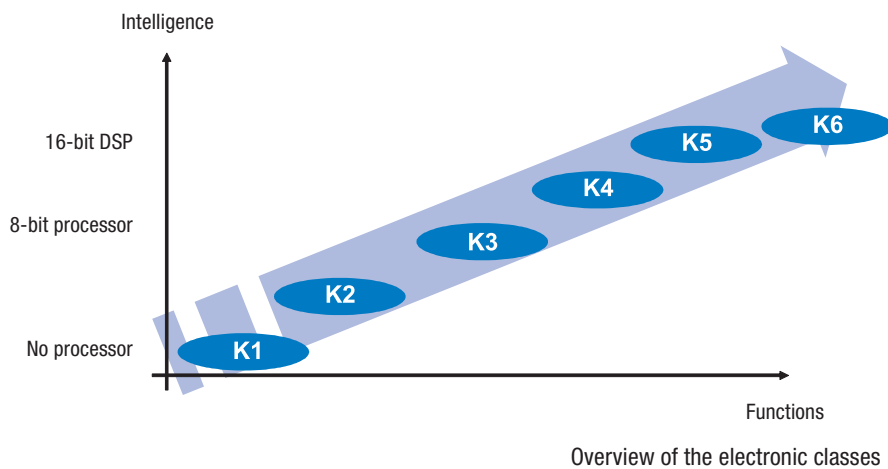
3.3.1 Functional scope of "K classes 1, 4 and 5"

Class	Motor type	Commutation	Function
K1	Motor with rotor position encoder	external	Detection of the rotor position
K4	Motor with enhanced motor control basic features	Sinus commutation with field-orientated control up to n = 0	Speed controller Current controller Position controller
K5	Motor with enhanced motor control	Sinus commutation with field-orientated control up to n = 0	Speed controller Current controller Position controller Enhanced safety functions Bus system, e.g. CANopen, parameterisable Firmware download, etc.

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3.4 Rating plate

The rating plate with the respective features of the ECI-63.XX-K4 and VDC-3-49.15-K4 motors is attached to the housing.

3.4.1 Rating plate ECI-63.XX-K4

	Company logo
	Motor type, ECI = Electronically Commutated Internal Rotor Motor
	Diameter of motor housing = 63 mm
	Overall length
	Electronic class
	Nominal torque
	Nominal speed

ECI 63.20-K4
9326320400

Product No.
Nominal voltage — 24 VDC   425 mNm   4000 U/min — Power consumption
Class of protection — IP 54   E   8,5 A

Thermal class
US-Pat. 7230359B2 — US patent No.
ebm- papst St. Georgen   04/13 — Production date MM/YY
DE (S)   xx

Serial number

Production plant

Country code

3.4.2 Rating plate VDC-3-49.15-K4

Company logo

Product number

ebmpapst   937 4915 400
24 VDC   04/2014   2465 5497

Serial number

Production date MM/YY

Nominal voltage

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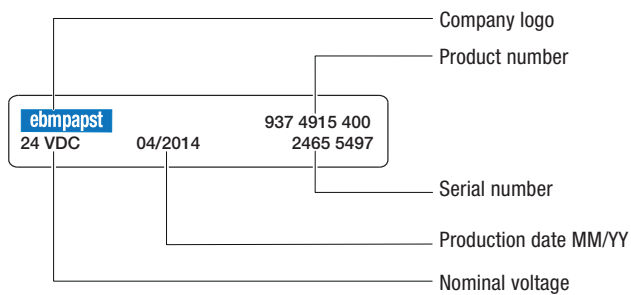
3.5 Basic configuration

In the VDC-49.15-K4 drive system the control electronics (3) is attached on the motor output end (1). The connection cable is preinstalled in the control electronics (3) in the factory. The motor housing on the output shaft (2) is formed as a flange with various drillholes for fixing and attaching the transmission.

In the drive systems of the ECI-63.XX modular system K4 series, the motor housing and control electronics (3) are configured with same diameter. All necessary electrical connections (4) are integrated in the control electronics (3). The motor housing is formed as a flange at the output shaft (2) with various drillholes for fixing and attaching the transmission.
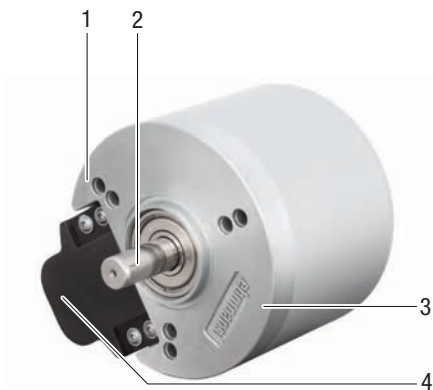
VDC-49.15-K4   **ECI-63.XX-K4**
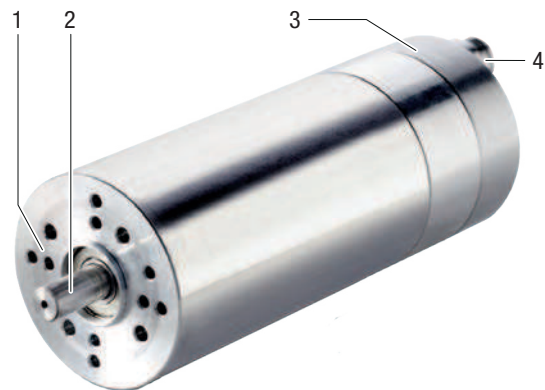
1 Motor output side with fixing option or transmission attachment
2 Output shaft
3 Integrated power and control electronics
4 Power, signal and RS485 link

4 Technical Specifications

This chapter contains the nominal technical data of the following motors:

- ECI-63.20-K4 / ECI-63.40-K4 / ECI-63.60-K4 and
- VDC-3-49.15-K4

and extended technical data for all sizes ().

4.1 ECI-63.20-K4

Nominal data

Type	Unit	ECI-63.20-K4-B00	ECI-63.20-K4-D00
Nominal voltage (U_N)	V DC	24	48
Allowable supply voltage range (U_{ZK})	V DC	20 … 28	40 … 53
Nominal speed (n_N)	rpm	4000	4000
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) (no-load speed)	rpm	5600	6000
Free-running current (I_L) (no-load current)	A	0.50	0.30
Max. reverse voltage	V DC	35	58
Setpoint input	–	Analog / PWM / Frequency / Digital	Analog / PWM / Frequency / Digital
Recommended speed control range	rpm	0 … 5000	0 … 5000
Locked rotor protection	–	thermal	thermal
Protection on overload	–	yes	yes
Starting torque	mNm	1250	1800
Rotor moment of inertia (J_R)	kgm^2 × 10^{-6}	19	19
Thermal resistance (R_{th})	K / W	3.6	3.6
Allowable ambient temperature range (T_U)	°C	0 … +40	0 … +40
Motor mass (m)	kg	0.85	0.85
Order No. (IP 40)	Stranded (litz) wire type	932 6320 403	932 6320 405
Order No. (IP 54)*	Connector type	932 6320 400	932 6320 402

Subject to change without notice

* The degree of protection (IP 54) given refers to the connector type and the installed condition with seal on the flange side.

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

Allowable shaft load at nominal speed and life expectancy L_{10} about 20000 h**

ECI-6320.400-K4 B00, 24V (at 25°C)

— n = Speed, f (M)   ····· I = Current, f (M)   -- η = Efficiency, f (M)

1) Nominal data, see table above

ECI-6320.402-K4 D00, 48V (at 25°C)

— n = Speed, f (M)   ····· I = Current, f (M)   -- η = Efficiency, f (M)

1) Nominal data, see table above

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4.2 ECI-63.40-K4

Nominal data

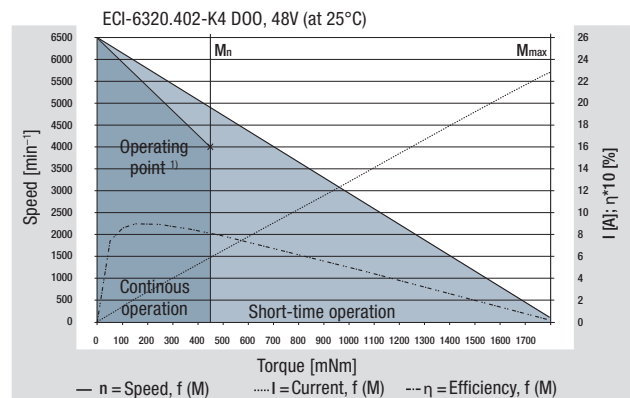| Type	Unit	ECI-63.40-K4-B00	ECI-63.40-K4-D00
Nominal voltage (U_N)	V DC	24	48
Allowable supply voltage range (U_{ZK})	V DC	20 … 28	40 … 53
Nominal speed (n_N)	rpm	4000	4000
Nominal torque (M_N)	mNm	600	750
Nominal current (I_N)	A	12.3	7.2
Nominal output power (P_N)	W	251	314
Free-running speed (n_L) (no-load speed)	rpm	5600	5400
Free-running current (I_L) (no-load current)	A	0.90	0.46
Max. reverse voltage	V DC	35	58
Setpoint input		Analog / PWM / Frequency / Digital	Analog / PWM / Frequency / Digital
Recommended speed control range	rpm	0 … 5000	0 … 5000
Locked rotor protection	–	thermal	thermal
Protection on overload	–	yes	yes
Starting torque	mNm	1300	2700
Rotor moment of inertia (J_R)	kgm^2 × 10^{-6}	38	38
Thermal resistance (R_{th})	K/W	2.9	2.9
Allowable ambient temperature range (T_U)	°C	0 … +40	0 … +40
Motor mass (m)	kg	1.15	1.15
Order No. (IP 40)	Stranded (litz) wire type	932 6340 403	932 6340 405
Order No. (IP 54)*	Connector type	932 6340 400	932 6340 402

Subject to change without notice

* The degree of protection (IP 54) given refers to the connector type and the installed condition with seal on the flange side.

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

Allowable shaft load at nominal speed and life expectancy L_{10} about 20000 h**

ECI-6340.400-K4 B00, 24V (at 25°C)

— n = Speed, f (M)   ····· I = Current, f (M)   --- η = Efficiency, f (M)

[1] Nominal data, see table above

ECI-6340.402-K4 D00, 48V (at 25°C)

— n = Speed, f (M)   ····· I = Current, f (M)   --- η = Efficiency, f (M)

[1] Nominal data, see table above

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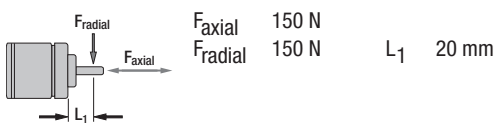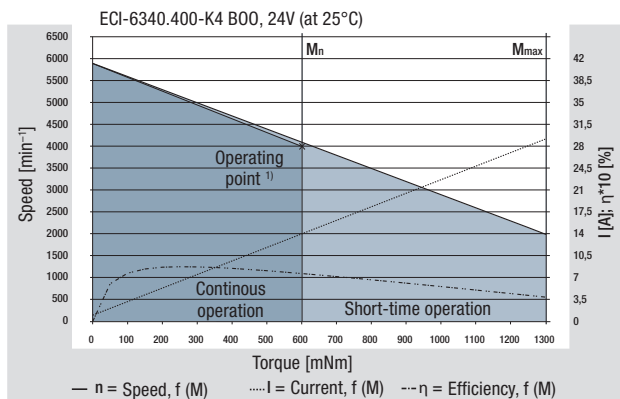
4.3 ECI-63.60-K4

Nominal data

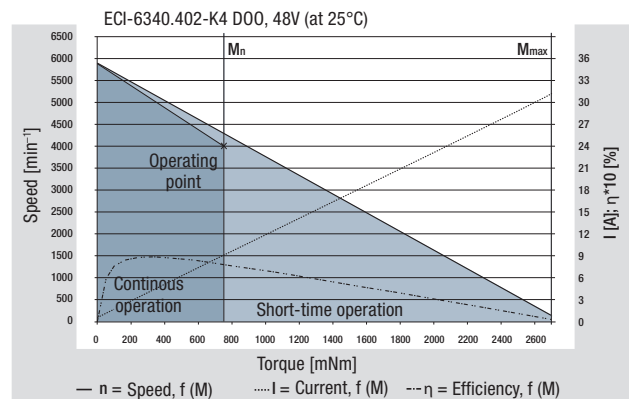| Type	Unit	ECI-63.60-K4-D00
Nominal voltage (U_N)	V DC	48
Allowable supply voltage range (U_{ZK})	V DC	40 … 53
Nominal speed (n_N)	rpm	4000
Nominal torque (M_N)	mNm	850
Nominal current (I_N)	A	8.6
Nominal output power (P_N)	W	356
Free-running speed (n_L) (no-load speed)	rpm	5800
Free-running current (I_L) (no-load current)	A	0.60
Max. reverse voltage	V DC	58
Setpoint input		Analog / PWM / Frequency / Digital
Recommended speed control range	rpm	0 … 5000
Locked rotor protection	−	thermal
Protection on overload	−	yes
Starting torque	mNm	2600
Rotor moment of inertia (J_R)	$kgm^2 \times 10^{-6}$	57
Thermal resistance (R_{th})	K/W	2.5
Allowable ambient temperature range (T_U)	°C	0 … +40
Motor mass (m)	kg	1.5
Order No. (IP 40)	Stranded (litz) wire type	932 6360 405
Order No. (IP 54)*	Connector type	932 6360 402

Subject to change without notice

* The degree of protection (IP 54) given refers to the connector type and the installed condition with seal on the flange side.

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

Allowable shaft load at nominal speed and life expectancy L_{10} about 20000 h**

ECI-6360.402-K4 D00, 48V (at 25°C)

— n = Speed, f (M)   ····· I = Current, f (M)   --- η = Efficiency, f (M)
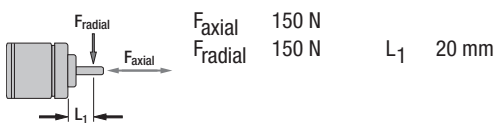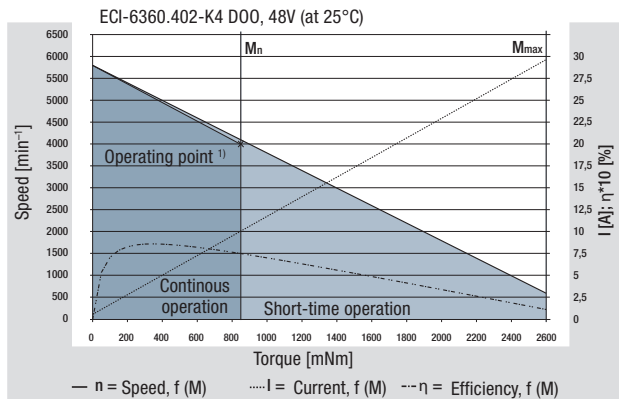
[1] Nominal data, see table above

i NOTE Extended technical data is available on request.

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4.4 VDC-3-49.15-K4

Nenndaten

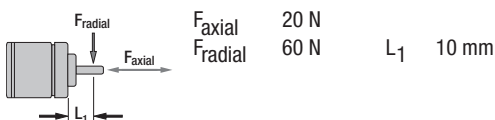| Typ	Unit	VDC-3-49.15-K4 B00	VDC-3-49.15-K4 D00
Nominal voltage (U_N)	V DC	24	48
Allowable supply voltage range (U_{ZK})	V DC	20 … 28	40 … 53
Nominal speed (n_N)	rpm	4000	4000
Nominal torque (M_N)	mNm	235	300
Nominal current (I_N)	A	5	3,2
Nominal output power (P_N)	W	100	125
Free-running speed (n_L)	rpm	5000	5000
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	rpm	0 … 4500	0 … 4500
Function for motor protection at stall		thermal	thermal
Overload protection		yes	yes
Starting torque	mNm	850	1500
Rotor moment of inertia (J_R)	$kgm^2 \times 10^{-6}$	108	108
Ambient temperature range (T_U)	°C / °F	0 … +40 / -22 … +104	0 … +40 / -22 … +104
Motor mass (m)	kg	0.56	0.56
Order No. (IP 54)*		937 4915 400	937 4915 402

Subject to change without notice

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

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

Allowable shaft load at nominal speed and life expectancy L_{10} about 20000 h**

VDC-3-49.15-K4 B00, 24V (at 25°C)

— n = Speed, f (M)   ⋯ I = Current, f (M)   --- η = Efficiency, f (M)

[1] Nominal data, see table above

VDC-3-49.15-K4 D00, 48V (at 25°C)

— n = Speed, f (M)   ⋯ I = Current, f (M)   --- η = Efficiency, f (M)

[1] Nominal data, see table above

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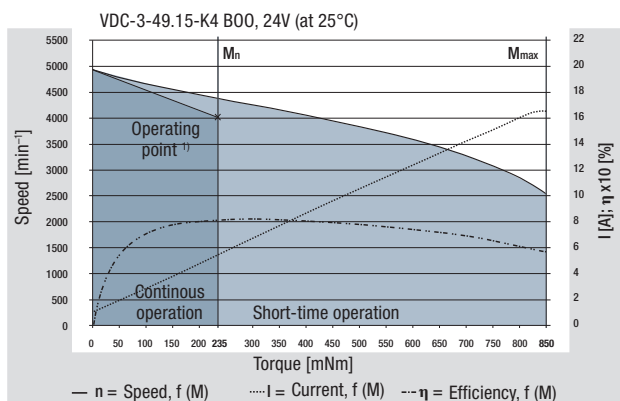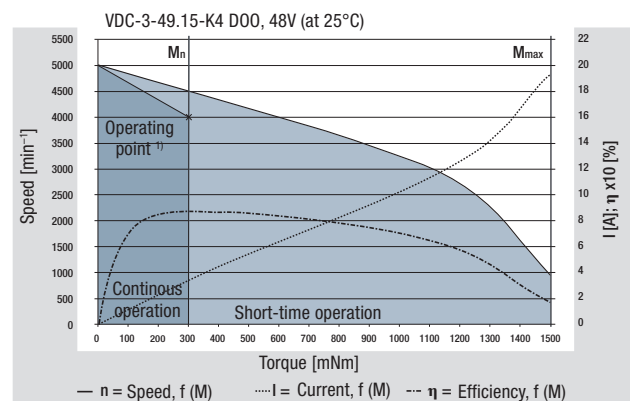
4.5 Electronic properties

Inputs IN A, IN B

Properties	Unit	Value / Comment
Input level	–	PLC level
Low level	V	< 5
High level	V	> 15
Protection against polarity reversal and voltages	V	≤ 30
if case of cable break	–	Logic level "0"
Input impedance	kΩ	5.4
Input frequency	kHz	≤ 10
Input dynamic (Tau)	ms	≤ 0.1
Applied logic level	–	IN A = B = 0 = output stage switched off, FK 5 IN A or B = 1 = output stage switched on
Subject to change without notice		

Inputs IN 1, IN 2

Properties	Unit	Value / Comment
Input level	–	PLC level
Low level	V	< 5
High level	V	> 15
Protection against polarity reversal and voltages	V	≤ 30
if case of cable break	–	Logic level "0"
Input impedance	kΩ	5.4
Maximum input frequency for command source via PWM / frequency	kHz	15
Input dynamic (Tau)	ms	≤ 0.1
Subject to change without notice		

Outputs (PNP)

Properties	Unit	Value / Comment
Output level	–	High side driver dependent on U_{Logic} (logic supply)
Low level	V	Open source
High level	V	> U_{Logic} - 2
Protection against polarity reversal and voltages	V	≤ 30
Output current / channel	mA	≤ 100
Peak output current / channel	A	approx. 600 mA (thermally dependent)
Short-circuit proof	–	yes
Polarity reversal protection	–	no
Overload protected	–	yes (automatic thermal cut-out)
Output frequency @ I_{out} = 100 mA	kHz	≤ 1
Subject to change without notice		

Analog inputs "Analog IN 1…2" (signal connector, differential to GND$_{Analog}$)

Properties	Unit	Value / Comment
Input voltage range (analog IN)	V	0 to 10
GND reference (differential measurement)	–	Analog GND
Input frequency	kHz	≤ 1
Internal resistance	kΩ	8
Signal resolution	bit	10
Measuring tolerance (relative to the end value 10 V)	%	≤ 2
Protection against polarity reversal and voltages	V	≤ 28
Subject to change without notice		

RS485 bus interface

Properties	Unit	Value / Comment
Functional scope	–	–
Baud rate	kbit/s	115
Dielectric strength	V	-8 V to +13 V
Internal bus termination	ohm	12k
Subject to change without notice		

Safety and monitoring functions

Properties	Unit	Value / Comment
Functional scope	–	• Temperature monitoring of the output stage • Under and overvoltage monitoring of the system voltages incl. U$_B$ overcurrent limitation • Overload protection through I²t
Temperature cut-out point output stage (PC software) (Hysteresis: 10 K), Error must be acknowledged again by means of software	°C	120
U$_{ZK}$ overvoltage cut-out (Hardware, hysteresis: 1V)	V	63
U$_{ZK}$ undervoltage auto restart (software, cut-off U$_{Logic}$ at 16V), The error must be acknowledged.	V	18
Overload protection I²t (software)	–	yes
Hardware overcurrent protection circuit as max. current per winding limitation	A	45 for VDC-3-49.15-K4 53 for ECI-63.XX-K4
Resolution of single turn absolute encoder	Bit / revolution	10 (accuracy approx. 3°)
Subject to change without notice		

5 Installation

This chapter describes the mechanical and electrical connection of the drive systems.

5.1 Notes

The drives must be checked for visible damage before installation. Damaged drive system must not be installed.
The drives must be fixed onto a flat surface with at least 4 screws. The screws must be secured with suitable measures against loosening.
Use thread-forming screws to DIN 7500 for the fixing.

5.2 Installing the drive

⚠ CAUTION

Risk of damage!

When the drives are installed in the motor housing it can be damaged by high radial loads, if the tightening torque applied to the fixing screws is too high or if the fixing screws are too long.

▶ Do not load the motor shaft, either radially or axially, with more than 150 N (ECI-63.XX-K4).
▶ Do not load the motor shaft radially with more than 60 N and axially with more than 20 N (VDC-49.15-K4).
▶ Tighten fixing screws M4 with $3^{\pm0.2}$ Nm maximum, M5 with $4^{\pm0.2}$ Nm maximum.
▶ Do not exceed the specified maximum length of the fixing screws (see Chapter "5.2.1 Determine screw length").

⚠ CAUTION

Risk of damage to electronic components!

The discharge of static charge during installation of the drives can damage the electronic component.

▶ Use ESD protective equipment during installation.

5.2.1 Determine screw length

A minimum screw length S_{min} is required for safe and reliable fixing of the motors.
The maximum allowable screw length S_{max} prevents damage to the motor.

Minimum screw length $S_{min} =$
Minimum depth of engagement E_{min} 6.5 mm + material thickness X of the mounting plate.

Maximum screw length $S_{max} =$
Maximum depth of engagement E_{min} 8.0 mm + material thickness X of the mounting plate.
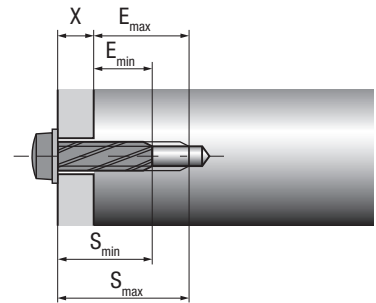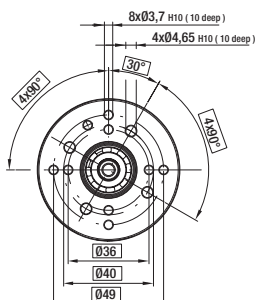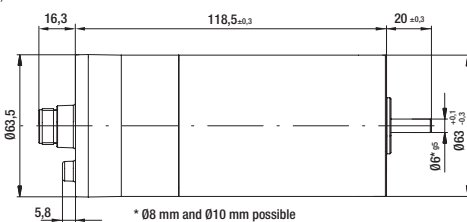

5.2.1 Technische Zeichnungen

ℹ NOTE

Only use the drillholes on the output side of the motors housing to fix the drive. To this end, transfer the necessary drillholes for the pitch circle and size of the fixing holes onto the mounting plate and drill (see sketch).
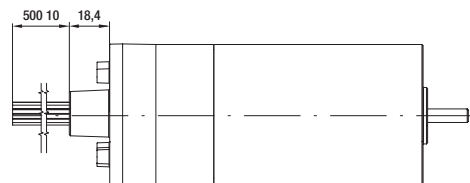
ECI-63.20-K4

Connector type (M16)

* Ø8 mm and Ø10 mm possible

Stranded (litz) wire type
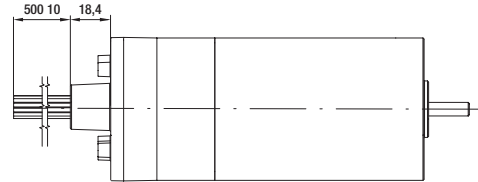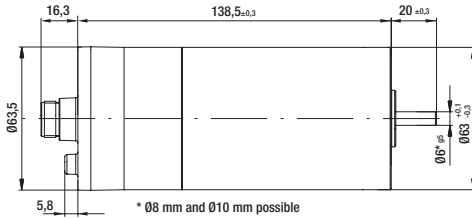(Cable harness must be ordered separately)

ebmpapst

ECI-63.40-K4

Connector type (M16)

Stranded (litz) wire type
(Cable harness must be ordered separately)

8xØ3,7 H10 (10 deep)
4xØ4,65 H10 (10 deep)
30°
4x90°
4x90°
Ø36
Ø40
Ø49

16,3
138,5±0,3
20 ±0,3
Ø63,5
Ø6*
Ø63 +0,1 -0,3
5,8
* Ø8 mm and Ø10 mm possible

500 10
18,4

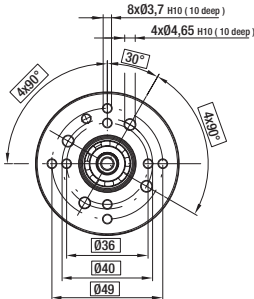## ECI-63.60-K4

Connector type (M16)

Stranded (litz) wire type
(Cable harness must be ordered separately)

8xØ3,7 H10 (10 deep)
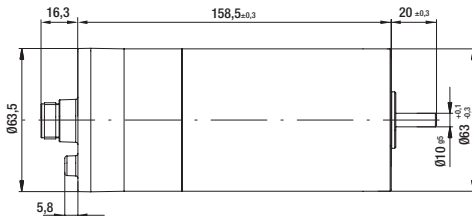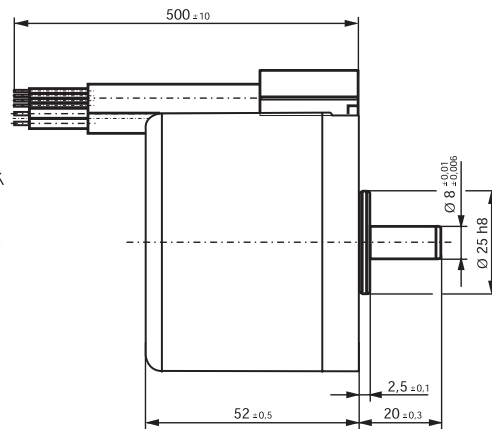4xØ4,65 H10 (10 deep)
30°
4x90°
4x90°
Ø36
Ø40
Ø49

16,3
158,5±0,3
20 ±0,3
Ø63,5
Ø10 ±5
Ø63 +0,1 -0,3
5,8

500 10
18,4

VDC-3-49.15-K4

500 ± 10
44,65 ±0,5
Ø 3,7*
3 X 120°
Ø 40
Ø 50
Ø 63 ±0,2
Ø 8 +0,01 +0,006
Ø 25 h8
2,5 ±0,1
52 ±0,5
20 ±0,3
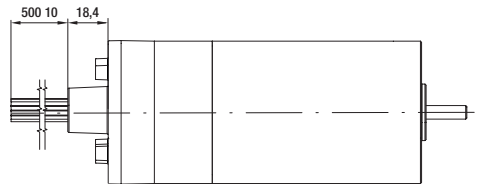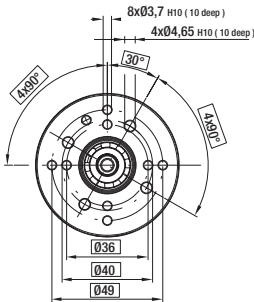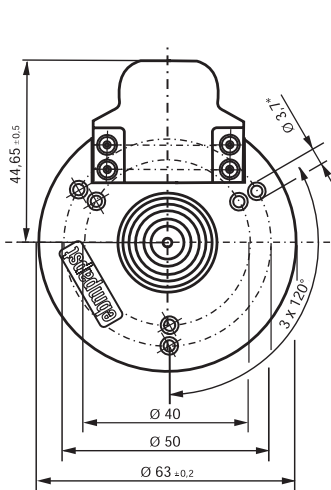
Tapped blind holes for thread-forming screws in accordance to DIN 7500.

max. screw depth 9,5 mm

max. screw-in torque 3 Nm

Protective cap in aluminium natural.

5.3 Electrical connection

The connection cable for the **VDC-3-49.15-K4** drive system is attached to the motor in the factory, no additional plugs are required for the electrical connection and parameter setting.

The following is required for the electrical connection and parameter setting of the **ECI-63.XX-K4** drive system:

1 Connection cable with 15 pin connector M16 (not for the Litz wire (stranded wire) variant of the **ECI-63.XX-K4**.

1 ebm-papst USB-CAN-RS485 adapter (screw terminal adapter board to the D-SUB 9 connection, USB connection cable to the PC).

1 ebm-papst "Kickstart" PC software.

> ⚠️ **DANGER**
>
> **Health hazard!**
> The drive systems are installed in design applications in which electrical and electromagnetic components are used. These can affect pacemakers, metallic implants or hearing aids and cause severe personal harm.
> ▶ Avoid the immediate vicinity, especially areas identified by the warning symbol 🚫, if you have a pacemaker, metal implants or wear a hearing aid.

> ℹ️ **NOTE**
>
> • The drive systems are built-in parts and do not have any electrical disconnecting switches.
> • Connect the product to suitable electrical circuits only. Please note that the power supply units must have suitable protection against regenerative voltage generated on the secondary side.
> • When working on the drive system the system / machine must always be disconnected from the power supply and secured against being switched back on again.

5.3.1 Safety check

Before connecting the drive system, check:

• Supply voltage and product voltage identical?

• Does the rating plate data match the connection data of the power supply unit?

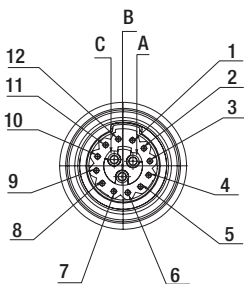• Connection cable suitable for the current intensity and the ambient conditions and area of use?

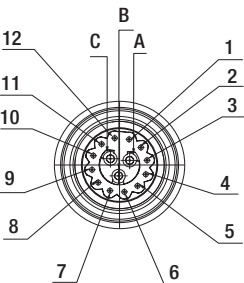## 5.3.1   Pin assignment of the connector and Litz wire version

NOTE

- The connection cable of the VDC-3-49.15-K4 motors is pre-installed on the motor in the factory.
- The connection cable with connector is available for the ECI-63.XX-K4 only. The ECI-63.XX-K4 motors have a 15 pin connector M16 (12+3) on the motor. This is used for the connection of a connector variant connector cable or for the separately supplied cable harness of the Litz wire variant.

A standard cable with classification CF-C11Y (3 x 1.5 mm² / 12 x 0.34 mm²) and connector M16 is required for connection of the motor.
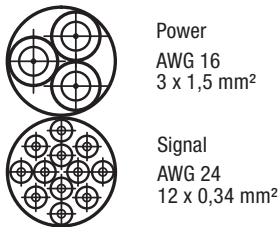1 m and 3 m cable lengths are available for the connection.

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

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

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

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

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

Power
AWG 16
3 x 1,5 mm²

Signal
AWG 24
12 x 0,34 mm²

Cable: CF-C11Y (3 x 1,5 mm² / 12 x 0,34 mm²)
Shielding: Complete shield

L = 1 000 mm ±30
    3 000 mm ±30

Crimp insert series M16
15-pin (12 + 3)

Cable plug-in connector M16
for cable Ø 8 – 11 mm