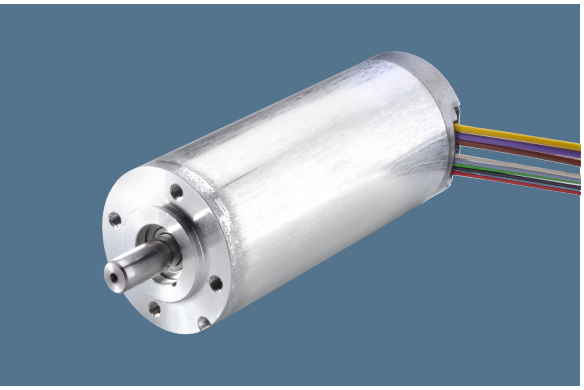
ECI-motor

ECI-42.20



- Highly dynamic 3-phase internal rotor motor in EC technology
- Multi-pole motor design for optimum power density
- Aluminium housing
- Robust ball bearing system for long service life
- Basic motor with electronics module K1 for operation with external drive electronics
- low cogging torque

Nenndaten

Typ		ECI-42.20 B00	ECI-42.20 D00
Nominal voltage (U_{BN})	V DC	24	48
Nominal speed (n_N) (controlled)	min^{-1}	4000	4000
Nominal torque (M_N)	mNm	110	110
Nominal current (I_{BN})	A	2,5	1,3
Nominal output power (P_N)	W	46	46
Speed at no-load operation (n_L)	min^{-1}	6500	6500
No-load current (I_{BL})	A	0,2	0,1
Short-term permiss. peak torque (M_{max})	mNm	480	480
Permiss. peak current, motor lead (I_{max})	A	14	7
Induced voltage (U_{max})	V/1000 min^{-1}	3,39	8,49
Terminal resistance (R_V)	Ω	0,9	3,25
Terminal inductance (L_V)	mH	1,1	4,5
Rotor moment of inertia (J_R)	kgm^2x10^{-6}	3,42	3,42
Protection class		IP 40	IP 40
Ambient temperature range (T_U)	°C	0...+40°C	0...+40°C
Motor mass (m)	kg	0,33	0,33
Order No.		932 4220 122	932 4220 123

F_{axial} 30 N
F_{radial} 75 N L_1 20 mm

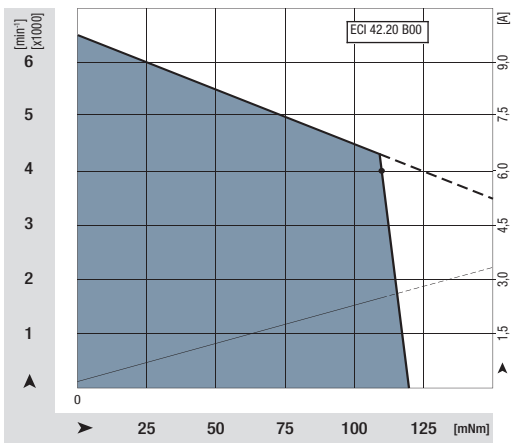
Permissible shaft load at nominal speed and life expectancy L_{10} at 20 000 h (at T_U max. 40°C).

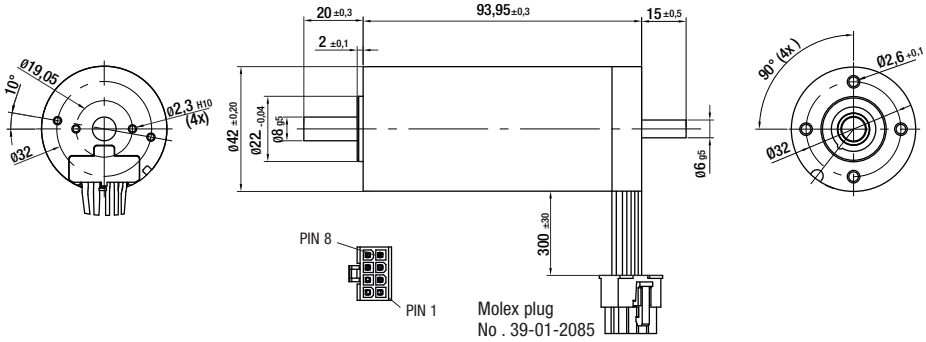
Signal line

No.	Colour	Function
4	green	Hall A
3	white	Hall B
8	grey	Hall C
2	red	UB
7	black	Gnd

Winding input lead

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

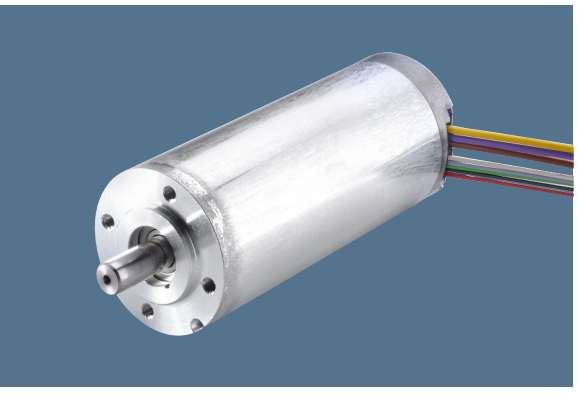




ebmpapst

ECI-motor

ECI-42.40



- Highly dynamic 3-phase internal rotor motor in EC technology
- Multi-pole motor design for optimum power density
- Aluminium housing
- Robust ball bearing system for long service life
- Basic motor with electronics module K1 for operation with external drive electronics
- low cogging torque

Nenndaten

Typ		ECI-42.40 B00	ECI-42.40 D00
Nominal voltage (U_{BN})	V DC	24	48
Nominal speed (n_N) (controlled)	min^{-1}	4000	4000
Nominal torque (M_N)	mNm	220	220
Nominal current (I_{BN})	A	5,1	2,6
Nominal output power (P_N)	W	92	92
Speed at no-load operation (n_L)	min^{-1}	6500	6500
No-load current (I_{BL})	A	0,4	0,2
Short-term permiss. peak torque (M_{max})	mNm	960	960
Permiss. peak current, motor lead (I_{max})	A	21	10,5
Induced voltage (U_{max})	V/1000 min^{-1}	4,41	8,38
Terminal resistance (R_V)	Ω	0,49	1,5
Terminal inductance (L_V)	mH	0,5	1,84
Rotor moment of inertia (J_R)	kgm^2x10^{-6}	6,7	6,7
Protection class		IP 40	IP 40
Ambient temperature range (T_U)	°C	0...+40°C	0...+40°C
Motor mass (m)	kg	0,48	0,48
Order No.		932 4240 122	932 4240 123

F_{axial} 30 N
F_{radial} 75 N L_1 20 mm

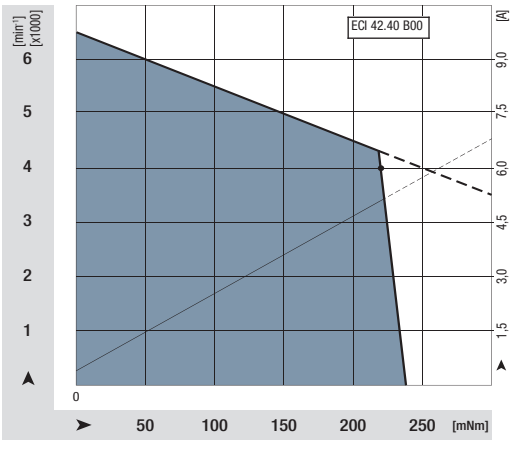
Permissible shaft load at nominal speed and life expectancy L_{10} at 20 000 h (at T_U max. 40°C).

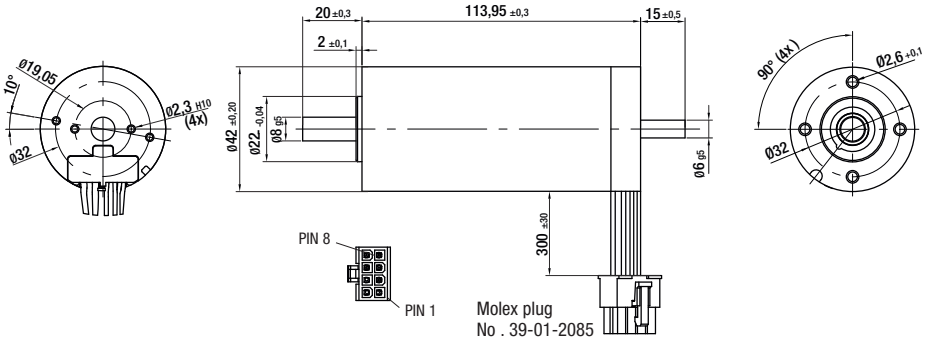
Signal line

No.	Colour	Function
4	green	Hall A
3	white	Hall B
8	grey	Hall C
2	red	UB
7	black	Gnd

Winding input lead

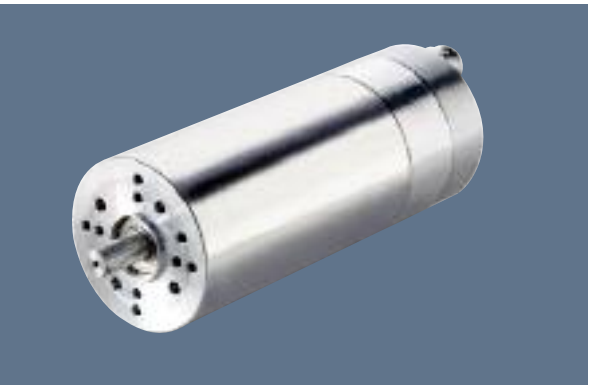
No.	Colour	Function
1	yellow	W
5	violet	V
6	brown	U





ECI 63.20

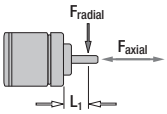
with electronic module K4



- 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
- Field oriented control
- 15-pin connector (M16)
- User friendly parameterisation via PC-Software “Kickstart” possible

Nominal data

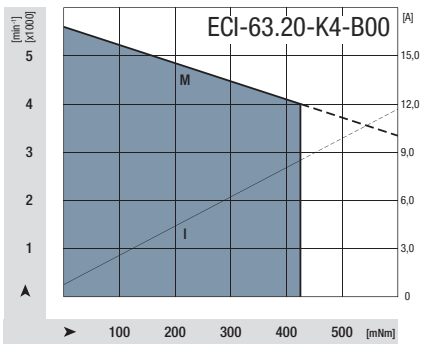
Type		ECI-63.20-K4-B00	ECI-63.20-K4-D00
Nominal voltage (U_N)	V DC	24	48
Permissible supply voltage range (U_{ZK})	V DC	20 ... 28	40 ... 53
Nominal speed (n_N)	min^{-1}	4 000	4 000
Nominal torque (M_N)	mNm	425	450
Nominal current (I_N)	A	8.5	5.4
Nominal output power (P_N)	W	178	188
Free-running speed (n_L)	min^{-1}	5 600	6 000
Free-running current (I_L)	A	0.5	0.3
Max. reverse voltage	V DC	35	58
Set value input		analogue/PWM/frequency/digital	analogue/PWM/frequency/digital
Recommended speed control range	min^{-1}	0 … 5 000	0 ... 5 000
Function for motor protection at stall		thermally	thermally
Overload protection		yes	yes
Starting torque	mNm	3.5 x M_N	4.2 x M_N
Rotor moment of inertia (J_R)	kgm^2x10^{-6}	19	19
Thermal resistance (R_{th})	K/W	3.6	3.6
Protection class		IP 40 / IP 54*	IP 40 / IP 54*
Ambient temperature range (T_U)	°C	0 … +40	0 … +40
Motor mass (m)	kg	0.85	0.85
Order No. (ECI-63.20-K4-S)	Connector interface	932 6320 400	932 6320 402
Order No. (ECI-63.20-K4-L)	Wire interface	932 6320 403	932 6320 405

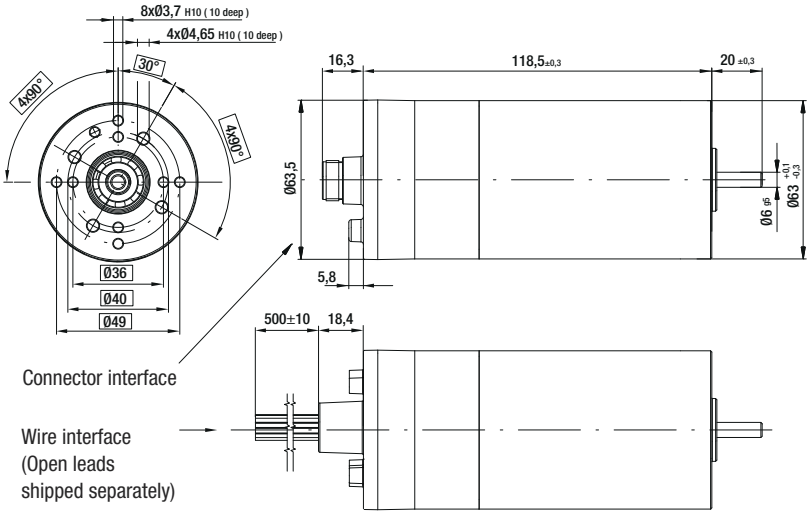


F_{axial} 150 N
F_{radial} 150 N L_1 20 mm

Permissible shaft load at nominal speed and life expectancy
L_{10} at 20 000 h (at T_U max. 40°C)

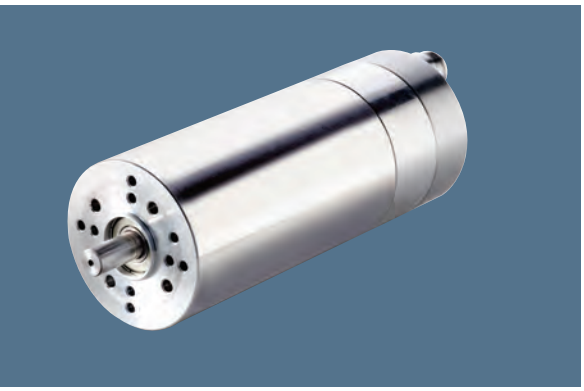
* Ingress Protection class (IP 54) refers to connector interface with sealing on the flange side





ECI 63.40

with electronic module K4

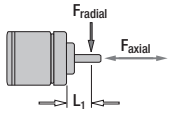


- Drive with completely integrated 4Q drive- and control electronics K4
- Speed-, position- or torque mode possible
- Selection of operation mode and parameterisation via RS485
- Extensive interface with numerous inputs and outputs
- Release of powerstage via digital input „hardware enable“
- Integrated brake chopper function
- Speed command signal from n = 0 with holding torque until 5 000 rpm possible
- Field oriented control
- 15-pin connector (M16)
- User friendly parameterisation via PC-Software “Kickstart” possible

Nominal data

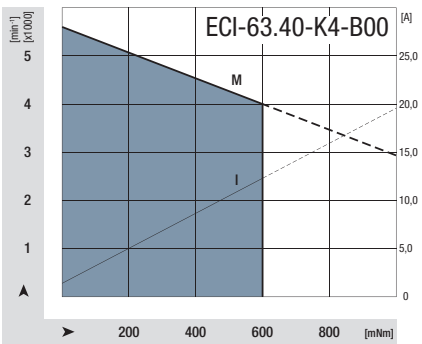
Type		ECI-63.40-K4-B00	ECI-63.40-K4-D00
Nominal voltage (U_N)	V DC	24	48
Permissible supply voltage range (U_{ZK})	V DC	20 ... 28	40 ... 53
Nominal speed (n_N)	min^{-1}	4 000	4 000
Nominal torque (M_N)	mNm	600	750
Nominal current (I_N)	A	12.3	7.2
Nominal output power (P_N)	W	251	314
Free-running speed (n_L)	min^{-1}	5 600	5 400
Free-running current (I_L)	A	0.9	0.46
Max. reverse voltage	V DC	35	58
Set value input		analogue/PWM/frequency/digital	analogue/PWM/frequency/digital
Recommended speed control range	min^{-1}	0 … 5 000	0 ... 5 000
Function for motor protection at stall		thermally	thermally
Overload protection		yes	yes
Starting torque	mNm	2.5 x M_N	4 x M_N
Rotor moment of inertia (J_R)	kgm^2x10^{-6}	38	38
Thermal resistance (R_{th})	K/W	2.9	2.9
Protection class		IP 40 / IP 54*	IP 40 / IP 54*
Ambient temperature range (T_U)	°C	0 … +40	0 … +40
Motor mass (m)	kg	1.15	1.15
Order No. (ECI-63.40-K4-S)	Stand design	932 6340 400	932 6340 402
Order No. (ECI-63.40-K4-L)	Cable design	932 6340 403	932 6340 405

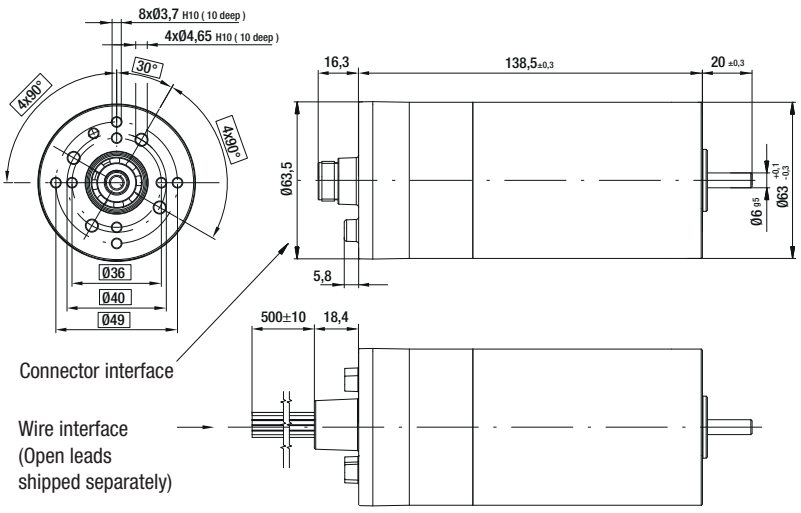
* Ingress Protection class (IP 54) refers to connector interface with sealing on the flange side



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

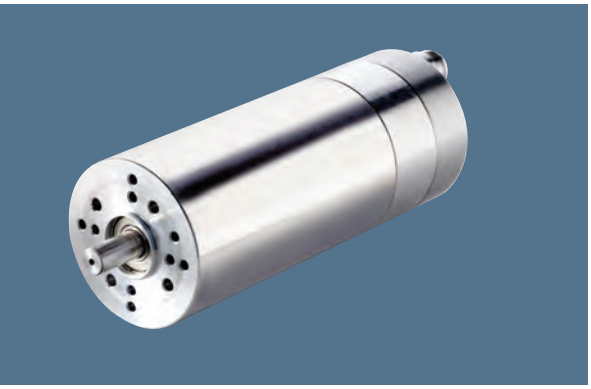
Permissible shaft load at nominal speed and life expectancy
L_{10} at 20 000 h (at T_U max. 40°C)





ECI 63.60

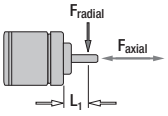
with electronic module K4



- 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
- Field oriented control
- 15-pin connector (M16)
- User friendly parameterisation via PC-Software “Kickstart” possible

Nominal data

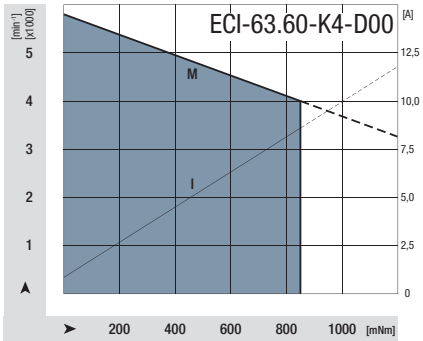
Type		ECI-63.60-K4-D00
Nominal voltage (U_N)	V DC	48
Permissible supply voltage range (U_{ZK})	V DC	40 ... 53
Nominal speed (n_N)	min^{-1}	4 000
Nominal torque (M_N)	mNm	850
Nominal current (I_N)	A	8.6
Nominal output power (P_N)	W	356
Free-running speed (n_L)	min^{-1}	5 800
Free-running current (I_L)	A	0.60
Max. reverse voltage	V DC	58
Set value input		analogue/PWM/frequency/digital
Recommended speed control range	min^{-1}	0 … 5 000
Function for motor protection at stall		thermally
Overload protection		yes
Starting torque	mNm	3 x M_N
Rotor moment of inertia (J_R)	kgm^2x10^{-6}	57
Thermal resistance (R_{th})	K/W	2.5
Protection class		IP 40 / IP 54*
Ambient temperature range (T_U)	°C	0 … +40
Motor mass (m)	kg	1.5
Order No. (ECI-63.60-K4-S)	Stand design	932 6360 402
Order No. (ECI-63.60-K4-L)	Cable design	932 6360 405

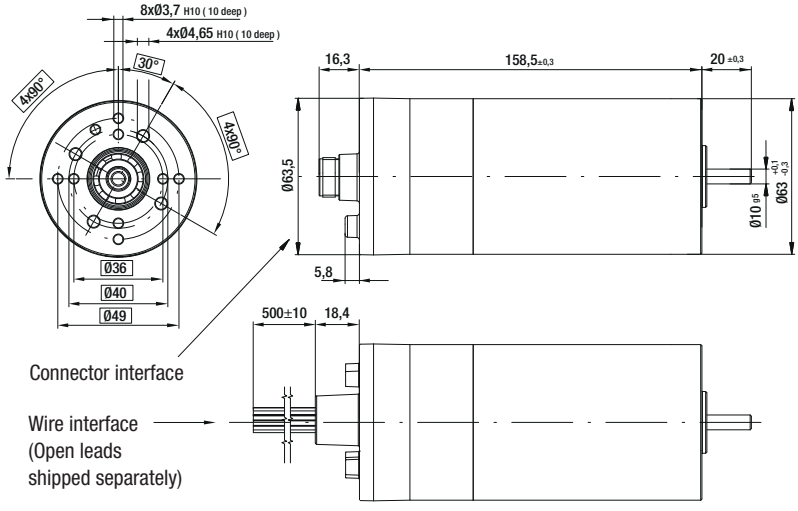


F_{axial} 150 N
F_{radial} 150 N L_1 20 mm

Permissible shaft load at nominal speed and life expectancy L_{10} at 20 000 h (at T_U max. 40°C)

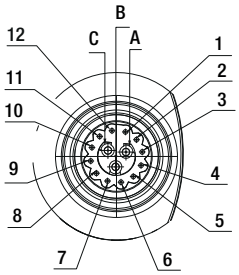
* Ingress Protection class (IP 54) refers to connector interface with sealing on the flange side





Configuration - drive connector

– 15-pin connector (M16)

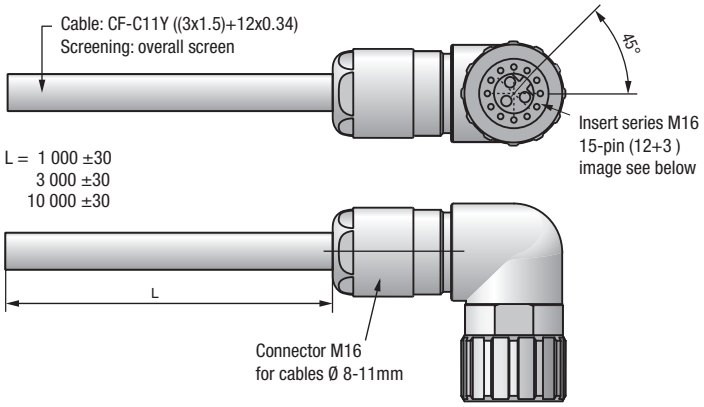


Pin configuration is the same for connector interface and wire interface

Pin 1	Digital IN A	NPN 24V
Pin 2	Digital IN B	NPN 24V
Pin 3	Digital IN 1	NPN 24V
Pin 4	Digital IN 2*	NPN 24V
Pin 5	Digital OUT 1	PNP 24V
Pin 6	Digital OUT 2	PNP 24V
Pin 7	Digital OUT 3	PNP 24V
Pin 8	Analogue IN 1	0...10V (differential)
Pin 9	Analogue GND	GND for Analogue IN 1 (differential)
Pin 10	RS485 +	Progr.-Bus
Pin 11	RS485 -	Progr.-Bus
Pin 12	U_{Logik}	Power supply + (24V)
Pin A	Ballast	Ballast resistor
Pin B	U_{ZK}	Power supply
Pin C	GND	Power- / signal-GND

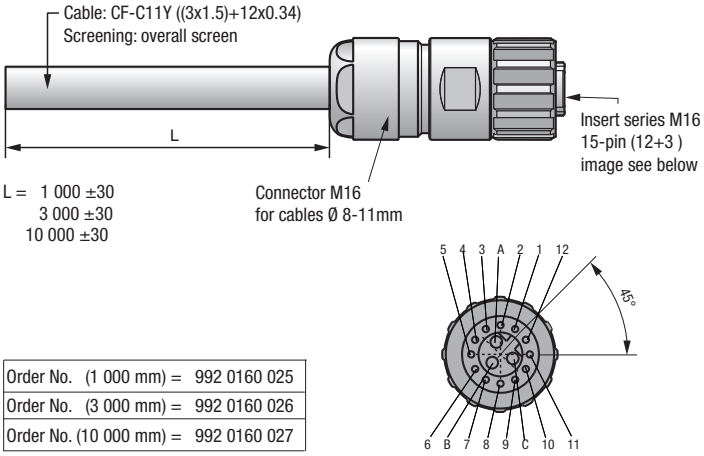
Connecting cable with straight and angular connector

– All signals / supplies within one cable
– The cable is available in 2 versions and in 3 standard lengths



Order No. (1 000 mm) =	992 0160 028
Order No. (3 000 mm) =	992 0160 029
Order No. (10 000 mm) =	992 0160 030

Strand	Pin		
white	Pin 1	Digital IN A	NPN 24V
brown	Pin 2	Digital IN B	NPN 24V
green	Pin 3	Digital IN 1	NPN 24V
yellow	Pin 4	Digital IN 2*	NPN 24V
grey	Pin 5	Digital OUT 1	PNP 24V
pink	Pin 6	Digital OUT 2	PNP 24V
blue	Pin 7	Digital OUT 3	PNP 24V
red	Pin 8	Analogue IN 1	0...10V (differential)
black	Pin 9	Analogue GND	GND for Analogue IN 1 (differential)
violet	Pin 10	RS485 +	Progr.-Bus
grey/pink	Pin 11	RS485 -	Progr.-Bus
red/blue	Pin 12	U_{Logik}	Logic power supply + (24V)
grey	Pin A	Ballast	Ballast resistor
brown	Pin B	U_{ZK}	Power supply
black	Pin C	GND	Power- / signal-GND

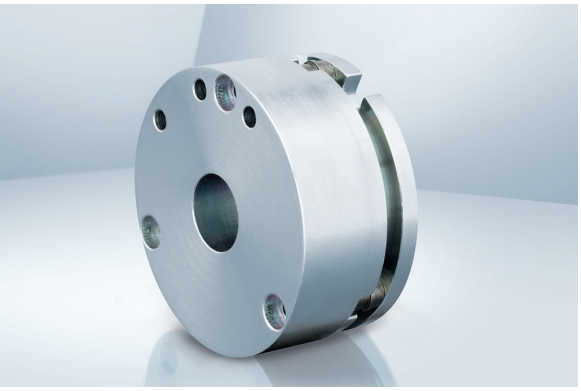


Order No. (1 000 mm) =	992 0160 025
Order No. (3 000 mm) =	992 0160 026
Order No. (10 000 mm) =	992 0160 027

Strand	Pin		
white	Pin 1	Digital IN A	NPN 24V
brown	Pin 2	Digital IN B	NPN 24V
green	Pin 3	Digital IN 1	NPN 24V
yellow	Pin 4	Digital IN 2*	NPN 24V
grey	Pin 5	Digital OUT 1	PNP 24V
pink	Pin 6	Digital OUT 2	PNP 24V
blue	Pin 7	Digital OUT 3	PNP 24V
red	Pin 8	Analogue IN 1	0...10V (differential)
black	Pin 9	Analogue GND	GND for Analogue IN 1 (differential)
violet	Pin 10	RS485 +	Progr.-Bus
grey/pink	Pin 11	RS485 -	Progr.-Bus
red/blue	Pin 12	U_{Logik}	Logic power supply + (24V)
grey	Pin A	Ballast	Ballast resistor
brown	Pin B	U_{ZK}	Power supply
black	Pin C	GND	Power- / signal-GND

* Can also be programmed as analogue IN 2

ECI brake module



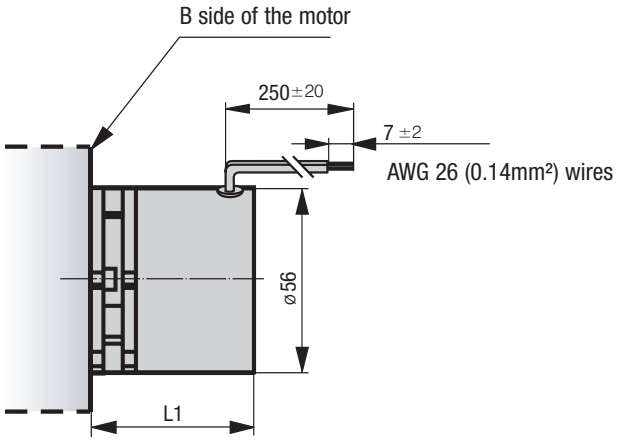
- Holding brake with emergency stop function**
- Braking torque applied by spring force
- Single-disk brake with 2 friction contact surfaces
- Currentless-operated brake, released electromagnetically

Type		BFK*
Nominal voltage	V DC	24
Permissible supply voltage range	V DC	22 - 26
Nominal power	W	10
Braking torque	Nm	1
Closing time	ms	50
Release time	ms	50
External version	Protection class	IP 40
Internal version	Protection class	IP 54
Ambient temperature range	°C / °F	0 ... +40 / +32 ... +104
Mass	kg	0.33

subject to alterations

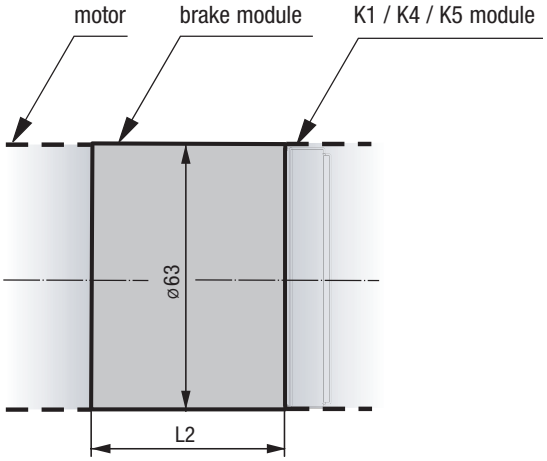
* Brake module is only mounted available with the ECI-63.XX-K1 / -K4 / -K5 drives.
** Max. 150 emergency stops possible

External version



External attached spring-applied brake

Internal version



Housing module with integrated spring-applied brake
(Brake module is connected internally and can be actived / deactived by the motor supply)

Additional length by brake module		
Type	L1 (external version)	L2 (internal version)
K1	27,5 mm	26,8 mm
K4	27,5 mm + 23mm (Adaptor)	45,4 mm
K5	-----	45,4 mm

VARIODRIVE Compact-motor

VDC-3-49.15-K4

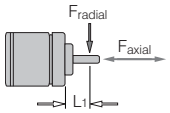
- Drive with completely integrated 4Q operation and K4 control electronics
- Speed, position or torque mode possible
- Selection of operation mode and parameterization via RS485
- Extensive interface with numerous inputs and outputs
- Output stage enabled via digital input
- Integrated brake chopper 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^{-1}	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^{-1}	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^{-1}	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)	$kgm^2 x10^{-6}$	108	108
Protection class		IP 54*	IP 54*
Ambient temperature range (T_U)	°C / °F	-30 … +40 / -22 ... +104	-30 … +40 / -22 ... +104
Motor mass (m)	kg	0.59	0.59
Order No.		937 4915 400	937 4915 402

subject to alterations

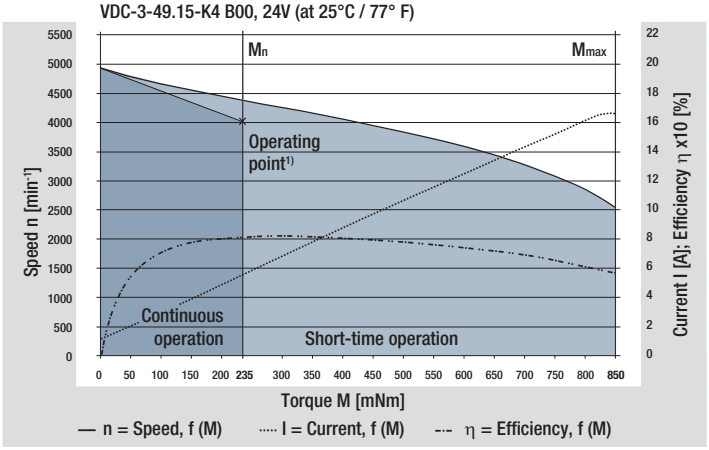
* Classification of protection class refers to installed state with sealing on the flange side
** at T_U max. 40 °C / 104 °F



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

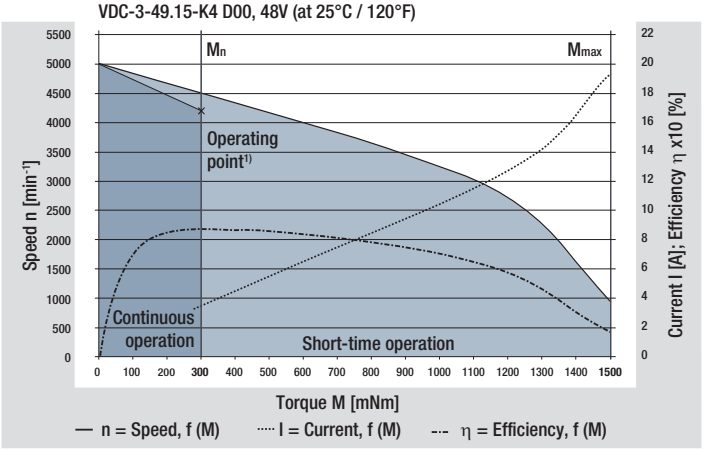
Permissible shaft load at nominal speed and life expectancy L_{10} of 20 000 h**

VDC-3-49.15-K4 B00, 24V (at 25°C / 77° F)



1) Nominal data, see table above

VDC-3-49.15-K4 D00, 48V (at 25°C / 120°F)

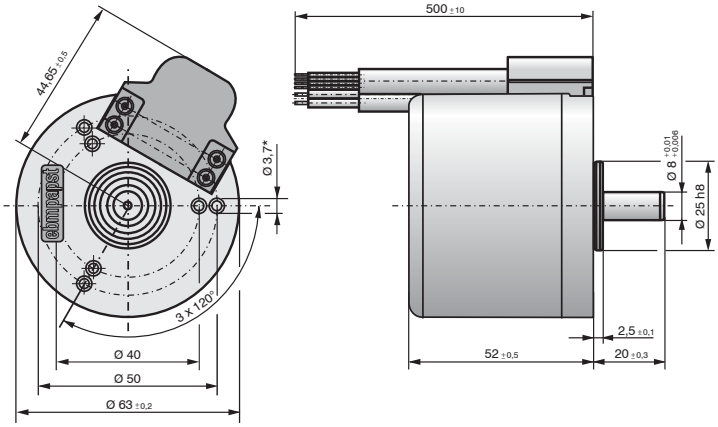


1) Nominal data, see table above

VARIODRIVE Compact-motor

VDC-3-49.15-K4

Technical drawing

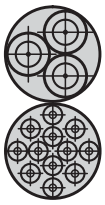


* Tapped blind holes for thread-forming screws in accordance to DIN 7500.
max. screw depth 9,5 mm
max. screw-in torque 3 Nm

Protective cap in aluminium natural.

Pin connection motor

Wire	Configuration	Function	AWG
blue	Ballast	Ballast resistor	16
brown	U_{ZK}	Power supply	16
black	GND	Power-/ Signal-GND	16
green	U_{Logic}	Logic power supply (+24V)	24
white	RS 485 +	Progr. -Bus	24
grey	RS 485 -	Progr. -Bus	24
red	Analog IN 1	0...10V (differential)	24
yellow	Analog GND	GND Analog IN 1 (differential)	24
violet	IN 1	NPN 24V	24
black	IN 2	NPN 24V / Analog	24
red/blue	IN A	NPN 24V	24
grey/pink	IN B	NPN 24V	24
brown	OUT 1	PNP 24V	24
pink	OUT 2	PNP 24V	24
blue	Must not be used	Must not be used	24



AWG 16 (1.3 mm²)

AWG 24 (0.22 mm²)

Possible gear combinations (e.g. PerformaxPLUS 63)

Type	Permanent nominal torque [Nm]	Gear reduction [i]	Order No.
VDC-3-49.15-K4-B00-PXP63/5	1.0	5:1	947 4915 420
VDC-3-49.15-K4-B00-PXP63/30	5.7	30:1	947 4915 421
VDC-3-49.15-K4-D00-PXP63/5	1.3	5:1	947 4915 422
VDC-3-49.15-K4-D00-PXP63/30	7.3	30:1	947 4915 423
Further gear reductions, also in combination with other gearbox types, are available for your application.			

Accessories

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 or the adjacent QR-Code:

Power supply unit

PS320 / 480 220 x 71 x 140 mm

- **Material:** Housing: Die cast aluminium
- **Connection:** All of plug-in type
- **Type of protection:** IP 65
- **Protection class:** I (PE connection required)
- **Mounting position:** Any
- **Highlights:** Wide range voltage input
  High overload capacity
  Status visualisation by way of LED
  On/Off switch
- **Mass:** 2.3 kg

Nominal data

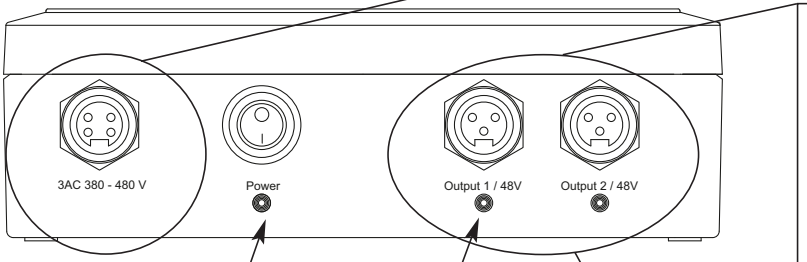
Typ		PS480-24-1	PS320-24-2	PS480-48-1	PS320-48-2
Part no.		9920472002	9920472004	9920472003	9920472001
Output voltage	V DC	1 x 24.5 ±3%	2 x 24.5 ±3%	1 x 48 ±3%	2 x 48 ±3%
Continuous output power	W	1 x 480	2 x 160	1 x 480	2 x 160
Peak output power	W	max. 880	max. 2 x 440	max. 880	max. 2 x 440
Overvoltage protection (DC output end)[2]	V	Permanent shut-off at ≥ 35V		Permanent shut-off at ≥ 60V	
Max. feedback voltage	V DC	< 35		< 60	
Efficiency[1]	%	93			
Input voltage	V AC	380-480 (3~)			
Input operating voltage range	V AC	330-550 (3~)			
Nominal input current [1]	A	< 1.0 (with 3 x 400V AC, 50 Hz) < 0.8 (with 3 x 480V AC, 50 Hz)		< 0.8 (with 3 x 400V AC, 50 Hz) < 0.8 (with 3 x 480V AC, 50 Hz)	
Peak input current	A	< 4A, 3 x 400V AC, 50 Hz			
Nominal input frequency	Hz	50-60 Hz			
Overtemperature protection[2]		Permanent shut-off			
Phase error[1]		Function guaranteed in 2-phase operation (however shorter service life and MTBF)			
Overvoltage category		III (acc. to EN50178)			
Output/input isolation		SELV, PELV IEC/EN 60950-1, EN50178 EN60204-1, IEC 60364-4-41			
Additional control input		Not used => reduced power ≤ 100W / channel			
Output ripple	mV	< 200		< 400	
Overvoltage[2]		Shut-off on overvoltage			
Service life	h	50.000 at nominal load in operation at 30°C			
Operating temperature	°C	-30 … 40			
Installation altitude		< 1000 m above sea level			
Dimensions (L x H x D)	mm	220 x 71 x 140			

Subject to alternations

[1] At P_{out} = 320W;
[2] To reset the power supply unit, switch off I/O switch for ≥ 3 s

Power supply unit

PS320 / 480 220 x 71 x 140 mm



Visualisation (LED):

On/Off switch

Green light: 3-phase operation
Flashing green: 2-phase operation

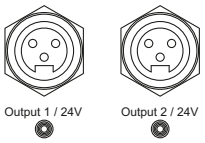
DC outputs

Green light: Control input Low, normal operation
Flashing green: Control input Low, normal operation, overload
Yellow light: Control input High, reduced-power operation
Flashing yellow: Control input High, reduced-power operation, overload

Connector versions

AC input: Lumberg Type RKW 40
Alternatively: Type RK 40

PS320-24-2 / PS320-48-2



DC output: Lumberg Type RSW 30
Alternatively: Type RS 30

PS480-48-1

DC output: Lumberg Type RSW 30
Alternatively: Type RS 30

PS480-24-1

DC output: Cable connector 7.810.500.000
Crimp insert (pin) 7.003.983.101
Crimp contacts (pin) 7.010.982.001

Characteristic curve current/voltage (example: PS320-24-2):