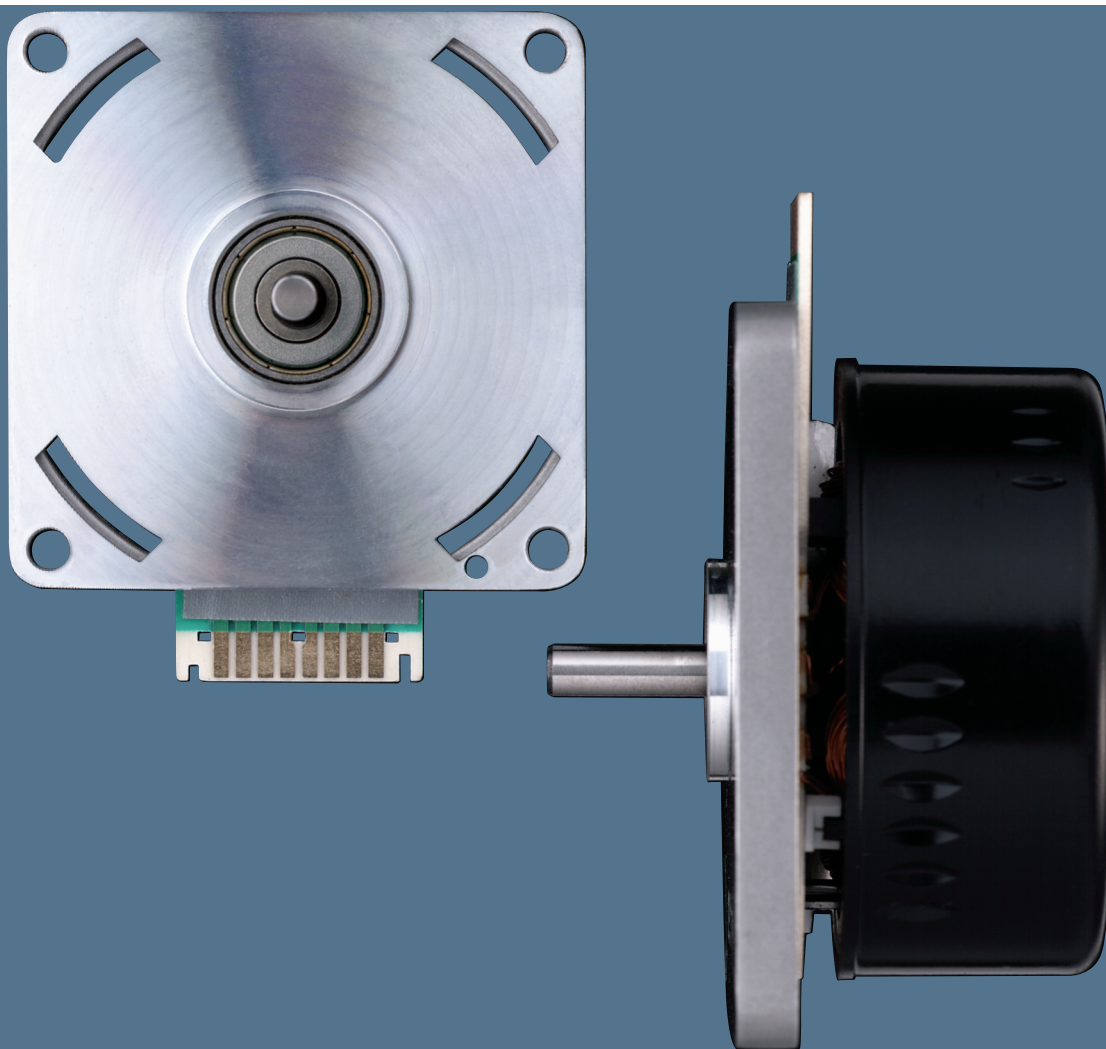


VARIODRIVE technical information	14
VARIODRIVE 3-phase external rotor motor	15



**По вопросам продаж и поддержки обращайтесь:**

- |                             |                                 |                                |                           |
|-----------------------------|---------------------------------|--------------------------------|---------------------------|
| Архангельск (8182)63-90-72  | Калининград (4012)72-03-81      | Нижний Новгород (831)429-08-12 | Смоленск (4812)29-41-54   |
| Астана +7(7172)727-132      | Калуга (4842)92-23-67           | Новокузнецк (3843)20-46-81     | Сочи (862)225-72-31       |
| Белгород (4722)40-23-64     | Кемерово (3842)65-04-62         | Новосибирск (383)227-86-73     | Ставрополь (8652)20-65-13 |
| Брянск (4832)59-03-52       | Киров (8332)68-02-04            | Орел (4862)44-53-42            | Тверь (4822)63-31-35      |
| Владивосток (423)249-28-31  | Краснодар (861)203-40-90        | Оренбург (3532)37-68-04        | Томск (3822)98-41-53      |
| Волгоград (844)278-03-48    | Красноярск (391)204-63-61       | Пенза (8412)22-31-16           | Тула (4872)74-02-29       |
| Вологда (8172)26-41-59      | Курск (4712)77-13-04            | Пермь (342)205-81-47           | Тюмень (3452)66-21-18     |
| Воронеж (473)204-51-73      | Липецк (4742)52-20-81           | Ростов-на-Дону (863)308-18-15  | Ульяновск (8422)24-23-59  |
| Екатеринбург (343)384-55-89 | Магнитогорск (3519)55-03-13     | Рязань (4912)46-61-64          | Уфа (347)229-48-12        |
| Иваново (4932)77-34-06      | Москва (495)268-04-70           | Самара (846)206-03-16          | Челябинск (351)202-03-61  |
| Ижевск (3412)26-03-58       | Мурманск (8152)59-64-93         | Санкт-Петербург (812)309-46-40 | Череповец (8202)49-02-64  |
| Казань (843)206-01-48       | Набережные Челны (8552)20-53-41 | Саратов (845)249-38-78         | Ярославль (4852)69-52-93  |

сайт: [www.ebmpapstnt-rt.ru](http://www.ebmpapstnt-rt.ru) || эл. почта: [etm@nt-rt.ru](mailto:etm@nt-rt.ru)

## Technical information



VARIODRIVE offers you the extensive power range and dynamics of a modern EC drive with a price-performance ratio previously believed inconceivable. The motors and motor electronics of this product line originated essentially from the basic elements of the renowned ebm-papst DC fans. Production processes and material procurement benefit from the millions of fans produced. This formed the basis for 5 sizes of 3-phase EC external rotors in an extensive performance range.

With high operating efficiency – in other words, with low energy consumption and high motor performance – these motors are a convincing solution, offering a wide speed range and excellent control characteristics. High torque constant, no vibration and virtually noiseless running are further advantages of these motors.

A new addition to the VARIODRIVE motors is size VD-3-49.15. In addition to the basic strengths of the VARIODRIVE series, this motor has a multipole design and thus features outstanding high power density and powerful torque as well as IP 54 protection, even in the basic version. Thus it is exceptionally well suited for tough applications in the industrial environment.

### Facts and figures

- 3-phase external rotor motors in 5 different sizes
- EC technology for long service life and silent running
- Power range: 5 to 100 watts
- Precision ball bearings

# VARIODRIVE motor

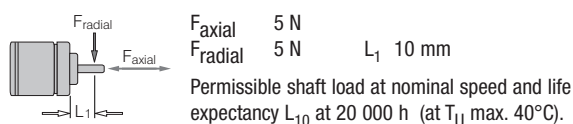
VD-3-25.07

- 3-phase, 6-pulse external rotor motor.
- EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Rotor position detection via 3 Hall sensors.
- Motor supply and control via external operating electronics.
- Customer-specific winding layout and / or motor part sets available on request.



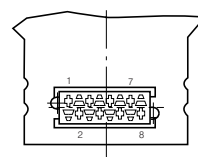
## Nominal data

Type	VD-3-25.07 B01	
Nominal voltage ( $U_{BN}$ )	V DC	24
Nominal speed ( $n_N$ )	rpm	6 000
Nominal torque ( $M_N$ )	mNm	8,0
Nominal current ( $I_{BN}$ )	A	0,4
Nominal output power ( $P_N$ )	W	5
Speed at no-load operation ( $n_l$ )	rpm	8 500
No-load current ( $I_{Bl}$ )	A	0,095
Permanent stall torque ( $M_{BN0}$ )	mNm	7,0
Permissible eff. continuous stall current, motor lead ( $I_{n0eff}$ )	A	0,32
Permissible continuous stall power ( $P_{BN0}$ )	W	2,0
Short-term permiss. peak torque ( $M_{max}$ )	mNm	40
Permiss. peak current, motor lead ( $I_{max}$ )	A	1,8
Induced voltage ( $U_{imax}$ )	V/1000 rpm	2,78
Terminal resistance	$\Omega$	14,8
Terminal inductance	mH	8
Rotor moment of inertia ( $J_R$ )	$\text{kgm}^2 \times 10^{-6}$	4,3
Thermal resistance ( $R_{th}$ )	K/W	16,7
Protection class		IP 00
Ambient temperature range ( $T_U$ )	$^{\circ}\text{C}$	0 to +40
Motor mass (m)	kg	0,055
Order No.		937 2507 000

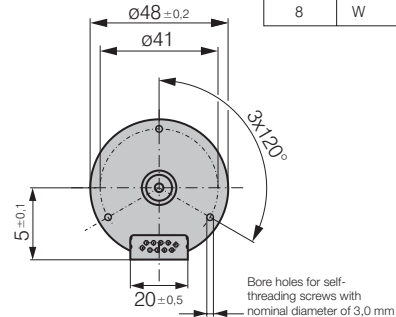
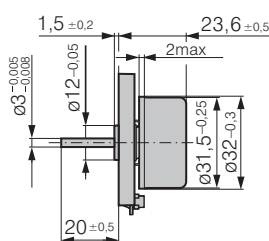
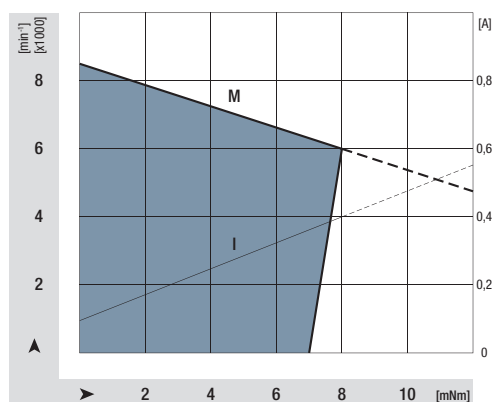


## Operating electronics:

Adapted operating electronics  
DRIVECONTROL VT-A on request  
(adapter cable required)

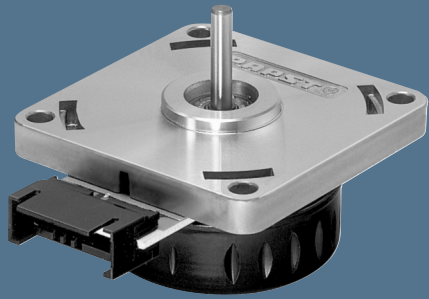


Pin position	Connection
1	GND
2	PS3
3	+Ub
4	PS2
5	PS1
6	U
7	V
8	W



# VARIODRIVE motor

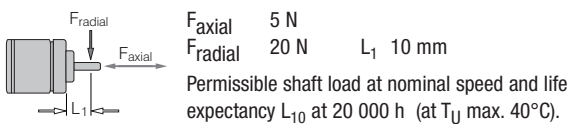
VD-3-35.06



- 3-phase, 6-pulse external rotor motor.
- EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Rotor position detection via 3 Hall sensors.
- Motor supply and control via external operating electronics.
- Customer-specific winding layout and / or motor part sets available on request.

## Nominal data

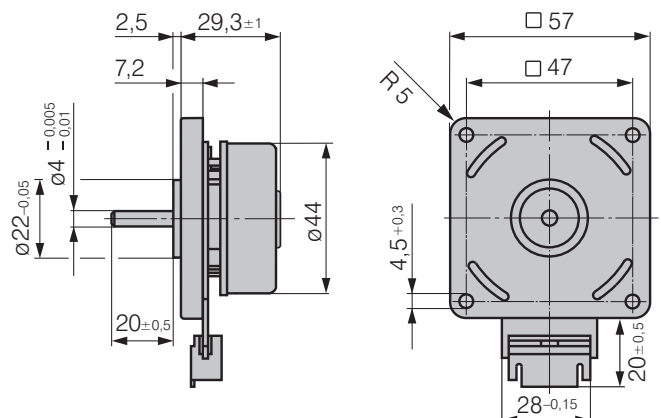
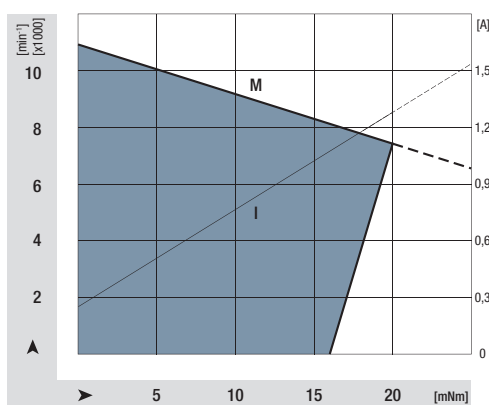
Type		VD-3-35.06 B01	VD-3-35.06 B00
Nominal voltage ( $U_{BN}$ )	V DC	24	24
Nominal speed ( $n_N$ )	rpm	7 500	3 700
Nominal torque ( $M_N$ )	mNm	20	20
Nominal current ( $I_{BN}$ )	A	1,25	0,8
Nominal output power ( $P_N$ )	W	16	8
Speed at no-load operation ( $n_l$ )	rpm	11 000	7 100
No-load current ( $I_{BL}$ )	A	0,25	0,16
Continuous stall torque ( $M_{BNO}$ )	mNm	16	16
Permissible eff. continuous stall current, motor lead ( $I_{n0eff}$ )	A	1,0	0,6
Permissible continuous stall power ( $P_{BNO}$ )	W	5,0	5,0
Short-term permiss. peak torque ( $M_{max}$ )	mNm	69	69
Permiss. peak current, motor lead ( $I_{max}$ )	A	4,0	2,5
Induced voltage ( $U_{imax}$ )	V/1000 rpm	2,19	3,52
Terminal resistance	$\Omega$	3,7	9,4
Terminal inductance	mH	2,5	6,4
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x10 <sup>-6</sup>	16	16
Thermal resistance ( $R_{th}$ )	K/W	5,2	7,0
Protection class		IP 00	IP 00
Ambient temperature range ( $T_U$ )	$^{\circ}$ C	0 to +40	0 to +40
Motor mass (m)	kg	0,120	0,120
Order No.		937 3506 000	937 3506 010



## Operating electronics for speed-controlled operation:

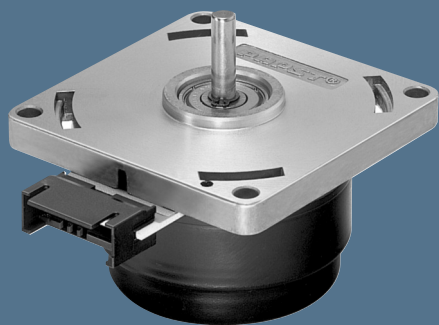
for Order No. 937 3506 000 = DRIVECONTROL VT-A / Order No. 937 1201 001

for Order No. 937 3506 010 = DRIVECONTROL VT-A / Order No. 937 1201 002



# VARIODRIVE motor

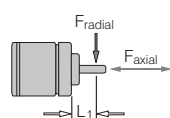
VD-3-43.10



- 3-phase, 6-pulse external rotor motor.
- EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Rotor position detection via 3 Hall sensors.
- Motor supply and control via external operating electronics.
- Customer-specific winding layout and / or motor part sets available on request.

## Nominal data

Type		VD-3-43.10 B01	VD-3-43.10 B00
Nominal voltage ( $U_{BN}$ )	V DC	24	24
Nominal speed ( $n_N$ )	rpm	7 900	3 700
Nominal torque ( $M_N$ )	mNm	53	54
Nominal current ( $I_{BN}$ )	A	2,7	1,6
Nominal output power ( $P_N$ )	W	44	21
Speed at no-load operation ( $n_l$ )	rpm	10 200	8 000
No-load current ( $I_{Bl}$ )	A	0,27	0,18
Continuous stall torque ( $M_{BNO}$ )	mNm	50	49
Permissible eff. continuous stall current, motor lead ( $I_{n0eff}$ )	A	2,7	1,8
Permissible continuous stall power ( $P_{BNO}$ )	W	10	10
Short-term permiss. peak torque ( $M_{max}$ )	mNm	110	110
Permiss. peak current, motor lead ( $I_{max}$ )	A	6,5	4,2
Induced voltage ( $U_{imax}$ )	V/1000 rpm	2,03	3,07
Terminal resistance	$\Omega$	0,96	2,3
Terminal inductance	mH	1,55	3,5
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x10 <sup>-6</sup>	40	40
Thermal resistance ( $R_{th}$ )	K/W	4,11	4,75
Protection class		IP 00	IP 00
Ambient temperature range ( $T_U$ )	°C	0 to +40	0 to +40
Motor mass (m)	kg	0,24	0,24
Order No.		937 4310 000	937 4310 010

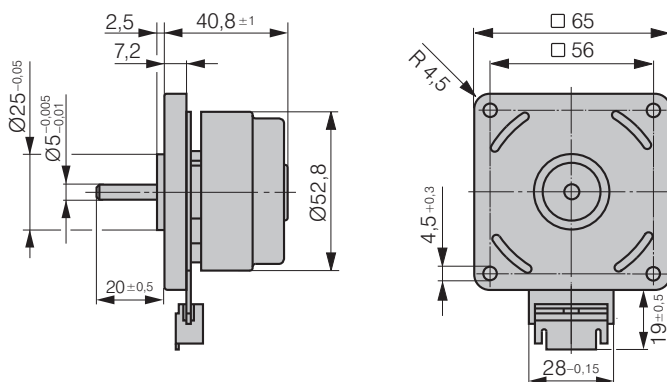
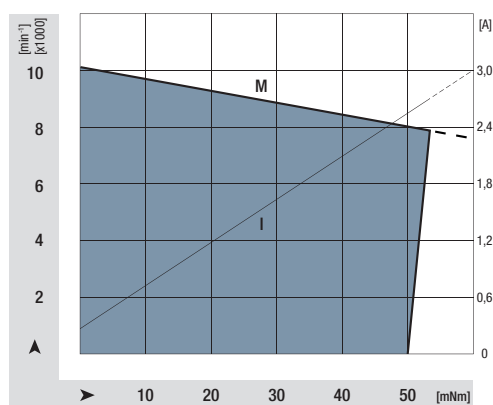


$F_{axial}$  7 N  
 $F_{radial}$  35 N  $L_1$  10 mm

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

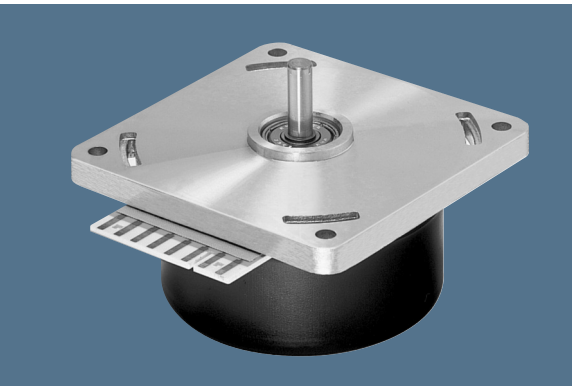
## Operating electronics for speed-controlled operation:

for Order No. 937 4310 000 = DRIVECONTROL VT-A / Order No. 937 1401 001  
 for Order No. 937 4310 010 = DRIVECONTROL VT-A / Order No. 937 1401 002



# VARIODRIVE motor

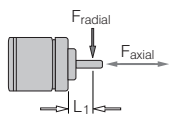
VD-3-54.14



- 3-phase, 6-pulse external rotor motor.
- EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Rotor position detection via 3 Hall sensors.
- Motor supply and control via external operating electronics.
- Customer-specific winding layout and / or motor part sets available on request.

## Nominal data

Type		VD-3-54.14 B01	VD-3-54.14 B00	VD-3-54.14 B02
Nominal voltage ( $U_{BN}$ )	V DC	24	24	24
Nominal speed ( $n_N$ )	rpm	5 600	3 700	6 200
Nominal torque ( $M_N$ )	mNm	150	150	150
Nominal current ( $I_{BN}$ )	A	5,1	3,6	5,7
Nominal output power ( $P_N$ )	W	88	57	97
Speed at no-load operation ( $n_l$ )	rpm	7 100	5 200	7 250
No-load current ( $I_{BL}$ )	A	0,41	0,26	0,43
Continuous stall torque ( $M_{BNO}$ )	mNm	115	115	135
Permissible eff. continuous stall current, motor lead ( $I_{n0eff}$ )	A	4,4	3,1	5,4
Permissible continuous stall power ( $P_{BNO}$ )	W	13	13	13
Short-term permiss. peak torque ( $M_{max}$ )	mNm	400	400	440
Permiss. peak current, motor lead ( $I_{max}$ )	A	15	10	20
Induced voltage ( $U_{imax}$ )	V/1000 rpm	3,06	4,38	2,95
Terminal resistance	$\Omega$	0,49	0,96	0,33
Terminal inductance	mH	1,00	2,00	0,72
Rotor moment of inertia ( $J_R$ )	$\text{kgm}^2 \times 10^{-6}$	145	145	165
Thermal resistance ( $R_{th}$ )	K/W	2,5	3,0	2,4
Protection class		IP 00	IP 00	IP 00
Ambient temperature range ( $T_U$ )	$^{\circ}\text{C}$	0 to +40	0 to +40	0 to +40
Motor mass (m)	kg	0,52	0,52	0,52
Order No.		937 5414 000	937 5414 010	937 5414 005

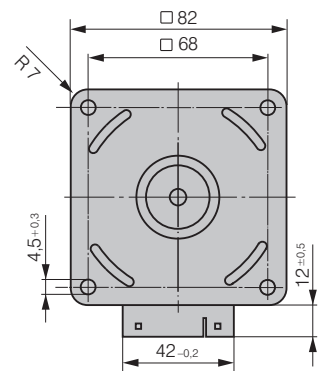
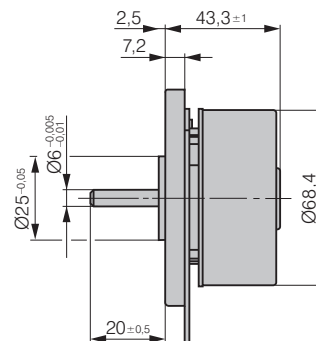
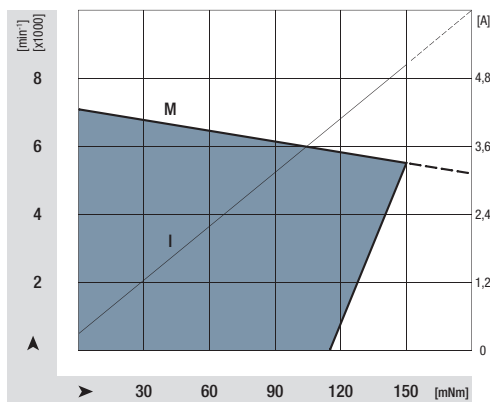


$F_{axial}$  10 N  
 $F_{radial}$  60 N  $L_1$  10 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 20 000 h (at  $T_U$  max. 40 $^{\circ}\text{C}$ ).

### Operating electronics for speed-controlled operation:

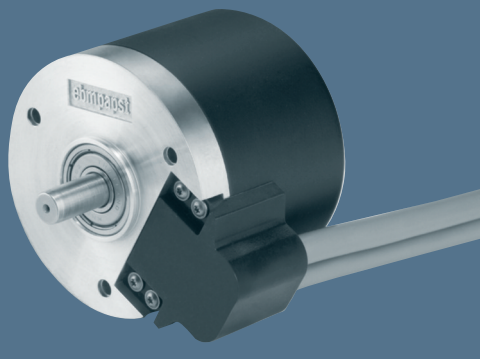
for Order No. 937 5414 000 = DRIVECONTROL VT-A / Order No. 937 2501 001  
 for Order No. 937 5414 010 = DRIVECONTROL VT-A / Order No. 937 2501 002  
 for Order No. 937 5414 005 = DRIVECONTROL VT-D on request



# VARIODRIVE motor

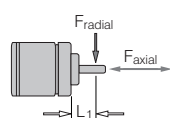
VD-3-49.15

- 3-phase external rotor motor in EC technology.
- Multi-pole motor design for high power density.
- Rotor with powerful neodymium magnet.
- Rotor position detection via 3 Hall sensors.
- Motor supply and control via external operating electronics.
- Robust mechanical design for industrial applications.
- Protection class IP 54 already achieved in the basic configuration.



## Nominal data

Type		VD-3-49.15 B00
Nominal voltage ( $U_{BN}$ )	V DC	24
Nominal speed ( $n_N$ )	rpm	4 500
Nominal torque ( $M_N$ )	mNm	235
Nominal current ( $I_{BN}$ )	A	6,1
Nominal output power ( $P_N$ )	W	110
Speed at no-load operation ( $n_l$ )	rpm	6 000
No-load current ( $I_{BL}$ )	A	0,47
Continuous stall torque ( $M_{BNO}$ )	mNm	245
Permissible eff. continuous stall current, motor lead ( $I_{n0eff}$ )	A	7,4
Permissible continuous stall power ( $P_{BNO}$ )	W	17,5
Short-term permiss. peak torque ( $M_{max}$ )	mNm	1150
Permiss. peak current, motor lead ( $I_{max}$ )	A	30
Induced voltage ( $U_{imax}$ )	V/1000 rpm	4,3
Terminal resistance	$\Omega$	0,23
Terminal inductance	mH	0,17
Rotor moment of inertia ( $J_R$ )	$\text{kgm}^2 \times 10^{-6}$	108
Thermal resistance ( $R_{th}$ )	K/W	-
Protection class		IP 54
Ambient temperature range ( $T_U$ )	$^{\circ}\text{C}$	0 to +40
Motor mass (m)	kg	0,59
Order No.		937 4915 000



$F_{axial}$  20 N  
 $F_{radial}$  60 N  $L_1$  10 mm  
 Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 20 000 h (at  $T_U$  max. 40°C).

\* Blind holes for self threading screws according to DIN 7500. Max. length of engagement 9,5 mm. Max. fastening torque 3 Nm.

Connector housing 8-pole, Molex, receptacle 5557-NR, Mini Fit, Article No.: 39-01-2085 / with terminals 5556 female, Mini Fit Article No.: 39-00-0046

Connector housing 3-pole, Molex, receptacle 3191-3, Article No.: 39-03-6035 / with terminals 5556 female standard 093, Article No.: 39-00-0046

Signal line:

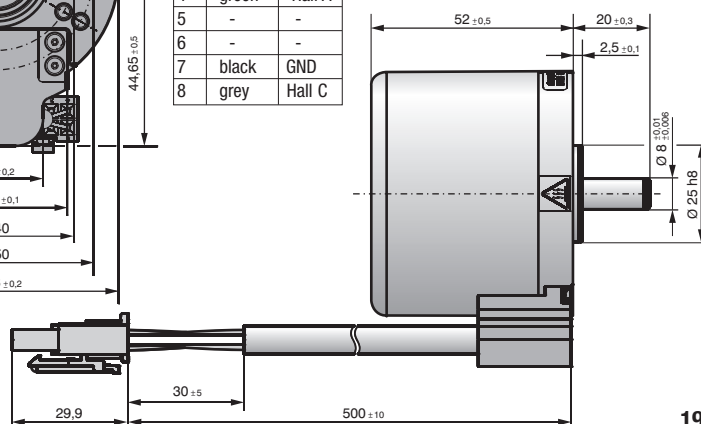
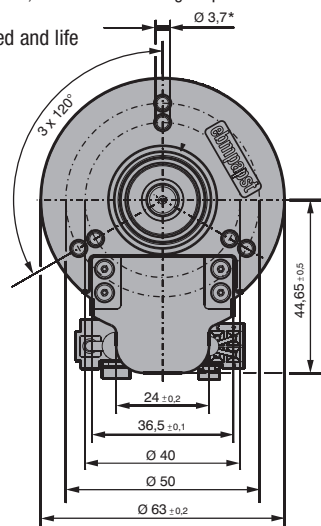
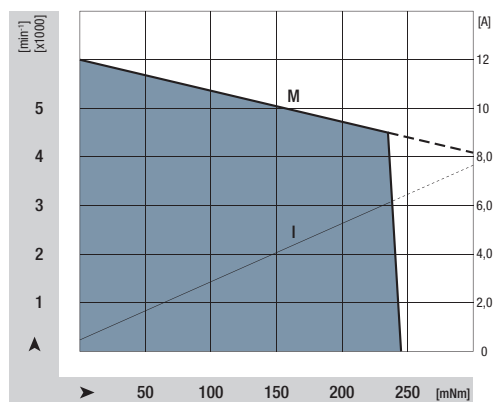
No.	Colour	Function
1	-	-
2	red	+12 V
3	white	Hall B
4	green	Hall A
5	-	-
6	-	-
7	black	GND
8	grey	Hall C

Pin Connection, customer side



Supply line:

No.	Colour	Function
1	yellow	W
2	violet	V
3	brown	U



# DRIVECONTROL

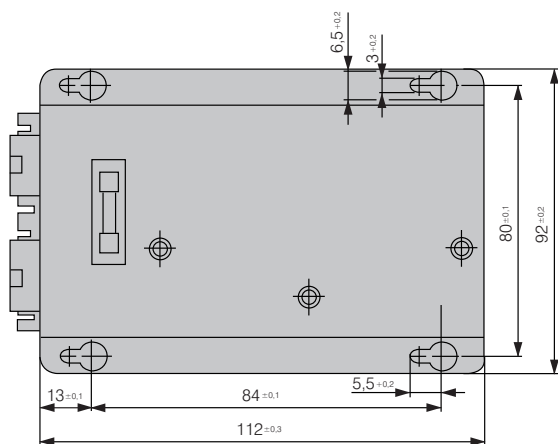
## VT-A series



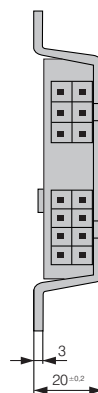
Operating electronics for driving 3-phase motors of the VARIODRIVE series. Simple OEM electronics for use in series applications. The DRIVECONTROL VT-A is available in 4 different performance levels for speed-controlled or voltage-controlled operation. Only one supply voltage is required for motor and electronics. Within the specified performance range there is a variety of defined product variants. Based on this a suitable version of electronics can be chosen by selecting the electronics matching to the desired motor performance, the required output current, the required speed control range, the connector system or the type of control characteristics.

### Nominal data

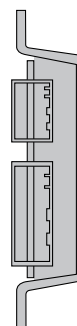
Nominal data	Unit	Voltage-controlled	Speed-controlled
Nominal voltage	V	24	24
Nominal voltage range	V	10 to 30	14 to 28
Max. output voltage	V	UB - 2 V	UB - 2 V
Output current, peak	A	2 - 5	2 - 5
Set value input	V DC	0 to 10	0 to 10
Speed control range	rpm	–	300 to 4 000 / 300 to 10 000
Speed control	Type	–	P
ACTUAL speed value		–	yes
Operating temperature range	°C	0 to 40 °C	0 to 40 °C
Temperature monitoring		no	no
Mass	kg	0,2	0,2
Protection class		IP 00	IP 00



MOLEX-plug



AMP-pLug

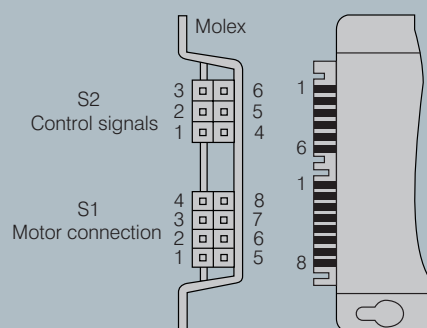




**Structure and performance features**

- 1-quadrant controller. Positive set value alterations are adjusted by acceleration. Negative set value alterations cause short-circuit braking via the motor winding (increase in intermediate circuit voltage possible!)
- Speed setting via set value input (interface 0 to 10 V DC)
- Setting of operating modes via 2 control inputs
- Speed-controlled version with evaluation of Hall signals for ACTUAL speed value monitoring via MF-pin
- With voltage-controlled (= uncontrolled) version, no braking function and ACTUAL speed value monitoring
- Fixed limits for current and voltage
- Voltage supply with input filter, filtering and generation of auxiliary voltage
- Equipped with PCB plug or Molex plug depending on type of motor

**Pin connection**



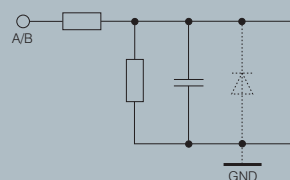
**1. Control input**

**Speed-controlled version**

A	B	A	
0	0	0	Counter-clockwise rotation
0	1	1	Clockwise rotation
1	0	0	Counter-clockwise rotation
1	1	1	Clockwise rotation
1	1	1	Brake function*

low (0)	0 to 0,8 V
high (1)	2,4 to 30 V



\*Brake function: The braking function serves to slow down the motor only. It has no holding brake function for the static duty.

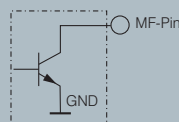
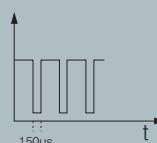
**Plug S2**

Pin	Type MOLEX	Type AMP
1	GND	MF-Pin
2	A	B
3	S+	A
4	+U <sub>B</sub>	S+
5	B	Gnd
6	MF-Pin	+U <sub>B</sub>

**2. Actual speed value output (MF-Pin)**

Only with speed-controlled version, open collector that transmits a short pulse at every edge change of the motor Hall signals.

The illustrated signal sequence for standard assembly is the speed value output.



Voltage range U <sub>CE</sub> :	< 30 V
Max. current I <sub>C</sub> :	10 mA
Pull-up resistor:	> 2000 Ohm at 24 V
Pulse length:	150 µs
U <sub>CEsat</sub> :	< 0,8 V

**Plug S1**

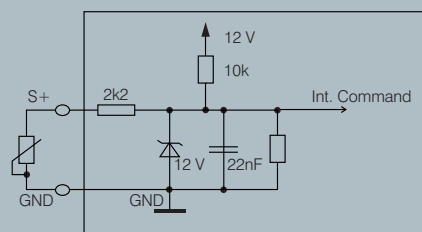
Pin	Type MOLEX	Type AMP
1	L 3	+U <sub>Hall</sub>
2	+U <sub>Hall</sub>	Gnd <sub>Hall</sub>
3	RLG 2	RLG 3
4	RLG 1	RLG 2
5	L 2	RLG 1
6	L 1	L 3
7	Gnd <sub>Hall</sub>	L 2
8	RLG 3	L 1

**3. Set value input**

The speed selection is normally made externally with a voltage in the range of 0 to 10 V DC. A voltage of 10 V is equivalent to the maximum speed determined internally.

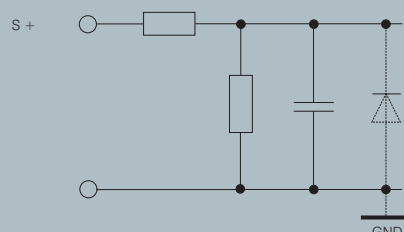
With the voltage controlled version of the VT-A, the set value is internally fixed at the maximum value. To reduce the set value, an external potentiometer can be connected or an external set value voltage can be applied.

**Voltage-controlled version**



Typical wiring of the reference input with the voltage controlled version. Special features are contained in the relevant data sheets.

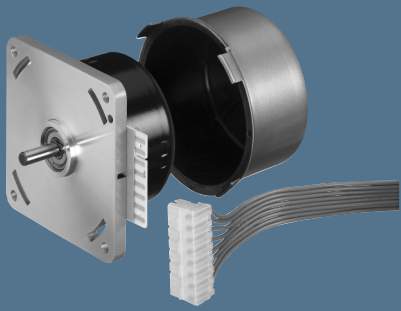
**Speed-controlled version**



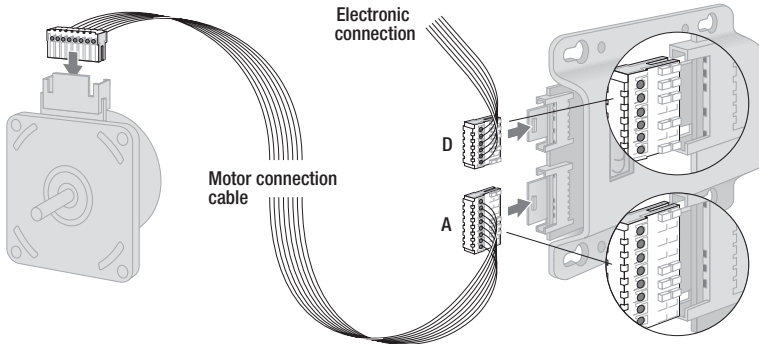
The interpretation of the set value and the corresponding level are described in the relevant data sheet.

For detailed information, please refer to the corresponding specification data sheets. The instructions and safety notes in the operating manual must be observed at all times.

# Accessories



## Electrical connection

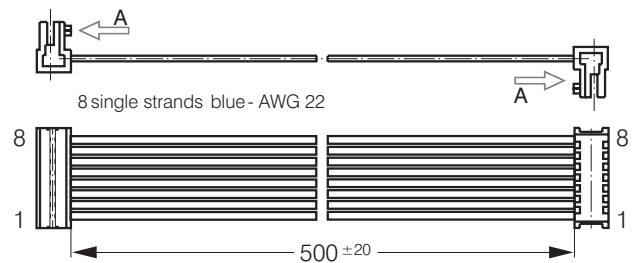


### Type 194 0010 000

Motor connection cable for VARIODRIVE motors VD-3-35.06 / VD-3-43.10 and DRIVECONTROL VT-A with AMP plugs

### Connector A

AMP Duoplug 2.5 - 8-pole grey  
No.: 3-829 868-8 (encoded)  
Alternative:  
Lumberg 35 21 08K30 (encoded)



### Type 194 0012 000

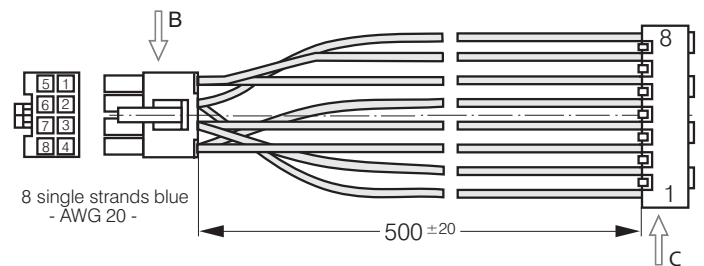
Motor connection cable for VARIODRIVE Motor VD-3-54.14 and DRIVECONTROL VT-A with Molex plugs

### Connector B

Molex 39-01-2085 Mini-Fit, Jr.

### Connector C

AMP-Edge 5mm-8-pole  
No.: 829 213-8 (encoded)



### Type 194 0011 000

Electronic connection cable for DRIVECONTROL VT-A with AMP plugs (motors VD-3-35.06 / VD-3-43.10)

### Connector D (encoded)

AMP Duoplug 2,5 - 6-pole grey  
No.: 3-829 868-6  
or Lumberg 35 21 06K30

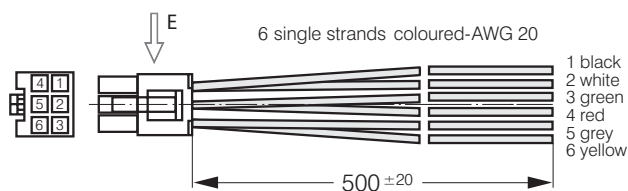


**Type 194 0013 000**

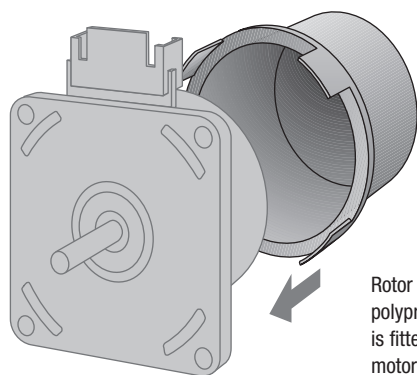
Electronic connection cable for DRIVECONTROL VT-A with Molex connectors (motors VD-3-54.14)

**Connector E**

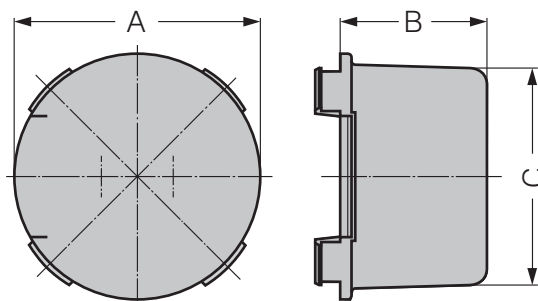
Molex 39-01-2065 Mini-fit, Jr.



**Rotor protective cap**



Rotor protective cap of black polypropylene (PP). The cap is fitted directly onto the motor flange and sealed with a rubber seal.



The protective cap cannot be mounted with motor FDC-3-43.10! When using the protective cap, power is reduced due to the thermal conditions.

		VARIODRIVE VD ... 35.0X 194 3506 000	VARIODRIVE VD ... 43.10 194 4310 000	VARIODRIVE VD ... 54.14 194 5414 000
Dimension	A	57	65	82
	B	27,4	38,8	42
	C	49,5	57,4	74,4

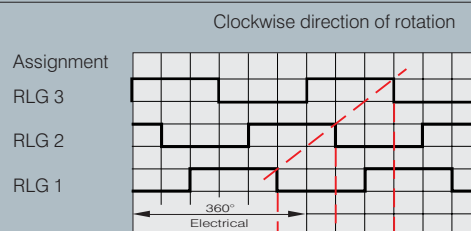
# VARIODRIVE motors

The following diagram illustrates the sequence of the Hall signals and the corresponding drive sequence with the relevant colours and / or pin assignment that apply to customer-developed products and / or to purchased electronics. It also illustrates the phase position of these signals to the induced motor voltage.

## Commutation sequences

### Commutation sequence

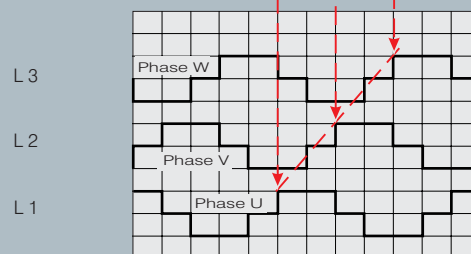
Chronological signal sequence of integrated Hall sensors (= RLG) at the corresponding connections.



VARIODRIVE	
Position	
3	
4	
5	

### Switching sequences of the power output stage

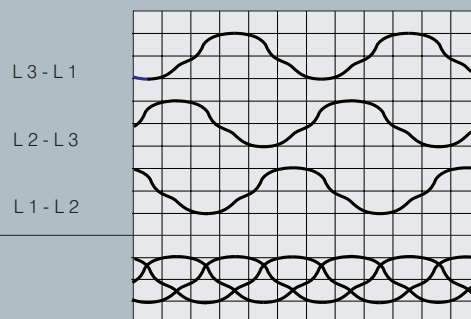
Required relationship between the signal change from RLG and the relevant change for the switching status of the power transistors in relation to the phase lead to the motor.



6	
7	
8	

### Induced voltages

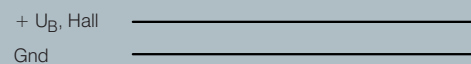
Idealised illustration of the sequence of the induced voltages between the relevant connections.



6 - 8	
7 - 6	
8 - 7	

### Total of induced voltages

### Supply voltage for Hall sensor



1	
2	

### Hall IC

### Hall IC

Specification data available on request.

### Plug

Electrical connection via 8-pole motor plug (not included in scope of delivery)

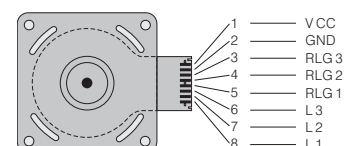
AMP-Edge 5 mm: No. 829-213-8 = VD-3-54.14

AMP-Duoplug: Type 2.5 No. 3-82 98 68-8

or, optionally

Lumberg-Duomodul: Type 3521 08K30 = VD-3-35.06 and VD-3-43.10

Connector position Notation

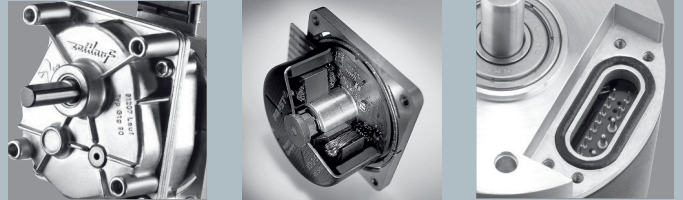


# VARIODRIVE Compact

VARIODRIVE Compact technical information	26
VARIODRIVE Compact motors	28
VARIODRIVE Compact gearmotors	38



# VARIODRIVE Compact

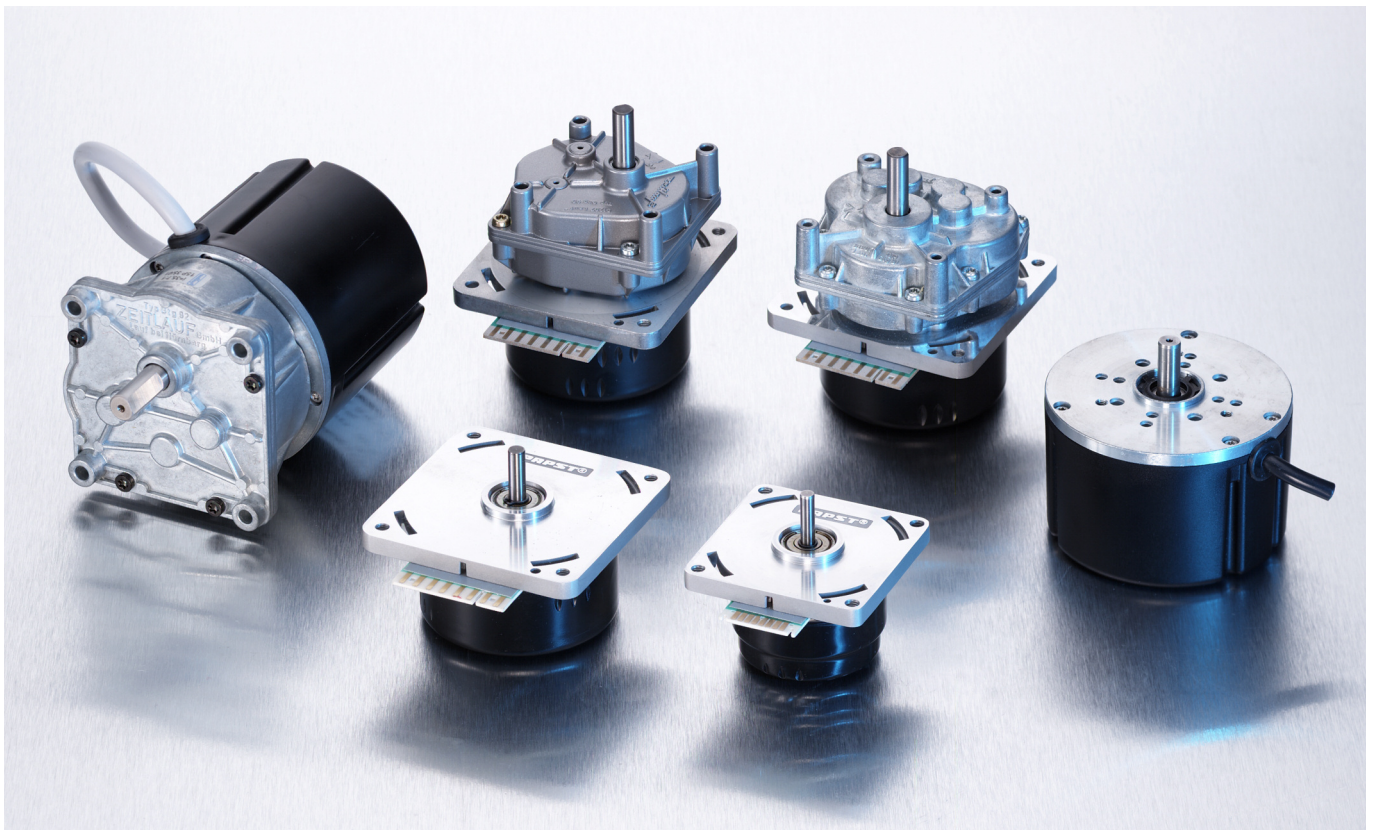


## Technical information

### VARIODRIVE Compact

This is total integration – with a 3-phase electronically commutated DC motor and the control electronics all in a single package: unrivalled in this performance class. The extremely compact drive unit with microprocessor-controlled motor manager and FET power output stage has an internal closed-loop speed control compatible with all standard industrial interfaces. This means: just connect it up and off you go!

VARIODRIVE Compact is ultraflexible. The motor can be speed-controlled and the desired speed selected via a set value voltage. Via 2 control inputs the direction of rotation can be selected, the motor can be enabled or a motor brake function can be activated. An open collector frequency output for monitoring the actual speed is also available.



### Facts and figures VARIODRIVE Compact

- 3-phase, electronically commutated external rotor motor
- Excellent control response over the entire speed range due to digital 4-Q PI controller
- High operating efficiency due to FET output stage and special control process
- Excellent speed stability, silent running, long service life
- Motor manager: reliable operation in all ranges with speed-dependent current limitation and locked-rotor protection clock
- Actual speed output
- Motor electronics optimally adapted to motor characteristic
- Spur gears and planetary gears in different gear reduction stages for a variety of applications
- Winding insulation as per insulation class E
- Standard protection class IP 00, for VDCS-3-54.14 and VDC 3-54.32 in IP 40
- Customer-specific winding layout and motor part sets available on request
- Selectable operation mode (direction of rotation, motor brake and motor enable via two control inputs A, B)
- Software and hardware adaptations (e.g. fixed speed, direction of rotation) on request

### VARIODRIVE Compact VDC-3-49.15 - from 0 to 100 watts in 5.2 centimetres

When high output is required but only limited installation space is available, power density is the most important keyword. Therefore, an optimum ratio of rated output and size was one of the most important factors in developing the new VARIODRIVE Compact motor VDC-3-49.15. The performance data of both motor designs (nominal voltage 48 or 24 VDC) speak for themselves.

With a diameter of 63 mm and a length of just 52 mm, both versions are substantially shorter than comparable internal rotor motors. At a nominal speed of 4,000 rpm each, they attain a rated torque of 250 mNm or 150 mNm. The high overload capacity allows start-up torques that are twice that high. At a current draw of 2.9 A (48 V) and 3.5 A (24 V), the drives have a continuous output of 105 W and 63 W, respectively.

In addition to the performance data, the internal values of this motor also speak for themselves. With the integrated electronics with powerful DSP, this motor features field-oriented activation via sinus commutation. Thus the attainable speed control range goes all the way down to standstill with holding torque. An additional input for set value allows control of the speed as well as the current, and thus the motor torque. This opens up a wide range of additional application options.

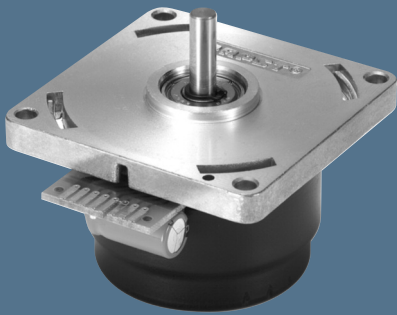
### Facts and figures: VDC-3-49.15

- Compact model
- Very high power density
- Steep speed-torque curve
- High overload capacity
- Extremely wide speed control range
- Holding torque near  $n = 0$
- High dynamics, comparable to BCI
- Robust housing and bearing system
- Long service life
- Type of protection: IP 54, standard



# VARIODRIVE Compact motor

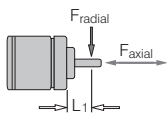
VDC-3-43.10



- 3-phase external rotor motor in EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- High operating efficiency due to FET power output stage.
- Analogue set value.
- Operating mode selection (direction of rotation, braking and motor enable) via 2 control inputs.
- Protection against overload due to integrated, speed-dependent current limiting.
- Customer-specific version possible based on software and hardware adaption (e.g. fixed speed, direction of rotation).

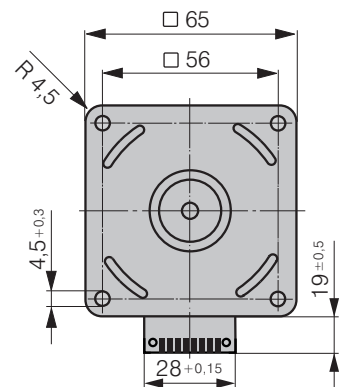
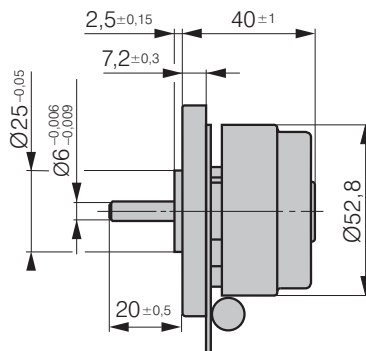
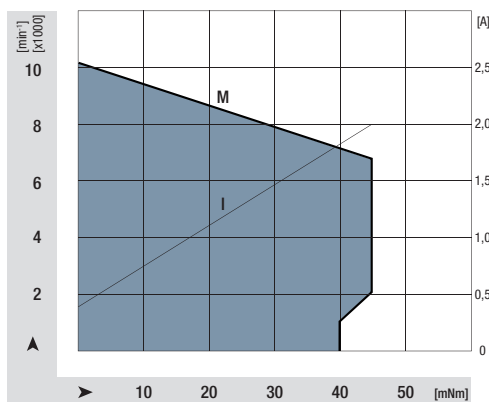
## Nominal data

Type		VDC-3-43.10 B01	VDC-3-43.10 B00
Nominal voltage ( $U_{BN}$ )	V DC	24	24
Permissible supply voltage range ( $U_B$ )	V DC	18 to 28	18 to 28
Nominal speed ( $n_N$ )	rpm	6 800	4 000
Nominal torque ( $M_N$ )	mNm	45	45
Nominal current ( $I_{BN}$ )	A	2,0	1,25
Nominal output power ( $P_N$ )	W	32	18,8
Speed at no-load operation ( $n_l$ )	rpm	10 200	4 100
No-load current ( $I_{Bl}$ )	A	0,4	0,14
Max. reverse voltage	V DC	40	40
Set value input	V	0 to 10	0 to 10
Set speed	rpm	0 to 10 000	0 to 4 000
Recommended speed control range	rpm	300 to 6 800	300 to 4 000
Locked-rotor protection		Protection pulsing	Protection pulsing
with locked-rotor protection clock		$T_{on} 0,8 / T_{off} 2,5$ s	$T_{on} 0,8 / T_{off} 2,5$ s
Overload protection		yes	yes
Starting torque	mNm	67	67
Rotor moment of inertia ( $J_R$ )	$kgm^2 \times 10^{-6}$	40	40
Thermal resistance ( $R_{th}$ )	K/W	3,6	4,1
Protection class		IP 00	IP 00
Ambient temperature range ( $T_U$ )	°C	0 to +40	0 to +40
Motor mass (m)	kg	0,24	0,24
Order No.		937 4310 600	937 4310 610



$F_{axial}$  10 N  
 $F_{radial}$  35 N     $L_1$  10 mm

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





Permissible S1 performance data

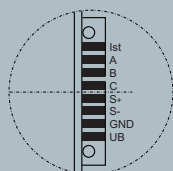
Order No. 937 4310 600

Speed n (rpm)	300	1000	2000	4000	5000
Torque M (mNm)	40	40	45	45	45
Input power $P_{S1 \text{ max}}$ (W)	7	11	19	30	45

Order No. 937 4310 610

Speed n (rpm)	300	1000	2000	4000
Torque M (mNm)	40	45	45	45
Input power $P_{S1 \text{ max}}$ (W)	10	15	20	30

Pin connection



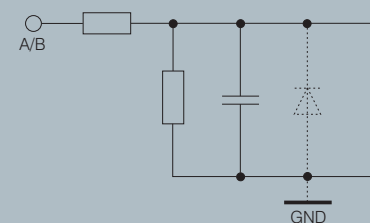
ACTUAL	ACTUAL Speed value	S+	Set value
A	Input A	S-	Ground set value
B	Input B	GND	Ground
C	Not connected	+UB	Supply voltage

1. Control inputs

A	B	
0	0	Output stage disabled
0	1	Counter-clockwise rotation
1	0	Clockwise rotation
1	1	Brake function*

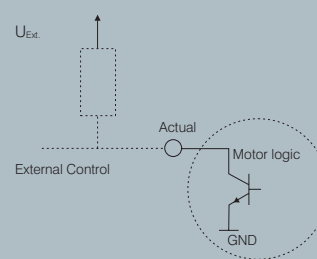
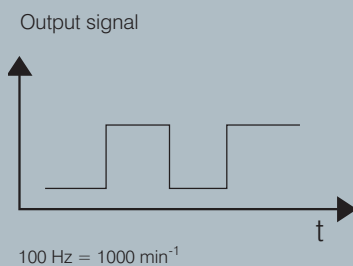
low (0) 0 to 0.8 V  
high (1) 2.4 to 30 V

\* Brake function:  
The braking function serves to slow down the motor only. It has no holding brake function for static duty.

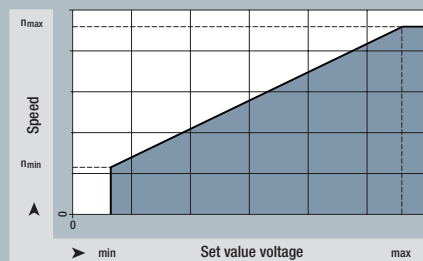


2. Actual speed value output

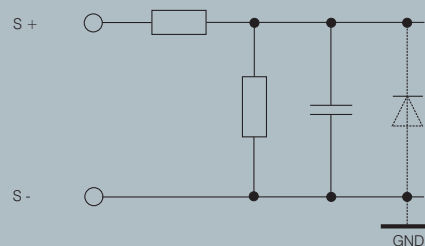
Version:  
Open Collector  
 $U_{\text{ext. max}} = 30 \text{ V}$   
 $U_{\text{CESAT}} = 0,5 \text{ V}$   
 $I_{\text{CMAX}} = 5 \text{ mA}$



3. Set value



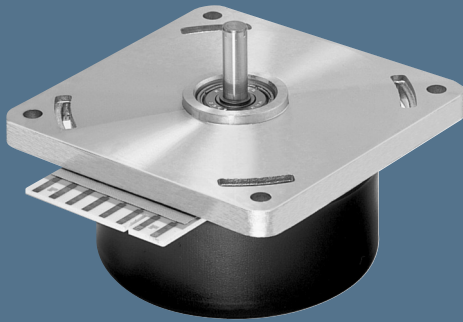
Speed setting for speed control via set value voltage (interface 0 to 10 V DC).



For detailed information, please refer to the corresponding specification data sheets. The instructions and safety notes in the operating manual must be observed at all times.

# VARIODRIVE Compact motor

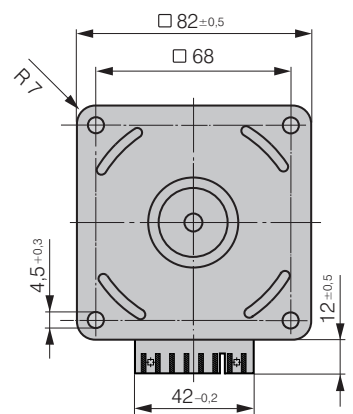
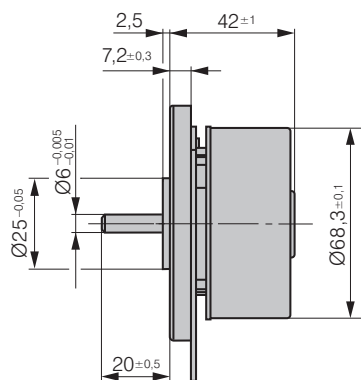
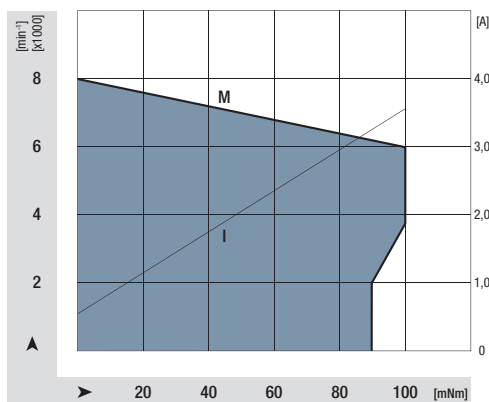
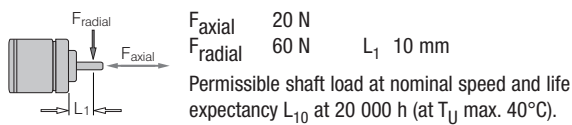
VDC-3-54.14



- 3-phase external rotor motor in EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- High operating efficiency due to FET power output stage.
- Analogue set value.
- Operating mode selection (direction of rotation, braking and motor enable) via 2 control inputs.
- Protection against overload due to integrated, speed-dependent current limiting.
- Customer-specific version possible based on software and hardware adaption (e.g. fixed speed, direction of rotation).

## Nominal data

Type		VDC-3-54.14 B01	VDC-3-54.14 B00
Nominal voltage ( $U_{BN}$ )	V DC	24	24
Permissible supply voltage range ( $U_B$ )	V DC	18 to 28	18 to 28
Nominal speed ( $n_N$ )	rpm	6 000	3 500
Nominal torque ( $M_N$ )	mNm	100	130
Nominal current ( $I_{BN}$ )	A	3,6	2,8
Nominal output power ( $P_N$ )	W	62,8	47,6
Speed at no-load operation ( $n_l$ )	rpm	8 000	4 000
No-load current ( $I_{Bl}$ )	A	0,51	0,21
Max. reverse voltage	V DC	40	40
Set value input	V	0 to 10	0 to 10
Set speed	rpm	0 to 10 000	0 to 4 000
Recommended speed control range	rpm	300 to 6 000	300 to 3 500
Locked-rotor protection		Protection pulsing	Protection pulsing
with locked-rotor protection clock		$T_{on} 0,8 / T_{off} 2,5$ s	$T_{on} 0,8 / T_{off} 2,5$ s
Overload protection		yes	yes
Starting torque	mNm	120	120
Rotor moment of inertia ( $J_R$ )	$kgm^2 \times 10^{-6}$	145	145
Thermal resistance ( $R_{th}$ )	K/W	2,5	3,0
Protection class		IP 00	IP 00
Ambient temperature range ( $T_U$ )	°C	0 to +40	0 to +40
Motor mass (m)	kg	0,52	0,52
Order No.		937 5414 622	937 5414 620



**Permissible S1 performance data**

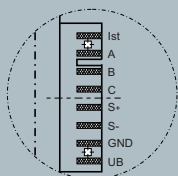
**Order No. 937 5414 622**

Speed n (rpm)	300	1000	2000	4000	6000
Torque M (mNm)	90	90	90	100	100
Input power P <sub>S1 max</sub> (W)	14	22	33	63	88

**Order No. 937 5414 620**

Speed n (rpm)	300	1000	2000	4000
Torque M (mNm)	110	110	120	130
Input power P <sub>S1 max</sub> (W)	14	23	40	70

**Pin connection**



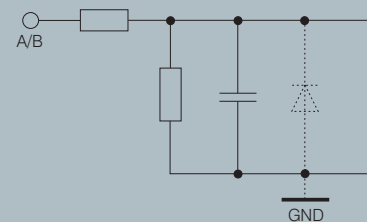
ACTUAL	ACTUAL Speed value	S+	Set value
A	Input A	S-	Ground set value
B	Input B	GND	Ground
C	Not connected	+UB	Supply voltage

**1. Control inputs**

A	B	
0	0	Output stage disabled
0	1	Counter-clockwise rotation
1	0	Clockwise rotation
1	1	Brake function*

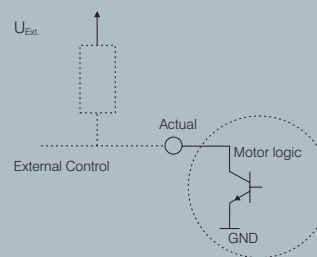
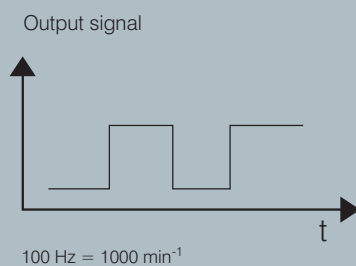
low (0) 0 to 0,8 V  
high (1) 2,4 to 30 V

\* Brake function:  
The braking function serves to slow down the motor only. It has no holding brake function for static duty.

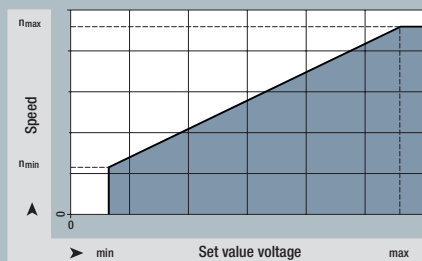


**2. Actual speed value output**

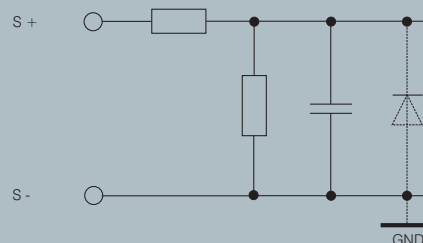
Version:  
Open Collector  
U<sub>ext. max</sub> = 30 V  
U<sub>CESAT</sub> = 0,5 V  
I<sub>CMAX</sub> = 5mA



**3. Set value**



Speed setting for speed control via set value voltage (interface 0 to 10 V DC).



For detailed information, please refer to the corresponding specification data sheets. The instructions and safety notes in the operating manual must be observed at all times.

# VARIODRIVE Compact motor

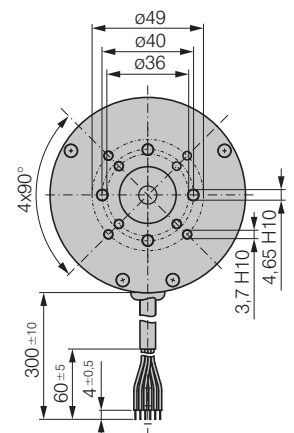
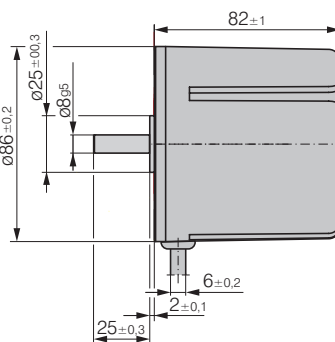
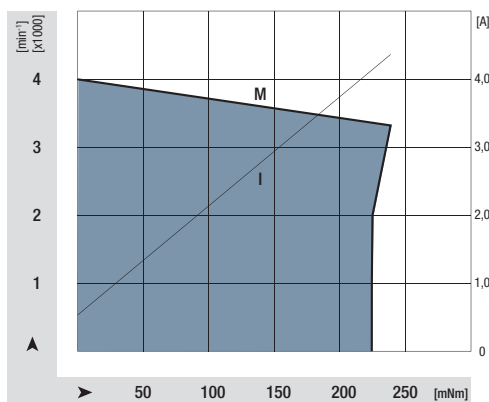
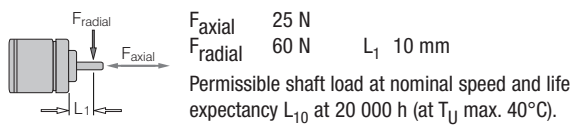
VDC-3-54.32



- 3-phase external rotor motor in EC technology.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- High operating efficiency due to FET power output stage.
- Analogue set value.
- Operating mode selection (direction of rotation, braking and motor enable) via 2 control inputs.
- Protection against overload due to integrated, speed-dependent current limiting.
- Customer-specific version possible based on software and hardware adaption (e.g. fixed speed, direction of rotation).

## Nominal data

Type	VDC-3-54.32 B00	
Nominal voltage ( $U_{BN}$ )	V DC	24
Permissible supply voltage range ( $U_B$ )	V DC	18 to 28
Nominal speed ( $n_N$ )	rpm	3 300
Nominal torque ( $M_N$ )	mNm	240
Nominal current ( $I_{BN}$ )	A	4,3
Nominal output power ( $P_N$ )	W	83
Speed at no-load operation ( $n_l$ )	rpm	4 100
No-load current ( $I_{Bl}$ )	A	0,5
Max. reverse voltage	V DC	40
Set value input	V	0 to 10
Set speed	rpm	0 to 4 000
Recommended speed control range	rpm	300 to 3 300
Locked-rotor protection		Protection pulsing
with locked-rotor protection clock		$T_{on}$ 0,8 / $T_{off}$ 2,5 s
Overload protection		yes
Starting torque	mNm	280
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> x10 <sup>-6</sup>	500
Thermal resistance ( $R_{th}$ )	K/W	2,15
Protection class		IP 40
Ambient temperature range ( $T_U$ )	°C	0 to +40
Motor mass (m)	kg	1,1
Order No.		937 5432 610



**Permissible S1 performance data**

**Order No. 937 5432 610**

Speed n (rpm)	300	1000	2000	3300
Torque M (mNm)	225	225	225	240
Input power P <sub>S1 max</sub> (W)	31	50	70	115

**Pin connection**

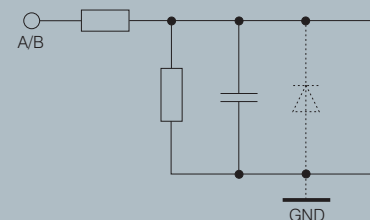
Yellow	ACTUAL	Actual speed value	Green	S+	Set value
White	A	Input A	-	S-	Ground set value
Grey	B	Input B	Black	GND	Ground
-	C	Not connected	Red	+Ub	Supply voltage

**1. Control inputs**

A	B	
0	0	Output stage disabled
0	1	Counter-clockwise rotation
1	0	Clockwise rotation
1	1	Brake function*

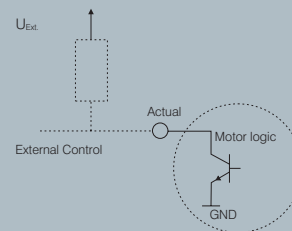
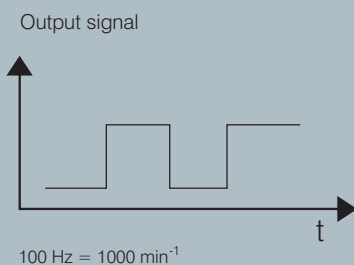
low (0) 0 to 0,8 V  
high (1) 2,4 to 30 V

\* Brake function:  
The braking function serves to slow down the motor only. It has no holding brake function for static duty.

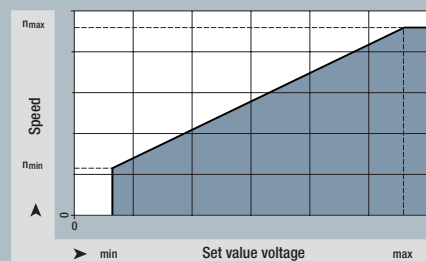


**2. Actual speed value output**

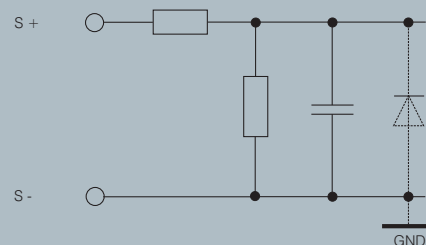
Version:  
Open Collector  
U<sub>ext. max</sub> = 30 V  
U<sub>CESAT</sub> = 0,5 V  
I<sub>CMAX</sub> = 5mA



**3. Set value**



Speed setting for speed control via set value voltage (interface 0 to 10 V DC).



For detailed information, please refer to the corresponding specification data sheets. The instructions and safety notes in the operating manual must be observed at all times.

# VARIODRIVE Compact motor

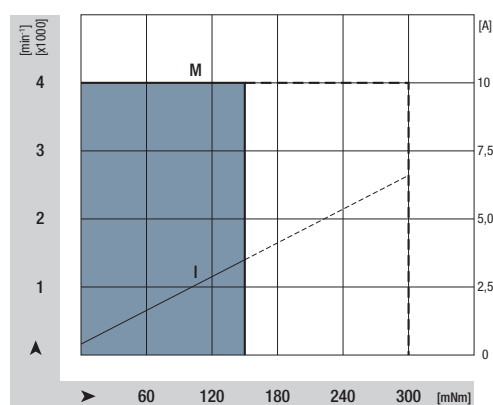
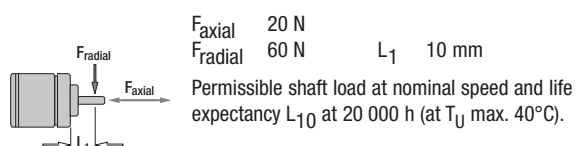
VDC-3-49.15



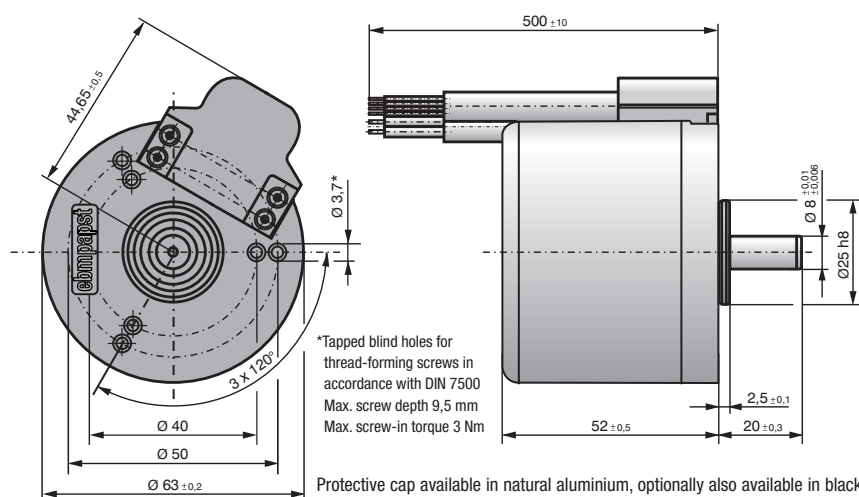
- 3-phase external rotor motor in EC technology.
- Multi-pole motor design with powerful neodymium magnet
- High power density with compact model.
- Integrated operating electronics with high-performance DSP.
- Excellent control behaviour with field-oriented control with sinus commutation.
- Extensive interface for variety of functions and operating mode selection.
- Overload protection with integrated temperature shutoff.
- Robust mechanical design with aluminium cover and sealed plug system.

## Nominal data

Type		VDC-3-49.15 B00	VDC-3-49.15 D00
Nominal voltage ( $U_N$ )	V DC	24	48
Permissible supply voltage range ( $U_{ZK}$ )	V DC	18 to 30	18 to 55
Nominal speed ( $n_N$ )	rpm	4 000	4 000
Nominal torque ( $M_N$ )	mNm	150	250
Nominal current ( $I_N$ )	A	3,5	2,75
Nominal output power ( $P_N$ )	W	63	105
Speed at no-load operation ( $n_L$ )	rpm	4 000	4 000
No-load current ( $I_L$ )	A	0,4	0,25
Max. reverse voltage	V DC	36,7	63
Set value input	V DC	0 ... 10	0 ... 10
Set speed	rpm	0 ... 4 000	0 ... 4 000
Recommended speed control range	rpm	0 ... 4 000	0 ... 4 000
Locked-rotor protection		thermal	thermal
with locked-rotor protection clock		no	no
Overload protection		yes	yes
Starting torque	mNm	300	500
Rotor moment of inertia ( $J_R$ )	kgm <sup>2</sup> ×10 <sup>-6</sup>	108	108
Thermal resistance ( $R_{th}$ )	K/W	-	-
Protection class		IP 54*	IP 54*
Ambient temperature range ( $T_U$ )	°C	0 ... +40	0 ... +40
Motor mass (m)	kg	0,59	0,59
Order No.		937 4915 600	937 4915 607



\* Type of protection specified pertains to installed state with seal on the flange side.



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

Protective cap available in natural aluminium, optionally also available in black.

**Basic functions:**

- Closed-loop speed control with analogue set value input.
- Control of speed  $n = 0$  with holding torque.
- Extended motor dynamics based on short-term  $I^2t$  peak current limitation.
  - Depending on the ambient conditions the increased peak torque can be used up to a few minutes.
- Torque limitation via analogue set value input (for current limitation).
- Control input for hardware enable for safe switch-on after safety shut-off.
- Separate signal output for information on direction of rotation.
- Signal output for status display of the drive (drive ready yes/no).
- Separate power supply for motor logic (logic power supply can remain active even when motor is switched off).

**Pin connection**

Colour	Function	Description	Circuit*
Blue (1,5 mm <sup>2</sup> )	Gnd	Power supply earth	yes
Brown (1,5 mm <sup>2</sup> )	+Ub	Logic power supply	yes
Black (1,5 mm <sup>2</sup> )	UZK	Power supply	yes
Blue	Gnd	Power supply earth	optional
Pink	S1	0 to 10 V – speed controller	yes
Green	TXD	Communication / programming interface	no
White	RXD	Communication / programming interface	no
Grey-Pink	A	Control input A, TTL level	yes
Violet	B	Control input B, TTL level	yes
Grey	IST	Actual value 1	optional
Red-Blue	F+	Frequency specification for speed setpoint	no
Brown	S2	0 to +5 V current limitation (torque)	yes
Black	C	Control input C – hardware enable	yes
Red	E	Actual value 2	optional
Yellow	D	Drive status	optional

\*Connections marked "No" must not be occupied when carrying out basic functions.

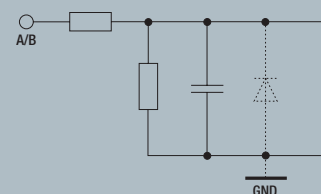
Other options on request:

- Set value input for closed loop speed control operation via set value frequency or PWM signal.
- Programming of the  $I^2t$  peak current limitation.
- 2-channel encoder signal with up to 100 pulses/revolution via programmable division ratio of the actual value output between both outputs.
- Electrically isolated inputs and outputs.
- Control inputs for direction of rotation and brakes with line break detection.
- Version with CANopen bus interface (DSP 402).

**1. Actual speed value output**

A	B		low (0)	0 to 0,8 V
			high (1)	2,4 to 30 V
0	0	Output stage disabled		
0	1	Counter-clockwise rotation		
1	0	Clockwise rotation		
1	1	Brake function*		

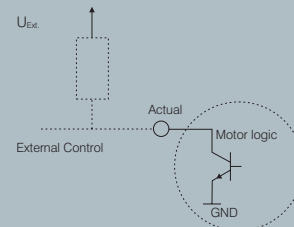
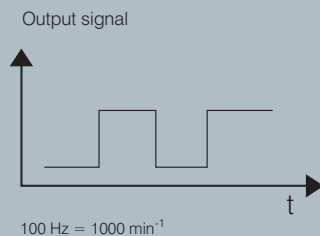
\*Brake operation:  
In holding status, the position can be held for long periods at rated torque or for short periods ( $I^2t$  function) at start-up torque.



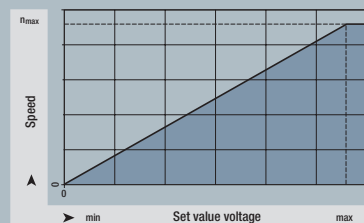
**2. Actual speed value output**

**Version:**

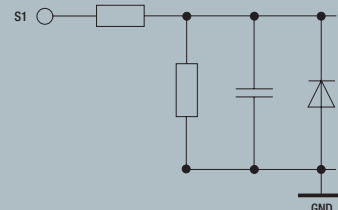
- Open Collector
- $U_{ext. max} = < 36 V$
- $U_{CESAT} = 0,4 V$
- $I_{CMAX} = < 10 mA$



**3. Set value input**



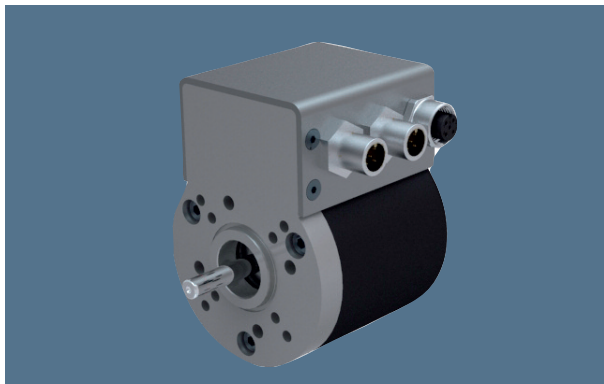
Speed setting for closed loop speed control using set point voltage (0 to 10 V DC interface)



For detailed information, please refer to the corresponding specification data sheets. The instructions and safety notes in the operating manual must be observed at all times.

# VDC-3-49-15

with electronics module K5

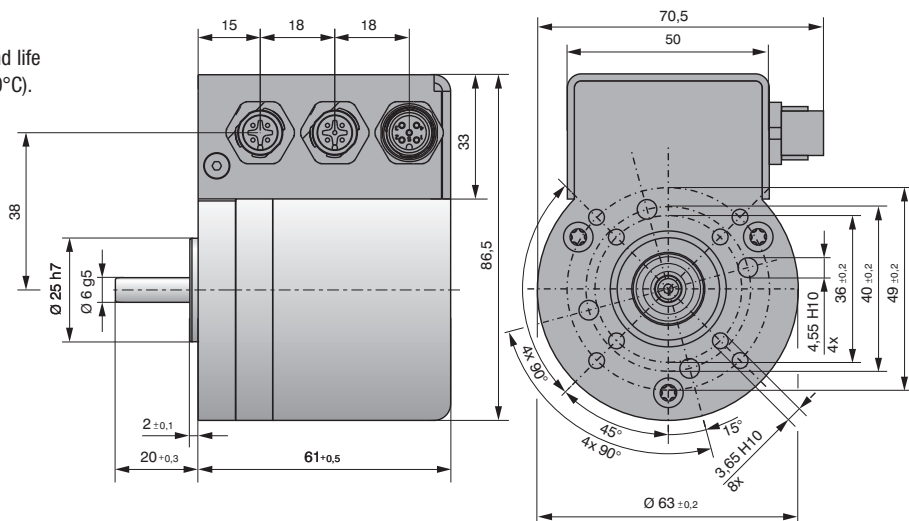
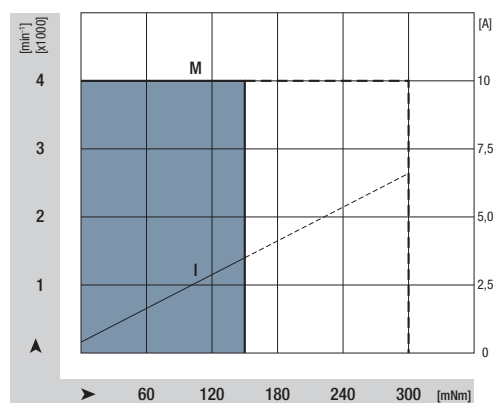
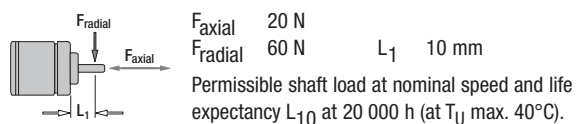


- Completely integrated operation and control electronics "K5" with CANopen communication interface and programming functionality
- Sine commutation of the drive based on field oriented control (FOC) and 4-quadrant operation
- Speed control range down to  $n=0$  rpm with holding torque
- Different modes of operation based on DSP 402 standard (speed, position, homing, torque) through CANopen interface
- Electronics-module in IP 54 version
- Connector system in sealed M12 industry standard
- Interface with digital inputs

## Nominal data

Type	VDC5-3-49.15 B00	
Nominal voltage ( $U_N$ )	V DC	24
Permissible supply voltage range ( $U_{ZK}$ )	V DC	18 to 30
Nominal speed ( $n_N$ )	rpm	4 000
Nominal torque ( $M_N$ )	mNm	150
Nominal current ( $I_N$ )	A	3,5
Nominal output power ( $P_N$ )	W	63
Speed at no-load operation ( $n_L$ )	rpm	4 000
No-load current ( $I_L$ )	A	0,4
Max. reverse voltage	V DC	36,7
Set value input		Can Bus
Set speed	rpm	0 ... 4 000
Recommended speed control range	rpm	0 ... 4 000
Locked-rotor protection		thermal
with locked-rotor protection clock		no
Overload protection		yes
Starting torque	mNm	300
Rotor moment of inertia ( $J_R$ )	$\text{kgm}^2 \times 10^{-6}$	108
Thermal resistance ( $R_{th}$ )	K/W	-
Protection class		IP 54*
Ambient temperature range ( $T_U$ )	$^{\circ}\text{C}$	0 ... +40
Motor mass ( $m$ )	kg	0,59
Order No.		-

\* Type of protection specified pertains to installed state with seal on the flange side.

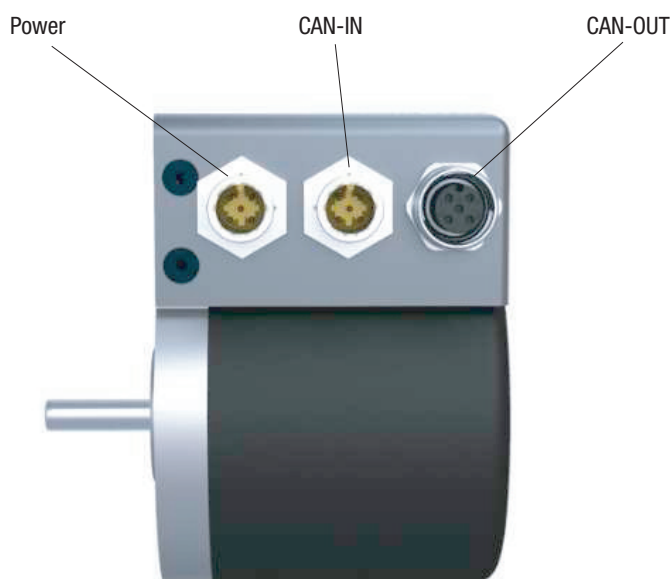




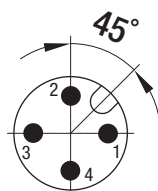
## Description of connection interface with electronics module K5

The VDC-3-49.15 with built-on electronics module K5 is an extremely compact drive unit.

With the CANopen interface, the extensive functionality and the robust design the motor is suitable for a large variety of applications such as automated format adjustments or torque-controlled winder drives.

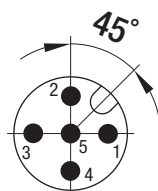


**Power:**



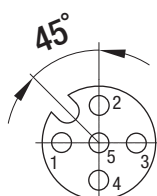
Pin 1	UZK	Power supply motor
Pin 2	GND	Power/ logic supply
Pin 3	UB	Logic supply
Pin 4	IN 1	Digital input

**CAN-IN:**



Pin 1	n.c.	
Pin 2	IN 2	Digital input
Pin 3	CAN-GND	CAN-GND
Pin 4	CAN_H	CAN High Signal
Pin 5	CAN_L	CAN Low Signal

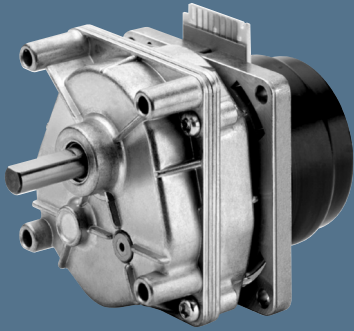
**CAN-OUT:**



Pin 1	n.c.	
Pin 2	IN 3	Digital input
Pin 3	CAN-GND	CAN-GND
Pin 4	CAN_H	CAN High Signal
Pin 5	CAN_L	CAN Low Signal

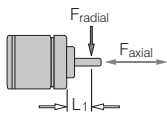
# VARIODRIVE Compact gearmotor

VDC-3-43.10-C



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data		Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i			Nm	rpm	kg	
VDC-3-43.10 B00-C/16	16 : 1	2	0,6	19 to 250	0,53	947 4310 600	
VDC-3-43.10 B00-C/23	22,9 : 1	2	0,8	13 to 175	0,53	947 4310 601	
VDC-3-43.10 B00-C/32	32 : 1	2	1,2	9 to 125	0,53	947 4310 602	
VDC-3-43.10 B00-C/45	45,4 : 1	3	1,5	7 to 88	0,55	947 4310 603	
VDC-3-43.10 B00-C/58	57,8 : 1	3	1,9	5 to 69	0,55	947 4310 604	
VDC-3-43.10 B00-C/79	79,1 : 1	3	2,6	4 to 51	0,55	947 4310 605	
VDC-3-43.10 B00-C/122	121,6 : 1	3	4,0	2 to 33	0,55	947 4310 606	

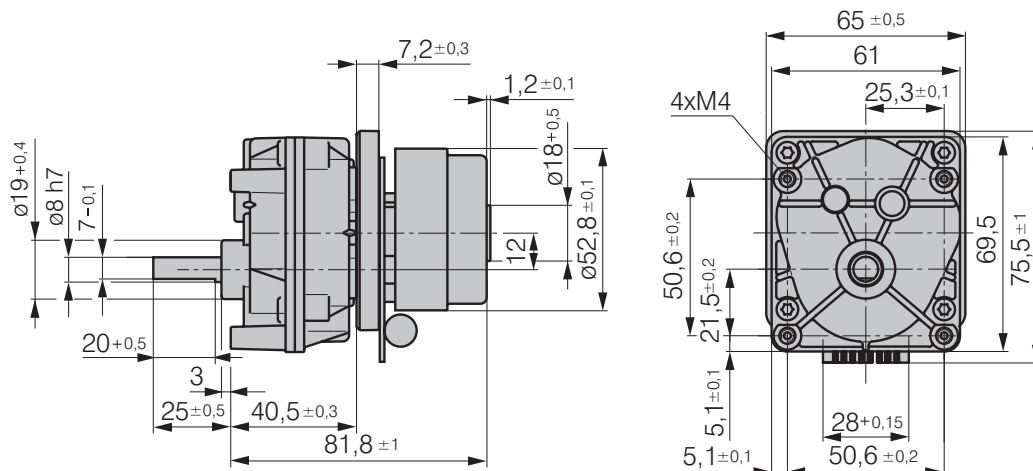


$F_{axial}$  40 N  
 $F_{radial}$  120 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

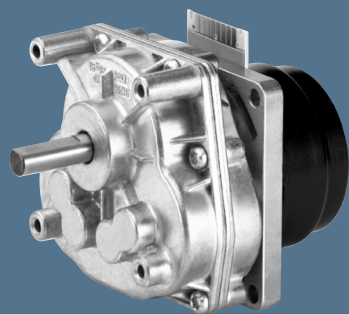
## Gear type C

Multi-stage spur gear in die-cast zinc body.  
 Grease lubrication for maintenance-free continuous operation.  
 Shaft output with combined sleeve / needle bearing.  
 Reversible direction of rotation.



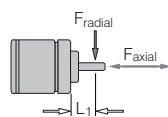
# VARIODRIVE Compact gearmotor

VDC-3-43.10-D



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i		Nm	rpm	kg	
VDC-3-43.10 B00-D/11	11,3 : 1	2	0,4	27 to 354	0,59	947 4310 610
VDC-3-43.10 B00-D/13	13,2 : 1	2	0,5	23 to 303	0,59	947 4310 611
VDC-3-43.10 B00-D/16	15,9 : 1	2	0,6	19 to 252	0,59	947 4310 612
VDC-3-43.10 B00-D/26	26,4 : 1	2	1,0	11 to 152	0,59	947 4310 613
VDC-3-43.10 B00-D/39	38,6 : 1	2	1,4	8 to 104	0,59	947 4310 614

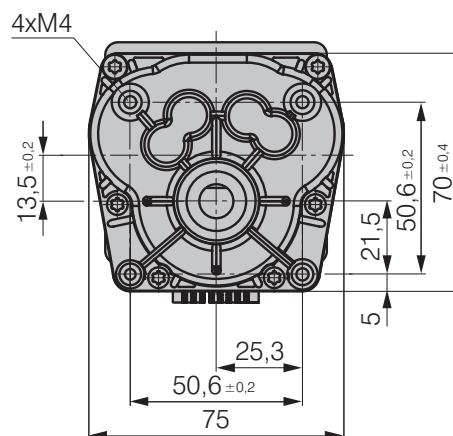
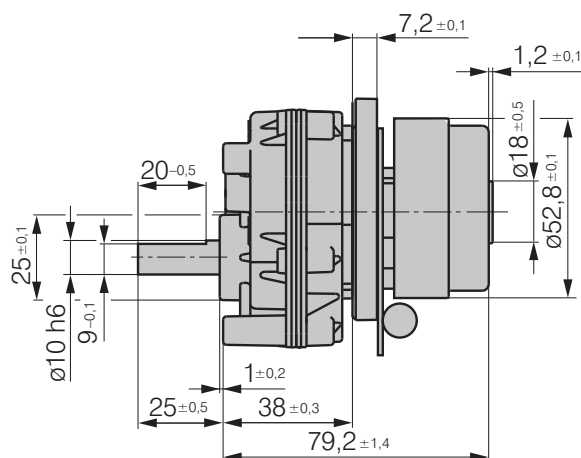


$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

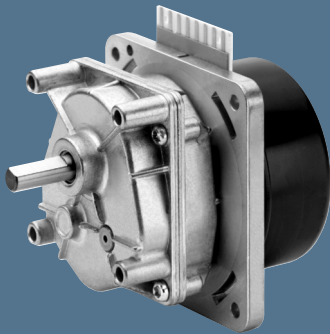
## Gear type D

Multi-stage spur gear in die-cast zinc body.  
 Grease lubrication for maintenance-free continuous operation.  
 Shaft output with combined sleeve / needle bearing.  
 Reversible direction of rotation.



# VARIODRIVE Compact gearmotor

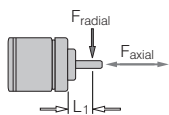
VDC-3-54.14-C



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i		Nm	rpm	kg	
VDC-3-54.14 B00-C/16	16 : 1	2	1,7	19 to 250	0,81	947 5414 600
VDC-3-54.14 B00-C/23	22,9 : 1	2	2,4	13 to 175	0,81	947 5414 601
VDC-3-54.14 B00-C/32	32 : 1	2	3,4	9 to 125	0,81	947 5414 602
VDC-3-54.14 B00-C/45	45,4 : 1	3	4,3	7 to 88	0,83	947 5414 603
VDC-3-54.14 B00-C/58	57,8 : 1	3	5,5	5 to 69	0,83	947 5414 604
VDC-3-54.14 B00-C/79	79,1 : 1	3	7,0*	4 to 51	0,83	947 5414 605
VDC-3-54.14 B00-C/122	121, 6 : 1	3	7,0*	2 to 33	0,83	947 5414 606

\*Monitor torque limitation at max. 7.0 Nm on output side.



$F_{axial}$  40 N  
 $F_{radial}$  120 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

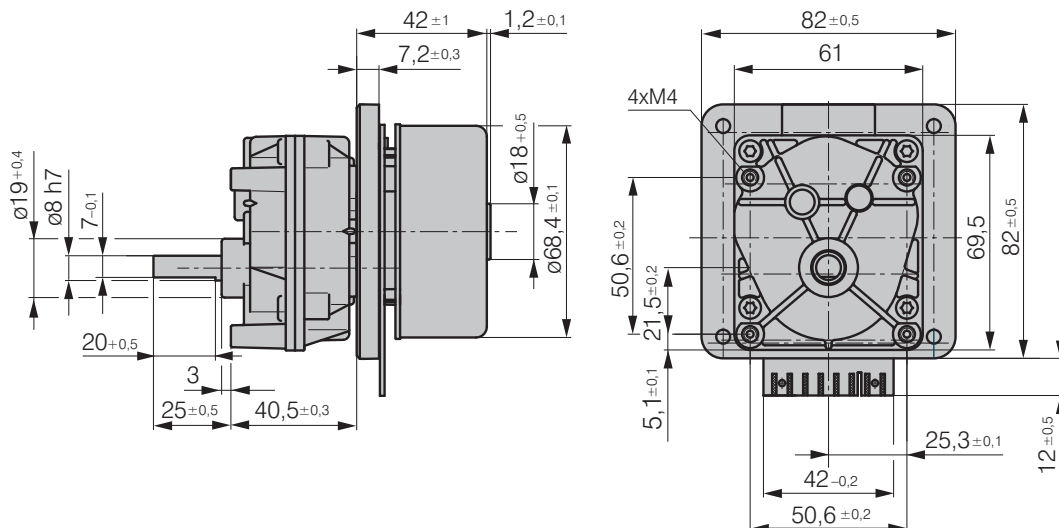
## Gear type C

Multi-stage spur gear in die-cast zinc body.

Grease lubrication for maintenance-free continuous operation.

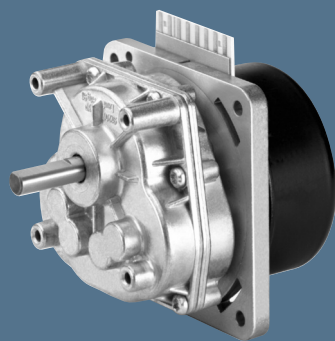
Shaft output with combined sleeve / needle bearing.

Reversible direction of rotation.



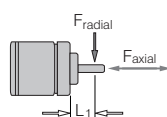
# VARIODRIVE Compact gearmotor

VDC-3-54.14-D



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i		Nm	rpm	kg	
VDC-3-54.14 B00-D/11	11,3 : 1	2	1,2	27 to 354	0,9	947 5414 610
VDC-3-54.14 B00-D/16	15,9 : 1	2	1,7	19 to 252	0,9	947 5414 611
VDC-3-54.14 B00-D/26	26,4 : 1	2	2,8	11 to 152	0,9	947 5414 612
VDC-3-54.14 B00-D/39	38,6 : 1	2	4,1	8 to 104	0,9	947 5414 613

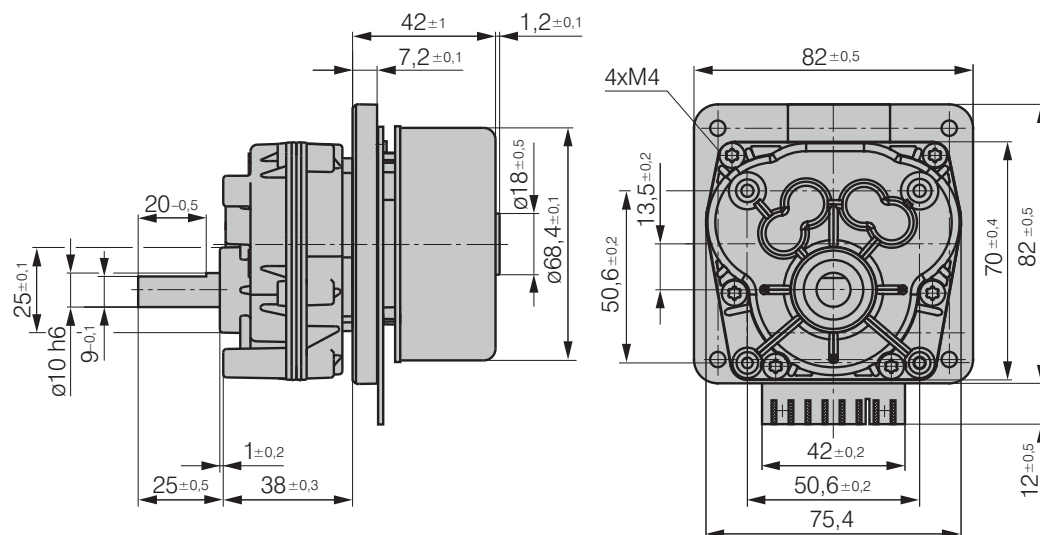


$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

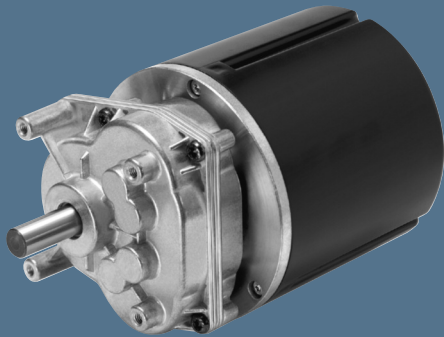
## Gear type D

Multi-stage spur gear in die-cast zinc body.  
 Grease lubrication for maintenance-free continuous operation.  
 Shaft output with combined sleeve / needle bearing.  
 Reversible direction of rotation.



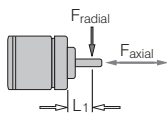
# VARIODRIVE Compact gearmotor

VDC-3-54.32-D



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i		Nm	rpm	kg	
VDC-3-54.32 B00-D/9	9,2 : 1	2	1,8	33 to 359	1,45	947 5432 610
VDC-3-54.32 B00-D/18	18,4 : 1	2	3,6	16 to 179	1,45	947 5432 611

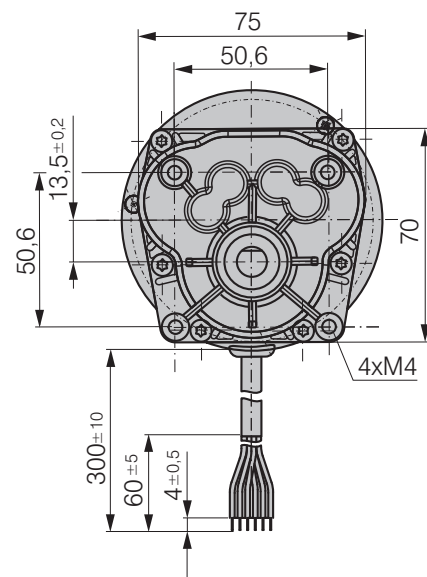
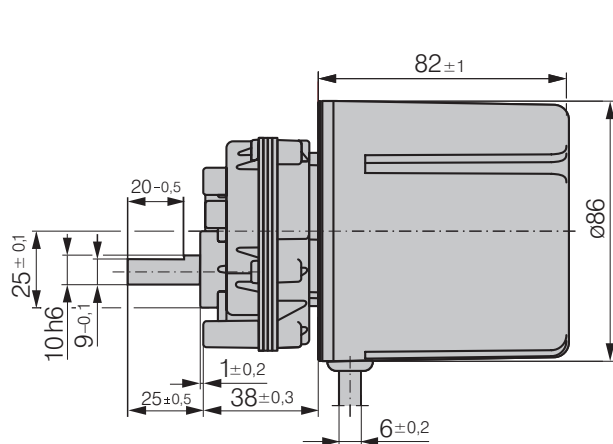


$F_{axial}$  50 N  
 $F_{radial}$  150 N     $L_1$  17 mm  
 Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

## Gear type D

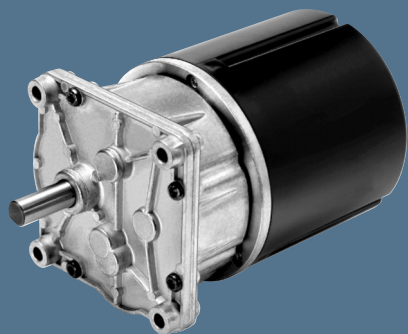
Multi-stage spur gear in die-cast zinc body.  
 Grease lubrication for maintenance-free continuous operation.  
 Shaft output with combined sleeve / needle bearing.  
 Reversible direction of rotation.

Yellow	ACTUAL	ACTUAL Speed value
White	A	Input A
Grey	B	Input B
-	C	Not connected
Green	S+	Set value
-	S-	Ground set value
Black	GND	Ground
Red	+Ub	Supply voltage



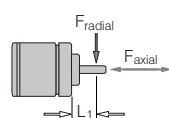
# VARIODRIVE Compact gearmotor

VDC-3-54.32-E



- 3-phase external rotor motor in EC technology for gear applications.
- Dynamically balanced rotor with 4-pole, plastic bonded ferrite magnet.
- Integrated operating electronics with powerful microcontroller.
- Excellent control response due to digital 4-Q PI controller.
- Analogue set value.
- Available in various reduction ratios.

Nominal data		Gear ratio	Gear stages	Nominal torque	Speed range	Mass	Order No.
Type	i		Nm	rpm	kg		
VDC-3-54.32 B00-E/31	31,1 : 1	2	6,0	10 to 106	1,58	947 5432 620	
VDC-3-54.32 B00-E/70	70,4 : 1	3	12,3	4 to 47	1,58	947 5432 621	

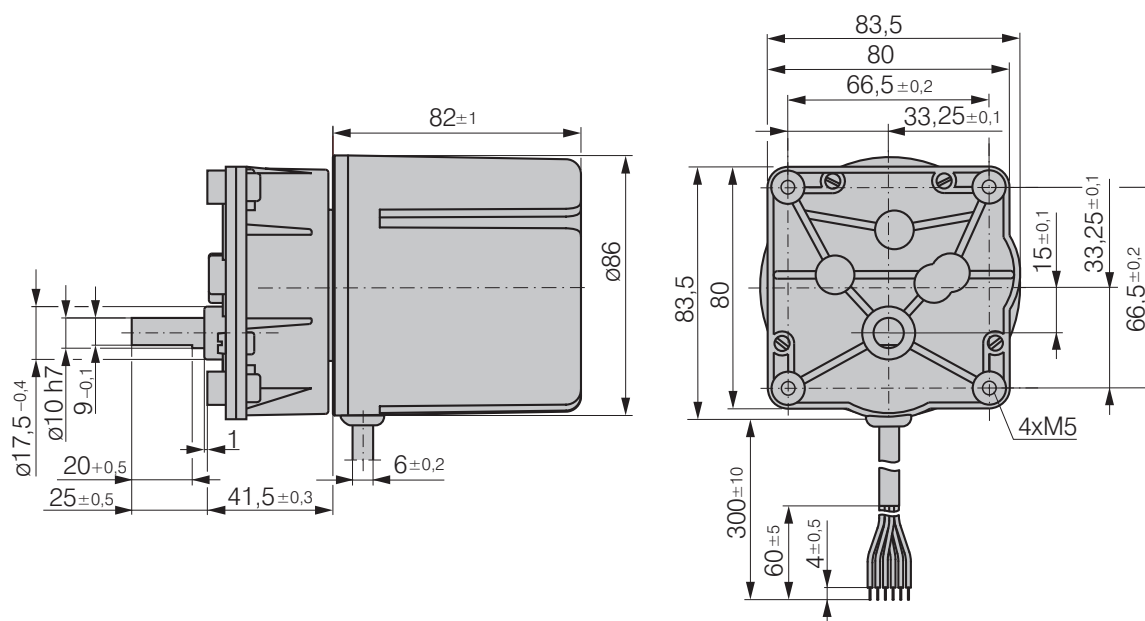


$F_{axial}$  50 N  
 $F_{radial}$  150 N     $L_1$  17 mm  
 Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

## Gear type E

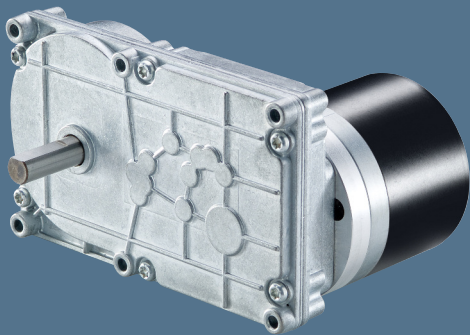
Multi-stage spur gear in die-cast zinc body.  
 Grease lubrication for maintenance-free continuous operation.  
 Shaft output with combined sleeve / needle bearing.  
 Reversible direction of rotation.

Yellow	ACTUAL	ACTUAL Speed value
White	A	Input A
Grey	B	Input B
-	C	Not connected
Green	S+	Set value
-	S-	Ground set value
Black	GND	Ground
Rot	+Ub	Supply voltage



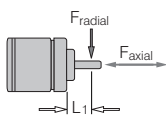
# VARIODRIVE Compact gearmotor

VDC-3-49.15-B



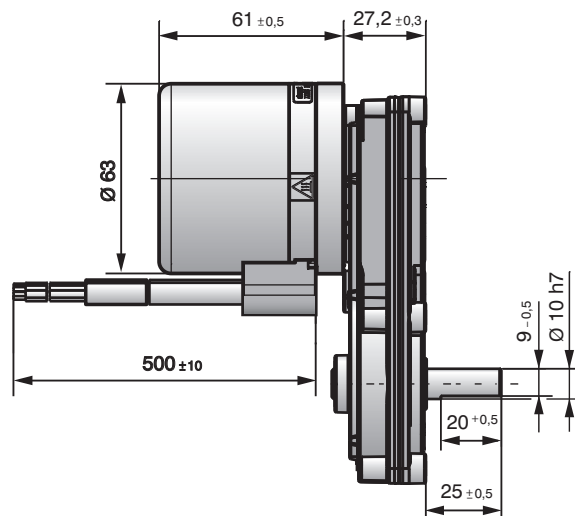
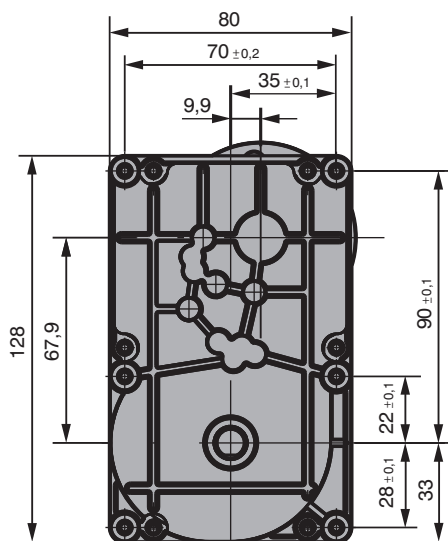
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with multi-stage spur gearboxes in flat design
- Gearbox housing made of die-cast zinc
- Noise-optimised helical gears in the first stage
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-B/8	8,2 : 1	3	0,9	0 to 488	1,2
VDC-3-49.15 B00-B/12	12,3 : 1	3	1,3	0 to 325	1,2
VDC-3-49.15 B00-B/28	27,6 : 1	3	3,0	0 to 145	1,2
VDC-3-49.15 B00-B/40	40,3 : 1	3	4,4	0 to 99	1,2
VDC-3-49.15 B00-B/64	64,0 : 1	3	7,0	0 to 63	1,2
VDC-3-49.15 B00-B/102	101,8 : 1	3	11,1	0 to 39	1,2



$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).





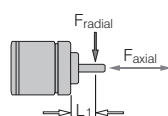
# VARIODRIVE Compact gearmotor

VDC-3-49.15-D



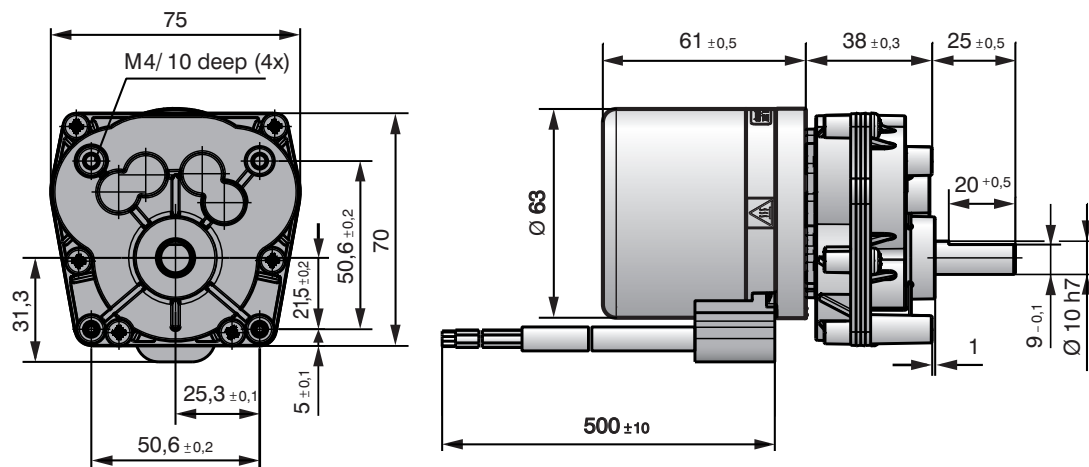
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with multi-stage spur gearboxes in flat design
- Gearbox housing made of die-cast zinc
- Noise-optimised helical gears in the first stage
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-D/9	9,2 : 1	2	1,1	0 to 435	1,1
VDC-3-49.15 B00-D/18	18,4 : 1	2	2,2	0 to 217	1,1
VDC-3-49.15 B00-D/28	27,6 : 1	2	3,4	0 to 145	1,1



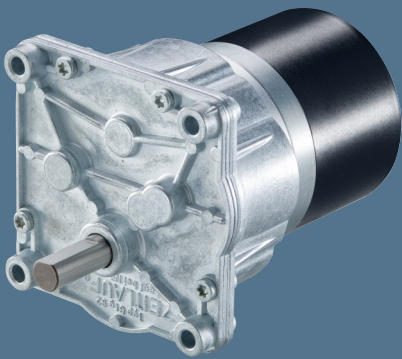
$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).



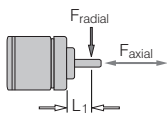
# VARIODRIVE Compact gearmotor

VDC-3-49.15-E



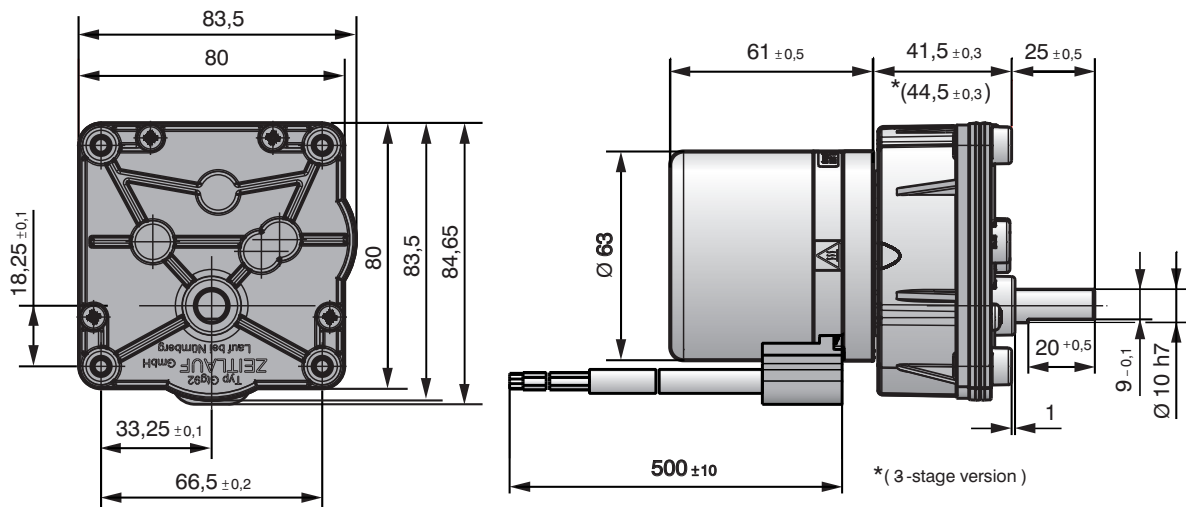
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with multi-stage spur gearboxes in flat design
- Gearbox housing made of die-cast zinc
- Noise-optimised helical gears in the first stage
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data		Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg	
VDC-3-49.15 B00-E/16	15,5 : 1	2	1,9	0 to 258	1,1	
VDC-3-49.15 B00-E/18	18,4 : 1	2	2,2	0 to 217	1,1	
VDC-3-49.15 B00-E/23	23,1 : 1	2	2,8	0 to 173	1,1	
VDC-3-49.15 B00-E/31	31,1 : 1	2	3,8	0 to 129	1,1	
VDC-3-49.15 B00-E/40	40,1 : 1	2	4,9	0 to 100	1,1	
VDC-3-49.15 B00-E/55	55,0 : 1	3	6,0	0 to 73	1,2	
VDC-3-49.15 B00-E/70	70,4 : 1	3	7,7	0 to 57	1,2	
VDC-3-49.15 B00-E/92	92,3 : 1	3	10,1	0 to 43	1,2	



$F_{axial}$  50 N  
 $F_{radial}$  150 N     $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).



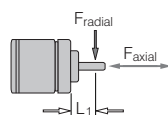
# VARIODRIVE Compact gearmotor

VDC-3-49.15-PX63 / -PX63 HRL



- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with one- and multi-stage planetary gearboxes in modular design
- Gearbox housing made of die-cast zinc
- First stage with noise optimized helical gears made of low-friction-optimised plastics
- Second stage with planetary gears made of case-hardened steel for high torques
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios
- Version HRL 63 with reinforced support of the output stage for increased radial loads

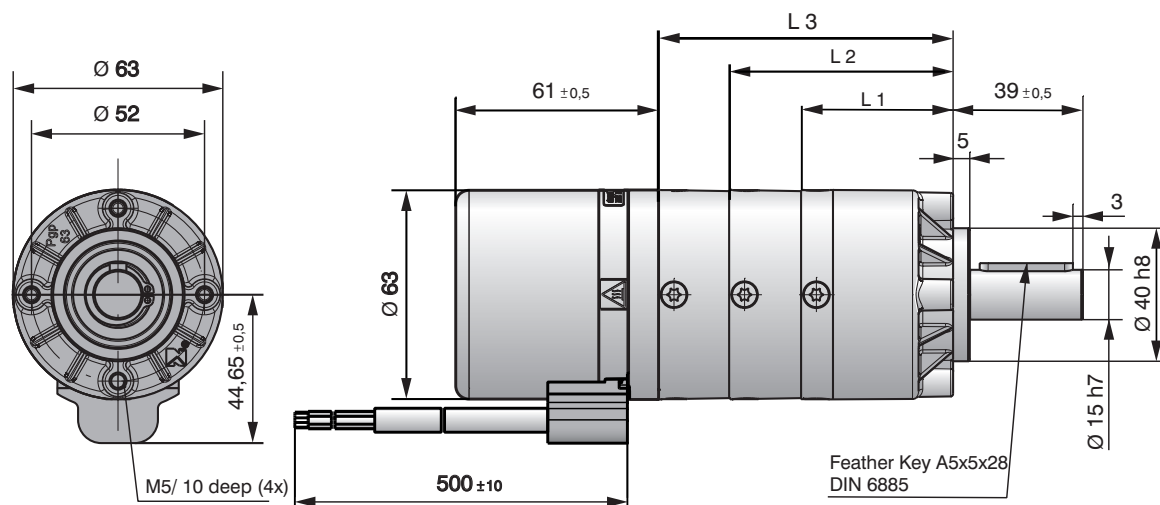
Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-PX63/3	3,2 : 1	1	0,4	0 to 1258	1,1
VDC-3-49.15 B00-PX63/5	5,0 : 1	1	0,7	0 to 800	1,1
VDC-3-49.15 B00-PX63/21	21,3 : 1	2	2,6	0 to 188	1,3
VDC-3-49.15 B00-PX63/30	30,0 : 1	2	3,6	0 to 133	1,3
VDC-3-49.15 B00-PX63HRL/5	5,0 : 1	1	0,7	0 to 800	1,4
VDC-3-49.15 B00-PX63HRL/9	9,0 : 1	1	1,2	0 to 444	1,4
VDC-3-49.15 B00-PX63HRL/30	30,0 : 1	2	3,6	0 to 133	2,0



$F_{axial}$  500 N  
 $F_{radial}$  350 N (PX.), 500 N (PX..HRL)  $L_1$  19 mm  
 Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).

## Motor length (mm)

Type	Motor length (mm)
L3	PX 63 2-stage with HRL 88,6 ± 0,3
L2	PX 63 1-stage with HRL 67,2 ± 0,3
L2	PX 63 2-stage without HRL 67,2 ± 0,3
L1	PX 63 1-stage without HRL 45,8 ± 0,3



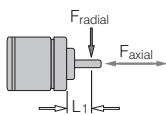
# VARIODRIVE Compact gearmotor

VDC-3-49.15-PN63



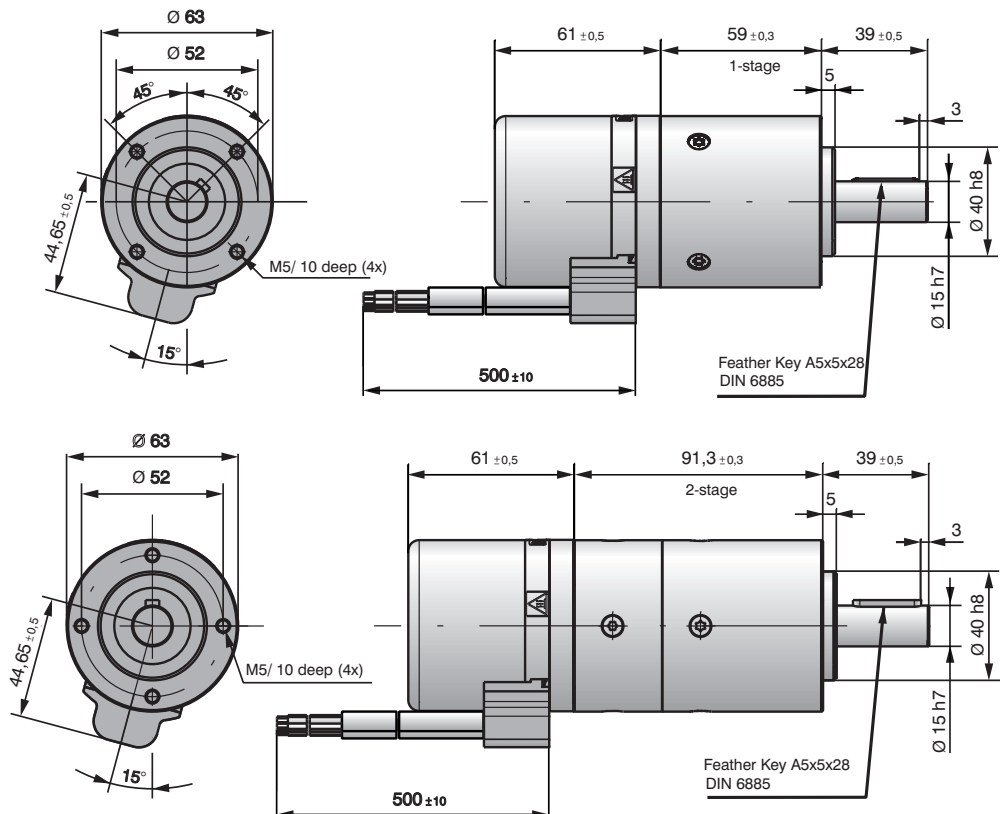
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with one- and multi-stage planetary gearboxes
- Gearbox housing made of machined aluminium
- Precision machined gears in the aluminium hollow wheel
- Noise-optimised helical gears in all stages
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-PN63/4	4,3 : 1	1	0,6	0 to 930	1,2
VDC-3-49.15 B00-PN63/6	6,0 : 1	1	0,8	0 to 667	1,2
VDC-3-49.15 B00-PN63/26	26,0 : 1	2	3,2	0 to 154	1,4



$F_{axial}$  1000 N  
 $F_{radial}$  500 N  $L_1$  19 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).



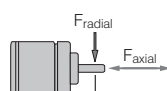
# VARIODRIVE Compact gearmotor

VDC-3-49.15-EC75



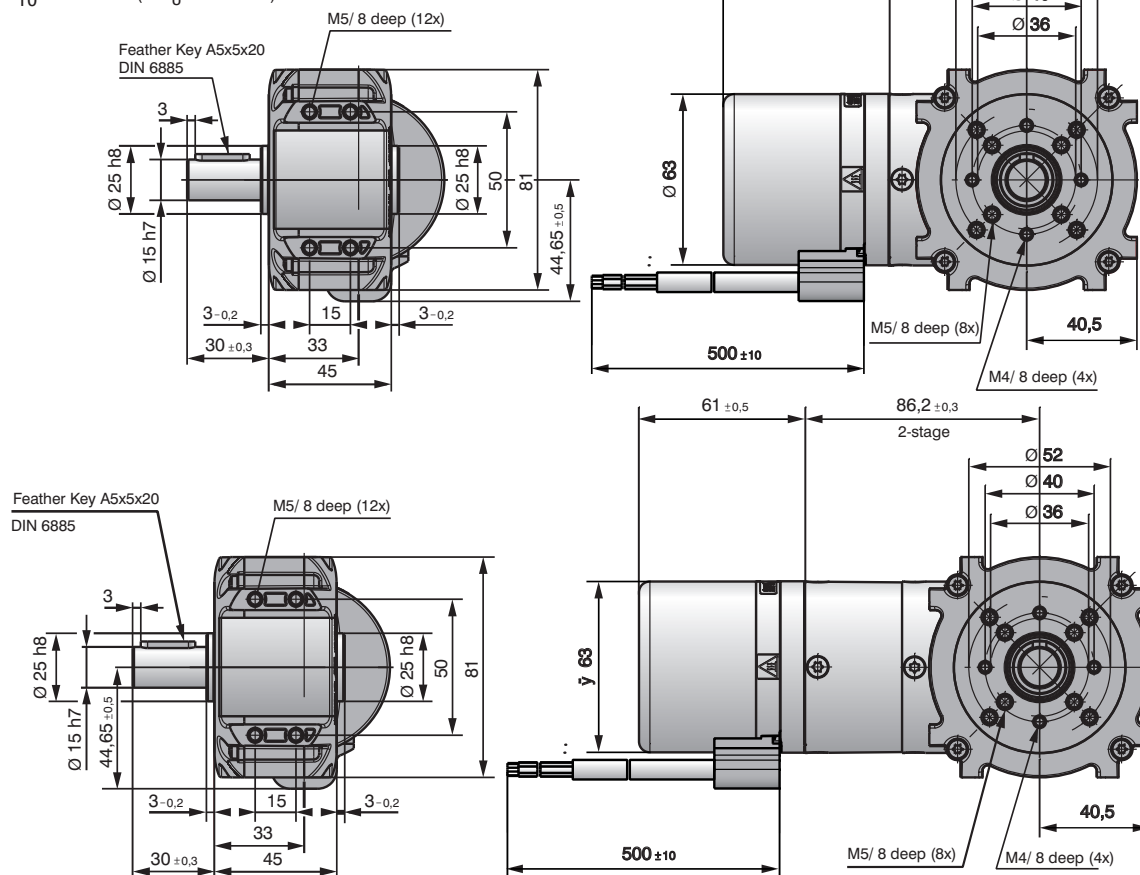
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with single and multi-stage angular gearboxes
- High efficiency through innovative crown gear technology
- Gearbox housing made of die-cast zinc
- Smooth-running and robust due to optimized gear design
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-EC75/4	4,1 : 1	1	0,6	0 to 976	1,6
VDC-3-49.15 B00-EC75/7	6,7 : 1	1	0,9	0 to 597	1,6
VDC-3-49.15 B00-EC75/20	20,3 : 1	2	2,5	0 to 120	2,0
VDC-3-49.15 B00-EC75/33	33,3 : 1	2	4,0	0 to 120	2,0



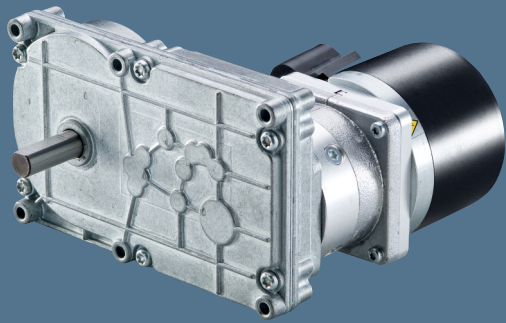
$F_{axial}$  500 N  
 $F_{radial}$  400 N  $L_1$  15 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).



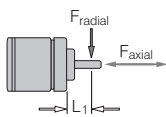
# VARIODRIVE Compact gearmotor

VDC-3-49.15-B, NEMA



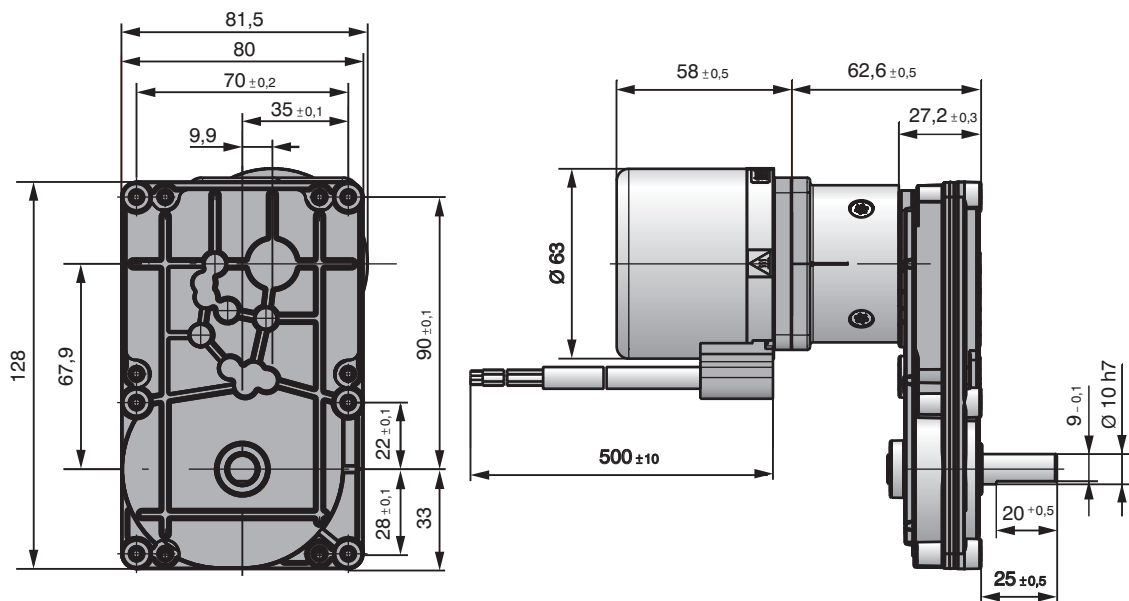
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with multi-stage spur gearboxes in flat design
- Gearbox assembly through standardised NEMA 23 interface
- Easy mounting or gearbox exchange through the use of a clamped gearwheel
- Gearbox housing made of die-cast zinc
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-B/18-N23	18,0 : 1	3	2,0	0 to 222	1,3
VDC-3-49.15 B00-B/28-N23	27,6 : 1	3	3,0	0 to 145	1,3
VDC-3-49.15 B00-B/40-N23	40,3 : 1	3	4,4	0 to 99	1,3
VDC-3-49.15 B00-B/64-N23	64,0 : 1	3	7,0	0 to 63	1,3
VDC-3-49.15 B00-B/102-N23	101,8 : 1	3	11,1	0 to 39	1,3



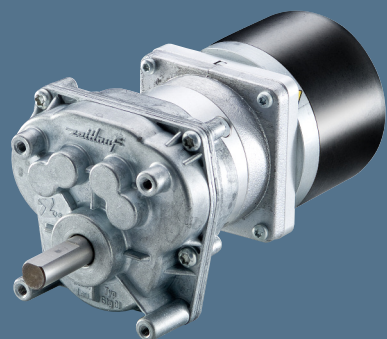
$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).



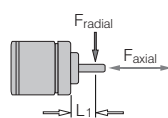
# VARIODRIVE Compact gearmotor

VDC-3-49.15-D, NEMA



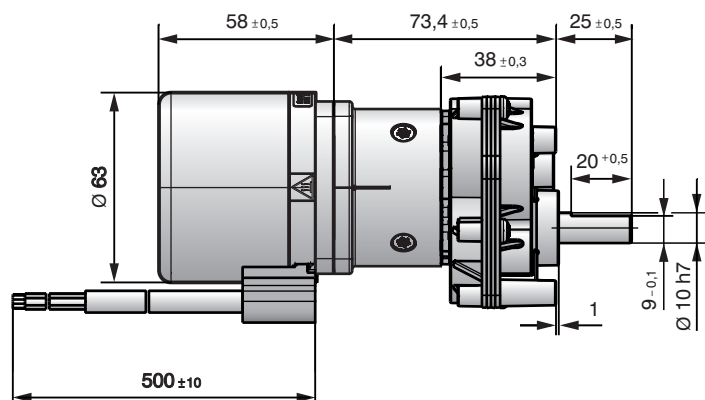
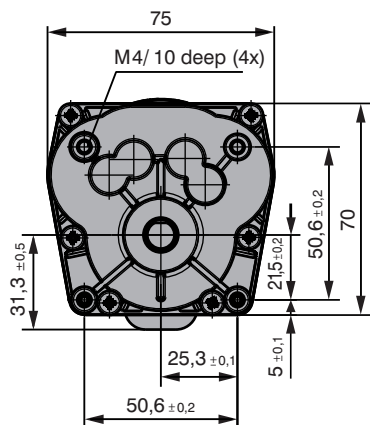
- 3-phase external rotor motor in EC technology
- Integrated operating electronics with extensive functionality
- Combined with multi-stage spur gearboxes in flat design
- Gearbox assembly through standardised NEMA 23 interface
- Easy mounting or gearbox exchange through the use of a clamped gearwheel
- Gearbox housing made of die-cast zinc
- Grease lubrication for maintenance-free continuous operation
- Available in various reduction ratios

Nominal data	Gear ratio	Gear stages	Nominal torque	Speed range	Mass
Type	i		Nm	rpm	kg
VDC-3-49.15 B00-D/8-N23	7,8 : 1	2	0,9	0 to 513	1,2
VDC-3-49.15 B00-D/9-N23	9,1 : 1	2	1,1	0 to 440	1,2
VDC-3-49.15 B00-D/11-N23	11,1 : 1	2	1,3	0 to 360	1,2
VDC-3-49.15 B00-D/14-N23	13,8 : 1	2	1,7	0 to 290	1,2
VDC-3-49.15 B00-D/18-N23	18,4 : 1	2	2,2	0 to 217	1,2
VDC-3-49.15 B00-D/22-N23	22,0 : 1	2	2,7	0 to 182	1,2
VDC-3-49.15 B00-D/28-N23	27,6 : 1	2	3,4	0 to 145	1,2
VDC-3-49.15 B00-D/42-N23	41,6 : 1	3	5,1	0 to 96	1,25
VDC-3-49.15 B00-D/67-N23	67,3 : 1	3	8,2	0 to 59	1,25



$F_{axial}$  50 N  
 $F_{radial}$  150 N  $L_1$  17 mm

Permissible shaft load at nominal speed and life expectancy  $L_{10}$  at 5 000 h (at  $T_U$  max. 40°C).







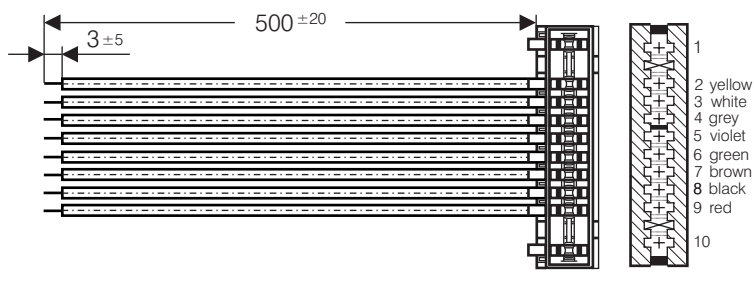
# Accessories

## Type 194 0009 000

Motor connection cable for VARIODRIVE Compact motors VD-3-43.10

## Connector F

Lumberg Duomodul - plug, connector 2,5 mm 10 pole, Lumberg Order No. 35 15 10 K05 S01

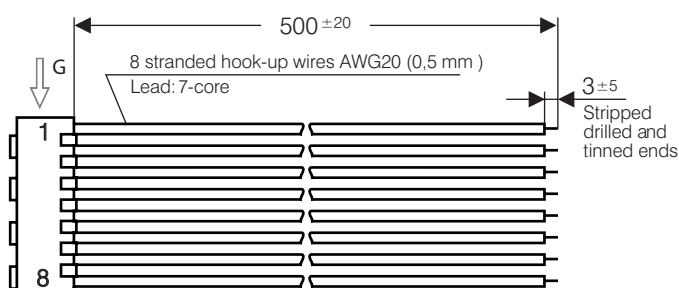


## Type 194 0014 000

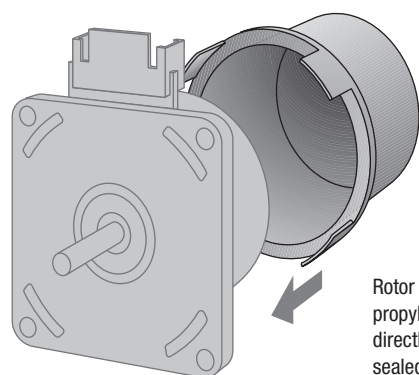
Motor connection cable for VARIODRIVE Compact motors VDC-3-54.14.

## Connector G

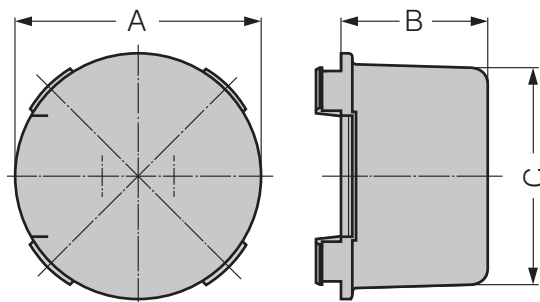
MT-Edge 5 mm - 8pole natural for 0,5 mm contact with 2 IDC contacts Order No. AMP 829 213-8



## Rotor protective cap



Rotor protective cap of black polypropylene (PP). The cap is fitted directly onto the motor flange and sealed with a rubber seal.



The protective cap cannot be mounted with motor VDC-3-43.10! When using the protective cap, power is reduced due to the thermal conditions.

	VARIODRIVE VD ... 35.0X 194 3506 000	VARIODRIVE VD ... 43.10 194 4310 000	VARIODRIVE VD ... 54.14 194 5414 000
Dimension			
A	57	65	82
B	27,4	38,8	42
C	49,5	57,4	74,4

## По вопросам продаж и поддержки обращайтесь:

Архангельск (8182)63-90-72	Калининград (4012)72-03-81	Нижегород (831)429-08-12	Смоленск (4812)29-41-54
Астана +7(7172)727-132	Калуга (4842)92-23-67	Новокузнецк (3843)20-46-81	Сочи (862)225-72-31
Белгород (4722)40-23-64	Кемерово (3842)65-04-62	Новосибирск (383)227-86-73	Ставрополь (8652)20-65-13
Брянск (4832)59-03-52	Киров (8332)68-02-04	Орел (4862)44-53-42	Тверь (4822)63-31-35
Владивосток (423)249-28-31	Краснодар (861)203-40-90	Оренбург (3532)37-68-04	Томск (3822)98-41-53
Волгоград (844)278-03-48	Красноярск (391)204-63-61	Пенза (8412)22-31-16	Тула (4872)74-02-29
Вологда (8172)26-41-59	Курск (4712)77-13-04	Пермь (342)205-81-47	Тюмень (3452)66-21-18
Воронеж (473)204-51-73	Липецк (4742)52-20-81	Ростов-на-Дону (863)308-18-15	Ульяновск (8422)24-23-59
Екатеринбург (343)384-55-89	Магнитогорск (3519)55-03-13	Рязань (4912)46-61-64	Уфа (347)229-48-12
Иваново (4932)77-34-06	Москва (495)268-04-70	Самара (846)206-03-16	Челябинск (351)202-03-61
Ижевск (3412)26-03-58	Мурманск (8152)59-64-93	Санкт-Петербург (812)309-46-40	Череповец (8202)49-02-64
Казань (843)206-01-48	Набережные Челны (8552)20-53-41	Саратов (845)249-38-78	Ярославль (4852)69-52-93