rexroth
A Bosch Company

Catalog of Rexroth VFC 3615 & 5615 Frequency Converters

www.boschrexroth.com.cn

VFC 3615 & 5615 Frequency Converter
More powerful, more efficient

MORE POWERFUL MICRO CONTROLLER

Lower speed tolerance

Upgraded MCU brings more powerful performance

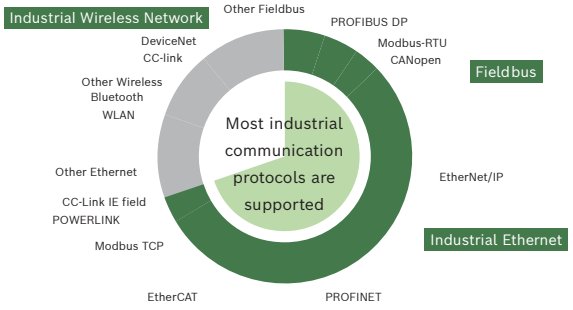
Higher output torque

Increased output torque, better adapts to high efficiency motor

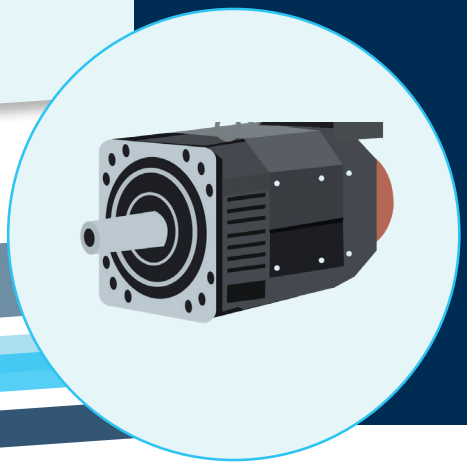
More application functions

Winding, printing, cutting machines...

MORE COMMUNICATION PROTOCOLS



MORE COMPLETE MOTOR TYPES



25%*

Increase on supported motor types

Adapts to high efficiency motors

*Output torque increase in flux weak sector

VFC 3615 & 5615
Frequency Converter Specifications

			VFC 3615	VFC 5615
Input	1P 200 V	Rated output power	0.4...2.2kW	
		Mains voltage	200...240 V±10 %	
		Supply frequency	50/60 Hz±5 %	
	3P 380 V	Rated output power	0.4 kW~30 kW[1]	0.4 kW~400 kW[1]
		Mains voltage	-15 % 380 V...480 V+10 %	
		Supply frequency	50/60 Hz±5 %	
Output	Output frequency		0...400 Hz	
	Control technology		V/f	V/f, SVC,FOC
	Motor type		Asynchronous motors	Asynchronous motors/Permanent magnet motors
Functions	Overload capacity		Heavy-duty: 150%, 60s Normal-duty: 120%, 60s	
	built-in DC reactor		-	≥132kW
	Frequency resolution		1...15 kHz (0.4...30 kW); 1...12 kHz (37 kW& Above)	
	Speed regulation range		1:50	1:200
	Start-up torque		3 Hz 150 % 1.5 Hz 100 %	0.5 Hz 200 %
	PID control		1	
	Control panel type		Standard detachable LED and optional detachable LCD	
I/O terminals	Analog input	+10 V	✓	
		+5 V	✓	
		AI1	0(2)...10 V/0(4)...20 mA	
		AI2	0(2)...10 V/0(4)...20 mA	
	Analog output	AO1	0(2)...10 V/0(4)...20 mA	
	Digital input	+24 V	max. 100 mA	
		DI1...DI4	PNP/NPN terminal, 24 VDC, 8 mA/12 VDC, 4 mA	
		DI5 (Pulse input)	PNP/NPN terminal, 24 VDC, 8 mA/12 VDC, 4 mA; Maximum pulse input 50 kHz	
	Digital output	DO1 Open collector output	Pull-up/pull-down, 30 VDC, 50 mA	
		DO1 Pulse output	max. 32 kHz	
	Relay output	RO1 (Ta, Tb, Tc)	250 VAC, 3 A/30VDC, 3 A	
	Communication		Modbus RTU	
Extension Card	I/O card1		4DI, 1AI, 1AO, 1OC,1 relay output	
	I/O card2 (Relay Card)		4Relay outputs, 250 VAC, 3 A/30VDC, 3 A	
	I/O card3		5DI, 2AI, 1AO, 2OC, 1TSI[2]	
	Communication card		Field Bus Card: Profibus DP CANopen Multi Ethernet Card: EtherCAT, PROFINET[3], Ethernet/IP[4], SERCOSⅢ, Modbus TCP	Field Bus Card: PROFIBUS DP, CANopen Multi Ethernet Card: EtherCAT, PROFINET[3], Ethernet/IP[4], SERCOSⅢ, Modbus TCP
	Encoder Card		-	ABZ incremental encoder card Resolver Card
Ambient conditions and certificates	Ambient temperature		-10...40 °C Without derating; 40...50 °C, Derating1.5 %/1 °C	
	Humidity		≤90 %	
	Altitude		1000 m Without derating; 1000...4000 m, Derating1 %/100 m	
	Protection category		IP20	
	STO		-	
	Certificate		CE, EAC	

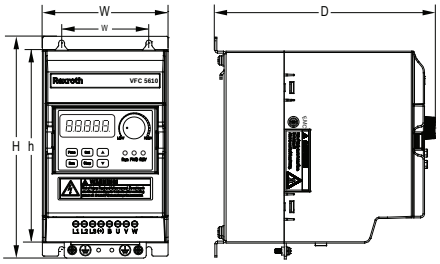
[1] Heavy load: 0.4kW... 4kW, Normal load: >= 5.5kW [2] Supported thermal sensor type:KTY 84/130, PT100, PT1000, TDK G1551_8320 (NTC) [3] According to DIN EN IEC61784-2:2020-07 Communication Profile Family

[4] According to DIN EN IEC61784-2:2020-07 Communication Profile Family

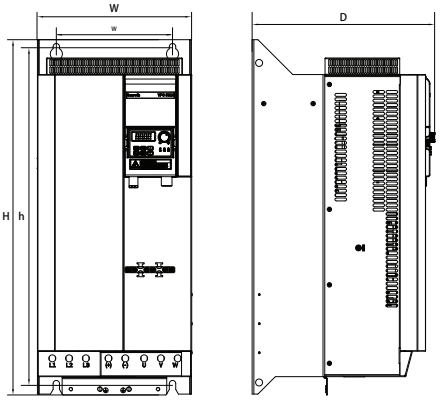
VFC 3615 & 5615

	VFC 3615/5615	Rated motor power [kW]		Rated continuous current [A]		W [mm] [W]	W [mm] [w]	H [mm] [H]	H [mm] [h]	D [mm] [D]
		Heavy duty	Normal duty	Heavy duty	Normal duty					
1P 200 VAC	0K40-1P2-MxA-xx	0.4	-	2.4	-	95	66	166	156	167
	0K75-1P2-MxA-xx	0.75	-	4.1	-					
	1K50-1P2-MxA-xx	1.5	-	7.3	-	95	66	206	196	170
	2K20-1P2-MxA-xx	2.2	-	10.1	-	120	80	231	221	175
3P 380 VAC	0K40-3P4-MxA-xx	0.4	-	1.3	-	95	66	166	156	167
	0K75-3P4-MxA-xx	0.75	-	2.3	-					
	1K50-3P4-MxA-xx	1.5	-	4.0	-	95	66	206	196	170
	2K20-3P4-MxA-xx	2.2	-	5.6	-					
	3K00-3P4-MxA-xx	3.0	-	7.4	-	120	80	231	221	175
	4K00-3P4-MxA-xx	4.0	-	9.7	-					
	5K50-3P4-MxA-xx		5.5		12.7					
	7K50-3P4-MxA-xx	5.5	7.5	12.7	16.8	130	106	243	228	233
	11K0-3P4-MxA-xx	7.5	11	16.8	24.3					
	15K0-3P4-MxA-xx	11	15	24.3	32.4	150	125	283	265	233
	18K5-3P4-MxA-xx	15	18.5	32.4	39.2					
	22K0-3P4-MxA-xx	18.5	22	39.2	45.0	165	140	315	300	241
	30K0-3P4-MxA-xx	22	30	45.0	60.8					
	37K0-3P4-MxA-xx	30	37	60.8	73.7	250	200	510	492	272
	45K0-3P4-MxA-xx	37	45	73.7	89.1					
	55K0-3P4-MxA-xx	45	55	89.0	108	265	200	585	555	325
	75K0-3P4-MxA-xx	55	75	108	147					
	90K0-3P4-MxA-xx	75	90	147	176	325	200	760	727	342
	110K-3P4-MxA-xx	90	110	176	212					
	132K-3P4-MxA-xx	110	132	211	253	385	250	923	893	350
	160K-3P4-MxA-xx	132	160	253	303					
	185K-3P4-MxA-xx	160	185	303	351	480	400	1030	995	360
	200K-3P4-MxA-xx	185	200	351	380					
	220K-3P4-MxA-xx	200	220	380	411	595	425	1337	1300	386
	250K-3P4-MxA-xx	220	250	411	467					
	280K-3P4-MxA-xx	250	280	467	522					
	315K-3P4-MxA-xx	280	315	522	588	650	450	1458	1417	412
	355K-3P4-MxA-xx	315	355	588	659					
	400K-3P4-MxA-xx	400	-	738	-					

► 0.4...45 kW



► 55...400 kW



x MNA=No integrated EMC filter xx 7P=LED Operation Panel NN=No Operation Panel

VFC 3615 & 5615 Type Code

VFC 3615-0K40-1P2-MNA-7P-NNNNN-NNNN

Series
E.G: VFC3615 or 5615

NNNNMax. Power
E.G: 0K40=0.4 kW

Power Input
1P2=1P200 V
3P4=3P400 V

Communication
M=ModBus

Other Design
NNNN=None

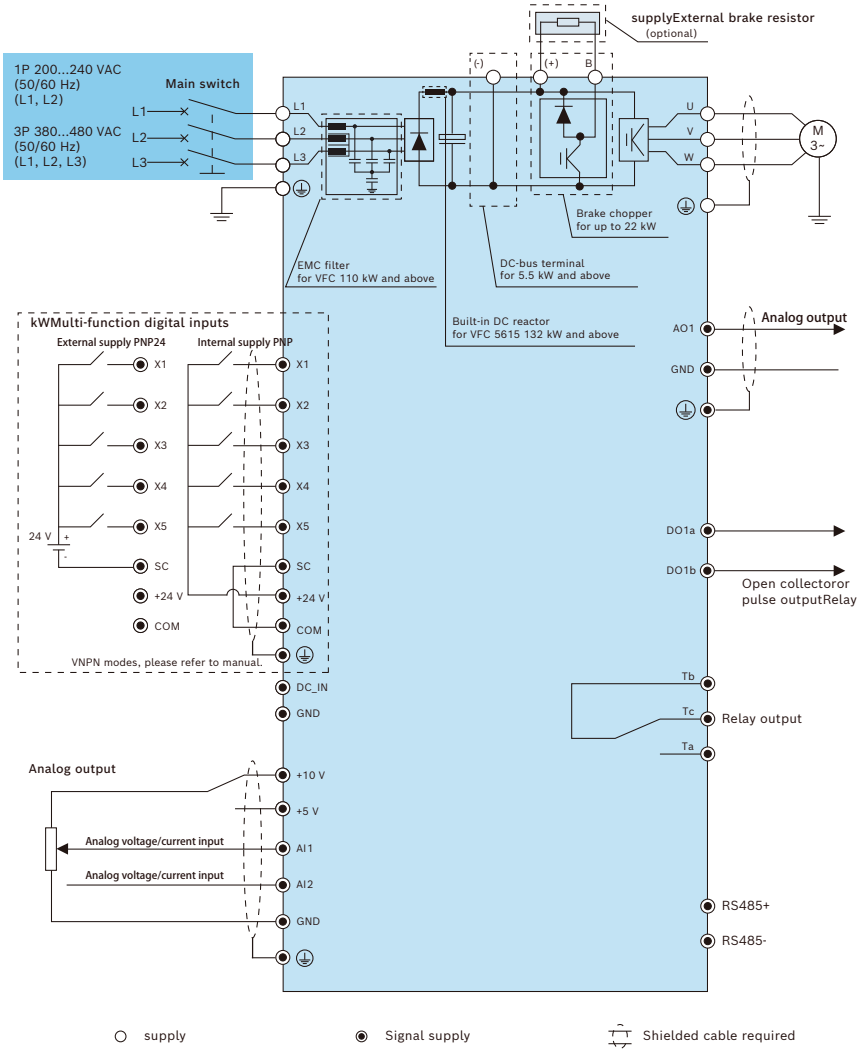
Firmware
NNNNN=Standard

Display
7P=segment LED
NN=Dust Cover
LP=LCDText LCD

Protection Class
A=IP20
B=Cold Plate
C=Wall Through

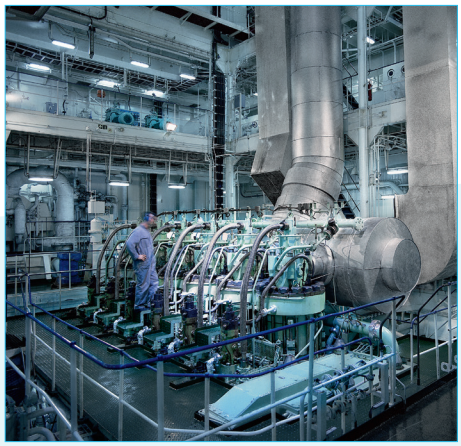
D=EMC Filter N=No EMC Filter

VFC 3615 & 5615



VFC 3615 & VFC 5615 Applications

HVAC
Fans, pumps, air conditioning



TEXTILE AND DYEING
Heat setting stenter, twister,
air-flow spinning

WOODWORKING MACHINERY
Welt fitting machine, Tenoning machin, Grooving machine,
Carving machine, Sanding machine, CNC machine

Energy savings calculator
- Keeps track of the achieved energy savings

Life time reminder
- Reduces downtime by helping to organize the maintenance schedule

Speed tracing
- For smooth catching and restarting of a running fan. Dry pump protection
- Automatically detects a dry running pump to protect theequipment.

Pump cascading
- Use Application Specific Firmware and relay card,4 maximum pumps could be circularly controlled byfrequency converter.

Smart cooling concept
- Double duct design isolates heat sink and semiconductor to prevent semiconductor from pollution.
- No cooling fan up to 1.5 kW and detachable cooling fan above 1.5 kW for cotton fiber easy clean.

Import PCBA coating
- Coating materials is made in Germany, enhanced anticorrosion in high temperature and humidity.

Low voltage ride-through
- Derating output when voltage reduced on power grid.

DC generatrix[1]
- DC generatrix operation to reduce the technical influence from instable power supply, and save energy through load sharing.

Compact Size
- Subminiature compact design.
- Side by Side mounting.

Easy Operation
- LEC panel with same parameter structure, Parameter copy function of 3610 series, easy to use.
- Structuring parameter convenient to commissioning.Cost-

Performance function design
- 60 seconds last of 150 % rated torque output.
- Over excitation control to reduce stop time.
- Standard equipped Modbus RTU.
- Built-in Mini USB connected with computer for commissioning, parameter copy and software updating.

[1] Only valid for 5.5kW & Above, to be use under instruction from application engineers

VFC 3615 & VFC 5615 Applications

METAL PROCESSING MACHINERY

Lathe, grinder, drill, planer, boring, cold forging

Compact design

- DIN rail and side by side mounting to save space. High start torque
- To meet the process demand of high strength metal cutting, avoid overcurrent and overload during low speed operation .

Quick and dynamic response

- Accurate speed control for highly smoothness and quality especially for concavo-convex workpiece surface.

Over excitation braking[1]

- Can help to reduce braking times up to 50 %, without an external break resistor

FOOD AND PACKAGING

Conveyor, blow molding, blender, cutter, labeling machines

Quick connectors and DIN rail mounting (up to 7.5 kW)

- Quick and easy installation and maintenance

Counter function

- Built-in Counter to realize the classification and packing of food & drink industry.

Removable control panel

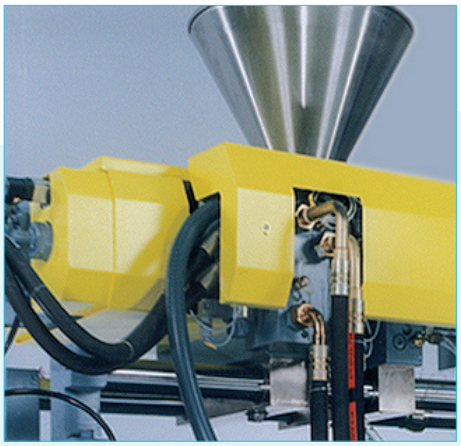
- Parameter copy function for efficient commissioning of multiple drives.
- Remote panel support for convenient and safe monitoring and operation.

Integrated sequence control (16 steps)

- Multi-stage speed control without an additional PLC.

RUBBER AND PLASTIC MACHINERY

Scroll extruder, pelletizer, bagging machine



Compact design

- DIN rail mounting (up to 7.5 kW) and side by side mounting (up to 22 kW), to save cabinet space.

High start torque, 200 % at 0.5 Hz

- To ensure the extruder can start up and operate during the uneven heating temperature environment.

High control accuracy, fast dynamic response

- Precise control is to ensure the material thickness evenly, in order to save cost and ensure the quality of products

Torque limit and slip compensation

- Especially used for constant output torque. Minimize the torque fluctuation and improve the extrusion process quality.

[1] Available up to 22 kW.

Accessories[1]

Mounting plates and panel extension cables[2]

Mounting plates are used for installing the panel in order to operate and monitor frequency converter without opening control cabinet.

- Make the hole 85mm(horizontal) * 75mm (vertical) on cabinet door.
- Remove the panel to install in the mounting plates. Then connect the panel with frequency converter via panel extension cables.
- Extension cables 2m, 3m, and 5m are available, and the longest operation distance is 5m.

LED/LCD panel[2]

LED and LCD Panel options of VFC series.

LED panel

- Parameter edit and commissioning via LED panel.
- Real-time display of operating data, fault display and diagnosis maintenance.
- Parameter copy.

LCD panel

- Available in Chinese, English, Germany, and other 9 languages.
- Six line big display screen with backlight, easy to commissioning.
- Parameter copy.

[1] All the accessories need to be purchased individually, please inquire Rexroth distributer for details
[2] Available for 03V12 version and above, and the firmware version can be checked via parameter d0.99

Accessories[1]

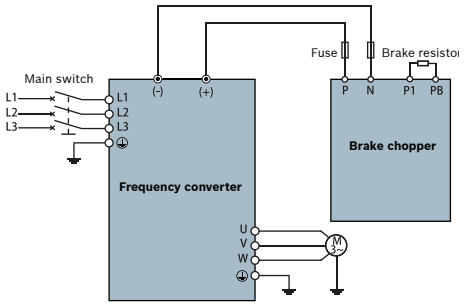
Brake Chopper[1]

The brake chopper is used for consuming electric energy transmitted from external motor to frequency converter and limiting bus voltage within a reasonable range to improve its braking performance and fast stop of the motor.

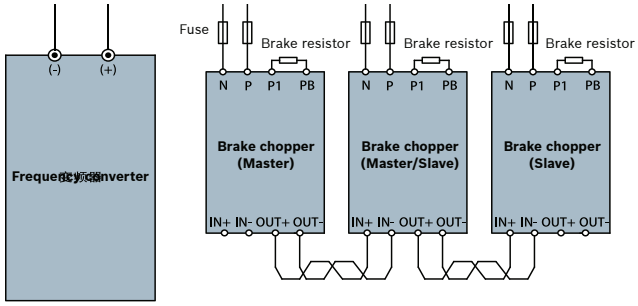
The brake chopper has standard dust cover, but you can also set the parameters with the use of LED and LCD operating panel of VFC series. It supports the linkage input and linkage output with paralleling up to 3 braking units in maximum. And it also has overvoltage, overcurrent, overheating, short circuit resistance, overheating protection.

- Operation voltage: 600...785 V, parameter adjusting step size: 0.01 V
- The length between brake chopper and frequency converter plus the length between brake chopper and brake resistor should not be more than 5m.

Basic wiring mode



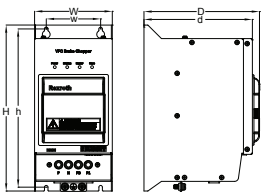
Brake chopper in paralleling wiring mode[1]



1: Paralleling wiring mode applies when the capacity of a single brake chopper could not meet the requirement

Brake chopper dimensions

Material Number	Type code	Applicable FC type	W (mm)	H (mm)	D (mm)	w (mm)	h (mm)	d (mm)
R912007179	FEAE07.1-VA1-NNNN	VFC 5615 37...75 kW	100	215	149	70	205	140
R912007180	FEAE07.1-VA2-NNNN	VFC 5615 90...110 kW						

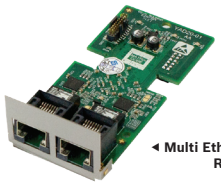


[1] Only valid for VFC 5615
[2] Parallel use of multiple chopper when single chopper capacity is not enough

Extension card module[1]

Based on the modular design concept for the VFC series frequency converter, the separately available Option Card Module offers the user a variety of customization options, which benefits for operation cost reducing.

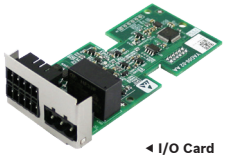
With the two slots of extension card module, different type of extension cards can be combined flexibly for various applications. Such as I/O extension card, multi relay card and various communication extension cards, such as MultiEthernet, Profibus DP and CANopen. etc.



◂ **Multi Ethernet Card**
R912006134

◂ **CANopen Card**
R912006133

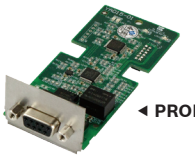
◂ **ABZ Incremental Encoder Card**
R912006414



◂ **I/O Card**

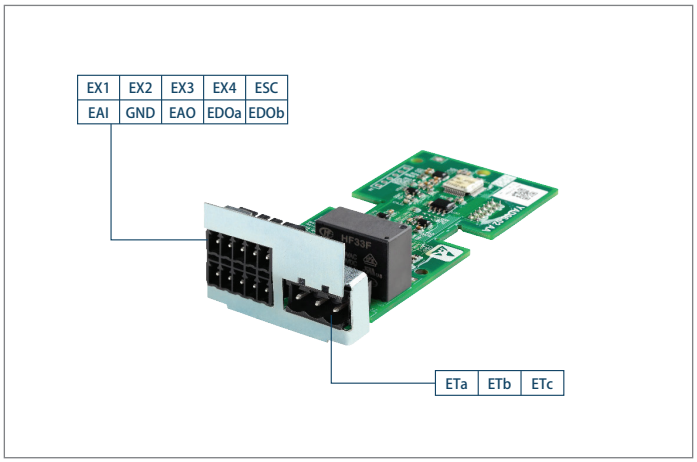
I/O1:	R912006050
I/O2:	R912006051
I/O3:	R912007257

◂ **Resolver Card**
R912006415



◂ **PROFIBUS DP Card**
R912006132

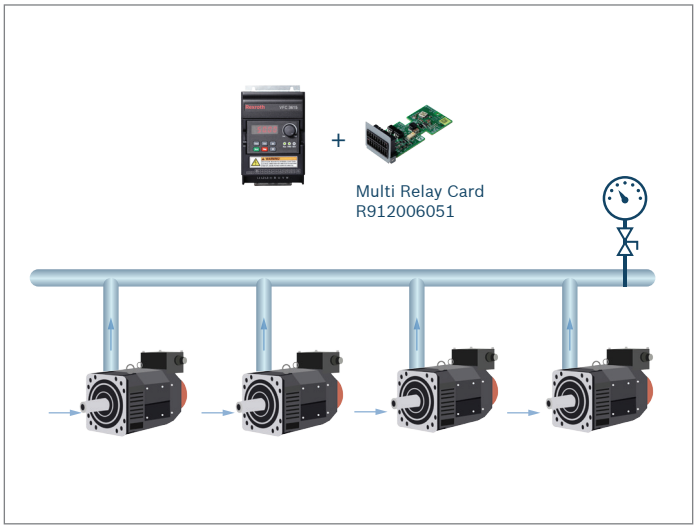
[1] Extension card module is needed for extension card installation. two extension cards of the same type can not be used in the same extension card module.



Terminal	Function	Description
EX1...EX4	4 multi-function digital inputs	24 VDC, 8 mA/12 VDC, 4 mA
EAI1	Analog input	-10...10 V/0(2)...10 V/0(4)...20 mA
EAO1	Analog output	0(2)...10 V/0(4)...20 mA
EDO1	Open collector output	30 VDC, 50 mA
ETa, ETb, ETc	Relay	250 VAC, 3 A/30 VDC, 3 A

I/O Extension Card[1]

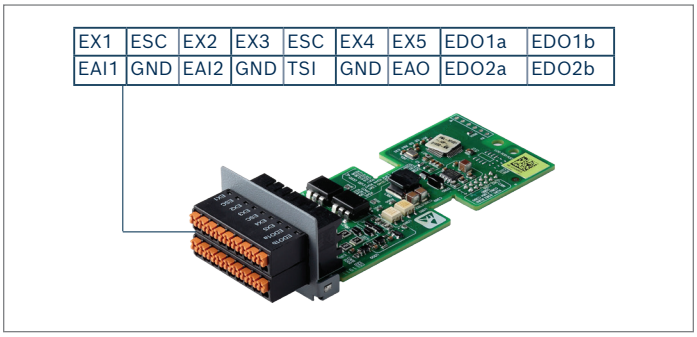
To extend the I/O terminals on VFC series frequency converter, an I/O extension card is available. The maximized I/O points of frequency converter with I/O extension card could be: 9DI, 3AI, 2AO, 2OC, 2 relay output



Terminal	Signal requirement	Description
R1a, R1c, R1b	Rated capacity: 250 VAC, 3 A 30 VDC, 3 A	R1b, R2b, R3b, R4b are relay outputs shared connections
R2a, R2c, R2b		
R3a, R3c, R3b		
R4a, R4c, R4b		

Multi Relay Card

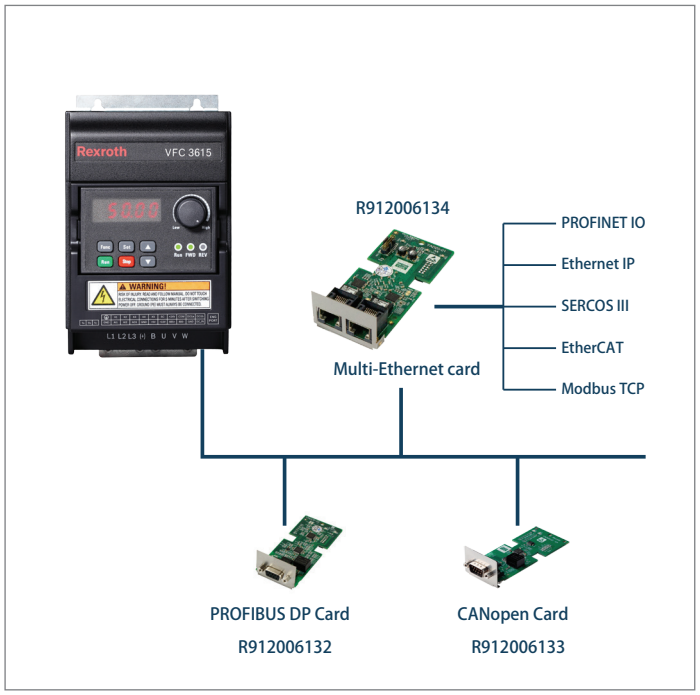
The Multi Relay Card offers 4 programmable relay outputs, that can be especially useful in pump and fan control, drive status monitoring or water supply applications.
By combining the Multi Relay Card and the I/O Extension Card it is possible to take advantage of up to 6 relays at the same time and save extra wiring cost and installing space.



I/O Extension Card 3

To extend the I/O terminals on VFC series frequency converter, an I/O3 extension card is available, it include 5DI, 2AI, 1AO, 2OC and 1 TSI

Terminal	Function	Description
EX1...EX5	5 multi-function digital inputs	24 VDC, 8 mA / 12 VDC, 4 mA
EAI1/EAI2	2 Analog input	-10...10 V/0(2)...10 V/0(4)...20 mA
EAO	1 Analog input	0(2)...10 V/0(4)...20 mA
EDO1/EDO2	2 Open collector output	30 VDC, 500 mA
TSI	1 Temperature sensorinput	Supported temperature sensor type: KTY 84/130, PT100, PT1000, TDK G1551_8320 (NTC)



PROFIBUS DP Card

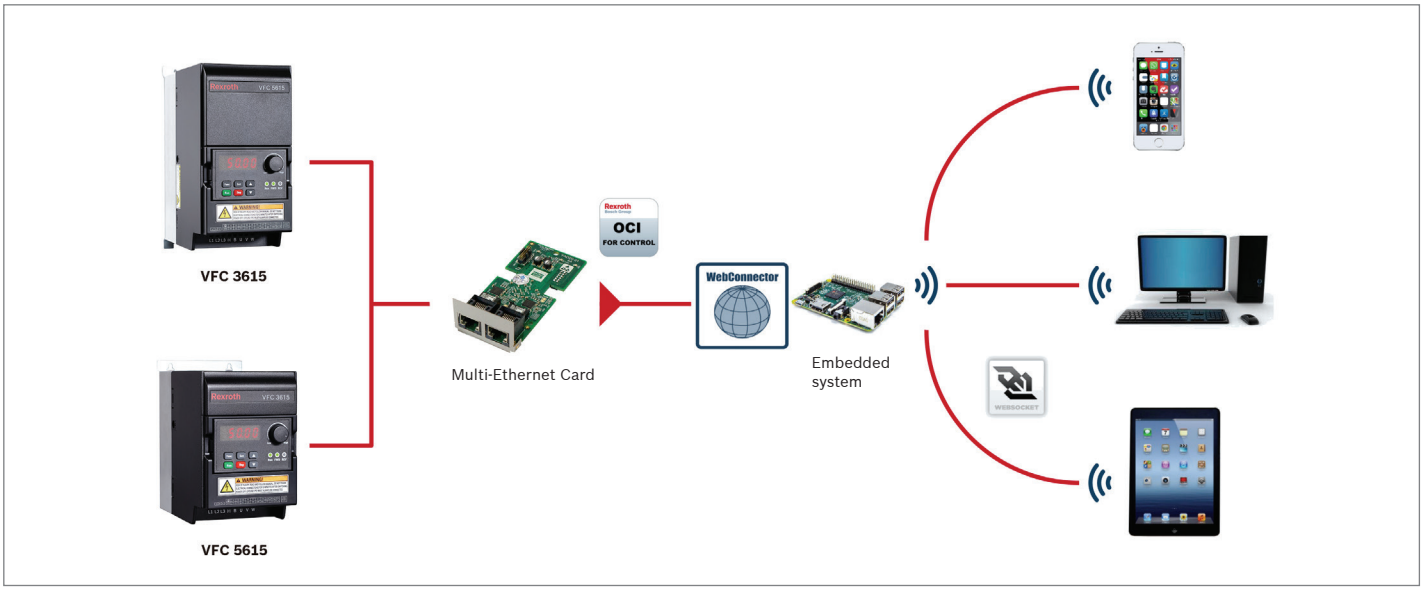
- Easy connectionu
- Wide application scenarios, good compatibilityu
- Maximum 127 slaves supported

CANopen Card

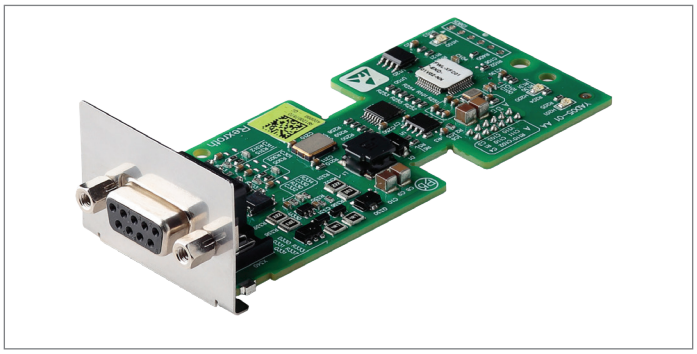
- Very short response time
- High data transfer efficiency and performance
- Standard terminal resistor

Multi-Ethernet Card[1]

- Below communication protocols are supported by Multi-Ethernet Card, which only needs Exchange parameters in frequency converter. Data exchange with PROFINET Controller[2], data exchange with Ethernet/IP Scanner[3], SERCOS III, EtherCAT, Modbus TCP
- One hardware for multi-application, with which users need only communication protocol switching by setting parameters
- VFC 5615 series of multifunctional unique options through Ethernet, with greater flexibility and adaptability in the Internet of things. With the BOSCH Rexroth WebConnector4 technology. In the near future, the customer to sit in the office or home, intelligent mobile phone monitoring from the inverter operation, storage and analysis of data acquisition, will become a reality



[1] According to DIN EN IEC61784-2:2020-07 Communication Profile Family 3 [2] according to DIN EN IEC61784-2:2020-07 Communication Profile Family 2 [3] Java based network applications



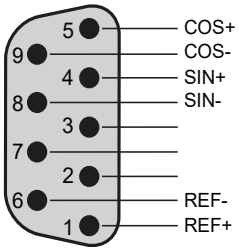
Resolver Card

▶ Resolver card is a standard extension card of VFC 5615 series frequency converter, which receives the resolver signal as feedback. It is to be installed together with the extension module

Terminals Description

Pin number	Terminal	Signal function
Pin 1	REF+	Resolver excitation +
Pin 6	REF-	Resolver excitation -
Pin 4	SIN+	Resolver feedback SIN+
Pin 8	SIN-	Resolver feedback SIN-
Pin 5	COS+	Resolver feedback COS+
Pin 9	COS-	Resolver feedback COS-

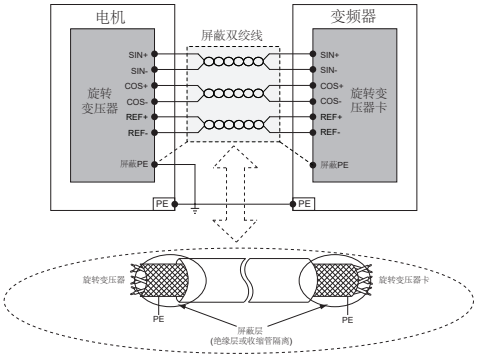
Terminals Mapping



Technical Data

Resolver power supply	Voltage	7 Vrms
	Frequency	10 kHz
Resolver card in-put signal	Voltage	1.5...4 Vrms
	Frequency	10 kHz
Connector type		DB9 (Female)

Wiring



Parameter

Code	Name	Setting range	Min.	Default	Attri.
H7.01	Encoder direction	0: Forward 1: Reverse	1	0	-

Parameter H7.01 is used to change the phase sequence, if the encoder phases are reversely connected.

Code	Name	Setting range	Min.	Default	Attri.
H7.05	Encoder wiring break detection level	0.0 (No protection) 0.1...1,000.0rpm	0.1 rpm	0.0 rpm	-
H7.06	Encoder wiring break detection time	0.1...10.0s	0.1s	1.0s	-

If measured speed is smaller than encoder wiring break de-tection level [H7.05] and keeps for more than encoder wir-ing break detection time [H7.06], wiring break error "EIbE" is detected.

This function can be disabled by setting [H7.05] = 0.0.

Code	Name	Setting range	Min.	Default	Attri.
H7.07	Encoder phase order error detection time	0.0 (No protection) 0.1...100.0s	0.1s	1.0s	-

If measured speed direction is different from running direc-tion and keeps for more than encoder phase order error de-tection time [H7.07], phase order error "EPOE" is detected. This function can be disabled by setting [H7.07] = 0.0.

Code	Name	Setting range	Min.	Default	Attri.
H7.31	Resolver poles	2...32	1	2	-

Parameter H7.31 is used to set the poles of resolver. Please correctly set this parameter before power on. For synchronous motor, resolver card supports resolver with two poles or with the same poles as motor. For asyn-chronous motor, resolver card supports resolver with any poles.

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ABZ Incremental encoder card

- It is a standard extension card of Rexroth VFC 5615 series product and should be used together with extension card box
- It has a variety of voltage levels, which could match the common 5 V encoder and 9...30 V wide voltage encoders in market
- It supports various encoders, covering the difference, open collector and push-pull type
- It includes frequency output interface of encoder signal, supporting NPN and PNP output
- It is extended in the same way like other option cards. And its mounting position is optional

Terminal Description

Interface	Terminal	Signal function	Description ECOM	Signal requirements
Encoder interface	E5V	Encoder power supply 5V	Refer to ECOM	Maximum output current: 200 mA
	E12V	Encoder power supply12V		Maximum output current: 150 mA
	ECOM	Common port of encoder power supply	GND Isolation	-
	A+	Encoder output signal A+	Refer to ECOM	Input voltage: 5...24 V Maximum input pulse frequency: 300 kHz
	A-	Encoder output signal A-		
	B+	Encoder output signal B+		
	B-	Encoder output signal B-		
	Z+	Encoder output signal Z+		
	Z-	Encoder output signal Z-		
	PE	Shielding terminal	Ground radiator terminal connected inside	-
Pulse output interface	OA	Pulse output A	Refer to GND	Output pulse voltage : 24V Maximum output current: 50 mA
	OB	Pulse output B		
	OZ	Pulse output Z		
	IN24V	External power supply	24V External power supply(non-24V FC terminal power supply) input to OA, OB &OZ	-
	GND	Common port of output pulse	Isolate from ECOM	-
	PE	Shielding terminal	Ground radiator terminal connected inside	-

Cable length

Cable length and section		
Cable length(m)	Cable section	
	AWG	mm^2
10	≤ 24	≥ 0.205
20		
30		
40		
50		
60		
70	≤ 23	≥ 0.258
80		
90	≤ 22	≥ 0.326
100		

Terminal diagram

A+	A-	B+	B-	Z+		OA	OB	OZ
PE	E5V	ECOM	E12V	Z-		GND	IN24V	PE

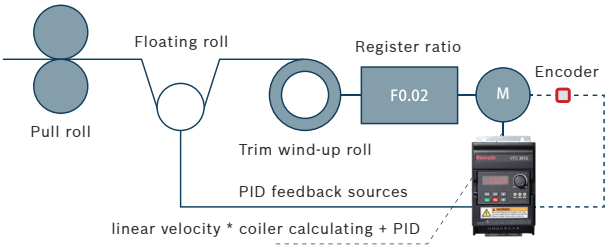
Technical Data

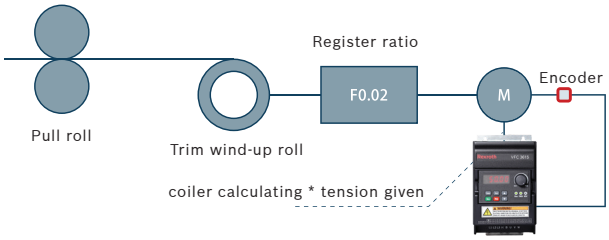
Encoder power supply	5 V ± 5 % (200 mA) 12 V ± 5 % (150 mA)
Maximum input pulse frequency	300 kHz
Pulse input voltage	5...24 V
Terminal type	Quick connector
Pulse output	1:1 push-pull output

Application Specific Firmware ASF

Application Specific Firmware[1] – Download firmware for different specific applications

- Different application specific firmware easy for different application demands. (textile, printing, water supply, etc.)
- Download ASF to frequency converter through USB and ConverterWorks software.
- Each standard frequency converter could be updated to application specific firmware product via installing ASF.
- Reducing customer and partner’ s stock, only standard equipment is fine.





[1] Please download latest ASF software via

PC Software

PC Software1 - easy commissioning

The Rexroth VFC series frequency converters can be commissioned and operated remotely with the free PC software. The connection to the PC is established via a standard Mini-USB interface.

Parameter Comparison Function

- Compared adjusted parameter with default parameter, comparison between 2 parameter groups.

Online Commissioning

- Connected with PC, it is easy to online start-up and stop, parameter revise, and back-up.

Online Monitor Signal

- Real time monitoring signal data for fast diagnosis and monitoring.

Core Firmware Update[1]

- Core firmware updated via Convcerterworks software, easy and convenient to get latest function.

Open Platform for flexible applications

According to various of special application demand, and based on standard software of frequency converter, Application Specific Firmware(e.g. water supply ASF) could be downloaded to frequency converter via commissioning software.

- ASF via frequency converter commissioning software, your frequency converter now available for serving special function request.

[1] Please download latest PC software via www.boschrexroth.com.cn/fc

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