

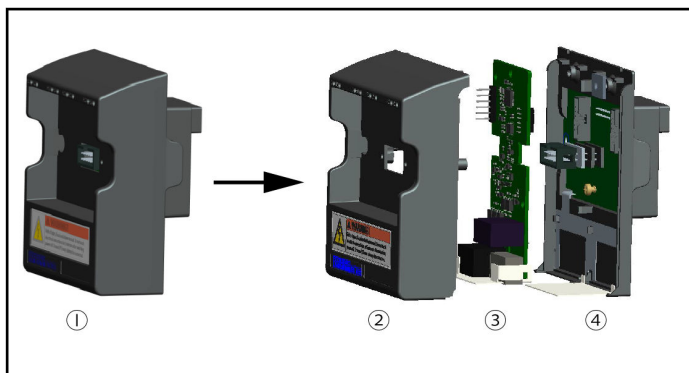
Frequency Converter Assembled Extension Module

Product Insert

R912006859
Edition 01

1 Brief Introduction

Assembled extension module is used as a standard extension card module for Rexroth EFC x610 series frequency converter. The module integrates specific extension card and the corresponding function can be realized simply through assembling the module to frequency converter. It is convenient, flexible and efficient to use. Assembled extension module is composed of one extension card box and one or two extension cards, as shown in the following figure.



- ① Assembled extension module
- ② Upper cover of extension card box
- ③ Extension card
- ④ Lower cover of extension card box

1. Remove operating panel ④ from control & terminal module ①.
2. Mount assembled extension module ② into control & terminal module ①.
3. Tighten two screws ③ to fix assembled extension module ② in control & terminal module ①.
4. Push operating panel ④ into assembled extension module ②.



- ⑤: Control & terminal module connector
- ⑥: Connector for operating panel

3 Product Type

3.1 Definition of Type Code

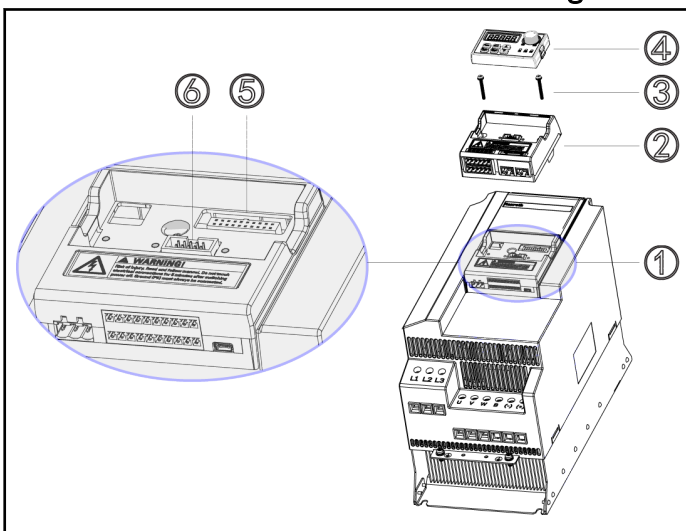
Short text	Column	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
Example:		F	E	A	E	0	2	.	1	-	E	A	-	N	N	N	N

Product	Accessory, electric..= FEAE
Variant	Extension card module.....= 02
Line	1.....= 1
Version	EFC.....= E VFC.....= V
Degrees of protection	IP 20.....= A IP 54.....= E
Other design¹⁾	None.....= NNNN

Note:
1) Slot1 = xxNN (from bottom left slot)
Slot2 = NNxx (from bottom right slot)

		Slot 2								
		ET	PB	CN	I1	I2	I3	E1	E2	NN
Slot 1	ET	-	-	-	o	o	o	o	o	o
	PB	-	-	-	o	o	o	o	o	o
	CN	-	-	-	o	o	o	o	o	o
	I1	-	-	-	-	o	-	o	o	o
	I2	-	-	-	-	-	o	o	o	o
	I3	-	-	-	-	-	-	o	o	o
	E1	-	-	-	-	-	-	-	o	o
E2	-	-	-	-	-	-	-	-	o	
NN	-	-	-	-	-	-	-	-	o	

2 Assembled Extension Module Mounting



3.2 Available Product

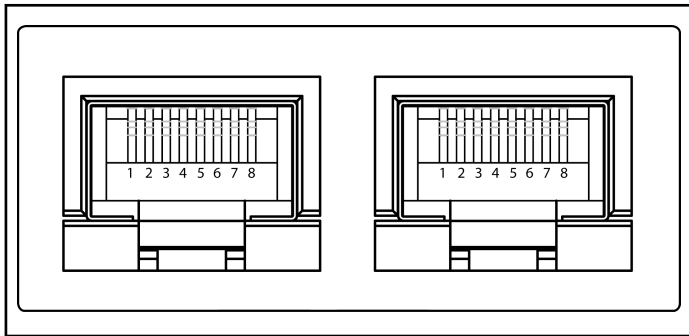
Type code	Description
FEAE02.1-EA-ETNN	Left slot is integrated with Multi-Ethernet (ET) card and right slot is reserved
FEAE02.1-EA-ETI1	Left slot is integrated with Multi-Ethernet (ET) card and right slot is integrated with I/O (I1) card
FEAE02.1-EA-PBI1	Left slot is integrated with PROFIBUS (PB) card and right slot is integrated with I/O (I1) card
FEAE02.1-EA-I1NN	Left slot is integrated with I/O (I1) card and right slot is reserved

Pin	Terminal sign	Function description
1	RX+	Data receiving terminal (+)
2	RX-	Data receiving terminal (-)
3	TX+	Data transmission terminal (+)
4	NC	Not used
5	NC	Not used
6	TX-	Data transmission terminal (-)
7	NC	Not used
8	NC	Not used

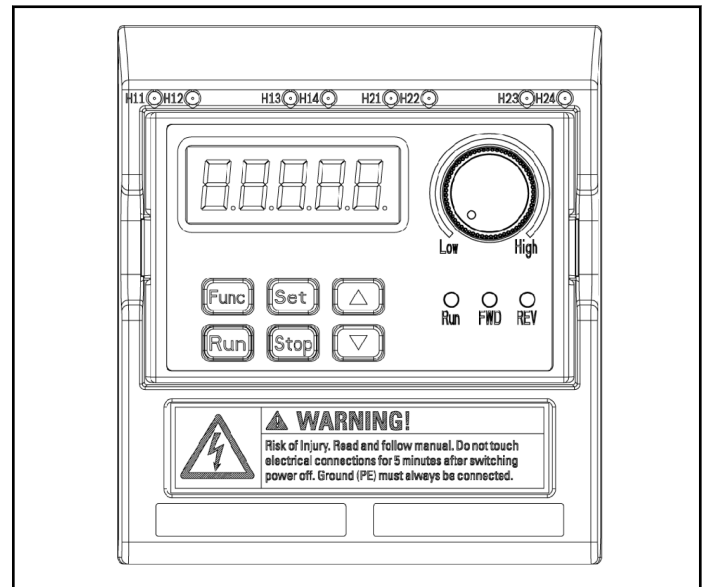
4 Extension Card Introduction

4.1 Multi-Ethernet Card Introduction

4.1.1 Multi-Ethernet Interface



4.1.2 Multi-Ethernet Card LED



LED	Function	Supported protocol	Status	Description
H11	Multi-Ethernet card and Fieldbus status	<ul style="list-style-type: none"> ▶ PROFINET ▶ EtherNet/IP ▶ Modbus/TCP 	Continuous off	Multi-Ethernet card <ul style="list-style-type: none"> ▶ does not have a valid IP address ▶ has not seen an ethernet link ▶ powered off ▶ an MEP firmware update process is running
			Blinking green	Does have a valid IP address, but no cyclic connection was established
			Continuous green	Cyclic connection is established and it is free of errors
			Blinking red	Cyclic connection was terminated unexpectedly
			Continuous red	Duplicate IP address in network detected
			Blinking green/red	Multi-Ethernet card is in power up mode and is conducting a self-test
			<ul style="list-style-type: none"> ▶ Sercos III 	Continuous off
		Continuous orange		Communication phase 0
		Orange with 1 green pulse		Communication phase 1
		Orange with 2 green pulses		Communication phase 2
		Orange with 3 green pulses		Communication phase 3
		Continuous green		Communication phase 4
		Blinking green/orange		Hotplug phase 0
		Green with 1 orange pulse		Hotplug phase 1
		Green with 2 orange pulses		Hotplug phase 2
		Blinking green		Switched from Fast-Forward to Loopback (e.g. due to link loss at one port)
		Blinking red/orange		Application error
		Blinking green/red		Warning for MST losses exceeded half of tolerable losses
		Continuous red		Communication error
		Blinking orange		Identification
		Blinking red	Firmware watchdog error	
		<ul style="list-style-type: none"> ▶ EtherCAT 	Continuous off	Status INIT
			Blinking green	Status PRE-OPERATIONAL
			Green light blinking once	Status SAVE-OPERATIONAL
			Green light steady on	Status OPERATIONAL
			Blinking red	Configuration error
			Red light blinking once	Synchronization error
			Red light blinking twice	Timeout – watchdog

LED	Function	Supported protocol	Status	Description
H12	Frequency converter application status		Continuous off	Frequency converter is powered off or no communication between Fieldbus platform and base drive system
			Blinking green	Frequency converter is in STOP state, no errors pending
			Continuous green	Frequency converter is in RUN state, no errors pending
			Blinking red	Frequency converter is in RUN state, a warning is pending
			Continuous red	Frequency converter is in STOP state, an error is pending
			Blinking green/red	N/A
H13/H14	Ethernet line status	<ul style="list-style-type: none"> ▶ PROFINET ▶ EtherNet/IP ▶ Sercos III ▶ Modbus/TCP 	Continuous off	No Ethernet link established at the appropriate Ethernet port
			Green	Ethernet link was established
			Flickering yellow	Activity on Ethernet line (telegram transmission)
		<ul style="list-style-type: none"> ▶ EtherCAT 	Continuous off	No Ethernet link established at the appropriate Ethernet port
			Green	Ethernet link was established
			Flickering green	Activity on Ethernet line (telegram transmission)



Details for parameter settings, application and security notes, see **Instruction Manual** of Multi-Ethernet card.

4.2 I/O Card Introduction

4.2.1 I/O Card Terminals



4.2.2 I/O Card Terminals Descriptions

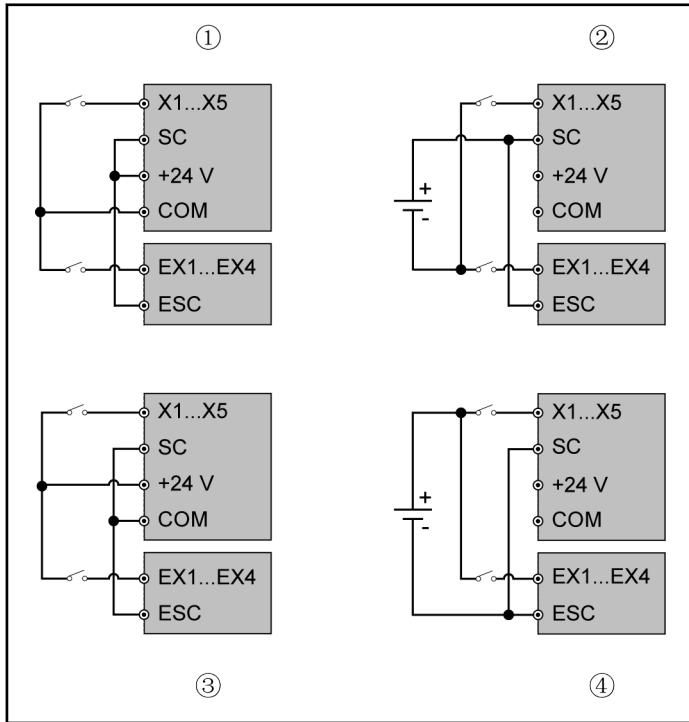
Terminal	Signal requirement	Description
EX1... EX4	Multi-function digital inputs: 24 VDC, 8 mA / 12 VDC, 4 mA with optocouplers isolation	See parameter group H8
ESC	–	Isolation optocouplers shared connection
EAI	Voltage input range: -10...10 V ^① Voltage input impedance: > 20 kΩ	The power supply is +5 V and +10 V from the frequency converter

Terminal	Signal requirement	Description
	Resolution: 1/1,000 Current input range: 0/4...20 mA Current input impedance: < 500 Ω Resolution: 1/1,000	See parameter group H8
GND	–	Analog terminals shared connection, isolated from ESC
EAO	Voltage output range: 0...10 V Voltage output load impedance: > 500 Ω Current output range: 0...20 mA Current output load impedance: < 500 Ω	See parameter group H8
EDOa, EDOb	Open collector output: Max. 30 VDC, 50 mA	See parameter group H8 ESC is reference
ETa, ETC	Rated capacity of relay outputs: 250 VAC, 3 A; 30 VDC, 3 A	See parameter group H8 ETb is the relay outputs shared connection
ETb		



Note^①: For -10 V input, external power supply must be provided. A frequency converter **ONLY** provides +5 V and +10 V.

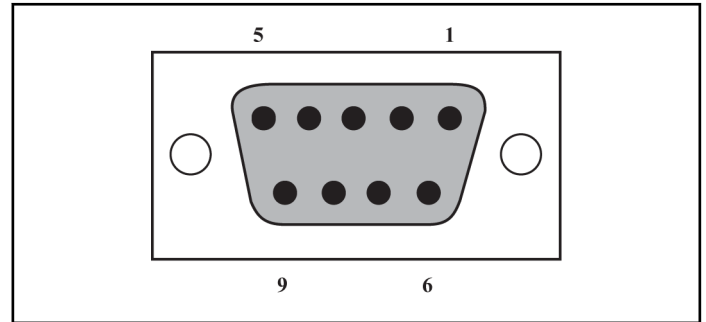
4.2.3 I/O Card Terminals Wiring



- ▶ X1...X5, SC, +24 V, COM are control terminals of the frequency converter, EX1...EX4, ESC are control terminals of the I/O card.
- ▶ Details on wiring of EAI, EAO, EDOa and EDOb, see **Quick Start Guide** of frequency converter.

4.3 PROFIBUS Card Introduction

4.3.1 PROFIBUS Interface



- ①: NPN with internal power supply
- ②: NPN with external power supply
- ③: PNP with internal power supply
- ④: PNP with external power supply

Pin	Terminal sign	Terminal name	Function description
1	NC	-	Reserved
2	NC	-	Reserved
3	PROFIBUS_B	PROFIBUS terminal_B	PROFIBUS data cable B
4	RTS	Request for signal sending	-
5	GND	Power-	-
6	Vcc	Power+	-
7	NC	-	Reserved
8	PROFIBUS_A	PROFIBUS terminal_A	PROFIBUS data cable A
9	NC	-	Reserved

4.3.2 PROFIBUS Card LED

LED	Color	Function	Status	Description
H11/H21	Green	PROFIBUS card configuration status	Fast blinking 0.4 s per cycle	Data exchanging
			ON	Communication established PROFIBUS card successfully parameterized and configured => Everything OK
H12/H22	Red	PROFIBUS card error indication	OFF	PROFIBUS card OK
			Slow Blinking 1 s per cycle	PROFIBUS card error



Details on PROFIBUS, see **Operating Instructions** of frequency converter.



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