

MULTIFUNCTION REGENERATION CONVERTER FR-XC

Versatile and feature-rich converter for power regeneration
[Addition of 400 V class 75K, 160K, and 220K models]



GLOBAL IMPACT OF MITSUBISHI ELECTRIC



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

"Changes for the Better" represents the Mitsubishi Electric Group's attitude to "always strive to achieve something better", as we continue to change and grow. Each one of us shares a strong will and passion to continuously aim for change, reinforcing our commitment to creating "an even better tomorrow".

Mitsubishi Electric is involved in many areas including the following:

Energy and Electric Systems

A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices

A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance

Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems

Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems

Maximizing productivity and efficiency with cutting-edge automation technology.

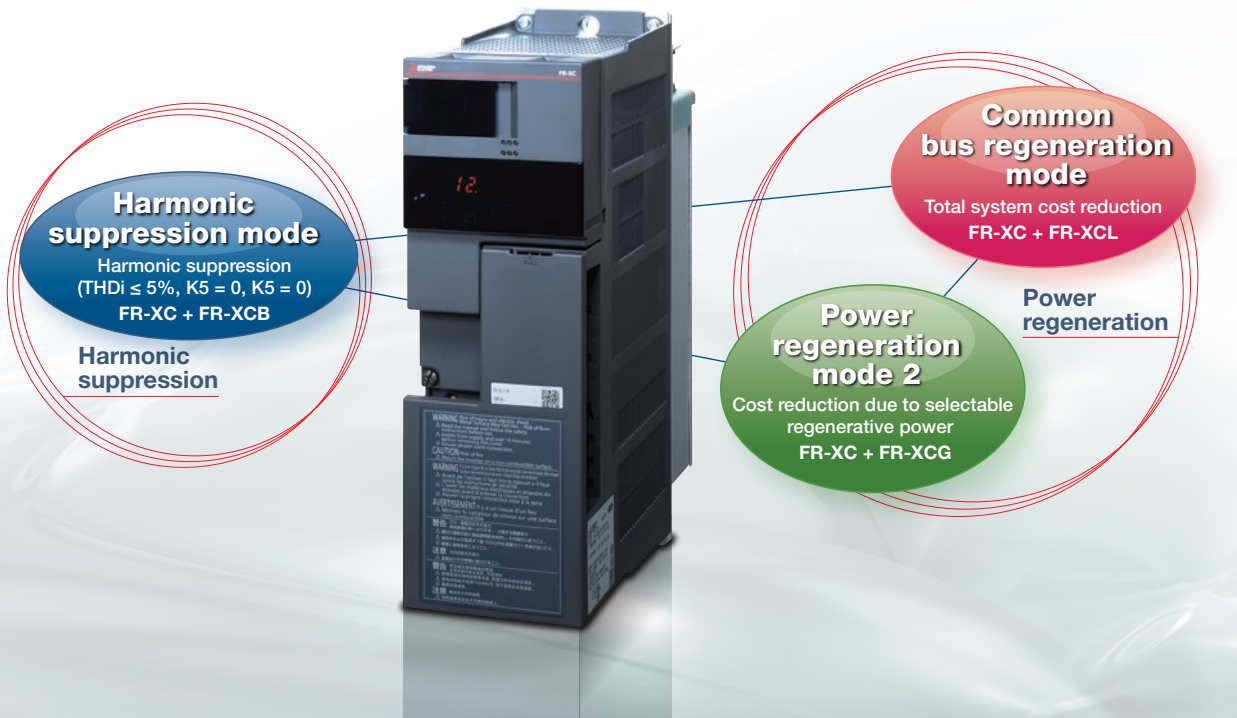
The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.



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Single Solution for Both Harmonic Suppression and Power Regeneration

Choose the suitable function for your needs by using the FR-XC converter with the FR-XCB, FR-XCL, or FR-XCG reactor.



	Harmonic suppression mode	Common bus regeneration mode	Power regeneration mode 2
Energy saving by power regeneration	★★★★	★★★★	★★★★
Power supply harmonic current suppression	★★★★	—	—
Reduction in the power supply capacity or the facility size by power factor improvement	★★★★	★	—
Use as a common converter	★★★★	★★★★	—
Initial cost reduction	★	★★	★★★★
Less wiring work	★★★★	★★★★	★★
Smaller enclosure size	★★	★★★★	★★

★★★★: Highly effective ★★★: Moderately effective ★: Slightly effective —: N/A

Compact design offering solution to harmonic problems

Harmonic suppression mode

Harmonic suppression ($K5 = 0$) achieved
Power supply capacity reduced by power factor improvement

FR-XC + FR-XCB



Power regeneration contributing to energy saving

Common bus regeneration mode

Harmonic suppression mode

Total cost reduction by connecting up to 10 inverters

FR-XC + FR-XCL

FR-XC + FR-XCB



Power regeneration mode 2

Space saving achievable depending on the regenerative power

FR-XC + FR-XCG



Compact design offering solution to harmonic problems

Harmonic suppression mode

The FR-XC-(H)15K or lower does not have the harmonic suppression function.

FR-XC + FR-XCB

Harmonic suppression (K5 = 0) achieved

- The FR-XC series converter is classified as the self-excitation three-phase bridge circuit under the "Harmonic Suppression Guidelines for Specific Consumers" and achieves $K5 = 0$ (conversion factor for equivalent capacity) when its harmonic suppression function is enabled and in use with the dedicated box-type reactor FR-XCB. (It is assumed that the converter generates no harmonics.)

The total harmonic distortion of the input current (THDi) is 5% or less*1, which facilitates compliance with the overseas standards related to harmonic suppression.

*1 When the input voltage is distorted, harmonic contents increase because power harmonics flow into the FR-XC series converter.

- The waveform with high peaks, which is typical of the input current to the inverter section from the converter section in an inverter unit, is rounded to make a sine wave with a lower input current effective value.

Power supply capacity reduced by power factor improvement

- With the reduced effective value of the input current to the inverter section, it is possible to install a power transformer, MCCB, cables, etc. with smaller capacity on the converter input side to reduce the equipment cost.

Wire and space saving

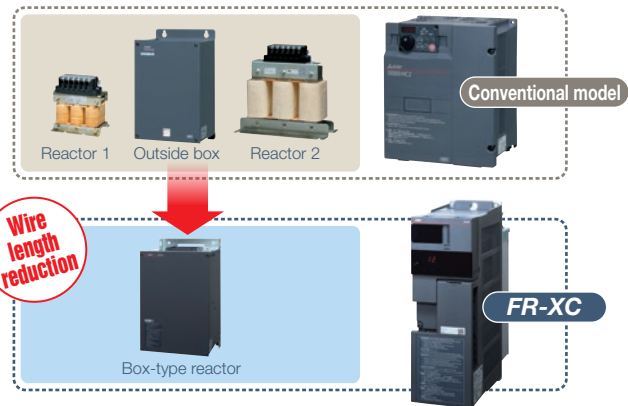
The slim converter requires less space, and the FR-XCB box-type reactor² enables wiring reduction as it contains peripheral devices such as reactors.

*2 Used for the FR-XC converter in harmonic suppression mode.

Space saving by increasing the current rating

When the 40°C rating of surrounding air temperature is selected within the temperature derating range, the current rating and the current to be applied can be increased. When the FR-XC series converter is intended for the use at the surrounding air temperatures less than 40°C, a model with a smaller capacity is applicable. With smaller converter, less space is required.

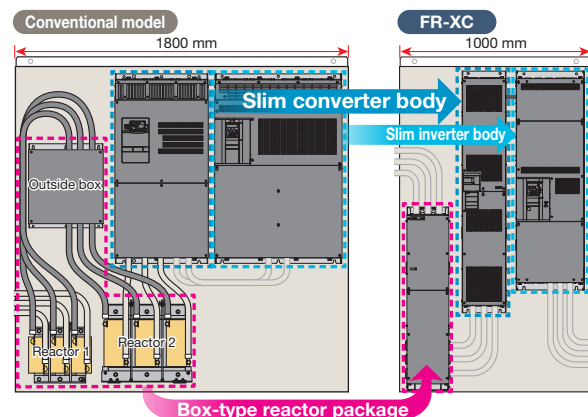
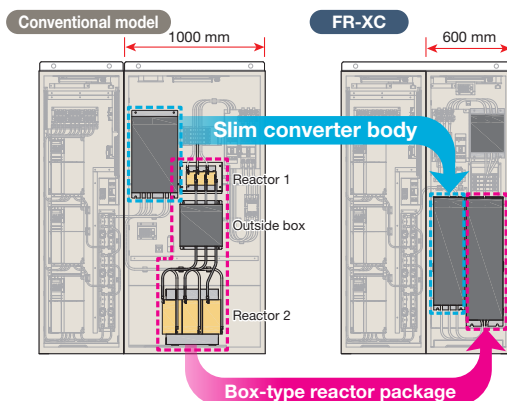
For selection, refer to the following pages: page 51 (harmonic suppression mode), page 37 (common bus regeneration mode), page 64 (power regeneration mode 2).



Installation space reduced by 40% or more

FR-XC-H75K: Width is reduced from 1000 mm to 600 mm.

FR-XC-H160K: Width is reduced from 1800 mm to 1000 mm.

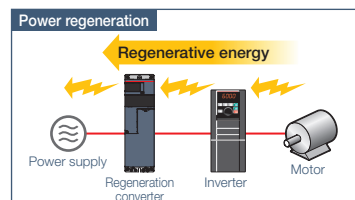


Power regeneration contributing to energy saving

While the motor rotates to drive the machine during power driving, the machine rotates the motor during regenerative driving, which results in energy saving since the motor serves as a generator which returns the power to the power supply. For example, when a power of 70 kW is required for power driving and a power of 30 kW is required for regenerative driving, the power consumption is reduced by 30%.

One of the two regeneration modes can be selected depending on the application.

Using regenerative power can increase power efficiency and reduce the CO₂ emission (power consumption) of the equipment. This creates the new added value of contributing to carbon neutrality.



Common bus regeneration mode

Harmonic suppression mode

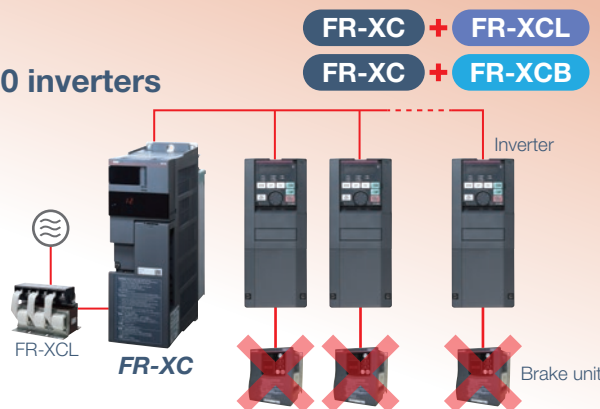
Total cost reduction by connecting up to 10 inverters

The FR-XC series converter can connect to up to 10 inverters³ together, though its predecessor FR-CV series converter is designed to connect to up to 6 inverters.

The power returned from an inverter during regenerative driving can be supplied to another inverter, saving the overall energy.

None of the inverters requires a brake unit, which enables total space and cost reduction.

³ If you want to connect 11 or more inverters, contact your sales representative.



Power regeneration mode 2

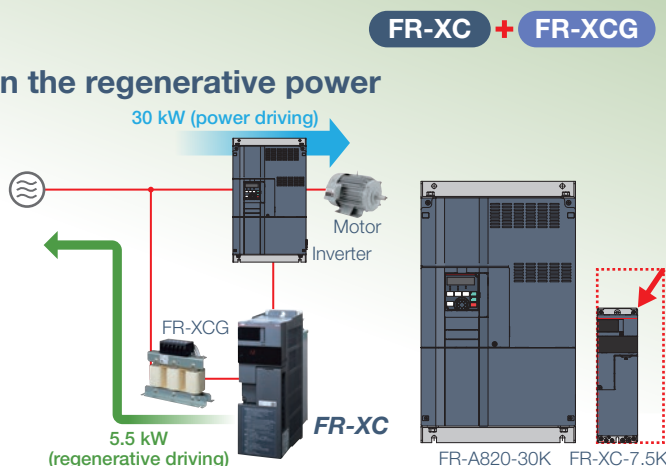
Space saving achievable depending on the regenerative power

For power driving, the inverter supplies power. For regenerative driving, the FR-XC series converter returns power to the power supply. (In this mode, the FR-XC series converter cannot be used as a common converter.)

The capacity of the FR-XC series converter is selectable according to the regenerative power of the system. Thus, the compact converter is applicable for the regenerative power smaller than the inverter capacity, which contributes to space saving. (Refer to page 64 for selection.)

For example, if you use the 30 kW inverter and the regenerative power of your system is 5.5 kilowatts, you can choose the 7.5 kW converter instead of the 30 kW converter.

The converter with its harmonic suppression function disabled can be used in the power regeneration mode.



For details on the control modes, refer to the following pages.

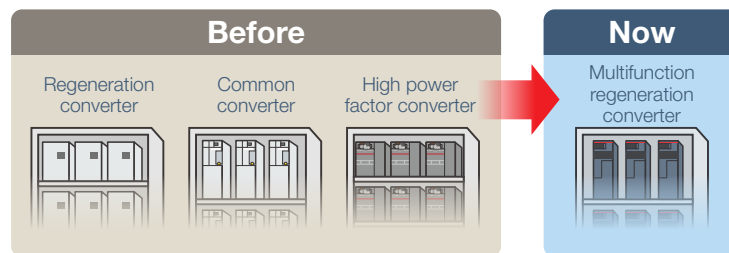
- Harmonic suppression modepage 46
- Common bus regeneration modepage 32
- Power regeneration mode 2.....page 60

Stock reduction

Single converter usable in different modes or with the control function enabled/disabled

The regeneration mode is changed with the selection switch, and the harmonic suppression function is enabled or disabled according to the parameter setting.

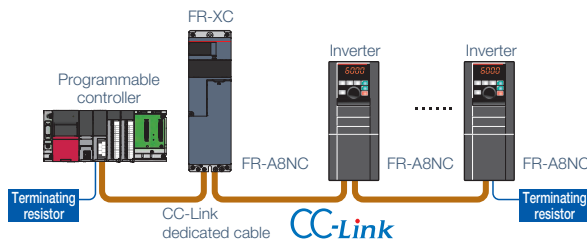
A single FR-XC series converter can be used as a backup converter for different applications. (Use the converter in combination with the dedicated stand-alone reactor (FR-XCL) or the dedicated box-type reactor (FR-XCB).)



Network compatibility

RS-485 communication is supported as standard. With the FR-A8NC communication option, the converter also supports CC-Link communication.

- As power can be monitored during both power driving and regenerative driving, the energy saving effect can be checked any time.
- Monitoring of faults and the voltage of each phase allows you to analyze the fault cause easily.

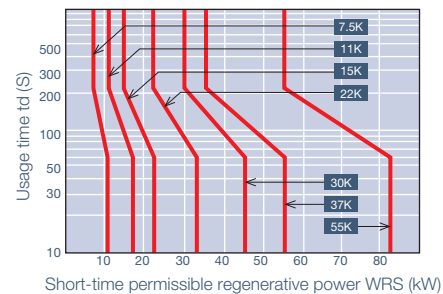


Large braking force

The power regeneration function (enabled continuously with 100%*1 torque or for 60 seconds with the maximum torque of 150%) offers a large braking force, eliminating the need for brake units.

*1 100% refers to the following values.
 Harmonic suppression mode: applicable inverter capacity (Refer to page 48.)
 Common bus regeneration mode: applicable inverter capacity (Refer to page 34.)
 Power regeneration mode 2: potential regenerative capacity (Refer to page 62.)

Regenerative braking torque (FR-XC-7.5K, 11K, 15K, 22K, 30K, 37K and 55K)



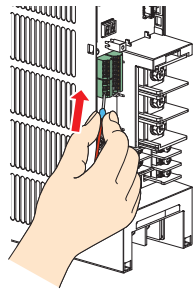
Easy wiring of the control circuit

Spring clamp terminals (control circuit terminals)

Spring clamp terminals*2 provide high reliability and easy wiring.

*2 The main circuit terminals are screw terminals.

- Easy wiring
Wiring is completed only by inserting the dedicated blade terminal of each cable. Without using the blade terminal, the loose wires can also be connected using a flathead screwdriver.



- High reliability
Internal terminal contacts are spring-type. Therefore, wires can be protected against loosening or contact faults due to vibrations during operation on a bogie or during transport.
- Maintenance-free
No additional screw tightening is required.

Long life components and life check function

Long life components

- The service life of the cooling fans is designed for 10 years*3.
- The capacitors' life is also designed for 10 years*3*4.
- Estimated service lifespan of the long-life parts

Components	Estimated lifespan	Guideline of JEMA*5
Cooling fan	10 years	2 to 3 years
Main circuit smoothing capacitor	10 years	5 years
Printed board smoothing capacitor	10 years	5 years

Life check function

- The remaining lifetime can be estimated for wear and tear parts (main circuit capacitor, cooling fan) and inrush current limit circuit by checking the deterioration.
- Using the self-diagnosis function, the part life warning can be output*6 to prevent a fault.

*3 Surrounding air temperature: Annual average of 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt).
The design life is a calculated value and is not a guaranteed product life.

*4 Input current: 80% of the converter rating

*5 Excerpts from "Periodic check of the transistorized inverter" of JEMA (Japan Electrical Manufacturer's Association).

*6 A warning is output when any of the control circuit capacitors, inrush current limit circuit, and cooling fan reaches its output level.

Protection against hazardous environments

The FR-XC series converters with circuit board coating (IEC 60721-3-3:1994 3C2/3S2) and plated conductors are available for improved environmental resistance. (The converter model name ends with "-60" or "-06".)

Global compatibility

- The FR-XC converter is compliant with UL, cUL, EC Directives (CE marking), and Radio Waves Act (South Korea, KC marking). It is also certified as compliant with the Eurasian Conformity (EAC).
- The converter is compliant with the EU RoHS Directive (Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), friendly to people and to the environment.



Installation inside the enclosure Option

The 30K converter or lower can be installed inside the enclosure by using the optional installation attachment FR-XCCP (the 37K and 55K converters do not need the attachment for installation in the enclosure).



IP20 compliant protective structure Option

The 37K and 55K converters can have the IP20-compliant protective structure when the optional IP20 compatible attachment FR-XCCU is attached.



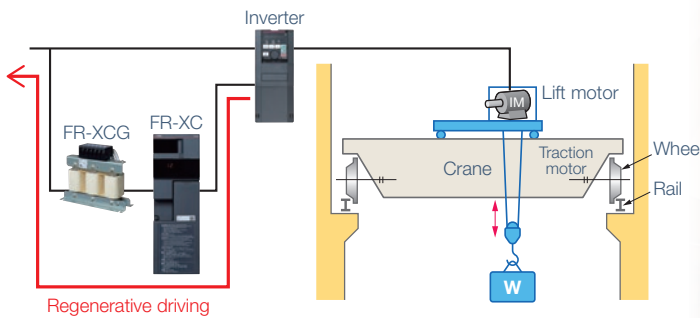
Application Examples

Ceiling crane



The regenerative power from the motor is returned the power supply to save energy. The capacity of the FR-XC series converter is selectable according to the regenerative power of the system, which contributes to space saving.

Power regeneration mode 2



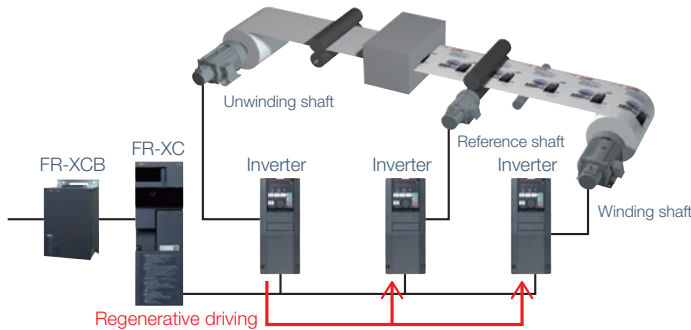
Printing machines



The regenerative power from the unwinding shaft can be supplied to another inverter, saving the overall energy. When the harmonic suppression function is enabled, power supply harmonics of inverters can be suppressed.

Common bus regeneration mode

Harmonic suppression mode

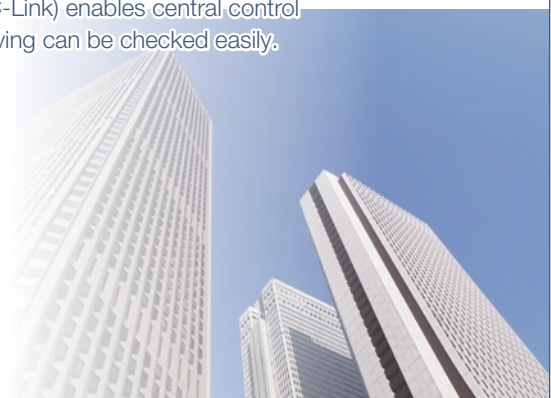
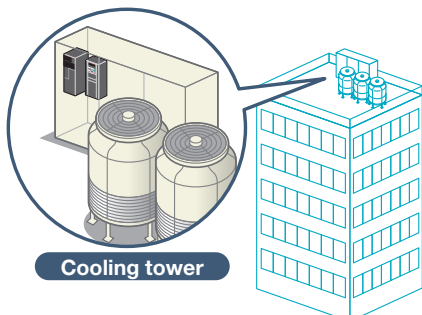


Air conditioning of buildings



Power supply harmonics of inverters can be suppressed, minimizing the effects on other equipment. Compatibility with networks (RS-485 communication, CC-Link) enables central control of systems in multiple locations. The effects of energy saving can be checked easily.

Harmonic suppression mode

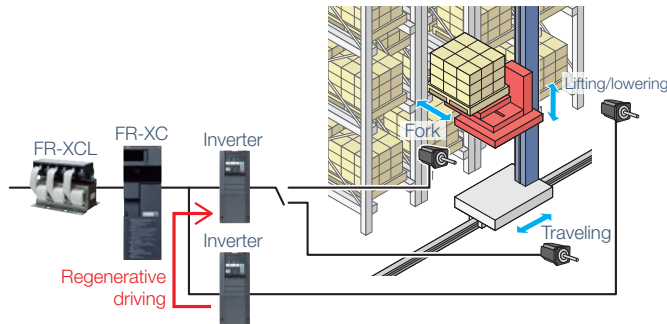


Conveyor



The regenerated energy of the inverter for the lift application is used by another inverter for the driving application. If there is still an excess, it is returned to the power supply, saving on the energy consumption.

Common bus regeneration mode

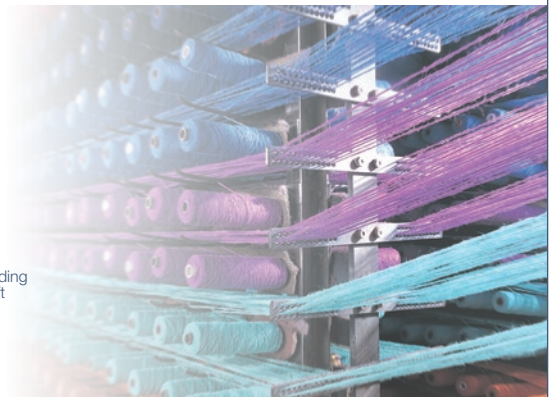
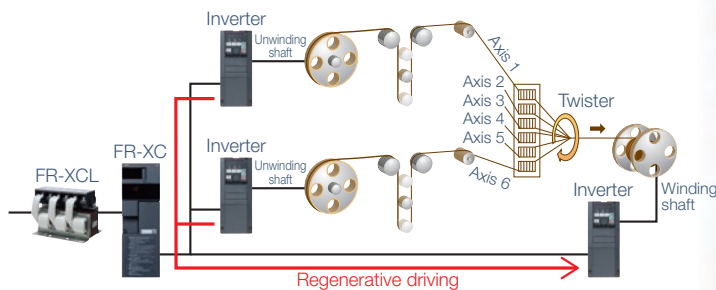


Spinning



As unwinding shafts are driven by a load, operation is always in regenerative driving state. The regenerative power can be used efficiently by connecting inverters of other drive shafts to a common bus. The FR-XC series converter supports the system with more than 6 inverters (up to 10 inverters).

Common bus regeneration mode

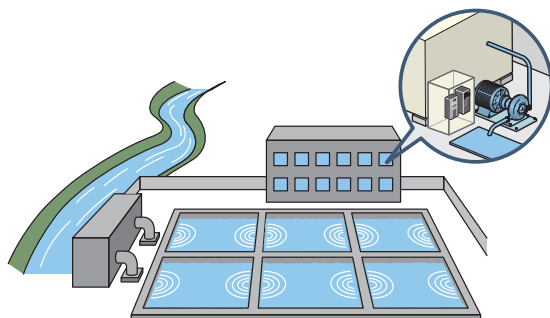


Pump (water treatment plant)



Power supply harmonics of inverters can be suppressed, allowing the compliance with the harmonic suppression guidelines. The FR-XCB box-type reactor enables wiring reduction as it contains peripheral devices.

Harmonic suppression mode



Lineup

●: Released, ○: To be released, —: Not applicable
 Specifications of the models to be released are subject to change without prior notice.

Multifunction regeneration converter model

FR-XC- [] 22 K - [] []

Symbol	Voltage
None	200 V class
H	400 V class

Converter capacity
Capacity (kW)

Symbol	Circuit board coating	Plated conductor
None	Without	Without
60	With	Without
06	With	With

Symbol	Functional specification*1
None	Common bus regeneration mode
PWM	Harmonic suppression mode

For selection, refer to the following pages:
 page 51 (harmonic suppression mode), page 37 (common bus regeneration mode), page 64 (power regeneration mode 2).

*1 Pr.416 ="9999"

Voltage	Model	7.5	11	15	18.5	22	30	37	55	75	110	160	220
200 V	FR-XC-[]K	●	●	●	—	●	●	●	●	—	—	—	—
	FR-XC-[]K-PWM	—	—	—	—	●	—	—	—	—	—	—	—
400 V	FR-XC-H[]K	●	●	●	—	●	●	●	●	●	○	●	●
	FR-XC-H[]K-PWM	—	—	—	●	●	—	●	●	●	○	●	●

Dedicated stand-alone reactor (option) model

A stand-alone reactor for use with the FR-XC converter in common bus regeneration mode.

A stand-alone reactor for use with the FR-XC converter in power regeneration mode 2.

FR-XCL- [] 22 K

Symbol	Voltage
None	200 V class
H	400 V class

Reactor capacity
Capacity (kW)

FR-XCG- [] 22 K

Symbol	Voltage
None	200 V class
H	400 V class

Reactor capacity
Capacity (kW)

Voltage	Model	7.5	11	15	22	30	37	55	75	90	132	160	185	220	250
200 V	FR-XCL-[]K	●	●	●	●	●	●	●	—	—	—	—	—	—	—
	FR-XCG-[]K	●	●	●	●	●	●	●	—	—	—	—	—	—	—
400 V	FR-XCL-H[]K	●	●	●	●	●	●	●	●	●	—	●	●	●	●
	FR-XCG-H[]K	●	●	●	●	●	●	●	●	●	●	●	●	●	—

Dedicated box-type reactor (option) model

A stand-alone box-type reactor for use with the FR-XC converter in harmonic suppression mode.

FR-XCB- [] 18.5 K - []

Symbol	Voltage
None	200 V class
H	400 V class

Symbol	Circuit board coating
None	Without
60	With

Voltage	Model	18.5	22	37	55	75	110	160	220
200 V	FR-XCB-[]K	●	●	●	●	—	—	—	—
400 V	FR-XCB-H[]K	●	●	●	●	●	○	●	●

Reactor capacity
Capacity (kW)

Dedicated contactor box (option) model

A dedicated contactor box used for coordination with the charging circuit.

FR-MCB- H 400

Symbol	Voltage	Capacity	Built-in magnetic contactor
H	400 V class	150 400 800	S-N[] AC200V

Combination in common bus regeneration mode

• 200 V class

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-XCL-[]K
FR-XC-7.5K	50°C/40°C rating	7.5
FR-XC-11K		11
FR-XC-15K		15
FR-XC-18.5K-PWM		22
FR-XC-22K		
FR-XC-22K-PWM		30
FR-XC-30K		
FR-XC-37K		37
FR-XC-37K-PWM		
FR-XC-55K		55
FR-XC-55K-PWM		

• 400 V class

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-XCL-H[]K
FR-XC-H7.5K	50°C/40°C rating	7.5
FR-XC-H11K		11
FR-XC-H15K		15
FR-XC-H18.5K-PWM		22
FR-XC-H22K		
FR-XC-H22K-PWM		30
FR-XC-H30K		
FR-XC-H37K		37
FR-XC-H37K-PWM		
FR-XC-H55K		55
FR-XC-H55K-PWM		
FR-XC-H75K	50°C rating	75
FR-XC-H75K-PWM	40°C rating	90
FR-XC-H160K	50°C rating	160
FR-XC-H160K-PWM	40°C rating	185
FR-XC-H220K	50°C rating	220
FR-XC-H220K-PWM	40°C rating	250

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-MCB-H[]
FR-XC-H75K	50°C rating	150
FR-XC-H75K-PWM	40°C rating	
FR-XC-H160K	50°C rating	400
FR-XC-H160K-PWM	40°C rating	
FR-XC-H220K	50°C rating	400
FR-XC-H220K-PWM	40°C rating	800

Combination in power regeneration mode 2

• 200 V class

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-XCG-[]K
FR-XC-7.5K	50°C/40°C rating	7.5
FR-XC-11K		11
FR-XC-15K		15
FR-XC-18.5K-PWM		22
FR-XC-22K		
FR-XC-22K-PWM		30
FR-XC-30K		
FR-XC-37K		37
FR-XC-37K-PWM		
FR-XC-55K		55
FR-XC-55K-PWM		

Combination in harmonic suppression mode

• 200 V class

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-XCB-[]K
FR-XC-18.5K-PWM	50°C/40°C rating	18.5
FR-XC-22K		
FR-XC-22K-PWM		22
FR-XC-30K		
FR-XC-37K		37
FR-XC-37K-PWM		
FR-XC-55K		55
FR-XC-55K-PWM		

• 400 V class

Multifunction regeneration converter		Dedicated stand-alone reactor	
Model	周囲温度定格	FR-XCB-H[]K	
FR-XC-H18.5K-PWM	50°C/40°C rating	18.5	
FR-XC-H22K		22	
FR-XC-H22K-PWM			
FR-XC-H30K		37	
FR-XC-H37K			
FR-XC-H37K-PWM		55	
FR-XC-H55K			
FR-XC-H55K-PWM			
FR-XC-H75K		50°C rating	75
FR-XC-H75K-PWM		40°C rating	
FR-XC-H160K	50°C rating	160	
FR-XC-H160K-PWM	40°C rating		
FR-XC-H220K	50°C rating	220	
FR-XC-H220K-PWM	40°C rating		

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-MCB-H[]
FR-XC-H75K	50°C rating	150
FR-XC-H75K-PWM	40°C rating	
FR-XC-H160K	50°C rating	400
FR-XC-H160K-PWM	40°C rating	
FR-XC-H220K	50°C rating	400
FR-XC-H220K-PWM	40°C rating	

• 400 V class

Multifunction regeneration converter		Dedicated stand-alone reactor
Model	周囲温度定格	FR-XCG-H[]K
FR-XC-H7.5K	50°C/40°C rating	7.5
FR-XC-H11K		11
FR-XC-H15K		15
FR-XC-H18.5K-PWM		22
FR-XC-H22K		
FR-XC-H22K-PWM		30
FR-XC-H30K		
FR-XC-H37K		37
FR-XC-H37K-PWM		
FR-XC-H55K		55
FR-XC-H55K-PWM		
FR-XC-H75K	50°C rating	75
FR-XC-H75K-PWM	40°C rating	90
FR-XC-H160K	50°C rating	132
FR-XC-H160K-PWM	40°C rating	160
FR-XC-H220K	50°C rating	185
FR-XC-H220K-PWM	40°C rating	220

Lineup

Converter installation attachment for enclosure (option) model

An attachment for installation of the FR-XC series converter in an enclosure.

FR - X C C P 03

Symbol	Applicable converter
01 to 03	Refer to the following table.

Model	01	02	03
FR-XCCP-[]	●	●	●

IP20 compatible attachment (option) model

An attachment for achieving the IP20 compliant protective structure of the FR-XC series converter.

FR - X C C U 01

Symbol	Applicable converter
01 to 03	Refer to the following table.

Model	01	02	03
FR-XCCU-[]	●	●	●

●: Released

Combination matrix of FR-XCCP and FR-XC(-PWM)

Multifunction regeneration converter	Converter installation attachment for enclosure
Model	FR-XCCP[]
FR-XC-7.5K FR-XC-H7.5K	01
FR-XC-11K FR-XC-H11K	
FR-XC-15K FR-XC-H15K	02
FR-XC-22K FR-XC-H22K	03
FR-XC-30K FR-XC-H30K	
FR-XC-18.5K-PWM FR-XC-H18.5K-PWM	
FR-XC-22K-PWM FR-XC-H22K-PWM	

Combination matrix of FR-XCCU and FR-XC(-PWM)

Multifunction regeneration converter	IP20 compatible attachment
Model	FR-XCCU[]
FR-XC-37K FR-XC-37K-PWM	01
FR-XC-H55K FR-XC-H55K-PWM	
FR-XC-55K FR-XC-55K-PWM	02
FR-XC-H37K FR-XC-H37K-PWM	03

MEMO

Common specifications

Common specifications

Control	Input frequency range		50 to 60 Hz
	Operation	Input signal (3)	
Output signal Open collector output (3)*6 Relay output (1)		The following signals can be assigned to Pr.11, Pr.12, or Pr.16 (Output terminal function selection) : Inverter run enable (RDY), During converter reset (RSO), Converter running (CVO), Overload warning (OL), Power supply phase detection (PHS), Instantaneous power failure detection (IPF), Regenerative drive recognition (Y7), Electronic thermal O/L relay pre-alarm (THP), Fan fault output (FAN), Heatsink overheat pre-alarm (FIN), During retry (RTY), Life alarm (Y14), Maintenance timer alarm (Y15), Instantaneous power failure detection hold (Y16), PU stopped (PS), Box-type reactor overheat pre-alarm (FTP), Alarm (LF), and Fault (ALM).	
Operation status			
Indication	Status monitoring	Converter	Input power value (with regenerative driving indication)
		FR-DU08/ FR-PU07	Input current, input voltage, bus voltage (output voltage), fault indication, power supply frequency, electronic thermal relay load factor, input power, cumulative power, cumulative energization time, input power with regenerative driving indication, I/O terminal status, electricity cost, option connector status
	Fault monitoring	Converter	When a protective function is activated, a fault indication is displayed.
		FR-DU08/ FR-PU07	When a protective function is activated, a fault indication is displayed, and the latest monitored value of input voltage, input current, bus voltage, cumulative energization time are recorded. The last eight fault records are stored.
Protective function	Fault		Overcurrent trip, Overvoltage trip, Converter overload trip (electronic thermal relay function), Heatsink overheat, Instantaneous power failure, Undervoltage, Input phase loss, External thermal relay operation*3, Communication option fault*4, Parameter storage device fault, PU disconnection*3, Retry count excess*3, CPU fault, Internal circuit fault, 24 VDC power output short circuit, Inrush current limit circuit fault, Connection mode fault, Unsupported control selection, Box-type reactor overheat protection, Box-type reactor power supply short circuit protection, Option fault*4, Main circuit power supply detection fault, Input power supply fault 1
	Alarm, Warning, Error message		Overload signal detection, Electronic thermal relay function pre-alarm, PU stop, Maintenance signal output*3, Power supply not detected, Converter operation disabled, Box-type reactor overheat pre-alarm, Fan alarm, Operation panel lock*5, Write disable error*5, Copy operation fault*5
Environment	Surrounding air temperature		-10 to +50°C (non-freezing)*1
	Surrounding air humidity		With circuit board coating (conforming to IEC 60721-3-3:1994 3C2/3S2): 95% RH or less (non-condensing), without circuit board coating: 90% RH or less (non-condensing)
	Storage temperature*2		-20 to +65°C
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt)
	Altitude		2500 m or less (For the installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.)
	Vibration		[55K or lower] 5.9 m/s ² or less at 10 to 55 Hz in X, Y, and Z directions. [75K or higher] Frequency range 10 to 57 Hz: maximum amplitude 0.075 mm. Frequency range 57 to 150 Hz: maximum acceleration speed 9.8 m/s ² .

*1 -10 to +40°C (non-freezing) at the 40°C rating.

*2 Applicable to conditions for a short time, for example, in transit.

*3 Not enabled in the initial state.

*4 Available when the FR-A8NC is installed.

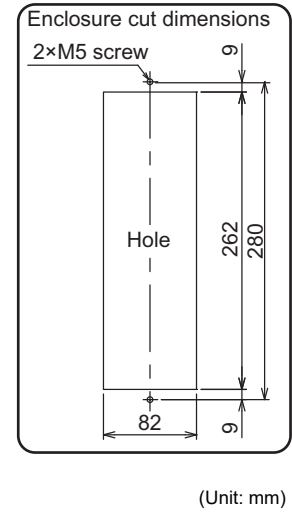
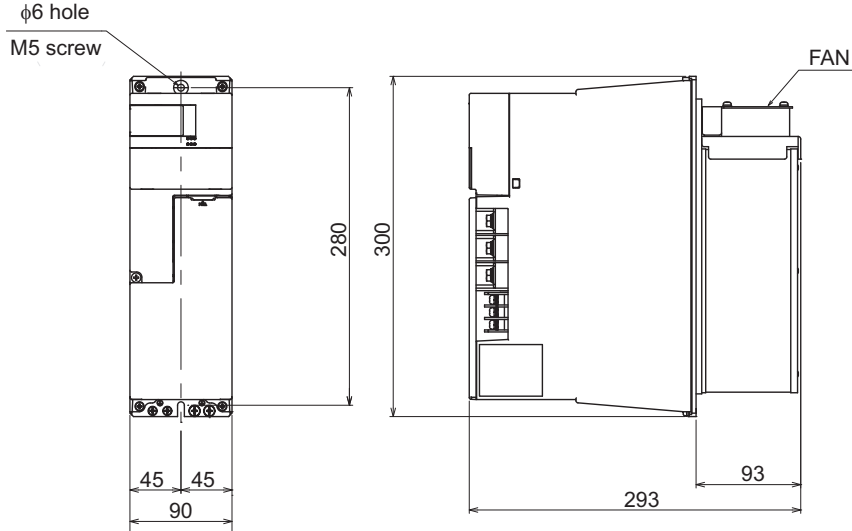
*5 Displayed on the operation panel (FR-DU08) only.

*6 Signal assignment is not available for one of the three terminals (terminal RYB).

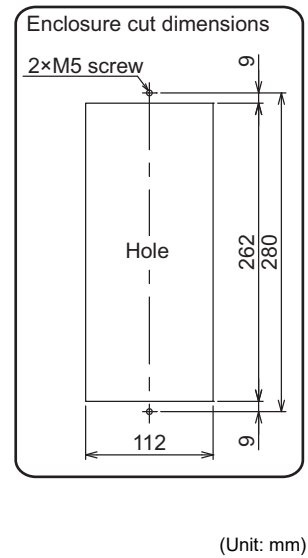
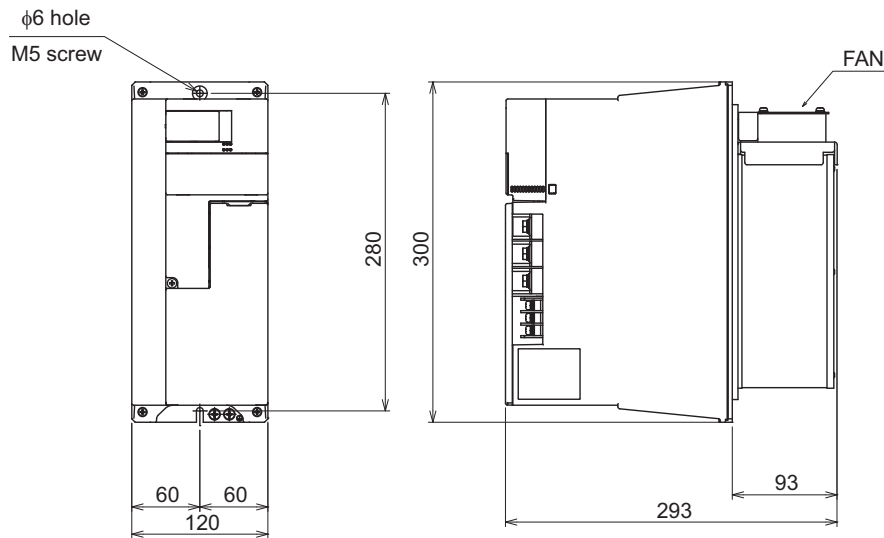
Outline Dimensions

◆ Multifunction regeneration converter FR-XC(-PWM)

- FR-XC-(H)7.5K, (H)11K

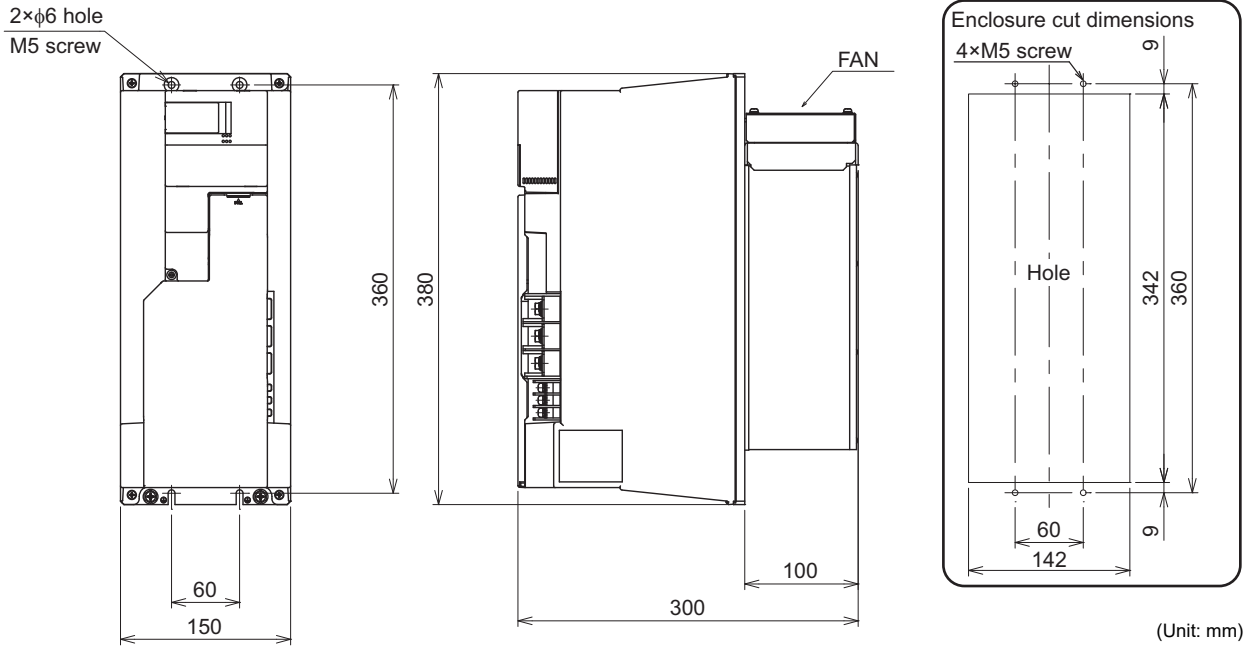


- FR-XC-(H)15K

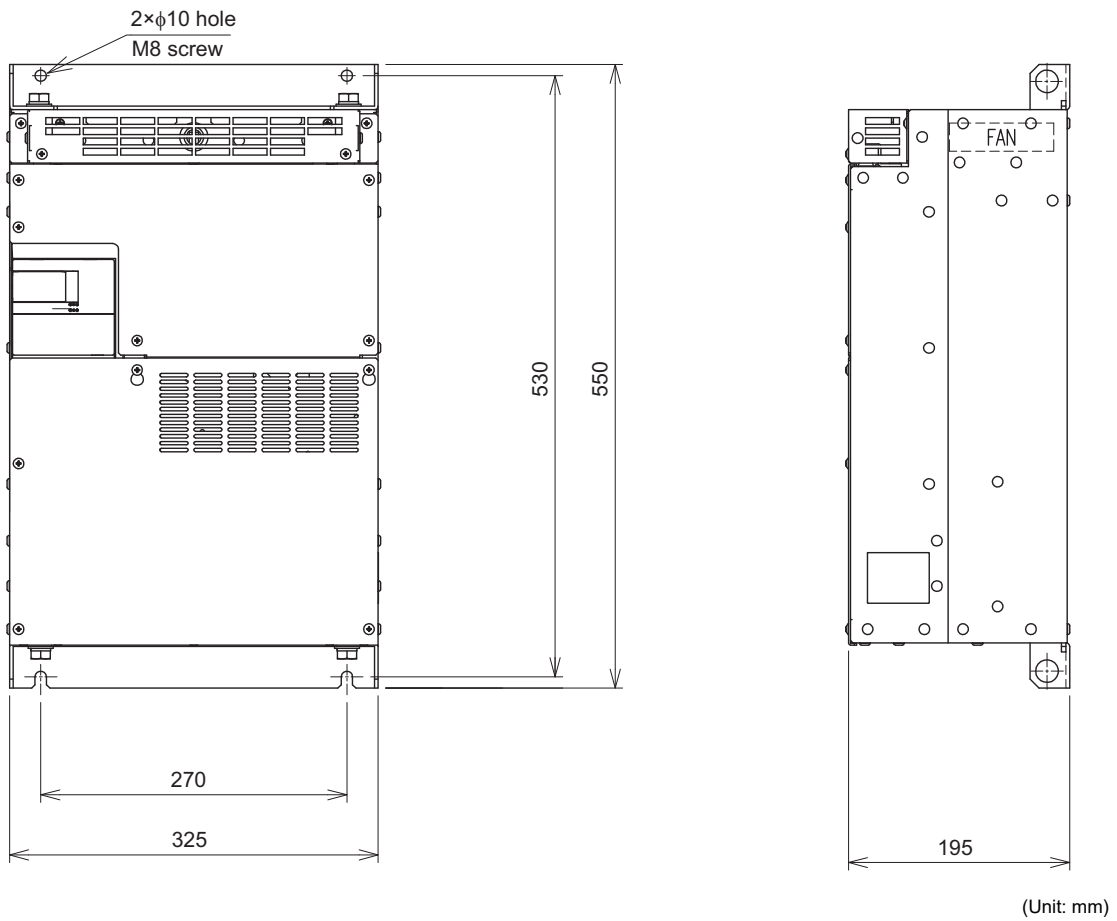


Outline Dimensions

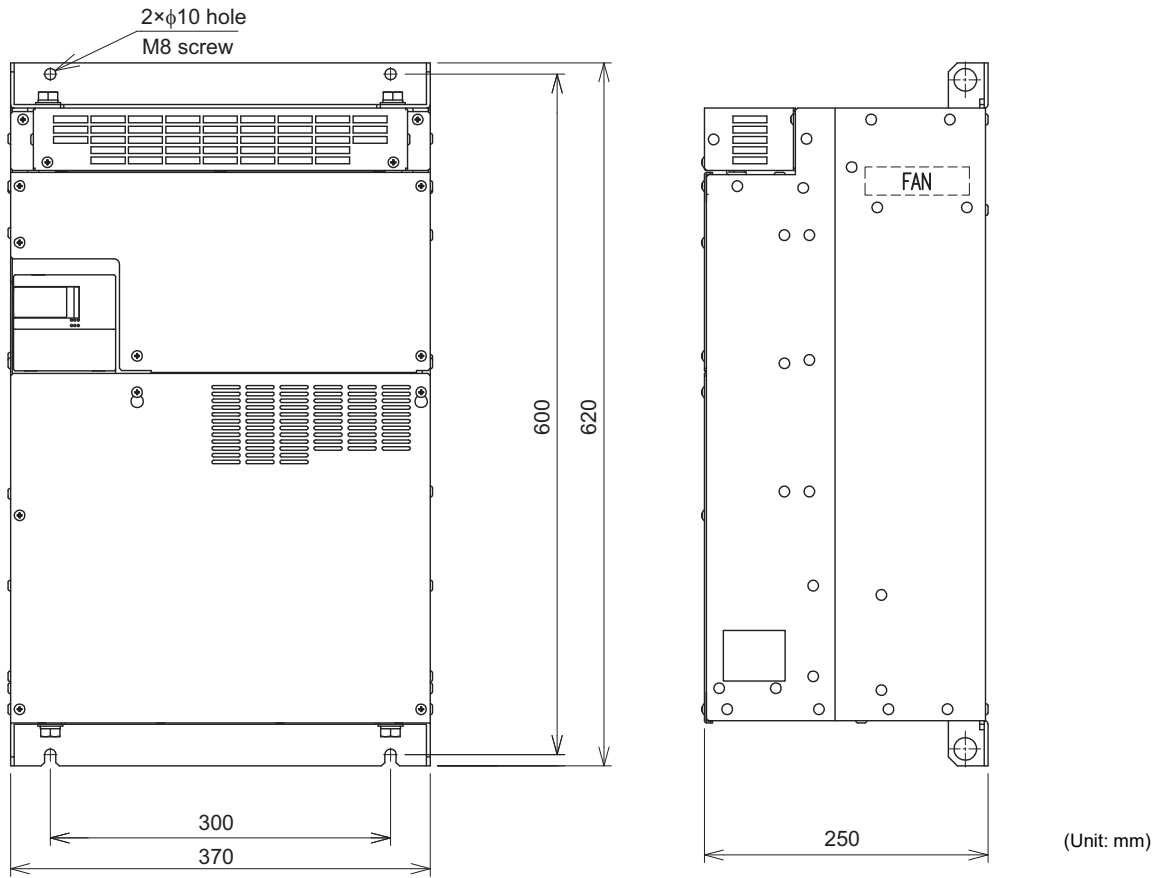
- FR-XC-(H)22K, (H)30K
- FR-XC-(H)18.5K-PWM, (H)22K-PWM



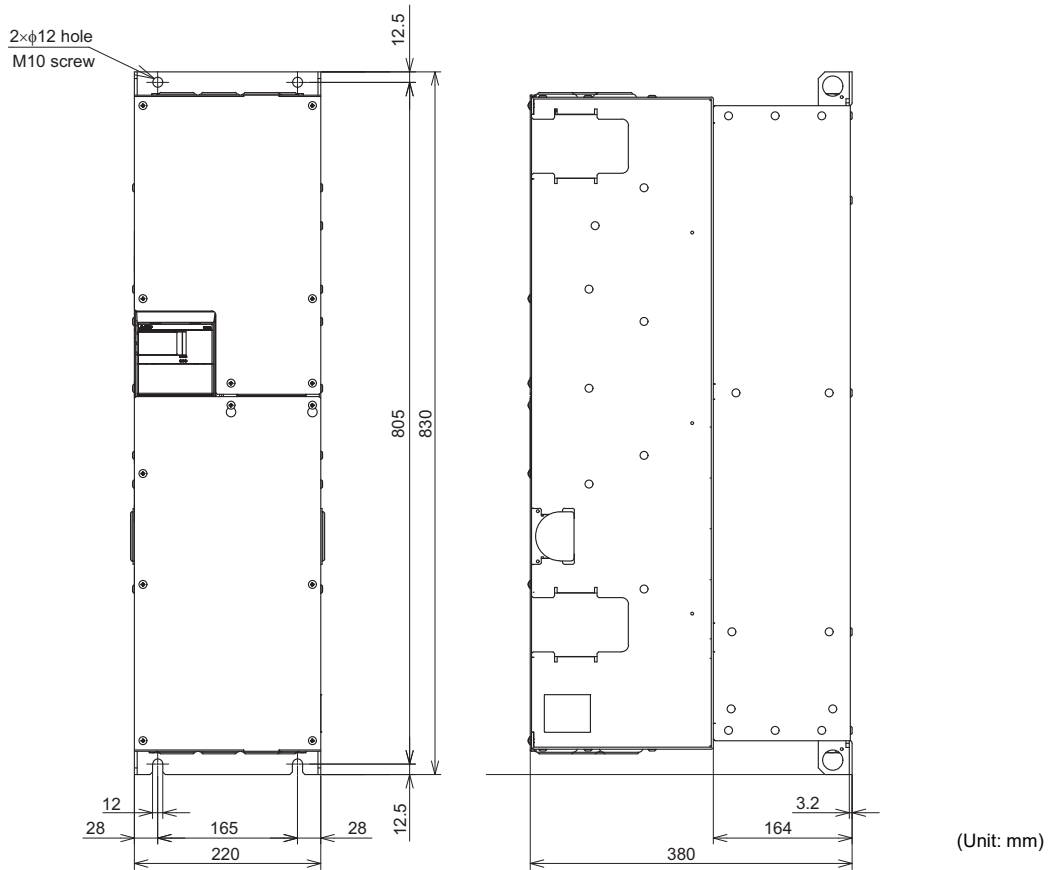
- FR-XC-(H)37K, H55K
- FR-XC-(H)37K-PWM, H55K-PWM



- FR-XC-55K
- FR-XC-55K-PWM



- FR-XC-H75K
- FR-XC-H75K-PWM



Outline Dimensions

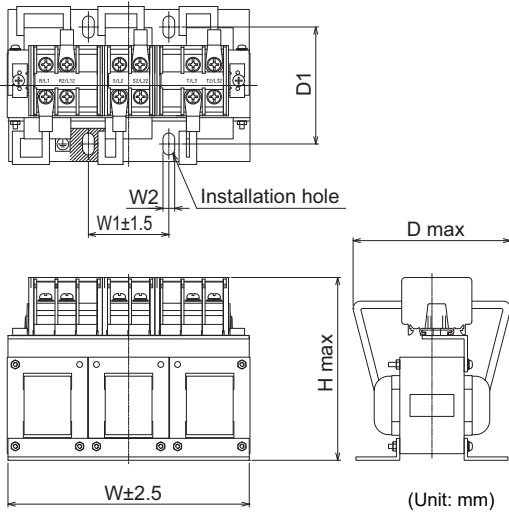
- FR-XC-H160K, H220K
- FR-XC-H160K-PWM, H220K-PWM



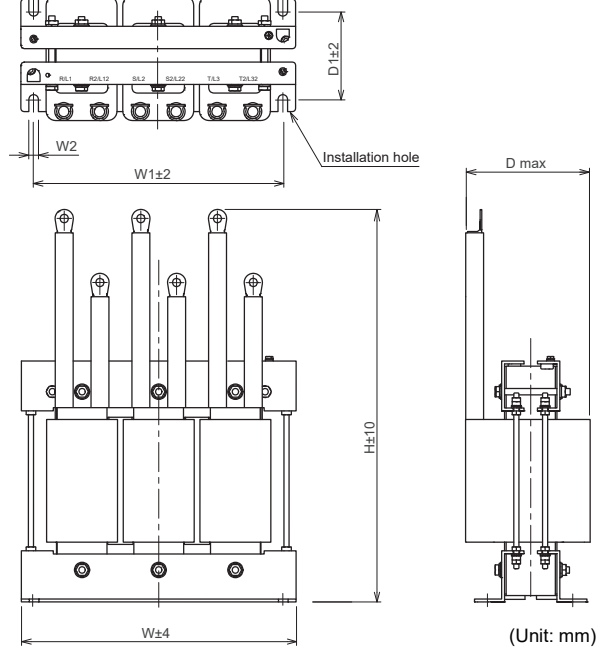
(Unit: mm)

◆ Dedicated stand-alone reactor FR-XCL (option)

- FR-XCL-(H)7.5K, (H)11K, (H)15K, (H)22K, (H)30K, (H)37K, (H)55K, H75K, H90K



- FR-XCL-H160K, H185K, H220K, H250K



200 V class

Model	W	W1	W2	H	D	D1	Mounting screw size	Terminal screw size	Mass
FR-XCL-7.5K	165	55	8	125	120	80±2	M6	M5	3.9 kg
FR-XCL-11K				130	130	73±2		M6	5.5 kg
FR-XCL-15K	192	70	8	130	140	100±2	M6	M6	6.3 kg
FR-XCL-22K				150	160	110±2		M6	10.0 kg
FR-XCL-30K	240	200	10	190	240	120±5	M8	M10	12.0 kg
FR-XCL-37K	248	225		190	260	135±5		M10	15.5 kg

400 V class

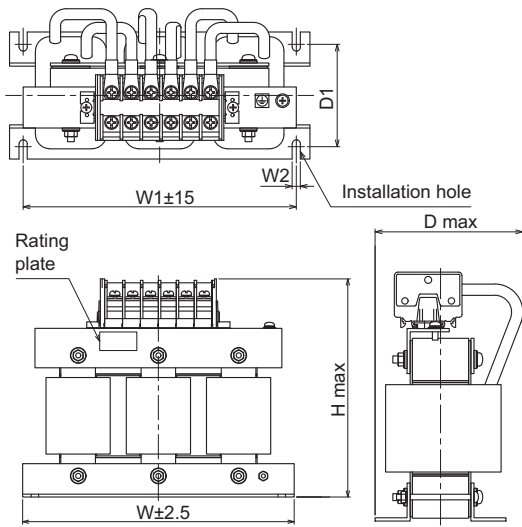
Model	W	W1	W2	H	D	D1	Mounting screw size	Terminal screw size	Mass
FR-XCL-H7.5K	165	55	8	125	120	73±2	M6	M5	3.7 kg
FR-XCL-H11K						80±2			4.2 kg
FR-XCL-H15K						110±2			6.0 kg
FR-XCL-H22K	240	70	8	150	150	109±2	M6	M6	9.0 kg
FR-XCL-H30K					170	129±2			12.0 kg
FR-XCL-H37K	220	200	10	190	230	120±5	M8	M8	12.0 kg
FR-XCL-H55K	250	225			230	135±5			16.0 kg
FR-XCL-H75K	300	270	10	335	200	140±2	M8	M8	50.0 kg
FR-XCL-H90K				360	210	150±2			60.0 kg
FR-XCL-H160K	430	390	15	600	190	140	M12	M12	95.0 kg
FR-XCL-H185K				640	210	160			115.0 kg
FR-XCL-H220K	500	460	15	640	210	160	M12	M12	150.0 kg
FR-XCL-H250K				660					160

Outline Dimensions

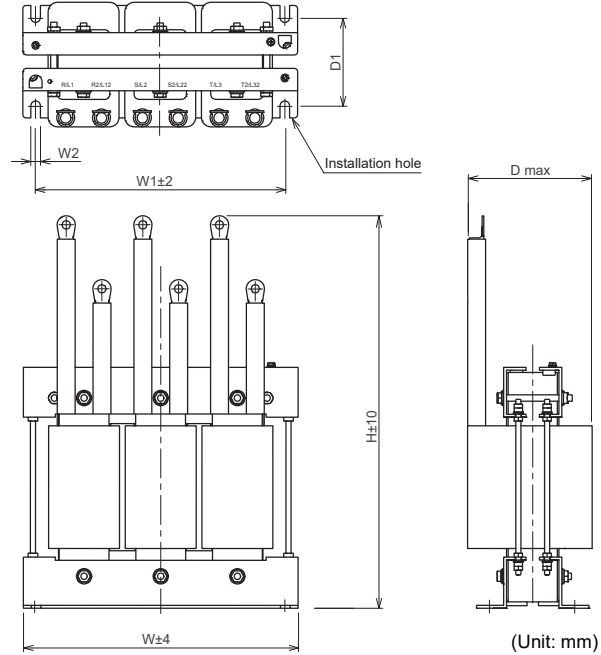
◆ Dedicated stand-alone reactor FR-XCG (option)

- FR-XCG-(H)7.5K, (H)11K, (H)15K, (H)22K, (H)30K, (H)37K, (H)55K, H75K, H90K

- FR-XCG-H132K, H160K, H185K, H220K



(Unit: mm)



(Unit: mm)

200 V class

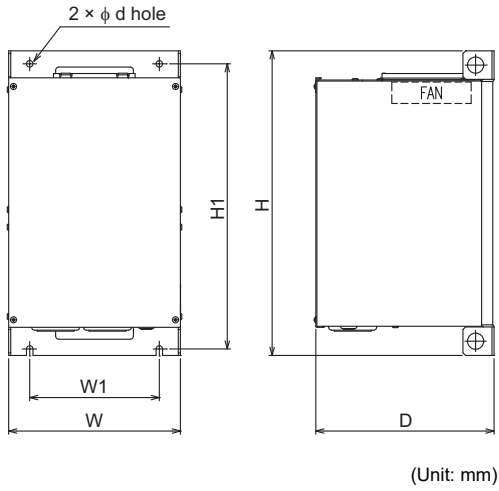
Model	W	W1	W2	H	D	D1	Mounting screw size	Terminal screw size	Mass
FR-XCG-7.5K	220	200	6	185	115	60±1.5	M5	M5	5 kg
FR-XCG-11K					120	75±1.5			8 kg
FR-XCG-15K					130	90±1.5			11 kg
FR-XCG-22K	255	225	8	240	140	85±1.5	M6	M6	16 kg
FR-XCG-30K					155	100±1.5			20 kg
FR-XCG-37K	300	270	10	285	180	130±1.5	M8	M10	25 kg
FR-XCG-55K					190				40 kg

400 V class

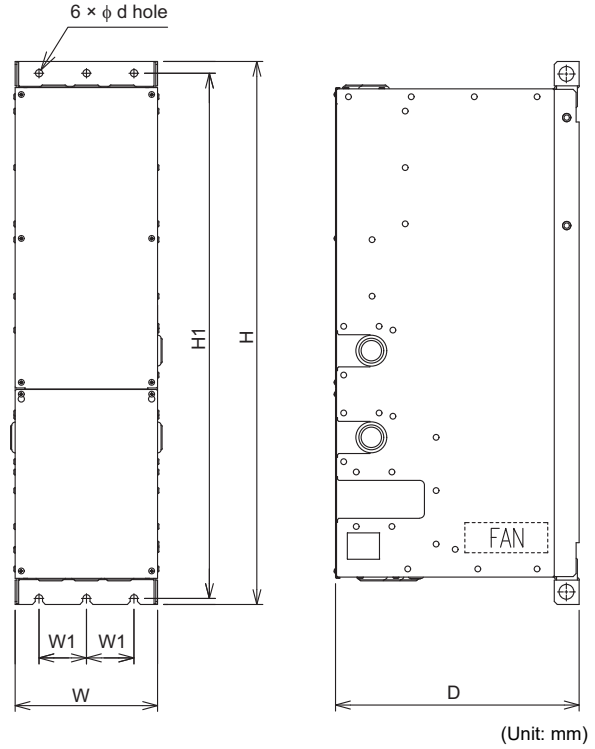
Model	W	W1	W2	H	D	D1	Mounting screw size	Terminal screw size	Mass
FR-XCG-H7.5K	220	200	6	185	115	60±1.5	M5	M5	5 kg
FR-XCG-H11K					120	75±1.5			8 kg
FR-XCG-H15K					130	90±1.5			11 kg
FR-XCG-H22K	255	225	8	240	140	85±1.5	M6	M6	16 kg
FR-XCG-H30K					155	100±1.5			20 kg
FR-XCG-H37K	300	270	10	285	180	130±1.5	M8	M8	25 kg
FR-XCG-H55K					190				40 kg
FR-XCG-H75K					335				200
FR-XCG-H90K	360	210	150±2	60 kg					
FR-XCG-H132K	430	390	15	560	195	140±2	M12	M12	80.0 kg
FR-XCG-H160K				190	95.0 kg				
FR-XCG-H185K				600	210				160±2
FR-XCG-H220K	500	460	650	210	160±2	150.0 kg			

◆ Dedicated box-type reactor FR-XCB (option)

- FR-XCB-(H)18.5K, (H)22K, (H)37K, (H)55K



- FR-XCB-H75K



200 V class

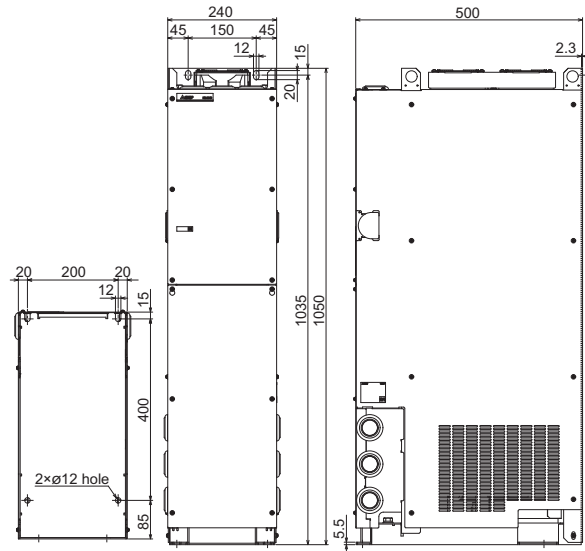
Model	W	W1	H	H1	D	d	Screw size	Mass
FR-XCB-18.5K	265	200	470	440	275	10	M8	26.0 kg
FR-XCB-22K								
FR-XCB-37K	350	270	600	575	330	12	M10	56.9 kg
FR-XCB-55K								68.5 kg

400 V class

Model	W	W1	H	H1	D	d	Screw size	Mass
FR-XCB-H18.5K	265	200	470	440	275	10	M8	26.9 kg
FR-XCB-H22K								63.0 kg
FR-XCB-H37K	350	270	600	575	330	12	M10	73.0 kg
FR-XCB-H55K								120.0 kg
FR-XCB-H75K	240	80	915	885	410			

Outline Dimensions

- FR-XCB-H160K, H220K

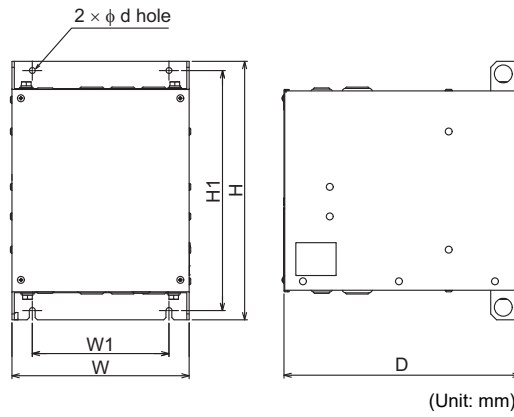


(Unit: mm)

Model	Mass
FR-XCB-H160K	230 kg
FR-XCB-H220K	260 kg

◆ **Dedicated contactor box FR-MCB**

- FR-MCB-H150, H400, H800

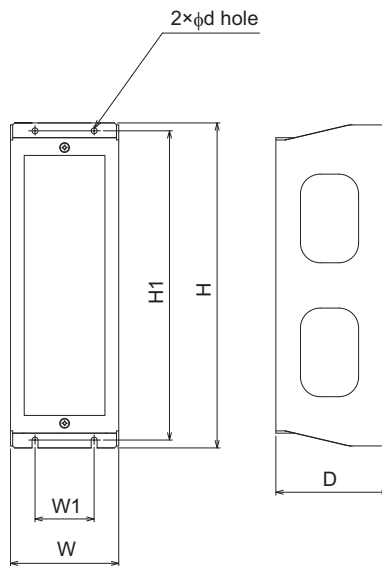


(Unit: mm)

Model	W	W1	H	H1	D	d	Screw size	Mass
FR-MCB-H150	240	185	350	325	320	8	M6	17.0 kg
FR-MCB-H400		175	540	518	370	10		29.0 kg
FR-MCB-H800		880	858	51.0 kg				

◆ **Converter installation enclosure attachment FR-XCCP (option)**

- FR-XCCP01, 02, 03



(Unit: mm)

Model	W	W1	H	H1	D	d	Screw size
FR-XCCP01	110	60	330	314	115	6	M5
FR-XCCP02	130	90			120		
FR-XCCP03	160	120	410	396	116	7	M6

Outline Dimensions

◆ Protruding the heat sink through a panel

When encasing the multifunction regeneration converter in an enclosure, the heat generated in the enclosure can be greatly reduced by exposing the heat sink of the converter. (The 30K converters or lower are designed to be installed in an enclosure with its heat sink protruded through the panel of the enclosure.)

This installation method is recommended when installing the converter in a compact enclosure.

[30K converters or lower]

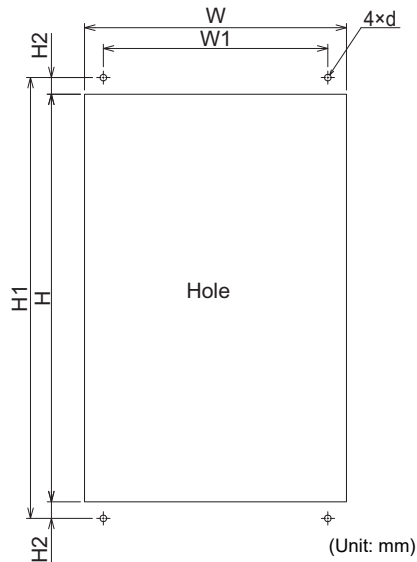
Refer to **page 17** for instructions on cutting the panel of the enclosure.



- Use the FR-XCCP (converter installation attachment for enclosure) to install the 30K converter or lower in the enclosure.

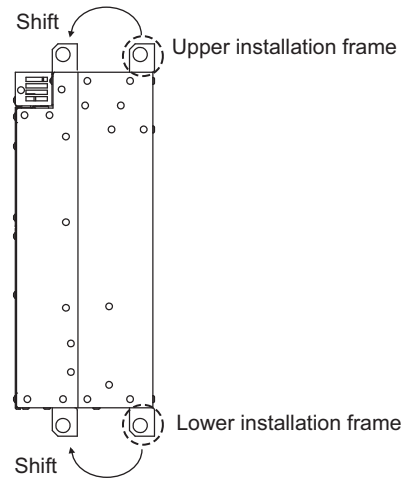
[37K converters or higher]

- Panel cutting
Cut the panel of the enclosure as follows.

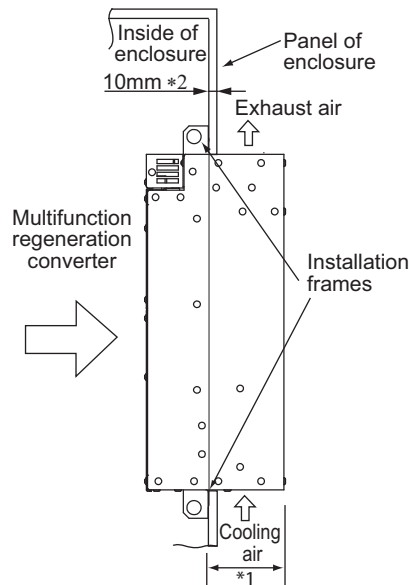


Multifunction regeneration converter	W	W1	H	H1	H2	d
FR-XC-(H)37K, H55K FR-XC-(H)37K-PWM, H55K-PWM	315	270	490	530	20	M8
FR-XC-55K FR-XC-55K-PWM	360	300	560	600		
FR-XC-H75K FR-XC-H75K-PWM	210	165	760	825	32.5	M10
FR-XC-H160K FR-XC-H160K-PWM	250	175	1255	1300	22.5	
FR-XC-H220K FR-XC-H220K-PWM						

- Mount point change of installation frame from the rear to the front
The upper and lower installation frames are attached on the multifunction regeneration converter (one for each position). Change the mount point of the upper and lower installation frames from the rear to the front as shown in the figure.
When reattaching the installation frames, make sure that the installation orientation is correct.



- Installation of the multifunction regeneration converter in the enclosure
Place the converter in an enclosure so that the converter's heat sink section protrudes from the hole through the panel of the enclosure. Fasten the converter to the panel with screws through holes in the upper and lower installation frames.



*1 Dimension of the converter's heat sink section protruded through the panel

Multifunction regeneration converter	Depth (mm)
FR-XC-(H)37K, H55K FR-XC-(H)37K-PWM, H55K-PWM	105
FR-XC-55K FR-XC-55K-PWM	135
FR-XC-H75K FR-XC-H75K-PWM	162
FR-XC-H160K FR-XC-H160K-PWM FR-XC-H220K FR-XC-H220K-PWM	215.5

*2 To avoid interference with the cooling fan on top of the heat sink, the thickness of the panel of the enclosure should not exceed 10 mm and the space around the fan should be cleared.


NOTE

- As the heat sink section protruded through the panel includes a cooling fan, this type of installation is not suitable for environment in which the converter may be exposed to drops of water, oil mist, dust, etc.
- Make sure that screws, debris etc. do not get into the converter and cooling fan.

Terminal Specifications

Terminal Specifications

■ indicates that terminal functions can be selected using **Pr.3, Pr.4, or Pr.7 (Input terminal function selection)** or **Pr.11, Pr.12, or Pr.16 (Output terminal function selection)**.

Type	Terminal symbol	Terminal name	Description	
Main circuit	R/L1, S/L2, T/L3	Power supply phase detection	These terminals are used to detect the phase and voltage of the power supply, and to input power to the control circuit. Connect each of them to terminals of the same name on both the power supply and the reactor. Operating the inverter without connecting them will damage the converter.	
	R2/L12, S2/L22, T2/L32	AC power input	Connect each of them to terminals of the same name on the reactor.	
	R1/L11, S1/L21	Power supply for the control circuit	These terminals are connected to the phase detection terminals R/L1 and S/L2 in the initial status. To retain the fault display and fault output, remove the jumpers (cables) and apply external power through these terminals.	
	R3/L13, S3/L23*1	Terminals for the charge circuit	Connect these terminals to the power supply. Otherwise, the converter will not start.	
	P/+, N/-	DC output for the common bus regeneration mode / harmonic suppression mode	Connect them to the inverter terminals P/+ and N/-.	
	P4, N/-	DC output for the power regeneration mode 2	Connect them to the inverter terminals P/+ and N/-.	
		Earth (ground)	For earthing (grounding) the converter chassis. This must be earthed (grounded).	
Control circuit/contact input	RES	Reset	Use this signal to reset a fault output provided when a protective function is activated. Turn ON the RES signal for 0.1 seconds or longer, then turn it OFF.	Input resistance: 4.7 kΩ, voltage when contacts are open: 21 to 27 VDC, current when contacts are short-circuited: 4 to 6 mADC
	SOF	Converter stop	Turn ON this signal to stop the regenerative driving. The function can be changed using Pr.4 .	
	LOH	Box-type reactor overheat protection	Used to monitor the speed of cooling fan in the FR-XCB reactor for overheat protection. When the sink logic is selected, connect this terminal to terminal LOH1 on the reactor. When the source logic is selected, connect this terminal to terminal LOH2 on the reactor.	
	SD	Contact input common (sink) (initial setting)	Common terminal for the contact input terminal (sink logic).	—
		External transistor common (source)	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction by undesirable current.	
		24 VDC power supply common	Common output terminal for 24 VDC 0.1A power supply (PC terminal). Isolated from terminals 5, SE, and SE2.	
	PC	External transistor common (sink) (initial setting)	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the sink logic to avoid malfunction by undesirable current.	Power supply voltage range: 19.2 to 28.8 VDC, permissible load current: 100 mA
Contact input common (source)		Common terminal for contact input terminal (source logic)		
24 VDC power supply		Can be used as a 24 VDC 0.1 A power supply.		
Terminal for FR-MCB Terminal for magnetic contactor (MC)	MC43(23), MC44(24) *1	Auxiliary contact input for MC	<p>Auxiliary contact (NO contact) input terminals for the magnetic contactor (MC). The operation of the MC can be monitored. When the FR-MCB is used (the FR-XC operates in common bus regeneration mode), connect these terminals to terminals 43 (23) and 44 (24) of the FR-MCB. When the FR-MCB is not used (the FR-XC operates in power regeneration mode 2), connect these terminals to auxiliary contacts (NO contacts) of the MC. These terminals are provided only for the FR-XC-H75K(-PWM).</p> <p>Voltage when contacts are open: 21 to 27 VDC, current when contacts are short-circuited: 6 to 8 mA.</p>	

Type	Terminal symbol	Terminal name	Description		
Control circuit/output signal	Open collector	RYA	Inverter run enable (NO contact)	Turns ON when the multifunction regeneration converter becomes ready for operation. Signal OFF: Inverter cannot run Signal ON: Inverter can run	
		RYB	Inverter run enable (NC contact)	Turns ON at alarm occurrence or at input of the Reset (RES) signal. Connect this terminal to the inverter terminal which the X10 signal is assigned to or the inverter terminal MRS. Terminal RYB is used with the normally closed (NC contact) specification. Turning ON the RYB signal stops the inverter. Signal OFF: Inverter can run Signal ON: Inverter cannot run	
		RSO	Converter reset	Turns ON during a converter reset (RES-ON). Connect this terminal to the inverter terminal which the RES signal is assigned to. Turning ON the RSO signal resets the inverter.	
		SE	Open collector output common	Common terminal for terminals RYA, RYB, and RSO. Connect it to the inverter terminal SD (sink logic).	
	Relay	A, B, C	Fault contact	1 changeover contact output that indicates that an converter's protective function has been activated and the outputs are stopped. Fault: discontinuity across B and C (continuity across A and C), Normal: continuity across B and C (discontinuity across A and C)	Permissible load: 24 VDC (27 VDC at maximum) 0.1 A (The voltage drop is 2.8 V at maximum while the signal is ON.) Contact capacity: 230 VAC 0.3 A (power factor = 0.4), Output: 30 VDC 0.3 A
Terminal for FR-MCB	Terminal for magnetic contactor (MC)	A1, A2*1	Command signal for MC	Contact output terminals for the operation command for the magnetic contactor (MC). When the FR-MCB is used (the FR-XC operates in common bus regeneration mode), connect terminal A1 to terminal SY/L2Y of the FR-MCB, and terminal A2 to terminal A2 of the FR-MCB. When the FR-MCB is not used (the FR-XC operates in power regeneration mode 2), the power supply for MC driving coil is required. Connect terminal A1 to the power supply for MC driving coil and terminal A2 to the coil terminal of the MC. These terminals are provided only for the FR-XC-H75K(-PWM).	Contact capacity: 250 VAC 10 A (cosφ = 1.0), 250 VAC 5 A (cosφ = 0.4) 30 VDC 10 A
Power supply for fan	FAN/FAN1*2	Reactor fan power supply	Power supply terminal for the fan on the FR-XCB reactor. Connect it to terminal FAN1 on the reactor.		
	SD/FAN2*2	Reactor fan power supply common	Common terminal for terminal FAN. Connect it to terminal FAN2 on the reactor. Use it in either the sink or source logic.		
RS-485	—	PU connector	RS-485 communication can be made through the PU connector (for connection on a 1:1 basis only). Conforming standard: EIA-485 (RS-485) Transmission format: Multidrop link Communication speed: 4800 to 38400 bps Wiring length: 500 m		

*1 Provided for 75K or higher.

*2 Differs depending on the capacity (55K or lower / 75K or higher).

Parameter List

Parameter List

Parameter read/write requires the operation panel (FR-DU08) or the optional parameter unit (FR-PU07 or FR-PU07BB(-L)). The PU can be installed on an enclosure surface. Use the option FR-CB2 [] or the following connector and cable available on the market. (To install the operation panel, the optional connector (FR-ADP) is also required.)

NOTE

- ◎ indicates simple mode parameters.
- The setting of parameters in highly colored cell () is changeable during operation even if "1" (write disabled) is set to Pr.77
Parameter write selection.

Pr.	Name	Setting range	Minimum setting increment	Initial value	Customer setting
◎0	Simple mode selection	0, 9999	0	0	
◎1	Maximum power supply frequency	60 Hz (Read only)	—	60 Hz	
◎2	Minimum power supply frequency	50 Hz (Read only)	—	50 Hz	
3	LOH terminal function selection	0, 3 to 5, 9999	1	5	
4	SOF terminal function selection		1	0	
7	RES terminal function selection		1	3	
8	SOF input selection	0 to 2	1	0	
9	OH input selection	0, 1	1	0	
11	RSO terminal function selection	0 to 4, 6 to 11, 14 to 18, 98, 99, 101 to 104, 106 to 111, 114 to 118, 198, 199, 9999	1	1	
12	RYA terminal function selection		1	0	
16	ABC terminal function selection		1	99	
◎22+4	Current limit level	0 to 190%	0.1%	150	
23+4	Current limit level (regenerative)	0 to 190%, 9999	0.1%	9999	
31	Life alarm status display	0, 1, 4, 5, 8, 9, 12, 13 (Read only)	1	0	
32	Inrush current limit circuit life display	0 to 100% (Read only)	1%	100%	
33	Control circuit capacitor life display	0 to 100% (Read only)	1%	100%	
34	Maintenance timer	0 (1 to 9998)	1	0	
35	Maintenance timer warning output set time	0 to 9998, 9999	1	9999	
44	Instantaneous power failure detection signal clear	0, 9999	1	9999	
46	Watt-hour meter clear	0, 10, 9999	1	9999	
47	Energization time carrying-over times	Read only	1	0	
48	Cumulative power monitor digit shifted times	0 to 4, 9999	1	9999	
◎52	PU main monitor selection	0, 5 to 10, 25, 28	1	0	
◎57	Restart selection	0, 9999	1	9999	
58	Free parameter 1	0 to 9999	1	9999	
59	Free parameter 2	0 to 9999	1	9999	
61	Key lock operation selection	0, 10	1	0	
◎65	Retry selection	0 to 4	1	0	
◎67	Number of retries at fault occurrence	0 to 10, 101 to 110, 1001 to 1010, 1101 to 1110	1	0	
◎68	Retry waiting time	0.1 to 600 s	0.1 s	1 s	
◎69	Retry count display erase	0	1	0	
75	Reset selection/disconnected PU detection / PU stop selection	0 to 3, 14 to 17	1	14	
◎77	Parameter write selection	1, 2	1	2	
80+4	Voltage control proportional gain	0 to 1000%	1%	100	
81+4	Voltage control integral gain	0 to 1000%	1%	100	
82+4	Current control proportional gain	0 to 200%	1%	100	
83+4	Current control integral gain	0 to 200%	1%	100	
117	PU communication station number	0 to 31	1	0	
118	PU communication speed	48, 96, 192, 384	1	192	
119	PU communication stop bit length	0, 1, 10, 11	1	1	
120	PU communication parity check	0 to 2	1	2	
121	PU communication retry count	0 to 10, 9999	1	1	
123	PU communication waiting time setting	0 to 150 ms, 9999	1 ms	9999	

Pr.	Name	Setting range	Minimum setting increment	Initial value	Customer setting
124	PU communication CR/LF selection	0 to 2	1	1	
Ⓒ145	PU display language selection	0 to 7	1	0	
168	Parameter for manufacturer setting. Do not set.				
169					
269					
342	Communication EEPROM write selection	0, 1	1	0	
415	SW2 setting status	55K or lower: 0 to 15 (Read-only) 75K or higher: 0 to 13 (Read-only)	1	15	
416	Control method selection	0, 1, 9999	1	9999	
Ⓒ500*1	Communication error execution waiting time	0 to 999.8 s	0.1 s	0 s	
Ⓒ501*1	Communication error occurrence count display	0	1	0	
Ⓒ502*1	Stop mode selection at communication error	0, 3	1	0	
520	Parameter for manufacturer setting. Do not set.				
Ⓒ542*1, *2, *3	Station number (CC-Link)	1 to 64	1	1	
Ⓒ543*1, *2, *3	Transmission speed selection (CC-Link)	0 to 4	1	0	
Ⓒ544*1, *2	CC-Link extended setting	0, 1, 12	1	0	
896	Power unit cost	0 to 500	0.01	0	
989	Parameter for manufacturer setting. Do not set.				
990	PU buzzer control	0, 1	1	1	
991	PU contrast adjustment	0 to 63	1	58	
Pr.CLR	Parameter clear	(0), 1	1	0	
ALL.C	All parameter clear	(0), 1	1	0	
Err.CL	Fault history clear	(0), 1	1	0	
Pr.CPY	Parameter copy	(0), 1 to 3	1	0	

*1 The setting is available only when a communication option (FR-A8NC) is installed.

*2 The setting is applied after the converter reset or next power-ON.

*3 [L.ERR] LED indicator on the FR-A8NC blinks when a setting is changed. The setting is applied after the converter reset, and the [L.ERR] turns OFF.

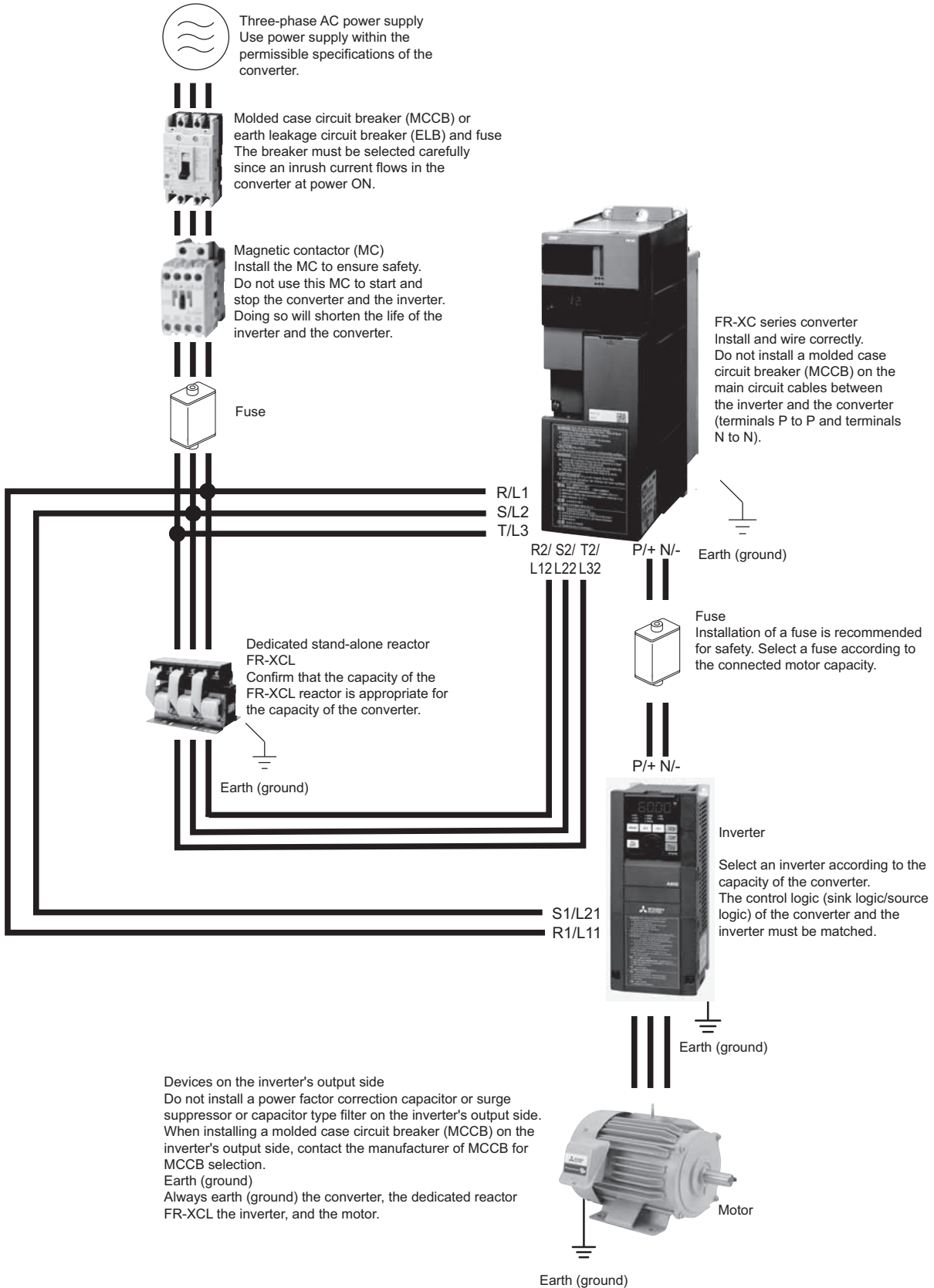
*4 The setting is available only when the harmonic suppression is enabled.

Common bus regeneration mode

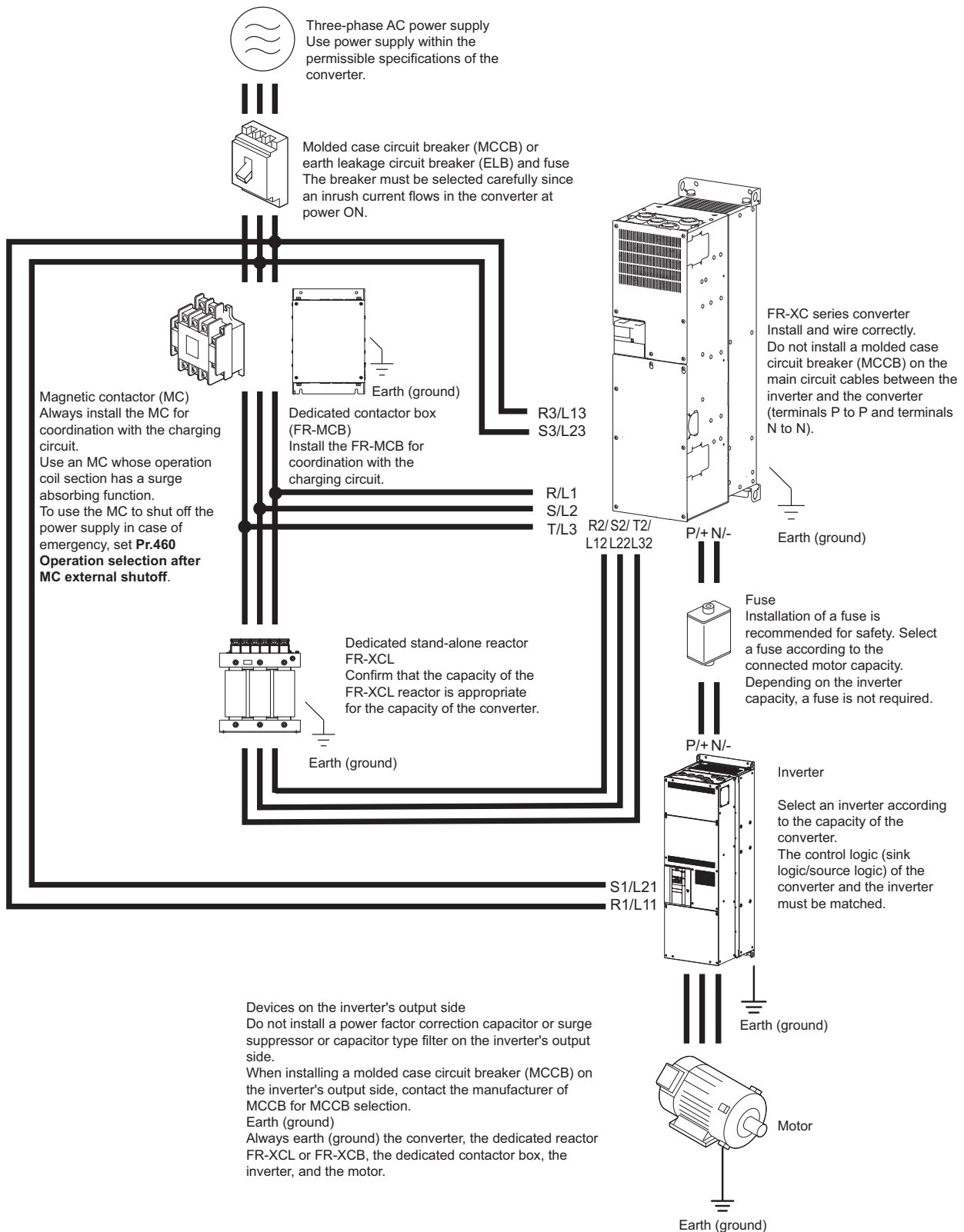
Common bus regeneration mode

◆ Example Connection

- 55K or lower



• 75K or higher



Common bus regeneration mode

◆ Rating (FR-XC-(H)) [JK]

• 200 V class

Model FR-XC-[JK]*1		7.5	11	15	22	30	37	55	
50°C rating	Applicable inverter capacity (kW)	7.5	11	15	22	30	37	55	
	Applicable motor current (A)	33	46	61	90	115	145	215	
	Rated input current (A)	Power driving	33	47	63	92	124	151	223
		Regenerative driving	26	37	51	74	102	125	186
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
Power supply capacity (kVA)*2	17	20	28	41	52	66	100		
40°C rating	Applicable inverter capacity (kW)	7.5	11	15	22	30	37	55	
	Applicable motor current (A)	36	50	67	99	127	160	236	
	Rated input current (A)	Power driving	36	51	69	101	136	166	245
		Regenerative driving	28	40	56	81	112	138	204
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
Power supply capacity (kVA)*2	19	22	31	45	57	73	110		
Power source	Rated input AC voltage/frequency	Three-phase 200 to 240 V, 50/60 Hz*8							
	Permissible AC voltage fluctuation	Three-phase 170 to 264 V, 50/60 Hz							
	Permissible frequency fluctuation	±5%							
Protection rating of structure (IEC 60529)	IP00*4								
Cooling system	Forced air								
Number of connectable inverters	10*6								
Approx. mass (kg)*7	5	5	6	10.5	10.5	28	38		

• 400 V class

Model FR-XC-H[JK]*1		7.5	11	15	22	30	37	55	75	160	220	
50°C rating	Applicable inverter capacity (kW)	7.5	11	15	22	30	37	55	75	160	220	
	Applicable motor current (A)	17	23	31	44	57	71	110	144	325	432	
	Rated input current (A)	Power driving	18	25	34	49	65	80	118	158	331	450
		Regenerative driving	14	20	27	39	54	66	98	135	288	396
	Continuous rating / overload current rating	100% continuous / 150% 60 s										
Power supply capacity (kVA)*3	17	20	28	41	52	66	100	133	279	379		
40°C rating	Applicable inverter capacity (kW)	7.5	11	15	22	30	37	55	90	185	250	
	Applicable motor current (A)	18	25	34	48	63	78	120	180	361	481	
	Rated input current (A)	Power driving	20	27	37	53	72	88	129	189	382	515
		Regenerative driving	15	21	29	42	59	72	107	162	333	450
	Continuous rating / overload current rating	100% continuous / 150% 60 s										
Power supply capacity (kVA)*3	19	22	30	44	58	73	110	160	322	434		
Power source	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50/60 Hz*8							Three-phase 380 to 500 V, 50/60 Hz*8*9			
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50/60 Hz										
	Permissible frequency fluctuation	±5%										
Protection rating of structure (IEC 60529)	IP00*4							IP20 *5 (FR-XCB and FR-MCB included)				
Cooling system	Forced air											
Number of connectable inverters	10*6											
Approx. mass (kg)*7	5	5	6	10.5	10.5	28	28	45	96	96		

*1 The harmonic suppression function is not pre-enabled in this model.

*2 Selection example for 220 V power supply voltage.

*3 Selection example for 440 V power supply voltage.

*4 IP00 for the FR-XCL.

*5 IP00 when the side wiring cover of the FR-XC is removed.

*6 If you want to connect 11 or more inverters, contact your sales representative.

*7 Mass of the FR-XC alone.

*8 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

*9 The rated voltage of the FR-MCB is three-phase 380 to 480 V, 50/60 Hz.

◆ Rating (FR-XC-(H)[]K-PWM)

• 200 V class

Model FR-XC-[]K-PWM*1		18.5	22	37	55	
50°C rating	Applicable inverter capacity (kW)	22	30	37	55	
	Applicable motor current (A)	90	115	145	215	
	Rated input current (A)	Power driving	92	124	151	223
		Regenerative driving	74	102	125	186
	Continuous rating / overload current rating	100% continuous / 150% 60 s				
Power supply capacity (kVA)*2	41	52	66	100		
40°C rating	Applicable inverter capacity (kW)	22	30	37	55	
	Applicable motor current (A)	99	127	160	236	
	Rated input current (A)	Power driving	101	136	166	245
		Regenerative driving	81	112	138	204
	Continuous rating / overload current rating	100% continuous / 150% 60 s				
Power supply capacity (kVA)*2	45	57	73	110		
Power source	Rated input AC voltage/frequency	Three-phase 200 to 240 V, 50/60 Hz*8				
	Permissible AC voltage fluctuation	Three-phase 170 to 264 V, 50/60 Hz				
	Permissible frequency fluctuation	±5%				
Protection rating of structure (IEC 60529)		IP00*4				
Cooling system		Forced air				
Number of connectable inverters		10*6				
Approx. mass (kg)*7		10.5	10.5	28	38	

• 400 V class

Model FR-XC-H[]K-PWM*1		18.5	22	37	55	75	160	220	
50°C rating	Applicable inverter capacity (kW)	22	30	37	55	75	160	220	
	Applicable motor current (A)	44	57	71	110	144	325	432	
	Rated input current (A)	Power driving	49	65	80	118	158	331	450
		Regenerative driving	39	54	66	98	135	288	396
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
Power supply capacity (kVA)*3	41	52	66	100	133	279	379		
40°C rating	Applicable inverter capacity (kW)	22	30	37	55	90	185	250	
	Applicable motor current (A)	48	63	78	120	180	361	481	
	Rated input current (A)	Power driving	53	72	88	129	189	382	515
		Regenerative driving	42	59	72	107	162	333	450
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
Power supply capacity (kVA)*3	44	58	73	110	160	322	434		
Power source	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50/60 Hz*8				Three-phase 380 to 500 V, 50/60 Hz*8*9			
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50/60 Hz							
	Permissible frequency fluctuation	±5%							
Protection rating of structure (IEC 60529)		IP00*4				IP20 *5 (FR-XCB and FR-MCB included)			
Cooling system		Forced air							
Number of connectable inverters		10*6							
Approx. mass (kg)*7		10.5	10.5	28	28	45	96	96	

*1 The harmonic suppression mode is selected initially. Set Pr.416 = "0" to select the common bus regeneration mode.

*2 Selection example for 220 V power supply voltage.

*3 Selection example for 440 V power supply voltage.

*4 IP20 for the FR-XCB.

*5 IP00 when the side wiring cover of the FR-XC is removed.

*6 If you want to connect 11 or more inverters, contact your sales representative.

*7 Mass of the FR-XC alone.

*8 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

*9 The rated voltage of the FR-MCB is three-phase 380 to 480 V, 50/60 Hz.

Common bus regeneration mode

◆ Amount of heat generated from the converter

- FR-XC

- 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-7.5K	220	240
FR-XC-11K	315	345
FR-XC-15K	460	505
FR-XC-22K FR-XC-18.5K-PWM	685	755
FR-XC-30K FR-XC-22K-PWM	810	890
FR-XC-37K FR-XC-37K-PWM	890	980
FR-XC-55K FR-XC-55K-PWM	1080	1190

- 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-H7.5K	130	145
FR-XC-H11K	200	220
FR-XC-H15K	280	305
FR-XC-H22K FR-XC-H18.5K-PWM	365	395
FR-XC-H30K FR-XC-H22K-PWM	435	485
FR-XC-H37K FR-XC-H37K-PWM	590	650
FR-XC-H55K FR-XC-H55K-PWM	880	965
FR-XC-H75K FR-XC-H75K-PWM	1170	1290
FR-XC-H160K FR-XC-H160K-PWM	2470	2715
FR-XC-H220K FR-XC-H220K-PWM	3390	3720

- FR-XCL

- 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCL-7.5K	55	60
FR-XCL-11K	72	79
FR-XCL-15K	90	99
FR-XCL-22K	98	108
FR-XCL-30K	116	128
FR-XCL-37K	144	159
FR-XCL-55K	168	185

- 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCL-H7.5K	62	69
FR-XCL-H11K	72	78
FR-XCL-H15K	72	79
FR-XCL-H22K	89	97
FR-XCL-H30K	109	121
FR-XCL-H37K	116	128
FR-XCL-H55K	180	197
FR-XCL-H75K	465	
FR-XCL-H90K	515	
FR-XCL-H160K	940	
FR-XCL-H185K	1020	
FR-XCL-H220K	1040	
FR-XCL-H250K	1165	

- FR-MCB

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-MCB-H150	395	
FR-MCB-H400	745	
FR-MCB-H800	965	

◆ Operating condition

Observe the following inverter selection conditions.

Item	Condition
Inverter capacity	The total capacity of the connected inverters (regardless of the rating or model of the inverters) must not exceed the applicable inverter capacity (kW) shown in the converter's rated specifications (refer to page 34).
Motor rated current	The total of the rated current of the connected motors (rated current for the selected rating) must not exceed the applicable motor current (A) shown in the converter's rated specifications (refer to page 34).
Number of inverters	The number of inverters actually connected must not exceed the number of connectable inverters shown in the converter's rated specifications (refer to page 34).
Inverter with the HD rating*1	For the HD rating, 200% of the total rated current of the connected motors must not exceed 150% of the applicable motor current (A) shown in the converter's specifications (refer to page 34).

*1 For the HD rating of the inverter, refer to the inverter Instruction Manual.

To use the converter with the inverter, **Pr.30 Regenerative function selection** must be set in the inverter. The parameter setting differs by the inverter series. For the parameters and the inverters not listed in the table, refer to the Instruction Manual of the inverter

Inverter capacity	Pr.30 Regenerative function selection	V/F control	Other than V/F control
		Pr.19 Base frequency voltage	Pr.83 Rated motor voltage
FR-A800, FR-F800	2 or 102	Rated motor voltage	
FR-E800, FR-E700, FR-F700PJ, FR-D700	0 (initial value), 2 (automatic restart after instantaneous power failure is enabled)		

NOTE

• For details of the inverter capacity, refer to the rating specifications in the Instruction Manual of the inverter.

Example: FR-A820

Model FR-A820-[]	00046	00077	00105
	0.4K	0.75K	1.5K
SLD	0.75	1.5	2.2

• For the FR-V500(L) inverter, the capacity used for selection is as follows.

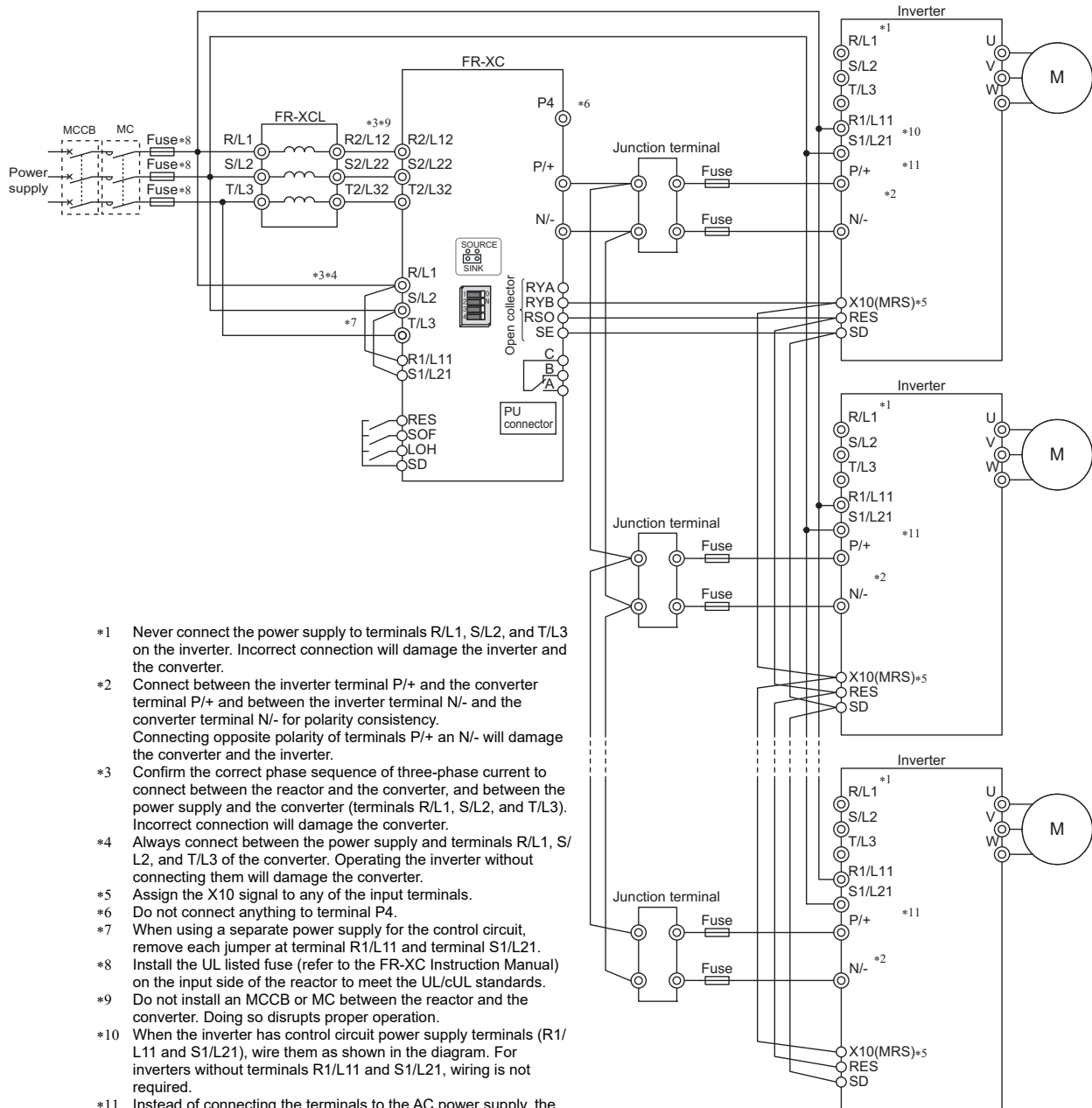
Capacity of the FR-V500 (kW)	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75*1	90*1	110*1	132*1
Capacity used for selection (kW)	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	55	132	132	220	220

- *1 The 75K or higher inverters are the FR-V540L inverters.
- Refer to **page 34** for the details of the applicable inverter capacity, the applicable inverter current, and the number of connectable inverters.
- The power factor improving AC reactor or DC reactor cannot be used.

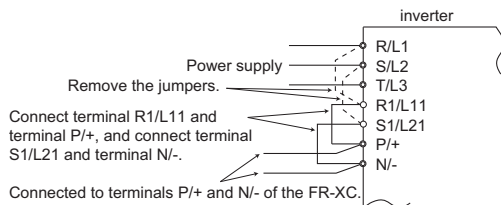
Common bus regeneration mode

◆ Terminal Connection Diagrams

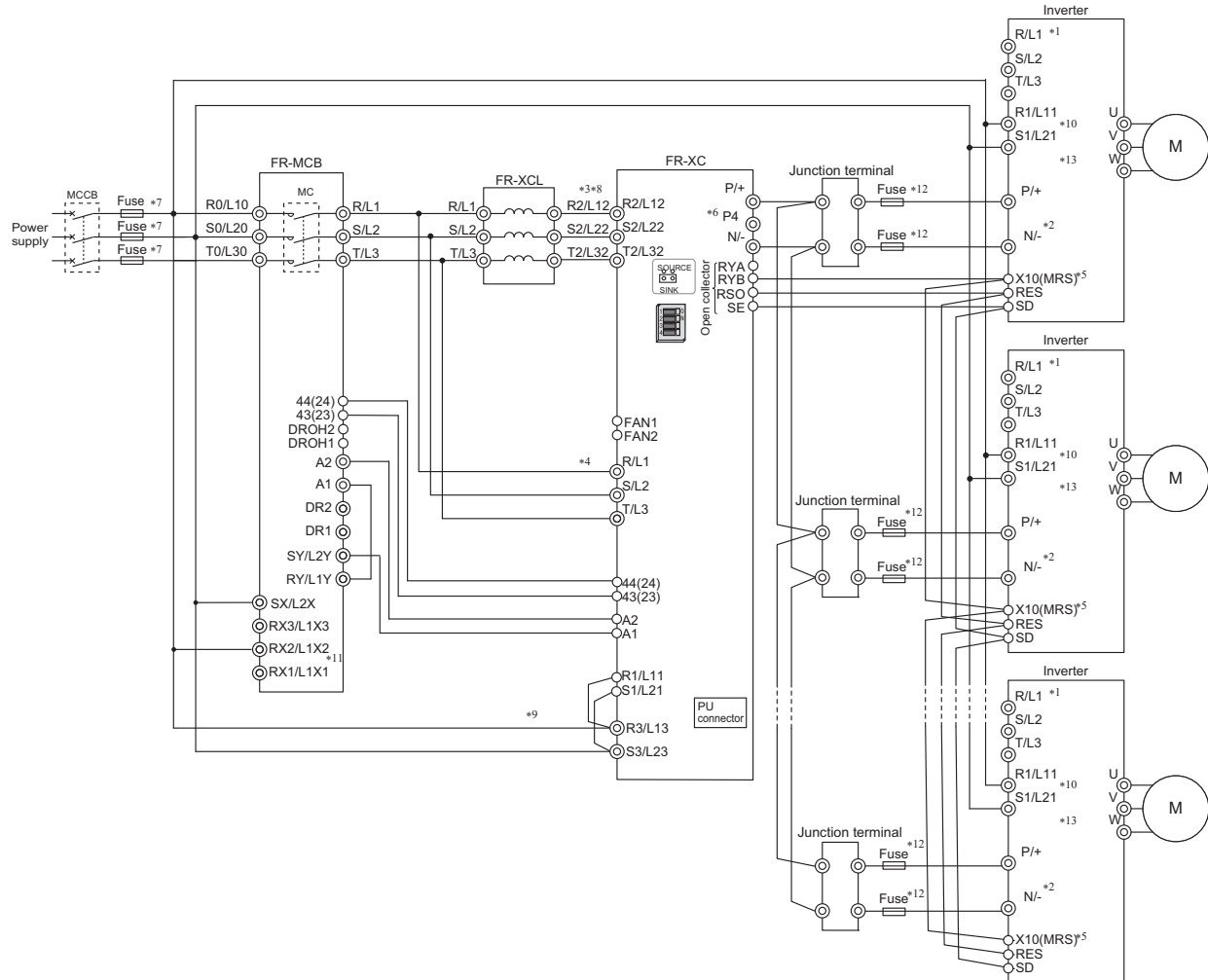
- 55K or lower



- *1 Never connect the power supply to terminals R/L1, S/L2, and T/L3 on the inverter. Incorrect connection will damage the inverter and the converter.
- *2 Connect between the inverter terminal P/+ and the converter terminal P/+ and between the inverter terminal N/- and the converter terminal N/- for polarity consistency. Connecting opposite polarity of terminals P/+ and N/- will damage the converter and the inverter.
- *3 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the converter (terminals R/L1, S/L2, and T/L3). Incorrect connection will damage the converter.
- *4 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter.
- *5 Assign the X10 signal to any of the input terminals. Do not connect anything to terminal P4.
- *6 When using a separate power supply for the control circuit, remove each jumper at terminal R1/L11 and terminal S1/L21.
- *7 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the reactor to meet the UL/cUL standards. Do not install an MCCB or MC between the reactor and the converter. Doing so disrupts proper operation.
- *8 When the inverter has control circuit power supply terminals (R/L11 and S1/L21), wire them as shown in the diagram. For inverters without terminals R1/L11 and S1/L21, wiring is not required.
- *9 Instead of connecting the terminals to the AC power supply, the control circuit can be powered by connecting terminal R1/L11 to terminal P/+ and terminal S1/L21 to terminal N/-.



- 75K or higher
When using the FR-MCB



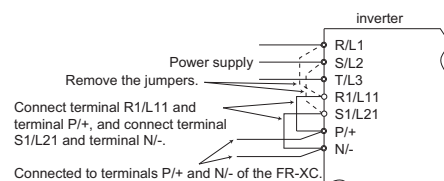
- *1 Never connect the power supply to terminals R/L1, S/L2, and T/L3 on the inverter. Incorrect connection will damage the inverter and the converter.
- *2 Connect between the inverter terminal P/+ and the converter terminal P/+ and between the inverter terminal N/- and the converter terminal N/- for polarity consistency.
Connecting opposite polarity of terminals P/+ an N/- will damage the converter and the inverter.
- *3 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the converter (terminals R/L1, S/L2, and T/L3).
Incorrect connection will damage the converter.
- *4 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter.
- *5 Assign the X10 signal to any of the input terminals.
- *6 Do not connect anything to terminal P4.
- *7 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the reactor to meet the UL/cUL standards.
- *8 Do not install an MCCB or MC between the reactor and the converter. Doing so disrupts proper operation.
- *9 Always connect the power supply and terminals R3/L13 and S3/L23 on the converter. Otherwise, the control circuit power supply is not started and the converter will not be charged.
- *10 When the inverter has control circuit power supply terminals (R1/L11 and S1/L21), wire them as shown in the diagram. For inverters without terminals R1/L11 and S1/L21, wiring is not required.
- *11 Connect either terminal RX2/L1X2 or RX3/L1X3 to the power supply according to the input power supply voltage as shown in the table below

Input voltage	Terminal
380 V or more to less than 427 V	RX2/L1X2
427 V to 500 V	RX3/L1X3

- *12 Fuses between the converter and the inverter are not required for the following combinations as the internal fuses of the converter can be used.

FR-XC		Inverter (kW)
FR-XC-H75K	50°C rating	75
	40°C rating	75, 90
FR-XC-H160K	50°C rating	160
	40°C rating	160, 185
FR-XC-H220K	50°C rating	220
	40°C rating	220, 250

- *13 Instead of connecting the terminals to the AC power supply, the control circuit can be powered by connecting terminal R1/L11 to terminal P/+ and terminal S1/L21 to terminal N/-. In this case, do not connect the terminals to the AC power supply. Doing so will damage the inverter.



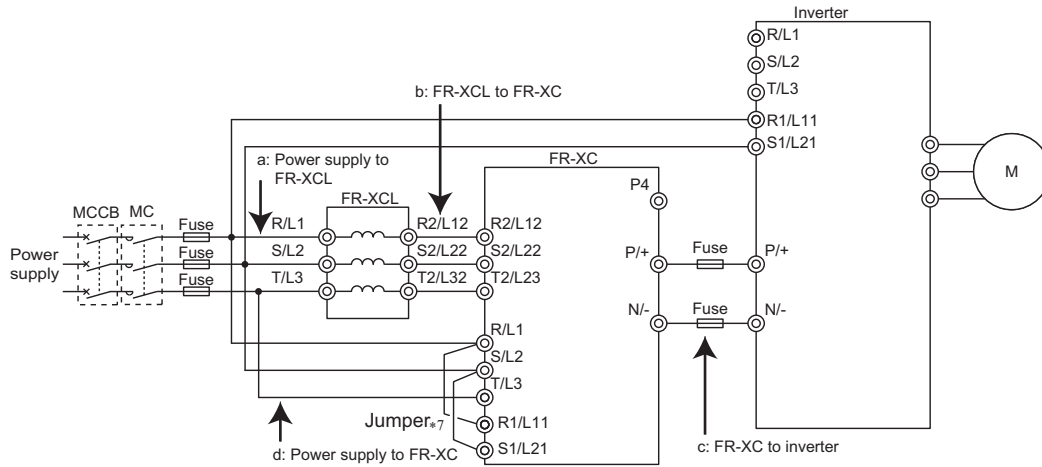
Common bus regeneration mode

◆ Cable gauge

Select a recommended gauge size cable to ensure that the voltage drop ratio is within 2%.

The following indicates selection examples when the wiring length from the power supply to the converter is 20 m.

- 55K or lower



- 200 V class

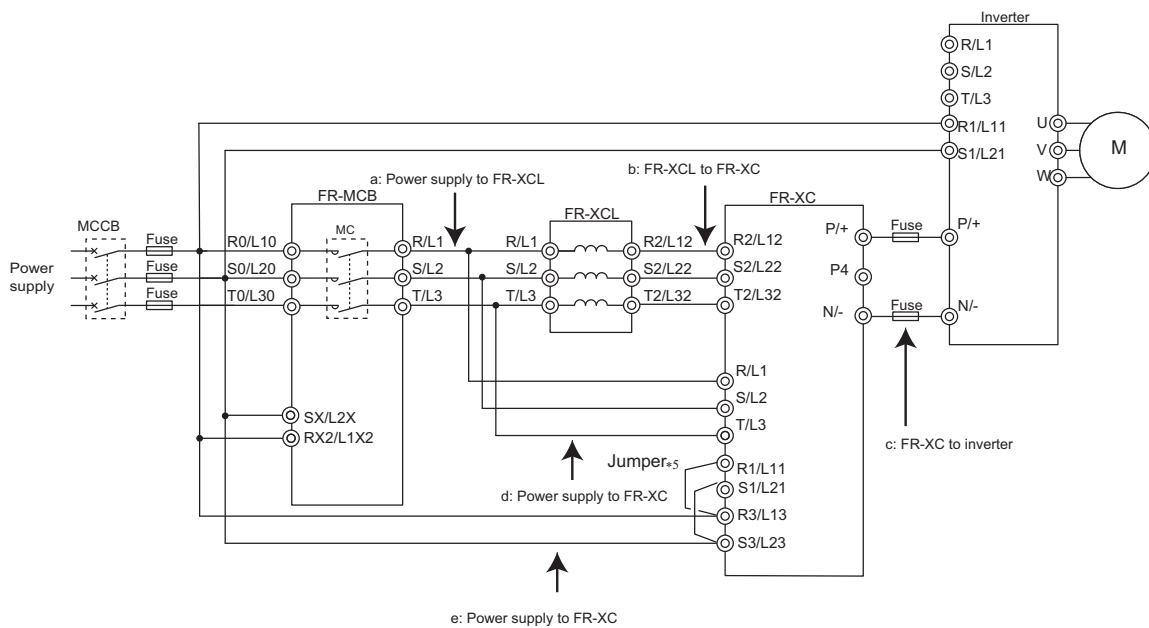
Model	Rating	Cable gauge										
		HIV cables, etc. (mm ²)*1				AWG/MCM *2			PVC cables, etc. (mm ²) *3			
		Location in the connection diagram			Earth (ground)	Location in the connection diagram			Location in the connection diagram			Earth (ground)
a, b	c *6	d	a, b	c		d	a, b	c	d			
FR-XC-7.5K	50°C	8	8	1.25	5.5	8	8	16	10	10	1.5	10
	40°C	5.5										
FR-XC-11K	50°C	14	14	1.25	8	6	6	16	10	16	1.5	16
	40°C	14										
FR-XC-15K	50°C	22	22	1.25	14	4	4	16	16	25	1.5	16
	40°C	22										
FR-XC-22K FR-XC-18.5K-PWM	50°C	38	38	1.25	22	2	2	16	25	25	1.5	16
	40°C	38										
FR-XC-30K FR-XC-22K-PWM	50°C	60	60	1.25	22	1	1/0	16	35	50	1.5	25
	40°C	60										
FR-XC-37K FR-XC-37K-PWM	50°C	80	80	1.25	22	2/0	2/0	16	50	70	1.5	35
	40°C	80										
FR-XC-55K FR-XC-55K-PWM	50°C	100	100	1.25	38	4/0	4/0	16	95	95	1.5	50
	40°C	100										

- 400 V class

Model	Rating	Cable gauge										
		HIV cables, etc. (mm ²)*1				AWG/MCM *4			PVC cables, etc. (mm ²) *5			
		Location in the connection diagram			Earth (ground)	Location in the connection diagram			Location in the connection diagram			Earth (ground)
a, b	c *6	d	a, b	c		d	a, b	c	d			
FR-XC-H7.5K	50°C	3.5	3.5	1.25	3.5	12	12	16	4	4	1.5	4
	40°C	3.5										
FR-XC-H11K	50°C	5.5	5.5	1.25	5.5	10	10	16	6	6	1.5	6
	40°C	5.5										
FR-XC-H15K	50°C	8	8	1.25	5.5	8	8	16	10	10	1.5	10
	40°C	8										
FR-XC-H22K FR-XC-H18.5K-PWM	50°C	14	22	1.25	14	6	6	16	10	16	1.5	16
	40°C	14										
FR-XC-H30K FR-XC-H22K-PWM	50°C	22	22	1.25	14	4	4	16	16	25	1.5	16
	40°C	22										
FR-XC-H37K FR-XC-H37K-PWM	50°C	38	38	1.25	14	4	2	16	25	35	1.5	16
	40°C	38										
FR-XC-H55K FR-XC-H55K-PWM	50°C	60	60	1.25	22	2	2	16	35	50	1.5	16
	40°C	60										

- *1 It is the gauge of a cable with the continuous maximum permissible temperature of 75°C (HIV cable (600 V grade heat-resistant PVC insulated wire), etc.). It assumes a surrounding air temperature of 50°C or less (40°C or less for the 40°C rating) and the wiring distance of 20 m or less from the power supply to the converter.
- *2 The cable size is that of the THHW cable with continuous maximum permissible temperature of 75°C. It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 For the FR-XC-15K or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 70°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For the FR-XC-22K / FR-XC-18.5K-PWM or higher, it is the gauge of a cable with the continuous maximum permissible temperature of 90°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *4 For the FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 75°C (THHW cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (THHN cable).
It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *5 For the FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 70°C (PVC cable).
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (XLPE cable).
It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *6 If a cable thinner than the recommended cable size is used, it may not be protected by the DC fuse. (Refer to **page 43** for the fuse selection.)
- *7 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

• 75K or higher



Model	Rating	Cable gauge													
		HIV cables, etc. (mm ²)*1					AWG/MCM *2					PVC cables, etc. (mm ²) *3			
		Location in the connection diagram					Location in the connection diagram					Location in the connection diagram			
a, b	c *4	d	e	Earth (ground)	a, b	c	d	e	a, b	c	d	e			
FR-XC-H75K FR-XC-H75K-PWM	50°C	60	60		3.5	22	1/0	2/0		11	70	70		4	35
	40°C														
FR-XC-H160K FR-XC-H160K-PWM	50°C	150	150	1.25		38	300	300	16		150	150	1.5		70
	40°C				8					8				10	
FR-XC-H220K FR-XC-H220K-PWM	50°C	200	200			60	400	400			185	185			95
	40°C														

- *1 It is the gauge of the cable with continuous maximum permissible temperature of 90°C or more (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.). It assumes a surrounding air temperature of 50°C or less and the wiring distance of 20 m or less from the power supply to the converter.
- *2 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (THHN cable).
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (XLPE cable).
(Selection example mainly for use in Europe.)
- *4 If a cable thinner than the recommended cable size is used, it may not be protected by the DC fuse. (Refer to **page 43** for the fuse selection.)
- *5 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

Common bus regeneration mode

◆ Circuit breaker and magnetic contactor

Check the model of the purchased multifunction regeneration converter. Appropriate peripheral devices must be selected according to the capacity.

For the converter in common bus regeneration mode, refer to the following table to prepare appropriate peripheral devices.

• 200 V class

FR-XC series converter model	Molded case circuit breaker (MCCB) ^{*1} / earth leakage circuit breaker (ELB) (NF, NV type)		Magnetic contactor (MC) ^{*2}	
	50°C rating	40°C rating	50°C rating	40°C rating
FR-XC-7.5K	60 A	60 A	S-T35	S-T35
FR-XC-11K	75 A	75 A	S-T35	S-T35
FR-XC-15K	125 A	125 A	S-T50	S-T50
FR-XC-22K FR-XC-18.5K-PWM	175 A	175 A	S-T65	S-T80
FR-XC-30K FR-XC-22K-PWM	225 A	225 A	S-T100	S-T100
FR-XC-37K FR-XC-37K-PWM	250 A	250 A	S-N150	S-N150
FR-XC-55K FR-XC-55K-PWM	400 A	400 A	S-N180	S-N180

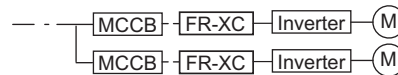
• 400 V class

FR-XC series converter model	Molded case circuit breaker (MCCB) ^{*1} / earth leakage circuit breaker (ELB) (NF, NV type)		Magnetic contactor (MC)/ dedicated contactor box (option) ^{*2}	
	50°C rating	40°C rating	50°C rating	40°C rating
FR-XC-H7.5K	30 A	30 A	S-T21	S-T21
FR-XC-H11K	50 A	50 A	S-T21	S-T21
FR-XC-H15K	60 A	60 A	S-T35	S-T35
FR-XC-H22K FR-XC-H18.5K-PWM	100 A	100 A	S-T35	S-T35
FR-XC-H30K FR-XC-H22K-PWM	125 A	125 A	S-T50	S-T50
FR-XC-H37K FR-XC-H37K-PWM	150 A	150 A	S-T65	S-T65
FR-XC-H55K FR-XC-H55K-PWM	200 A	200 A	S-T100	S-T100
FR-XC-H75K FR-XC-H75K-PWM	225 A	250 A	FR-MCB-H150 or S-N150 200 VAC ^{*3}	
FR-XC-H160K FR-XC-H160K-PWM	500 A	500 A	FR-MCB-H400 or S-N300 AC200V ^{*3}	FR-MCB-H400 or S-N400 AC200V ^{*3}
FR-XC-H220K FR-XC-H220K-PWM	700 A	700 A	FR-MCB-H400 or S-N400 AC200V ^{*3}	FR-MCB-H800 or S-N600AB AC200V ^{*3}

*1 Select an MCCB according to the power supply capacity. Install one MCCB per converter. (For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)

*2 The magnetic contactor is selected based on the AC-1 class. The electrical durability of magnetic contactor is 100,000 times. When the magnetic contactor is used for emergency stops during motor driving, the electrical durability is 25 times. (Note that the dedicated contactor box is not intended for emergency stop.) If using an MC for emergency stop during motor driving or using it on the motor side during commercial power supply operation, select an MC with the class AC-3 rated current for the rated motor current.

*3 Select an MC whose operation coil section has a surge absorbing function. To use the MC to shut off the power supply in case of emergency, set **Pr.460 Operation selection after MC external shutoff**. (refer to the FR-XC Instruction Manual)



◆ Fuse

Installation of a fuse between the multifunction regeneration converter and the inverter is recommended.

When using the converter in the common bus regeneration mode, select a fuse according to the capacity of the connected motor.

When using a motor whose capacity is smaller than the inverter capacity by two ranks or more, select the fuse with the capacity that is one rank lower than the inverter capacity.

• 200 V class

Motor capacity (kW)	Fuse rating (A)	Model (Part number/item number) *1	Fuse holder (2 poles)
0.1	5	6.900 CP GR 10.38 0005 (FR10GR69V5)	CUS102 (without fuse light melting indicator) or CUS102I (with fuse light melting indicator)
0.2	10	6.900 CP GR 10.38 0010 (FR10GR69V10)	
0.4	16	6.900 CP GR 10.38 0016 (FR10GR69V16)	
0.75	20	6.900 CP GR 10.38 0020 (FR10GR69V20)	
1.5	25	6.900 CP GR 10.38 0025 (FR10GR69V25)	
2.2	50	6.9 URD 30 TTF 0050	—
3.7	63	6.9 URD 30 TTF 0063	—
5.5	100	6.9 URD 30 TTF 0100	—
7.5	125	6.9 URD 30 TTF 0125	—
11	160	6.9 URD 30 TTF 0160	—
15	200	6.9 URD 30 TTF 0200	—
18.5	250	6.9 URD 30 TTF 0250	—
22	315	6.9 URD 30 TTF 0315	—
30	400	6.9 URD 30 TTF 0400	—
37	500	6.9 URD 30 TTF 0500	—
45	630	6.9 URD 31 TTF 0630	—
55	700	6.9 URD 31 TTF 0700	—

• 400 V class

Motor capacity (kW)	Fuse rating (A)	Model (Part number/item number) *1	Fuse holder (2 poles)
0.4	12.5	6.900 CP GR 10.38 0012.5 (FR10GR69V12.5)	CUS102 (without fuse light melting indicator) or CUS102I (with fuse light melting indicator)
0.75	16	6.900 CP GR 10.38 0016 (FR10GR69V16)	
1.5	16	6.900 CP GR 10.38 0016 (FR10GR69V16)	
2.2	20	6.900 CP GR 10.38 0020 (FR10GR69V20)	
3.7	30	6.900 CP GR 10.38 0030 (FR10GR69V30)	
5.5	50	6.9 URD 30 TTF 0050	—
7.5	50	6.9 URD 30 TTF 0050	—
11	80	6.9 URD 30 TTF 0080	—
15	125	6.9 URD 30 TTF 0125	—
18.5	125	6.9 URD 30 TTF 0125	—
22	160	6.9 URD 30 TTF 0160	—
30	200	6.9 URD 30 TTF 0200	—
37	250	6.9 URD 30 TTF 0250	—
45	315	6.9 URD 30 TTF 0315	—
55	350	6.9 URD 30 TTF 0350	—
75	450	6.9 URD 30 TTF 0450	—
90	500	6.9 URD 30 TTF 0500	—
160	800	6.9 URD 31 TTF 0800	—
185	900	6.9 URD 32 TTF 0900	—
220	1000	6.9 URD 32 TTF 1000 or 6.9 URD 31 TTF 0630 × 2 (parallel connection)*2	—
250	1250	6.9 URD 33 TTF 1250 or 6.9 URD 31 TTF 700 × 2 (parallel connection)*2	—

*1 Manufacturer: Mersen Japan KK
Contact: Sun-Wa Technos Corporation

*2 When installing fuses in parallel, leave a space of 12 mm or more between the fuses.

Common bus regeneration mode

NOTE

- Install fuses across terminals P/+ and P/+, and across terminals N/- and N/- of the converter and the inverter.
- Fuses between the converter and the inverter are not required for the following combinations as the internal fuses of the converter can be used.

FR-XC		Inverter (kW)
FR-XC-H75K	50°C rating	75
	40°C rating	75, 90
FR-XC-H160K	50°C rating	160
	40°C rating	160, 185
FR-XC-H220K	50°C rating	220
	40°C rating	220, 250

[Estimated lifespan of fuses]

Components	Estimated lifespan*1	Replacement method
Fuse	10 years	Replace by new one

*1 Estimated lifespan for when the yearly average surrounding air temperature is 50°C. (without corrosive gas, flammable gas, oil mist, dust and dirt etc.)

NOTE

- If the fuse melts down, wiring failure such as a short circuit may be the cause. Find out the cause and remove it before replacing the fuse.

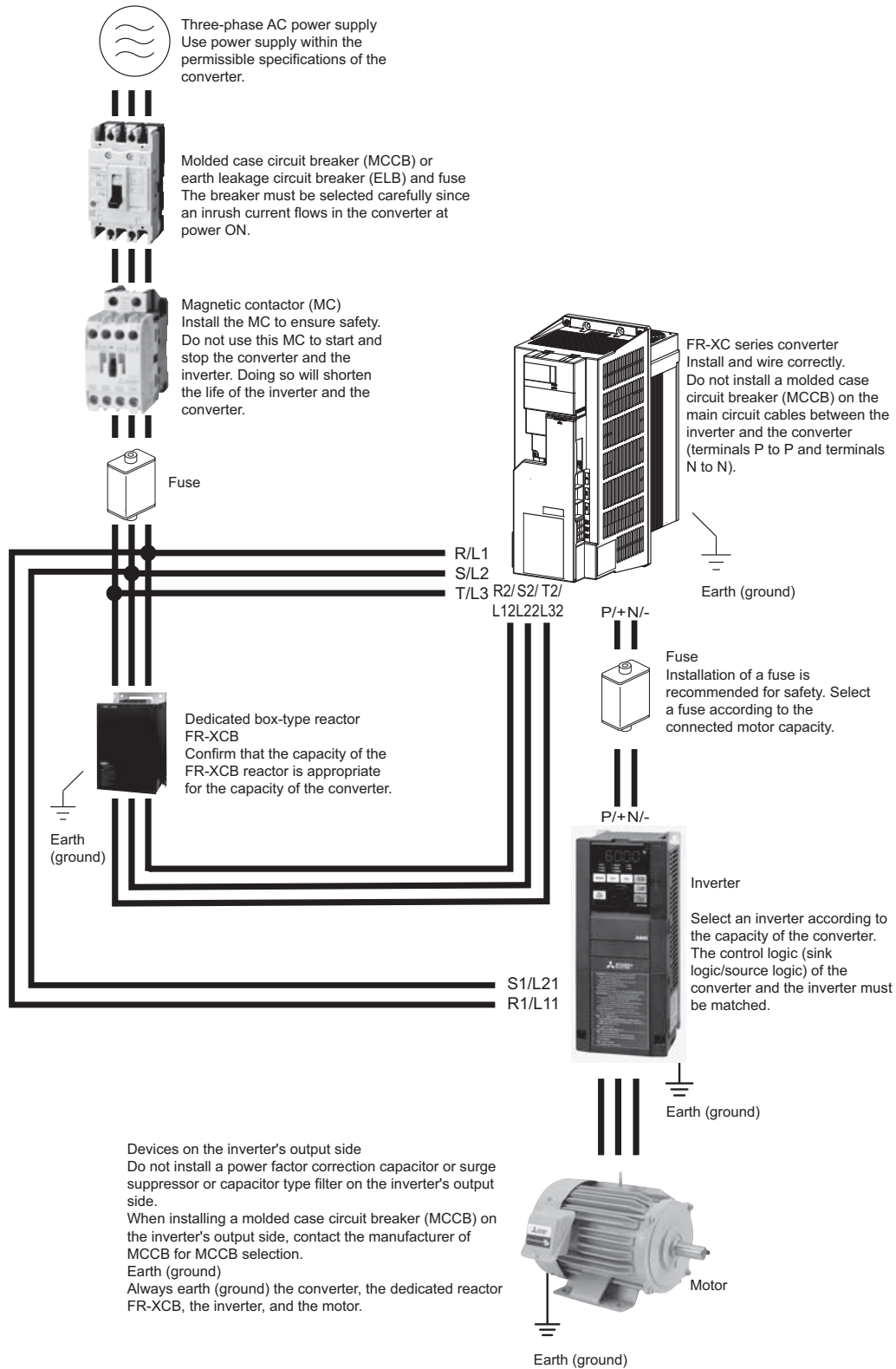
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Harmonic suppression mode

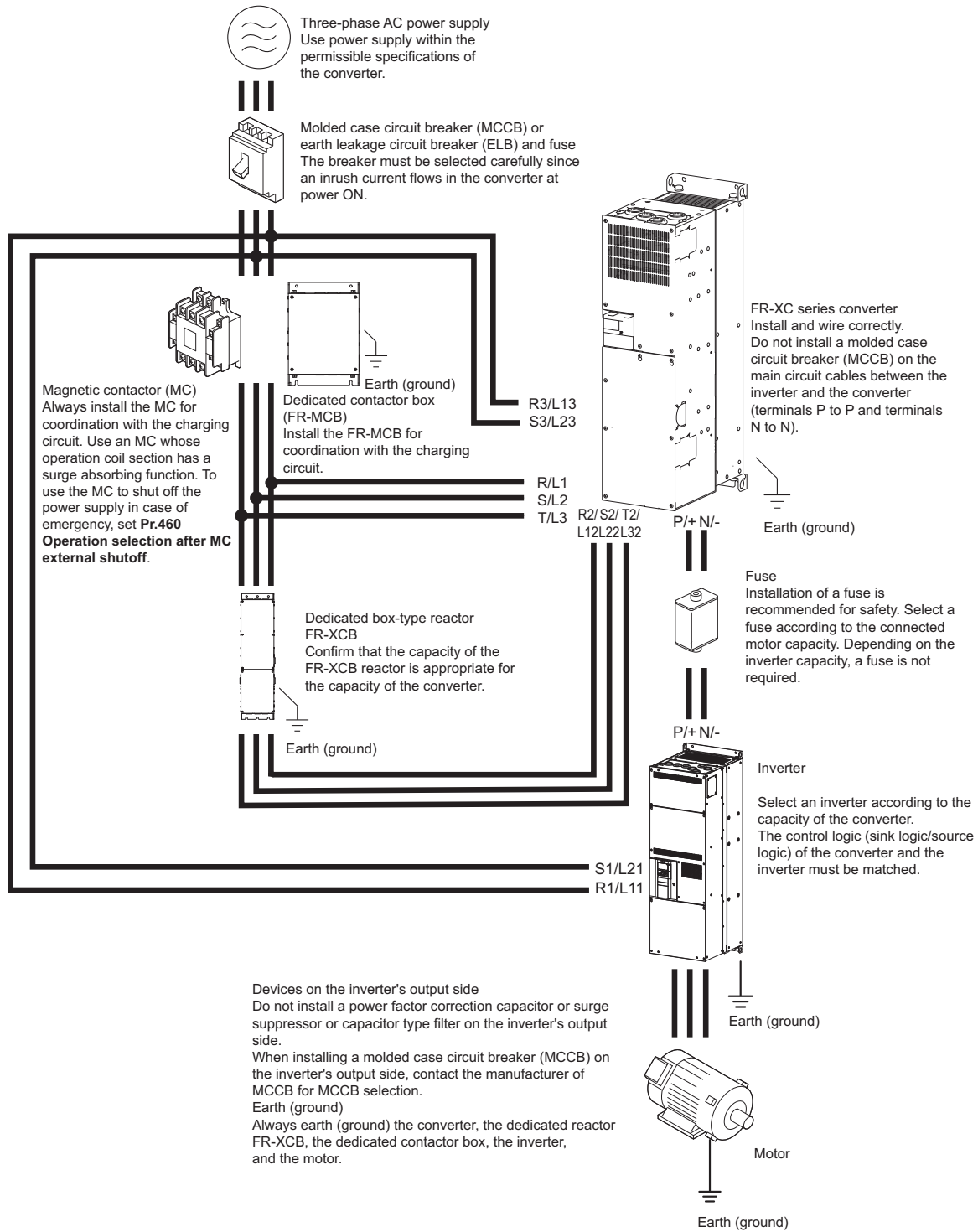
Harmonic suppression mode

◆ Example Connection

- 55K or lower



- 75K or higher



Harmonic suppression mode

◆ Rating (FR-XC-(H)) [JK]

• 200 V class

Model FR-XC-[JK]*1		22	30	37	55
50°C rating	Applicable inverter capacity (kW)	18.5	22	37	55
	Applicable motor current (A)	76	90	145	215
	Rated input current (A)	69	82	134	198
	Power/regenerative driving				
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
	Power supply capacity (kVA)*2	30	35	57	84
40°C rating	Applicable inverter capacity (kW)	18.5	22	37	55
	Applicable motor current (A)	83	99	160	236
	Rated input current (A)	75	90	147	217
	Power/regenerative driving				
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
	Power supply capacity (kVA)*2	32	38	62	92
Power source	Rated input AC voltage/frequency	Three-phase 200 to 230 V, 50/60 Hz*5*10			
	Permissible AC voltage fluctuation	Three-phase 170 to 253 V, 50/60 Hz			
	Permissible frequency fluctuation	±5%			
Input power factor		0.99 or more (when load ratio is 100%)			
Protection rating of structure (IEC 60529)		IP00*4			
Cooling system		Forced air			
Number of connectable inverters		10*7			
Approx. mass (kg)*8		10.5	10.5	28	38

• 400 V class

Model FR-XC-H[JK]*1		22	30	37	55	75	160	220
50°C rating	Applicable inverter capacity (kW)	18.5	22	37	55	75	160	220
	Applicable motor current (A)	38	44	71	110	144	325	432
	Rated input current (A)	37	43	71	104	139	290	397
	Power/regenerative driving							
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
	Power supply capacity (kVA)*3	32	37	60	88	118	245	334
40°C rating	Applicable inverter capacity (kW)	18.5	22	37	55	90	185	250
	Applicable motor current (A)	42	48	78	120	180	361	481
	Rated input current (A)	40	47	78	113	168	335	450
	Power/regenerative driving							
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
	Power supply capacity (kVA)*3	34	40	66	96	142	282	379
Power source	Rated input AC voltage/frequency	Three-phase 380 to 480 V, 50/60 Hz*6*10						
	Permissible AC voltage fluctuation	Three-phase 323 to 506 V, 50/60 Hz						
	Permissible frequency fluctuation	±5%						
Input power factor		0.99 or more (when load ratio is 100%)						
Protection rating of structure (IEC 60529)		IP00*4				IP20 *9 (FR-XCB and FR-MCB included)		
Cooling system		Forced air						
Number of connectable inverters		10*7						
Approx. mass (kg)*8		10.5	10.5	28	28	45	96	96

- *1 For the FR-XC-[JK], the common bus regeneration mode is selected initially. For the FR-XC-[JK]-PWM, the harmonic suppression mode is selected initially.
- *2 Selection example for 220 V power supply voltage.
- *3 Selection example for 440 V power supply voltage.
- *4 IP00 for the FR-XCL.
- *5 The DC bus voltage is approx. 297 VDC at an input voltage of 200 VAC, approx. 327 VDC at 220 VAC, and approx. 342 VDC at 230 VAC.
- *6 The DC bus voltage is approx. 594 VDC at an input voltage of 400 VAC, approx. 653 VDC at 440 VAC, and approx. 713 VDC at 480 VAC.
- *7 If you want to connect 11 or more inverters, contact your sales representative.
- *8 Mass of the FR-XC alone.
- *9 IP00 when the side wiring cover of the FR-XC is removed.
- *10 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

◆ Rating (FR-XC-(H)[]K-PWM)

• 200 V class

Model FR-XC-[]K-PWM*1		18.5	22	37	55
50°C rating	Applicable inverter capacity (kW)	18.5	22	37	55
	Applicable motor current (A)	76	90	145	215
	Rated input current (A)	69	82	134	198
	Power/regenerative driving				
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
	Power supply capacity (kVA)*2	30	35	57	84
40°C rating	Applicable inverter capacity (kW)	18.5	22	37	55
	Applicable motor current (A)	83	99	160	236
	Rated input current (A)	75	90	147	217
	Power/regenerative driving				
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
	Power supply capacity (kVA)*2	32	38	62	92
Power source	Rated input AC voltage/frequency	Three-phase 200 to 230 V, 50/60 Hz*5*10			
	Permissible AC voltage fluctuation	Three-phase 170 to 253 V, 50/60 Hz			
	Permissible frequency fluctuation	±5%			
Input power factor		0.99 or more (when load ratio is 100%)			
Protection rating of structure (IEC 60529)		IP00*4			
Cooling system		Forced air			
Number of connectable inverters		10*7			
Approx. mass (kg)*8		10.5	10.5	28	38

• 400 V class

Model FR-XC-H[]K-PWM*1		18.5	22	37	55	75	160	220	
50°C rating	Applicable inverter capacity (kW)	18.5	22	37	55	75	160	220	
	Applicable motor current (A)	38	44	71	110	144	325	432	
	Rated input current (A)	37	43	71	104	139	290	397	
	Power/regenerative driving								
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
	Power supply capacity (kVA)*3	32	37	60	88	118	245	334	
40°C rating	Applicable inverter capacity (kW)	18.5	22	37	55	90	185	250	
	Applicable motor current (A)	42	48	78	120	180	361	481	
	Rated input current (A)	40	47	78	113	168	335	450	
	Power/regenerative driving								
	Continuous rating / overload current rating	100% continuous / 150% 60 s							
	Power supply capacity (kVA)*3	34	40	66	96	142	282	379	
Power source	Rated input AC voltage/frequency	Three-phase 380 to 480 V, 50/60 Hz*6*10							
	Permissible AC voltage fluctuation	Three-phase 323 to 506 V, 50/60 Hz							
	Permissible frequency fluctuation	±5%							
Input power factor		0.99 or more (when load ratio is 100%)							
Protection rating of structure (IEC 60529)		IP00*4				IP20 *9 (FR-XCB and FR-MCB included)			
Cooling system		Forced air							
Number of connectable inverters		10*7							
Approx. mass (kg)*8		10.5	10.5	28	28	45	96	96	

- *1 The harmonic suppression mode is selected initially.
- *2 Selection example for 220 V power supply voltage.
- *3 Selection example for 440 V power supply voltage.
- *4 IP20 for the FR-XCB.
- *5 The DC bus voltage is approx. 297 VDC at an input voltage of 200 VAC, approx. 327 VDC at 220 VAC, and approx. 342 VDC at 230 VAC.
- *6 The DC bus voltage is approx. 594 VDC at an input voltage of 400 VAC, approx. 653 VDC at 440 VAC, and approx. 713 VDC at 480 VAC.
- *7 If you want to connect 11 or more inverters, contact your sales representative.
- *8 Mass of the FR-XC alone.
- *9 IP00 when the side wiring cover of the FR-XC is removed.
- *10 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

Harmonic suppression mode

◆ Amount of heat generated from the converter

- FR-XC

- 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-22K FR-XC-18.5K-PWM	745	810
FR-XC-30K FR-XC-22K-PWM	895	980
FR-XC-37K FR-XC-37K-PWM	1395	1530
FR-XC-55K FR-XC-55K-PWM	1865	2030

- 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-H22K FR-XC-H18.5K-PWM	795	855
FR-XC-H30K FR-XC-H22K-PWM	940	1025
FR-XC-H37K FR-XC-H37K-PWM	1470	1615
FR-XC-H55K FR-XC-H55K-PWM	1915	2080
FR-XC-H75K FR-XC-H75K-PWM	2025	2450
FR-XC-H160K FR-XC-H160K-PWM	4320	4995
FR-XC-H220K FR-XC-H220K-PWM	5940	6735

- FR-XCB

- 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCB-22K	355	385
FR-XCB-30K	380	420
FR-XCB-37K	575	630
FR-XCB-55K	730	800

- 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCB-H22K	495	530
FR-XCB-H30K	510	560
FR-XCB-H37K	790	870
FR-XCB-H55K	965	1050
FR-XCB-H75K	1265	1810
FR-XCB-H160K	2170	2775
FR-XCB-H220K	2565	3220

- FR-MCB

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-MCB-H150	395	
FR-MCB-H400	745	
FR-MCB-H800	965	

◆ Operating condition

Observe the following inverter selection conditions.

Item	Condition
Inverter capacity	The total capacity of the connected inverters (regardless of the rating or model of the inverters) must not exceed the applicable inverter capacity (kW) shown in the converter's rated specifications (refer to page 48).
Motor rated current	The total of the rated current of the connected motors (rated current for the selected rating) must not exceed the applicable motor current (A) shown in the converter's rated specifications (refer to page 48).
Number of inverters	The number of inverters actually connected must not exceed the number of connectable inverters shown in the converter's rated specifications (refer to page 48).
Inverter with the HD rating*1	For the HD rating, 200% of the total rated current of the connected motors must not exceed 150% of the applicable motor current (A) shown in the converter's specifications (refer to page 48).

*1 For the HD rating of the inverter, refer to the inverter Instruction Manual.

To use the converter with the inverter, **Pr.30 Regenerative function selection** must be set in the inverter. The parameter setting differs by the inverter series. For the parameters and the inverters not listed in the table, refer to the Instruction Manual of the inverter

Inverter capacity	Pr.30 Regenerative function selection	V/F control	Other than V/F control
		Pr.19 Base frequency voltage	Pr.83 Rated motor voltage
FR-A800, FR-F800	2 or 102	Rated motor voltage	
FR-E800, FR-E700, FR-F700PJ, FR-D700	0 (initial value), 2 (automatic restart after instantaneous power failure is enabled)		

NOTE

• For details of the inverter capacity, refer to the rating specifications in the Instruction Manual of the inverter.

Example: FR-A820

Model FR-A820-[]	00046	00077	00105
	0.4K	0.75K	1.5K
SLD	0.75	1.5	2.2

• For the FR-V500(L) inverter, the capacity used for selection is as follows.

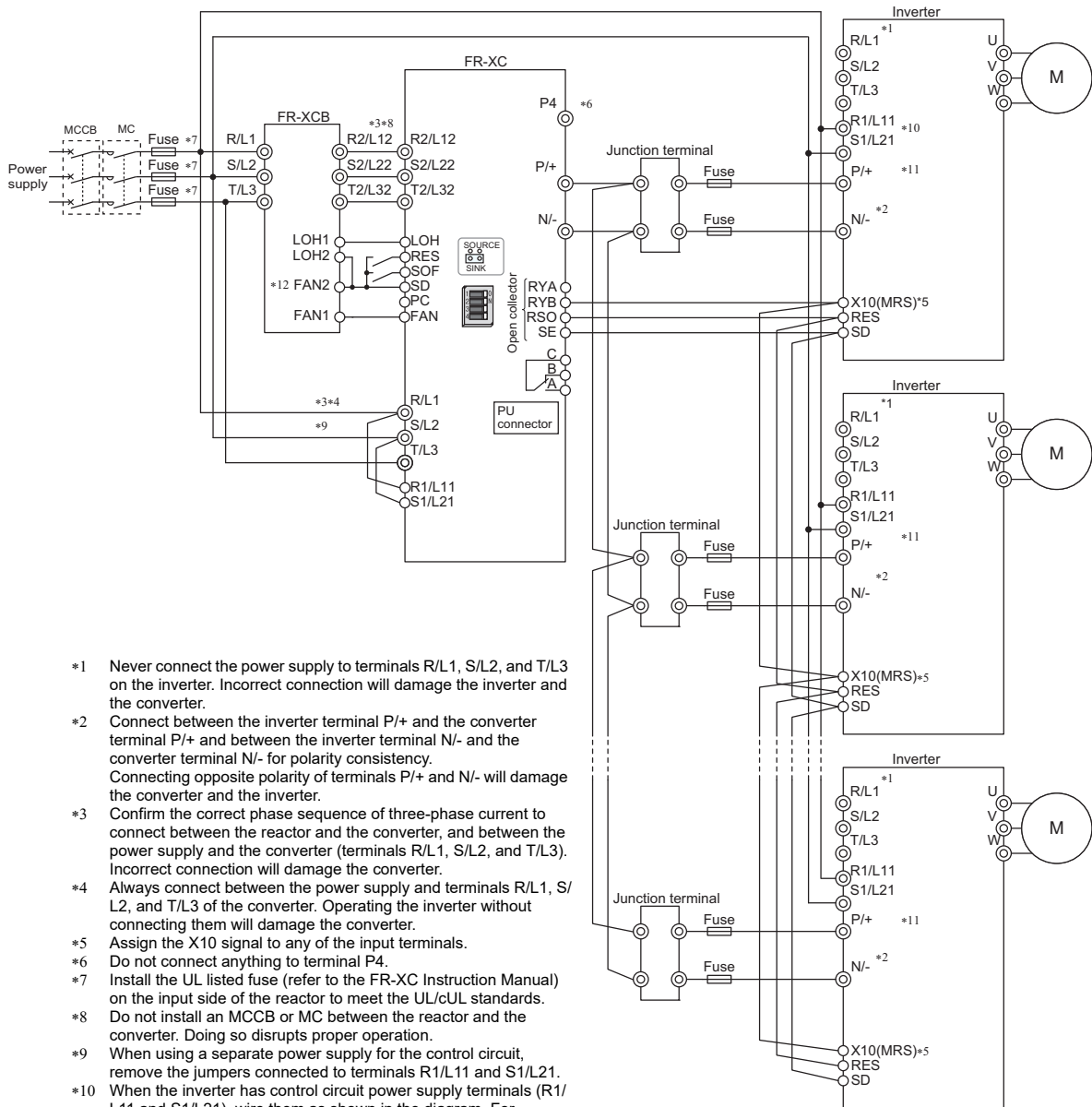
Capacity of the FR-V500 (kW)	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75*1	90*1	110*1	132*1
Capacity used for selection (kW)	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	55	132	132	220	220

- *1 The 75K or higher inverters are the FR-V540L inverters.
- Refer to **page 48** for the details of the applicable inverter capacity, the applicable inverter current, and the number of connectable inverters.
- The power factor improving AC reactor or DC reactor cannot be used.

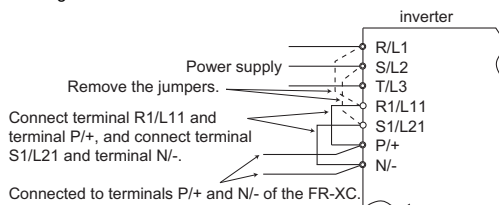
Harmonic suppression mode

◆ Terminal Connection Diagrams

- 55K or lower

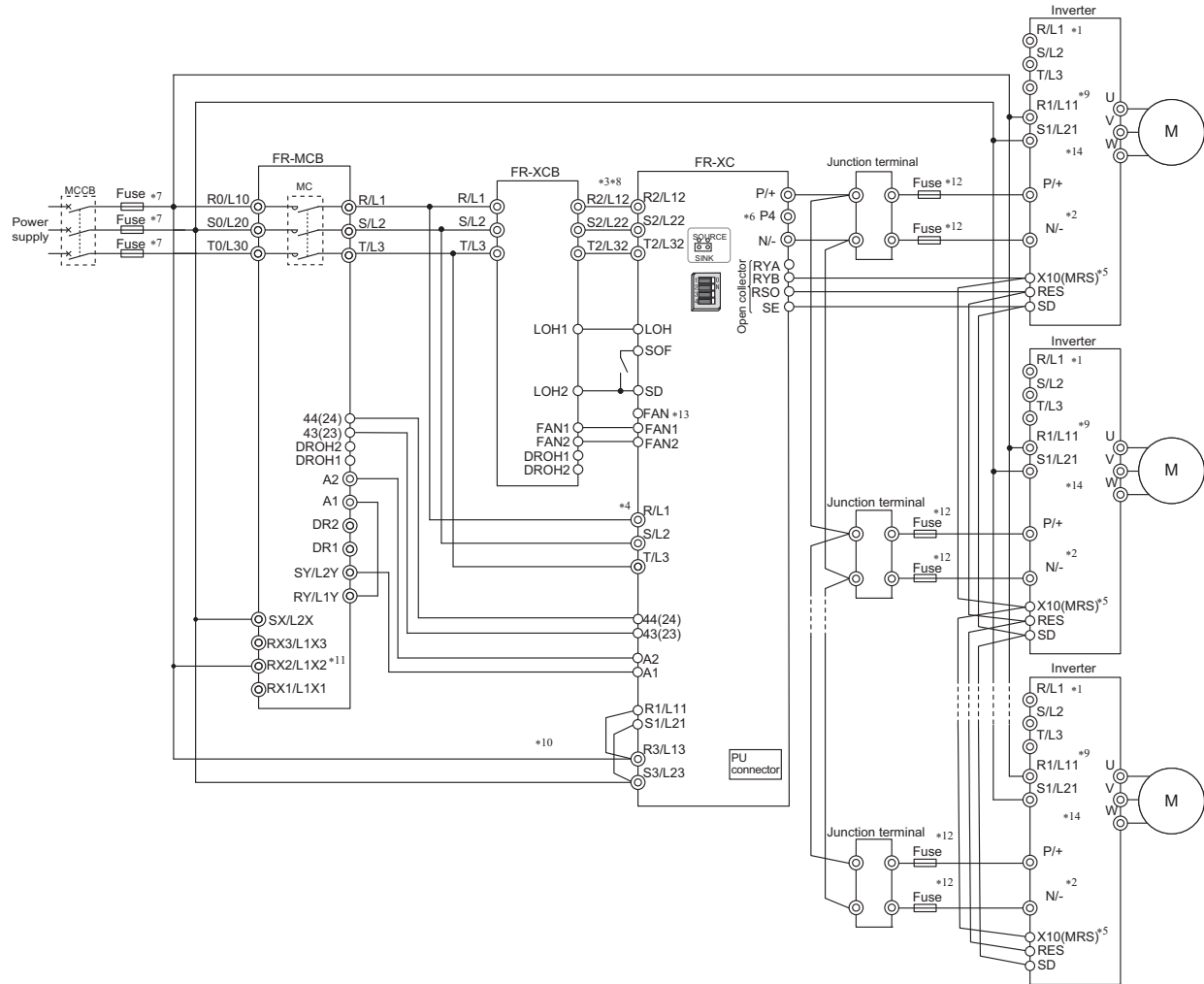


- *1 Never connect the power supply to terminals R/L1, S/L2, and T/L3 on the inverter. Incorrect connection will damage the inverter and the converter.
- *2 Connect between the inverter terminal P/+ and the converter terminal P/+ and between the inverter terminal N/- and the converter terminal N/- for polarity consistency. Connecting opposite polarity of terminals P/+ and N/- will damage the converter and the inverter.
- *3 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the converter (terminals R/L1, S/L2, and T/L3). Incorrect connection will damage the converter.
- *4 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter.
- *5 Assign the X10 signal to any of the input terminals. Do not connect anything to terminal P4.
- *7 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the reactor to meet the UL/cUL standards.
- *8 Do not install an MCCB or MC between the reactor and the converter. Doing so disrupts proper operation.
- *9 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.
- *10 When the inverter has control circuit power supply terminals (R1/L11 and S1/L21), wire them as shown in the diagram. For inverters without terminals R1/L11 and S1/L21, wiring is not required.
- *11 Instead of connecting the terminals to the AC power supply, the control circuit can be powered by connecting terminal R1/L11 to terminal P/+ and terminal S1/L21 to terminal N/-. In this case, do not connect the terminals to the AC power supply. Doing so will damage the inverter..



- *12 The terminal symbols differ depending on the manufacture year and month of the FR-XCB. (Refer to the FR-XC Instruction Manual.)

- 75K or higher
When using the FR-MCB



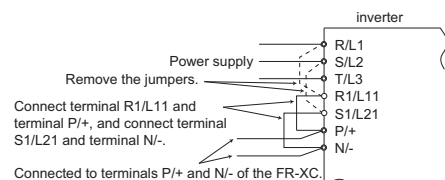
- *1 Never connect the power supply to terminals R/L1, S/L2, and T/L3 on the inverter. Incorrect connection will damage the inverter and the converter.
- *2 Connect between the inverter terminal P/+ and the converter terminal P/+ and between the inverter terminal N/- and the converter terminal N/- for polarity consistency. Connecting opposite polarity of terminals P/+ and N/- will damage the converter and the inverter.
- *3 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the converter (terminals R/L1, S/L2, and T/L3). Incorrect connection will damage the converter.
- *4 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter.
- *5 Assign the X10 signal to any of the input terminals.
- *6 Do not connect anything to terminal P4.
- *7 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the reactor to meet the UL/cUL standards.
- *8 Do not install an MCCB or MC between the reactor and the converter. Doing so disrupts proper operation.
- *9 When the inverter has control circuit power supply terminals (R1/L11 and S1/L21), wire them as shown in the diagram. For inverters without terminals R1/L11 and S1/L21, wiring is not required.
- *10 Always connect between the power supply and terminals R3 and S3 on the converter. Otherwise, the control circuit power supply is not started and the converter will not be charged.
- *11 Connect either terminal RX2/L1X2 or RX3/L1X3 to the power supply according to the input power supply voltage as shown in the table below.

Power supply voltage	Terminal
380 V or more to less than 427 V	RX2/L1X2
427 V to 500 V	RX3/L1X3

- *12 Fuses between the converter and the inverter are not required for the following combinations as the internal fuses of the converter can be used.

FR-XC		Inverter (kW)
FR-XC-H75K	50°C rating	75
	40°C rating	75, 90
FR-XC-H160K	50°C rating	160
	40°C rating	160, 185
FR-XC-H220K	50°C rating	220
	40°C rating	220, 250

- *13 Terminal FAN is used in the FR-XC-(H)55K or lower. This terminal is not used in the FR-XC-H75K.
- *14 Instead of connecting the terminals to the AC power supply, the control circuit can be powered by connecting terminal R1/L11 to terminal P/+ and terminal S1/L21 to terminal N/-. In this case, do not connect the terminals to the AC power supply. Doing so will damage the inverter.



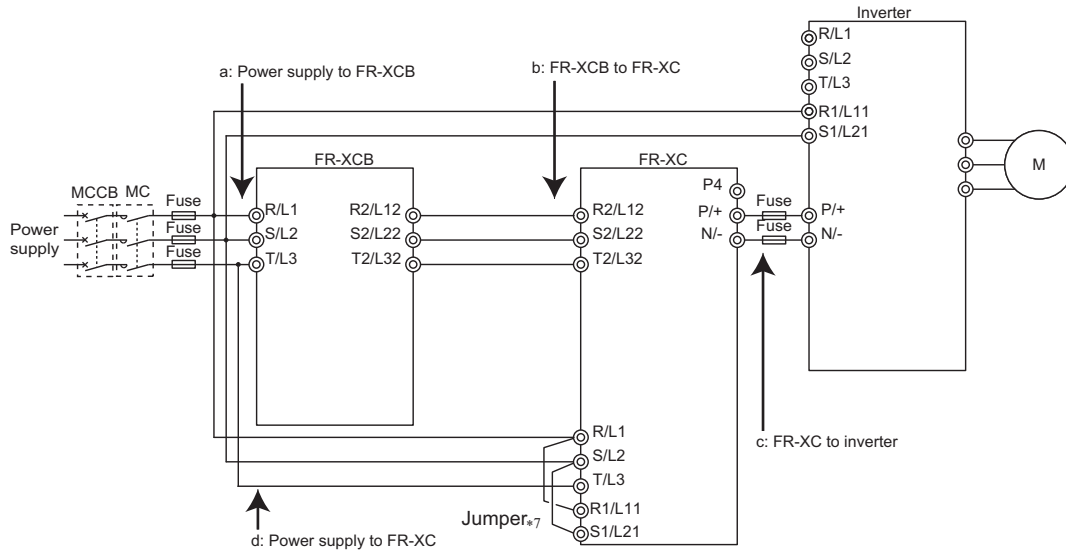
Harmonic suppression mode

◆ Cable gauge

Select a recommended gauge size cable to ensure that the voltage drop ratio is within 2%.

The following indicates selection examples when the wiring length from the power supply to the converter is 20 m.

- 55K or lower



- 200 V class

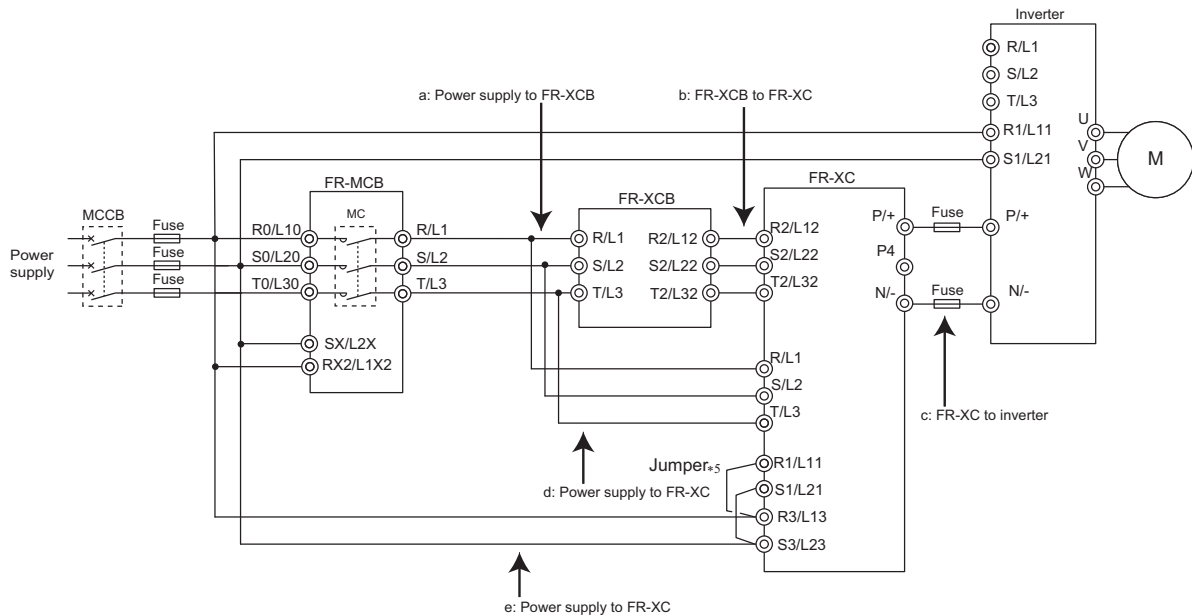
Model	Rating	Cable gauge											
		HIV cables, etc. (mm ²)*1				Earth (ground)	AWG/MCM *2			PVC cables, etc. (mm ²) *3			Earth (ground)
		Location in the connection diagram			Location in the connection diagram			Location in the connection diagram					
a, b	c *6	d	a, b	c	d	a, b	c	d					
FR-XC-22K FR-XC-18.5K-PWM	50°C	22	38	1.25	22	4	4	16	16	16	1.5	16	
	40°C						2			25			
FR-XC-30K FR-XC-22K-PWM	50°C	38	38	1.25	22	4	4	16	16	16	1.5	25	
	40°C						2			25			
FR-XC-37K FR-XC-37K-PWM	50°C	60	80	1.25	22	1/0	2/0	16	50	70	1.5	35	
	40°C						2/0						3/0
FR-XC-55K FR-XC-55K-PWM	50°C	100	100	1.25	38	3/0	4/0	16	70	95	1.5	50	
	40°C						4/0						

- 400 V class

Model	Rating	Cable gauge											
		HIV cables, etc. (mm ²)*1				Earth (ground)	AWG/MCM *4			PVC cables, etc. (mm ²) *5			Earth (ground)
		Location in the connection diagram			Location in the connection diagram			Location in the connection diagram					
a, b	c *6	d	a, b	c	d	a, b	c	d					
FR-XC-H22K FR-XC-H18.5K-PWM	50°C	8	14	1.25	8	8	6	16	10	10	1.5	10	
	40°C						6						16
FR-XC-H30K FR-XC-H22K-PWM	50°C	14	22	1.25	14	6	6	16	10	16	1.5	10	
	40°C		14				4						
FR-XC-H37K FR-XC-H37K-PWM	50°C	22	38	1.25	14	4	2	16	25	35	1.5	16	
	40°C						2						
FR-XC-H55K FR-XC-H55K-PWM	50°C	60	60	1.25	22	2	2	16	25	35	1.25	25	
	40°C						1						

- *1 It is the gauge of a cable with the continuous maximum permissible temperature of 75°C (HIV cable (600 V grade heat-resistant PVC insulated wire), etc.). It assumes a surrounding air temperature of 50°C or less (40°C or less for the 40°C rating) and the wiring distance of 20 m or less from the power supply to the converter.
- *2 It is the gauge of the cable with continuous maximum permissible temperature of 75°C (THHW cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 It is the gauge of a cable with the continuous maximum permissible temperature of 90°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *4 For the FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 75°C (THHW cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (THHN cable).
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *5 For the FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 70°C (PVC cable). For the FR-XC-H55K or higher, it is the gauge of the cable with the continuous maximum permissible temperature of 90°C (XLPE cable).
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (XLPE cable).
(Selection example mainly for use in Europe.)
- *6 If a cable thinner than the recommended cable size is used, it may not be protected by the DC fuse. (Refer to **page 57** for the fuse selection.)
- *7 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

• 75K or higher



Model	Rating	Cable gauge													
		HIV cables, etc. (mm ²)*1					AWG/MCM *2					PVC cables, etc. (mm ²) *3			
		Location in the connection diagram				Earth (ground)	Location in the connection diagram					Location in the connection diagram			
a, b	c *4	d	e	a, b	c		d	e	a, b	c	d	e			
FR-XC-H75K FR-XC-H75K-PWM	50°C	60	60	1.25	3.5	22	1/0	2/0	16	11	50	70	1.5	4	35
	40°C														
FR-XC-H160K FR-XC-H160K-PWM	50°C	100	125	8	38	60	4/0	250	8	8	95	125	10	70	
	40°C	150	150				300	300			150	150			
FR-XC-H220K FR-XC-H220K-PWM	50°C	150	200	8	60	60	300	400	8	8	150	185	10	95	
	40°C	200	200				400	400			185	185			

- *1 It is the gauge of the cable with continuous maximum permissible temperature of 90°C or more (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.). It assumes a surrounding air temperature of 50°C or less and the wiring distance of 20 m or less from the power supply to the converter.
- *2 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (THHN cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (XLPE cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *4 If a cable thinner than the recommended cable size is used, it may not be protected by the DC fuse. (Refer to **page 57** for the fuse selection.)
- *5 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

Harmonic suppression mode

◆ Circuit breaker and magnetic contactor

Check the model of the purchased multifunction regeneration converter. Appropriate peripheral devices must be selected according to the capacity.

Refer to the following tables to prepare appropriate peripheral devices.

- 200 V class

FR-XC series converter model	Molded case circuit breaker (MCCB) ^{*1} / earth leakage circuit breaker (ELB) (NF, NV type)		Magnetic contactor (MC) ^{*2}	
	50°C rating	40°C rating	50°C rating	40°C rating
FR-XC-22K FR-XC-18.5K-PWM	125 A	125 A	S-T50	S-T50
FR-XC-30K FR-XC-22K-PWM	125 A	125 A	S-T65	S-T65
FR-XC-37K FR-XC-37K-PWM	200 A	200 A	S-T100	S-N150
FR-XC-55K FR-XC-55K-PWM	300 A	300 A	S-N180	S-N180

- 400 V class

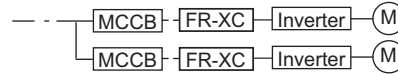
FR-XC series converter model	Molded case circuit breaker (MCCB) ^{*1} / earth leakage circuit breaker (ELB) (NF, NV type)		Magnetic contactor (MC)/ dedicated contactor box (option) ^{*2}	
	50°C rating	40°C rating	50°C rating	40°C rating
FR-XC-H22K FR-XC-H18.5K-PWM	60 A	60 A	S-T35	S-T35
FR-XC-H30K FR-XC-H22K-PWM	75 A	75 A	S-T35	S-T35
FR-XC-H37K FR-XC-H37K-PWM	100 A	100 A	S-T50	S-T65
FR-XC-H55K FR-XC-H55K-PWM	150 A	150 A	S-T80	S-T80
FR-XC-H75K FR-XC-H75K-PWM	175 A	225 A	FR-MCB-H150 or S-N150 200 VAC ^{*3}	
FR-XC-H160K FR-XC-H160K-PWM	400 A	500 A	FR-MCB-H400 or S-N300 200 VAC ^{*3}	
FR-XC-H220K FR-XC-H220K-PWM	500 A	600 A	FR-MCB-H400 or S-N400 200 VAC ^{*3}	

*1 Select an MCCB according to the power supply capacity. Install one MCCB per converter.

(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)

*2 The magnetic contactor is selected based on the AC-1 class. The electrical durability of magnetic contactor is 100,000 times. When the magnetic contactor is used for emergency stops during motor driving, the electrical durability is 25 times. (Note that the dedicated contactor box is not intended for emergency stop.) If using an MC for emergency stop during motor driving or using it on the motor side during commercial power supply operation, select an MC with the class AC-3 rated current for the rated motor current.

*3 Select an MC whose operation coil section has a surge absorbing function. To use the MC to shut off the power supply in case of emergency, set **Pr.460 Operation selection after MC external shutoff**. (refer to the FR-XC Instruction Manual)



◆ Fuse

Installation of a fuse between the multifunction regeneration converter and the inverter is recommended.

When using the converter in the common bus regeneration mode, select a fuse according to the capacity of the connected motor.

When using a motor whose capacity is smaller than the inverter capacity by two ranks or more, select the fuse with the capacity that is one rank lower than the inverter capacity.

• 200 V class

Motor capacity (kW)	Fuse rating (A)	Model (Part number/item number) *1	Fuse holder (2 poles)
0.1	5	6.900 CP GR 10.38 0005 (FR10GR69V5)	CUS102 (without fuse light melting indicator) or CUS102I (with fuse light melting indicator)
0.2	10	6.900 CP GR 10.38 0010 (FR10GR69V10)	
0.4	16	6.900 CP GR 10.38 0016 (FR10GR69V16)	
0.75	20	6.900 CP GR 10.38 0020 (FR10GR69V20)	
1.5	25	6.900 CP GR 10.38 0025 (FR10GR69V25)	
2.2	50	6.9 URD 30 TTF 0050	—
3.7	63	6.9 URD 30 TTF 0063	—
5.5	100	6.9 URD 30 TTF 0100	—
7.5	125	6.9 URD 30 TTF 0125	—
11	160	6.9 URD 30 TTF 0160	—
15	200	6.9 URD 30 TTF 0200	—
18.5	250	6.9 URD 30 TTF 0250	—
22	315	6.9 URD 30 TTF 0315	—
30	400	6.9 URD 30 TTF 0400	—
37	500	6.9 URD 30 TTF 0500	—
45	630	6.9 URD 31 TTF 0630	—
55	700	6.9 URD 31 TTF 0700	—

• 400 V class

Motor capacity (kW)	Fuse rating (A)	Model (Part number/item number) *1	Fuse holder (2 poles)
0.4	12.5	6.900 CP GR 10.38 0012.5(FR10GR69V12.5)	CUS102 (without fuse light melting indicator) or CUS102I (with fuse light melting indicator)
0.75	16	6.900 CP GR 10.38 0016(FR10GR69V16)	
1.5	16	6.900 CP GR 10.38 0016(FR10GR69V16)	
2.2	20	6.900 CP GR 10.38 0020(FR10GR69V20)	
3.7	30	6.900 CP GR 10.38 0030(FR10GR69V30)	
5.5	50	6.9 URD 30 TTF 0050	—
7.5	50	6.9 URD 30 TTF 0050	—
11	80	6.9 URD 30 TTF 0080	—
15	125	6.9 URD 30 TTF 0125	—
18.5	125	6.9 URD 30 TTF 0125	—
22	160	6.9 URD 30 TTF 0160	—
30	200	6.9 URD 30 TTF 0200	—
37	250	6.9 URD 30 TTF 0250	—
45	315	6.9 URD 30 TTF 0315	—
55	350	6.9 URD 30 TTF 0350	—
75	450	6.9 URD 30 TTF 0450	—
90	500	6.9 URD 30 TTF 0500	—
160	800	6.9 URD 31 TTF 0800	—
185	900	6.9 URD 32 TTF 0900	—
220	1000	6.9 URD 32 TTF 1000 or 6.9 URD 31 TTF 0630 × 2 (parallel connection)*2	—
250	1250	6.9 URD 33 TTF 1250 or 6.9 URD 31 TTF 0700 × 2 (parallel connection)*2	—

*1 Manufacturer: Mersen Japan KK
Contact: Sun-Wa Technos Corporation

*2 When installing fuses in parallel, leave a space of 12 mm or more between the fuses.

Harmonic suppression mode

NOTE

- Install fuses across terminals P/+ and P/+, and across terminals N/- and N/- of the multifunction regeneration converter and the inverter.
- Fuses between the converter and the inverter are not required for the following combinations as the internal fuses of the converter can be used.

FR-XC		Inverter (kW)
FR-XC-H75K	50°C rating	75
	40°C rating	75, 90
FR-XC-H160K	50°C rating	160
	40°C rating	160, 185
FR-XC-H220K	50°C rating	220
	40°C rating	220, 250

[Estimated lifespan of fuses]

Components	Estimated lifespan*1	Replacement method
Fuse	10 years	Replace by new one

*1 Estimated lifespan for when the yearly average surrounding air temperature is 50°C. (without corrosive gas, flammable gas, oil mist, dust and dirt etc.)

NOTE

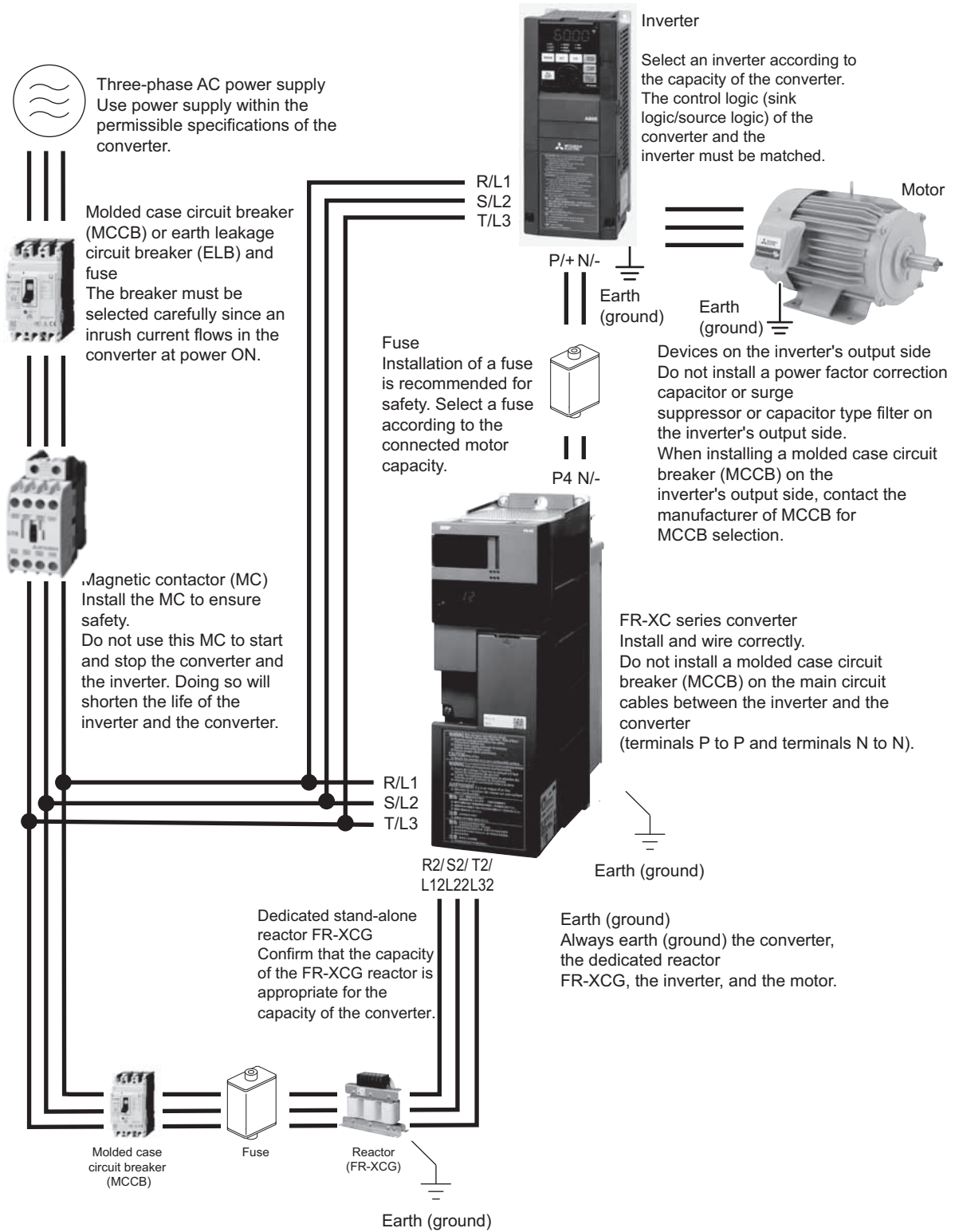
- If the fuse melts down, wiring failure such as a short circuit may be the cause. Find out the cause and remove it before replacing the fuse.

MEMO

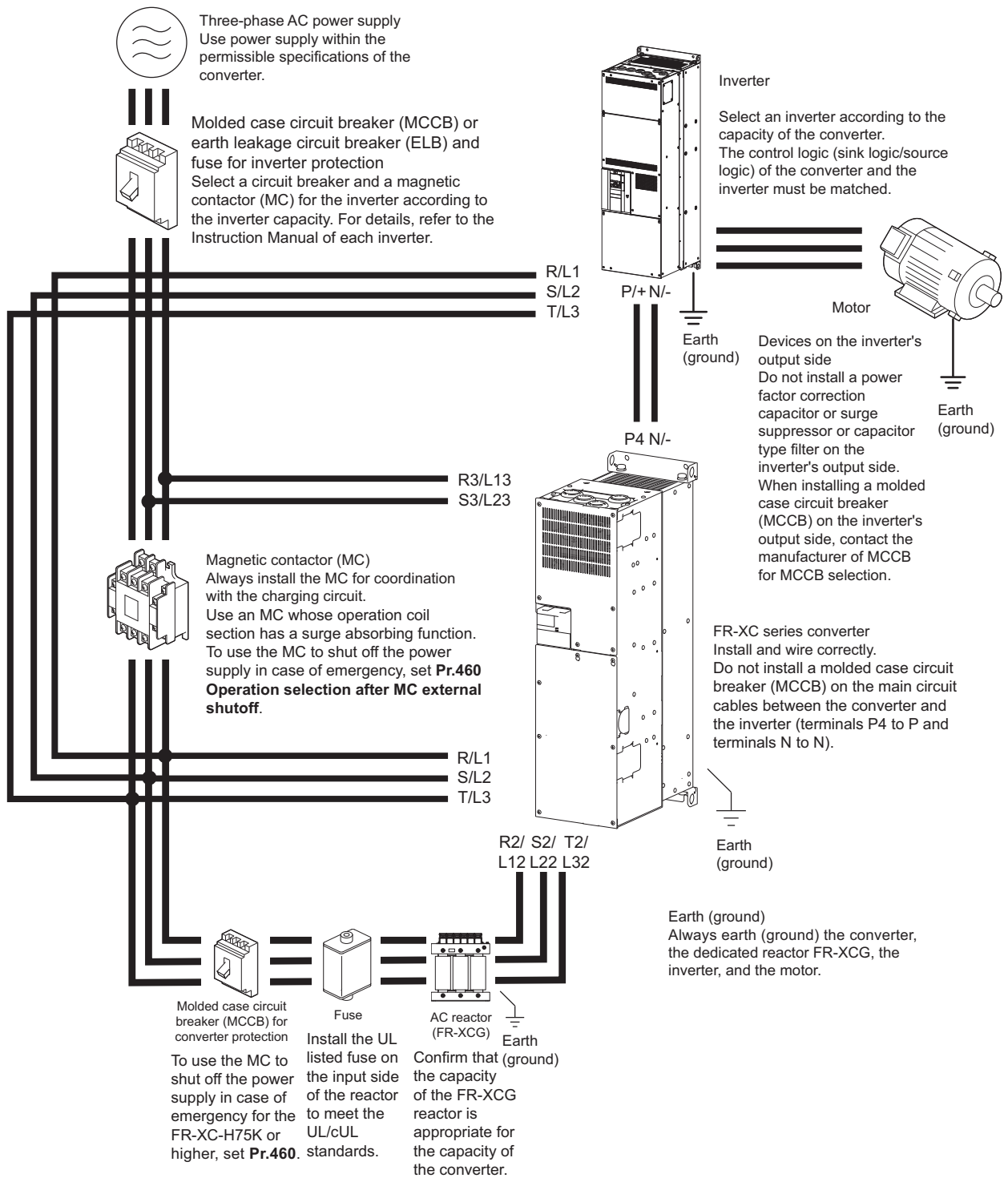
Power regeneration mode 2

◆ Example Connection

- 55K or lower



• 75K or higher



Power regeneration mode 2

◆ Rating (FR-XC-(H)[JK)

• 200 V class

Model FR-XC-[JK		7.5	11	15	22	30	37	55
50°C rating	Potential continuous regenerative capacity (kW)*2	5.5	7.5	11	18.5	22	30	45
	Rated current (A) (regenerative driving)	19	26	37	62	74	102	152
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
40°C rating	Potential continuous regenerative capacity (kW)*2	5.5	7.5	11	18.5	22	30	45
	Rated current (A) (regenerative driving)	21	28	40	68	81	112	167
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
Power source	Rated input AC voltage/frequency	Three-phase 200 to 240 V, 50/60 Hz*3						
	Permissible AC voltage fluctuation	Three-phase 170 to 264 V, 50/60 Hz						
	Permissible frequency fluctuation	±5%						
Protection rating of structure (IEC 60529)		IP00						
Cooling system		Forced air						
Number of connectable inverters		1						
Approx. mass (kg)*1		5	5	6	10.5	10.5	28	38

• 400 V class

Model FR-XC-H[JK		7.5	11	15	22	30	37	55	75	160	220		
50°C rating	Potential continuous regenerative capacity (kW)*2	5.5	7.5	11	18.5	22	30	45	75	132	185		
	Rated current (A) (regenerative driving)	10	14	20	33	39	54	80	135	238	333		
	Continuous rating / overload current rating	100% continuous / 150% 60 s											
40°C rating	Potential continuous regenerative capacity (kW)*2	5.5	7.5	11	18.5	22	30	45	90	160	220		
	Rated current (A) (regenerative driving)	11	15	21	36	42	59	88	162	288	396		
	Continuous rating / overload current rating	100% continuous / 150% 60 s											
Power source	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50/60 Hz*3											
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50/60 Hz											
	Permissible frequency fluctuation	±5%											
Protection rating of structure (IEC 60529)									IP00			IP20*4(FR-XCB included)	
Cooling system		Forced air											
Number of connectable inverters		1											
Approx. mass (kg)*1		5	5	6	10.5	10.5	28	28	45	96	96		

*1 Mass of the FR-XC alone.

*2 Maximum capacity of regenerative power generated from the Mitsubishi Electric standard 4-pole motor in each axis.

*3 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

*4 IP00 when the side wiring cover of the FR-XC is removed.

◆ Rating (FR-XC-(H)[]K-PWM)

• 200 V class

Model FR-XC-[]K-PWM		18.5	22	37	55
50°C rating	Potential continuous regenerative capacity (kW)*2	18.5	22	30	45
	Rated current (A) (regenerative driving)	62	74	102	152
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
40°C rating	Potential continuous regenerative capacity (kW)*2	18.5	22	30	45
	Rated current (A) (regenerative driving)	68	81	112	167
	Continuous rating / overload current rating	100% continuous / 150% 60 s			
Power source	Rated input AC voltage/frequency	Three-phase 200 to 240 V, 50/60 Hz*3			
	Permissible AC voltage fluctuation	Three-phase 170 to 264 V, 50/60 Hz			
	Permissible frequency fluctuation	±5%			
Protection rating of structure (IEC 60529)		IP00			
Cooling system		Forced air			
Number of connectable inverters		1			
Approx. mass (kg)*1		10.5	10.5	28	38

• 400 V class

Model FR-XC-H[]K-PWM		18.5	22	37	55	75	160	220
50°C rating	Potential continuous regenerative capacity (kW)*2	18.5	22	30	45	75	132	185
	Rated current (A) (regenerative driving)	33	39	54	80	135	238	333
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
40°C rating	Potential continuous regenerative capacity (kW)*2	18.5	22	30	45	90	160	220
	Rated current (A) (regenerative driving)	36	42	59	88	162	288	396
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
Power source	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50/60 Hz*3						
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50/60 Hz						
	Permissible frequency fluctuation	±5%						
Protection rating of structure (IEC 60529)		IP00				IP20*4(FR-XCB included)		
Cooling system		Forced air						
Number of connectable inverters		1						
Approx. mass (kg)*1		10.5	10.5	28	28	45	96	96

*1 Mass of the FR-XC alone.

*2 Maximum capacity of regenerative power generated from the Mitsubishi Electric standard 4-pole motor in each axis.

*3 The permissible voltage imbalance ratio is 3% or less. (Unbalance factor = Max | Line voltage - Mean of three line voltages | / Mean of three line voltages × 100)

*4 IP00 when the side wiring cover of the FR-XC is removed.

Power regeneration mode 2

◆ Amount of heat generated from the converter

• FR-XC

• 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-7.5K	220	240
FR-XC-11K	315	345
FR-XC-15K	460	505
FR-XC-22K FR-XC-18.5K-PWM	685	755
FR-XC-30K FR-XC-22K-PWM	810	890
FR-XC-37K FR-XC-37K-PWM	890	980
FR-XC-55K FR-XC-55K-PWM	1080	1190

• 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XC-H7.5K	130	145
FR-XC-H11K	200	220
FR-XC-H15K	280	305
FR-XC-H22K FR-XC-H18.5K-PWM	365	395
FR-XC-H30K FR-XC-H22K-PWM	435	485
FR-XC-H37K FR-XC-H37K-PWM	590	650
FR-XC-H55K FR-XC-H55K-PWM	880	965
FR-XC-H75K FR-XC-H75K-PWM	1400	1540
FR-XC-H160K FR-XC-H160K-PWM	2470	2715
FR-XC-H220K FR-XC-H220K-PWM	3390	3720

• FR-XCG

• 200 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCG-7.5K	60	73
FR-XCG-11K	82	92
FR-XCG-15K	99	115
FR-XCG-22K	118	142
FR-XCG-30K	135	162
FR-XCG-37K	172	205
FR-XCG-55K	210	243

• 400 V class

Model	Amount of heat generated (W)	
	50°C rating	40°C rating
FR-XCG-H7.5K	68	82
FR-XCG-H11K	80	91
FR-XCG-H15K	91	105
FR-XCG-H22K	136	159
FR-XCG-H30K	156	178
FR-XCG-H37K	193	231
FR-XCG-H55K	232	275
FR-XCG-H75K	465	
FR-XCG-H90K	515	
FR-XCG-H132K	780	
FR-XCG-H160K	885	
FR-XCG-H185K	875	
FR-XCG-H220K	1030	

◆ Operating condition

• To select the converter, refer to **page 62** for the potential regenerative capacity and overload current rating of the converter. Ensure that the selected converter is one with a larger regenerative power than that of the motor that will be used.

• Confirm that the converter is correctly selected, and select a dedicated stand-alone reactor (FR-XCG) by referring to "Combination matrix of FR-XCG and FR-XC(-PWM)" on **page 13**.

Selection example:

For the 50°C rating

For a motor which can supply 10 kW regenerative power with an overload capacity of 120% (12 kW) for 60 seconds, the FR-XC-15K (15 kW converter) should be selected.

Model FR-XC-[]K ⁺¹		7.5	11	15	22	30	37	55
	Applicable inverter capacity (kW)	7.5	11	15	22	30	37	55
		—	—	—	18.5	22	37	55
50°C rating	Potential regenerative capacity (kW) ⁺⁷	5.5	7.5	11	18.5	22	30	45
	Rated current (A) (regenerative driving)	19	26	37	62	74	102	152
	Continuous rating / overload current rating	100% continuous / 150% 60 s						
40°C rating	Potential regenerative capacity (kW)	5.5	7.5	11	18.5	22	30	45
	Rated current (A) (regenerative driving)	21	28	40	68	81	112	167
	Continuous rating / overload current rating	100% continuous / 150% 60 s						

When using a 75 kW inverter/motor or higher, also install the FR-HEL DC reactor (refer to the inverter Instruction Manuals).

The following table shows applicable combinations of the converter and the inverter.

• 200 V class

Model	Rating	Inverter capacity											
		3.7K or lower	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K or higher
FR-XC-7.5K	50°C/40°C rating	x	Δ	Δ	○	○	○	○	○	○	○	○	○
FR-XC-11K		x	x	Δ	Δ	○	○	○	○	○	○	○	○
FR-XC-15K		x	x	x	Δ	Δ	○	○	○	○	○	○	○
FR-XC-22K		x	x	x	x	x	Δ	Δ	○	○	○	○	○
FR-XC-30K		x	x	x	x	x	x	Δ	Δ	○	○	○	○
FR-XC-37K		x	x	x	x	x	x	x	Δ	Δ	○	○	○
FR-XC-55K		x	x	x	x	x	x	x	x	x	Δ	Δ	○

• 400 V class

Model	Rating	Inverter capacity											
		3.7K or lower	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K or higher
FR-XC-H7.5K	50°C/40°C rating	x	Δ	Δ	○	○	○	○	○	○	○	○	○
FR-XC-H11K		x	x	Δ	Δ	○	○	○	○	○	○	○	○
FR-XC-H15K		x	x	x	Δ	Δ	○	○	○	○	○	○	○
FR-XC-H22K		x	x	x	x	x	Δ	Δ	○	○	○	○	○
FR-XC-H30K		x	x	x	x	x	x	Δ	Δ	○	○	○	○
FR-XC-H37K		x	x	x	x	x	x	x	Δ	Δ	○	○	○
FR-XC-H55K		x	x	x	x	x	x	x	x	x	Δ	Δ	○

Model	Rating	Inverter capacity										
		55K or lower	75K	90K	110K	132K	160K	185K	220K	250K	280K	315K or higher
FR-XC-H75K*1	50°C rating	x	Δ	○	○	○	○	○	○	○	○	*1
	40°C rating	x	x	Δ	○	○	○	○	○	○		
FR-XC-H160K	50°C rating	x	x	x	x	Δ	○	○	○	○		
	40°C rating	x	x	x	x	x	Δ	○	○	○		
FR-XC-H220K	50°C rating	x	x	x	x	x	x	Δ	○	○		
	40°C rating	x	x	x	x	x	x	x	Δ	○		

○: Compatible, Δ: Compatible (common bus regeneration mode or harmonic suppression mode is recommended), ×: Not compatible

*1 The FR-A840-06830(280K) or lower and the FR-F840-06830(315K) or lower are applicable to the converter in power regeneration mode 2. The following table shows compatibility between the converter and inverters

Inverter	Compatibility
FR-A840-06830(280K) or lower FR-F840-06830(315K) or lower	Compatible (Refer to page 66 for wiring of the control signals.)
FR-A842-07700(315K) or higher FR-F842-07700(355K) or higher	Not compatible (To achieve compatibility, use the MC (refer to the FR-XC Instruction Manual) For the products manufactured in October 2022 or earlier, refer to the FR-XC Instruction Manual.)

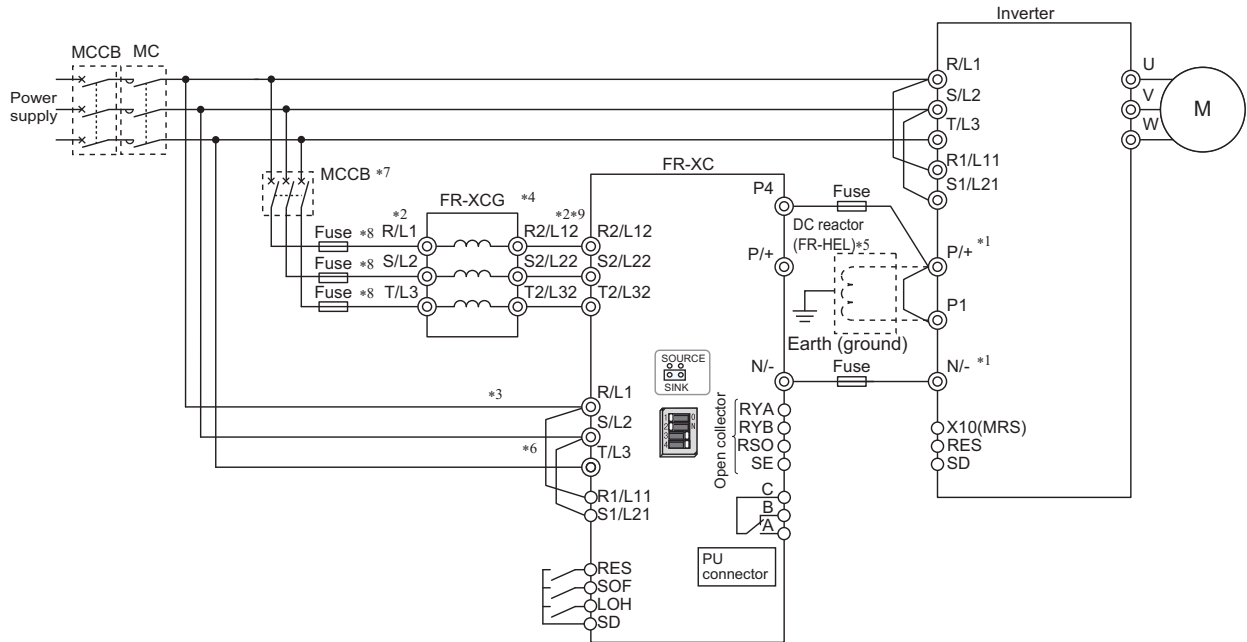
NOTE

- Select an appropriate magnetic contactor (MC) according to the inverter capacity referring to the Instruction Manual of the inverter. For wiring, refer to the FR-XC Instruction Manual.
- Refer to the FR-XC Instruction Manual for wiring between the converter and the inverter.

Power regeneration mode 2

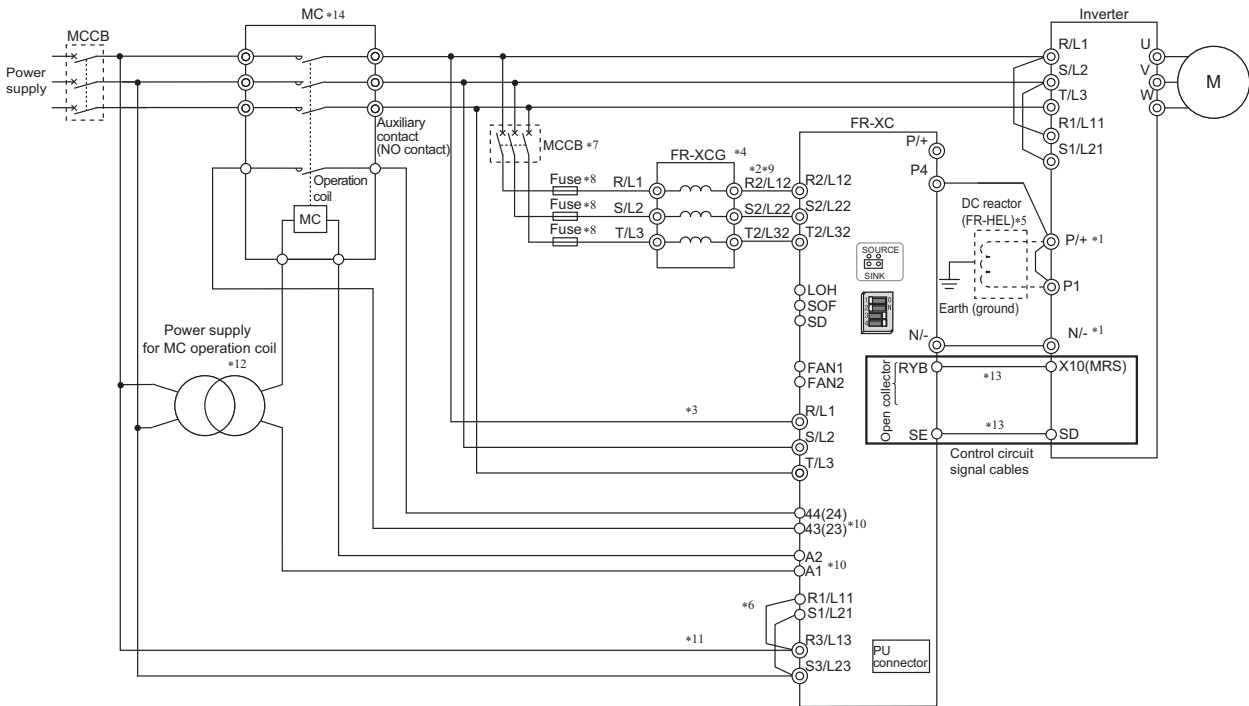
◆ Terminal Connection Diagrams

- 55K or lower



- *1 Connect between the inverter terminal P/+ and the converter terminal P4 and between the inverter terminal N/- and the converter terminal N/- for polarity consistency. Connecting the opposite polarity of terminals P/+ and N/- will damage the converter and the inverter.
- *2 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the reactor. Incorrect connection will damage the converter.
- *3 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter. A branch point to each of these terminals must be placed between the power supply and the FR-HAL reactor.
- *4 Install the FR-XCG reactor between the power supply and the converter as shown in the figure. For information to select an appropriate model, refer to **page 13**.
- *5 To connect a DC reactor, remove a jumper installed across terminals P1 and P/+ before installing the DC reactor.
- *6 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.
- *7 For selection of an MCCB for the converter, refer to **page 70**.
- *8 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the FR-XCG reactor to meet the UL/cUL standards.
- *9 Do not install an MCCB or MC between the reactors and the converter. Doing so disrupts proper operation.

- 75K or higher



- *1 Connect between the inverter terminal P/+ and the converter terminal P4 and between the inverter terminal N/- and the converter terminal N/- for polarity consistency.
Connecting the opposite polarity of terminals P/+ and N/- will damage the converter and the inverter.
- *2 Confirm the correct phase sequence of three-phase current to connect between the reactor and the converter, and between the power supply and the reactor.
Incorrect connection will damage the converter.
- *3 Always connect between the power supply and terminals R/L1, S/L2, and T/L3 of the converter. Operating the inverter without connecting them will damage the converter.
- *4 Install the FR-XCG reactor between the power supply and the converter as shown in the figure. For information to select an appropriate model, refer to **page 13**.
- *5 To connect a DC reactor, remove a jumper installed across terminals P1 and P/+ before installing the DC reactor.
- *6 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.
- *7 For selection of an MCCB for the converter, refer to **page 70**.
- *8 Install the UL listed fuse (refer to the FR-XC Instruction Manual) on the input side of the FR-XCG reactor to meet the UL/cUL standards.
- *9 Do not install an MCCB or MC between the reactors and the converter. Doing so disrupts proper operation.
- *10 Connect an appropriate magnetic contactor (MC) according to the inverter rated current. Use a 200 VAC class coil magnetic contactor and connect it to terminals A1, A2, 43 (23), and 44 (24) of the FR-XC. When using a magnetic contactor (MC) not shown in **page 70**, select one whose rated specifications of auxiliary contacts satisfy the rated specifications of terminals MC43 (23) and MC44 (24) (refer to **page 28**).
- *11 Always connect between the power supply and terminals R3/L13 and S3/L23 on the converter. Otherwise, the control power supply is not started and the converter will not be charged.
- *12 Prepare an appropriate 200 VAC class power supply to operate the magnetic contactor (MC). Do not use the power supply whose specification exceeds the rated specifications of terminals A1 and A2 of the FR-XC (refer to **page 28**).
- *13 Control signal cables must be 30 m or less long and 0.3 to 1.25 mm² thick.
- *14 To use the MC to shut off the power supply in case of emergency, set **Pr.460 Operation selection after MC external shutoff**. (Refer to the FR-XC Instruction Manual.)

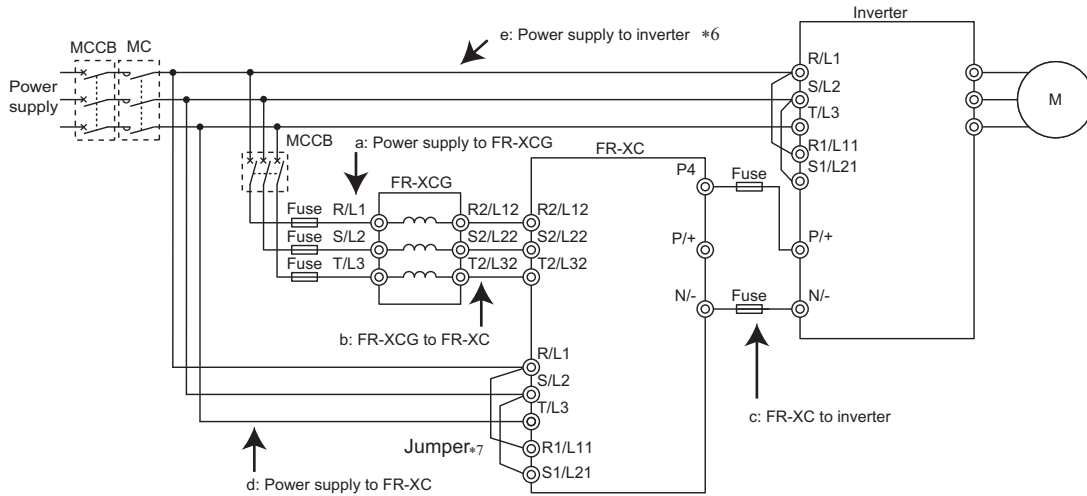
Power regeneration mode 2

◆ Cable gauge

Select a recommended gauge size cable to ensure that the voltage drop ratio is within 2%.

The following indicates selection examples when the wiring length from the power supply to the converter is 20 m.

- 55K or lower



- 200 V class

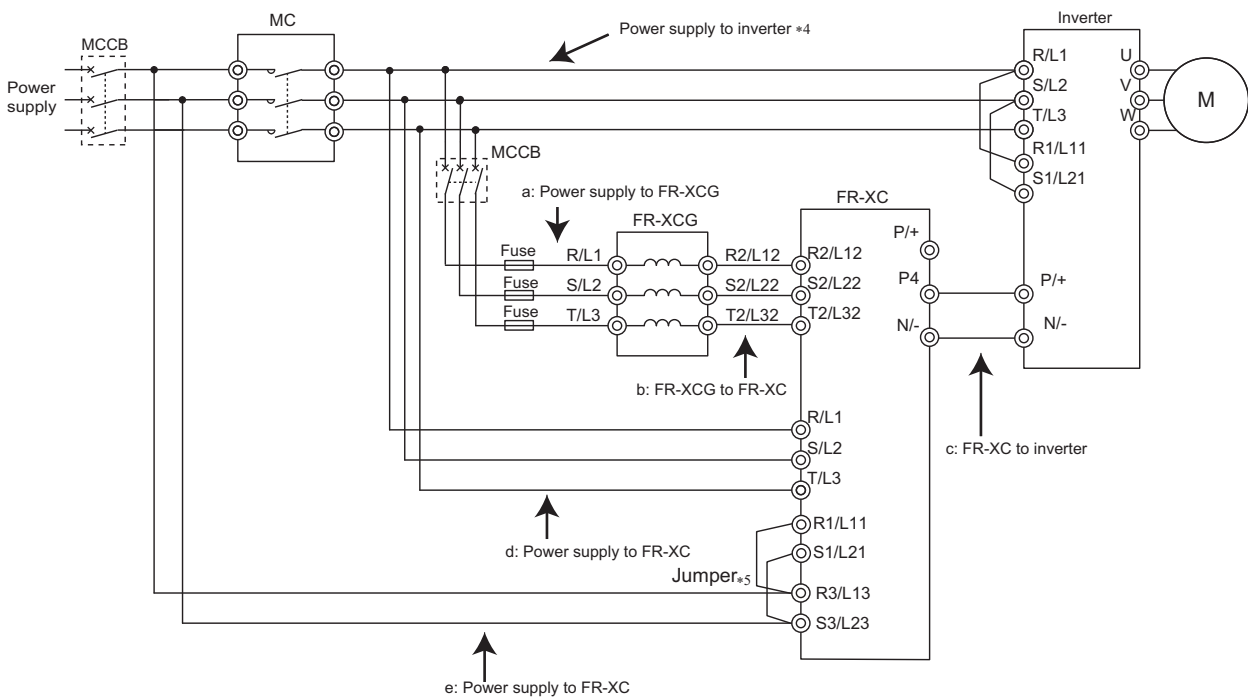
Model	Rating	Cable gauge										
		HIV cables, etc. (mm ²)*1				Earth (ground)	AWG/MCM *2			PVC cables, etc. (mm ²) *3		
		Location in the connection diagram			Earth (ground)		Location in the connection diagram			Location in the connection diagram		
		a, b	c *5	d		a, b	c	d	a, b	c	d	
FR-XC-7.5K	50°C	3.5	5.5	1.25	5.5	14	12	16	4	4	1.5	10
	40°C		3.5			12						
FR-XC-11K	50°C	5.5	8	1.25	8	10	10	16	6	6	1.5	16
	40°C		5.5									
FR-XC-15K	50°C	8	14	1.25	14	8	8	16	10	10	1.5	16
	40°C		14									
FR-XC-22K FR-XC-18.5K-PWM	50°C	22	22	1.25	22	6	4	16	10	16	1.5	16
	40°C		22			16						
FR-XC-30K FR-XC-22K-PWM	50°C	38	38	1.25	22	4	2	16	16	16	1.5	25
	40°C		22						25			
FR-XC-37K FR-XC-37K-PWM	50°C	60	60	1.25	22	1	1	16	35	35	1.5	25
	40°C		38				1/0			50		
FR-XC-55K FR-XC-55K-PWM	50°C	80	100	1.25	38	2/0	3/0	16	50	70	1.5	35
	40°C		100									

- 400 V class

Model	Rating	Cable gauge										
		HIV cables, etc. (mm ²) *1				Earth (ground)	AWG/MCM *2			PVC cables, etc. (mm ²) *4		
		Location in the connection diagram			Earth (ground)		Location in the connection diagram			Location in the connection diagram		
		a, b	c *5	d		a, b	c	d	a, b	c	d	
FR-XC-H7.5K	50°C	3.5	3.5	1.25	3.5	12	12	16	4	4	1.5	4
	40°C		3.5									
FR-XC-H11K	50°C	3.5	3.5	1.25	3.5	12	12	16	4	4	1.5	4
	40°C		3.5									
FR-XC-H15K	50°C	3.5	5.5	1.25	5.5	12	12	16	4	4	1.5	4
	40°C		5.5				10					
FR-XC-H22K FR-XC-H18.5K-PWM	50°C	8	14	1.25	8	10	8	16	6	10	1.5	10
	40°C		8			8						
FR-XC-H30K FR-XC-H22K-PWM	50°C	14	14	1.25	14	8	6	16	10	10	1.5	10
	40°C		14									
FR-XC-H37K FR-XC-H37K-PWM	50°C	22	22	1.25	14	6	4	16	16	16	1.5	16
	40°C		14									
FR-XC-H55K FR-XC-H55K-PWM	50°C	38	38	1.25	22	4	2	16	25	25	1.5	16
	40°C		38			2						

- *1 It is the gauge of a cable with the continuous maximum permissible temperature of 75°C (HIV cable (600 V grade heat-resistant PVC insulated wire), etc.). It assumes a surrounding air temperature of 50°C or less (40°C or less for the 40°C rating) and the wiring distance of 20 m or less from the power supply to the converter.
- *2 For the 200 V class converters and FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 75°C (THHW cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (THHN cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 For the FR-XC-15K or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 70°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For the FR-XC-22K / FR-XC-18.5K-PWM or higher, it is the gauge of a cable with the continuous maximum permissible temperature of 90°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *4 For the FR-XC-H37K or lower, it is the gauge of the cable with the continuous maximum permissible temperature of 70°C (PVC cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
For FR-XC-H55K, the cable gauge is with the continuous maximum permissible temperature of 90°C (XLPE cable). It assumes a surrounding air temperature of 40°C or less and the wiring distance of 20 m or less from the power supply to the converter.
(Selection example mainly for use in Europe.)
- *5 If a cable thinner than the recommended cable size is used, it may not be protected by the DC fuse. (Refer to **page 70** for the fuse selection.)
- *6 Refer to the Inverter Instruction Manual.
- *7 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

• 75K or higher



Model	Rating	Cable gauge														
		HIV cables, etc. (mm ²) *1					AWG/MCM *2					PVC cables, etc. (mm ²) *3				
		Location in the connection diagram					Location in the connection diagram					Location in the connection diagram				Earth (ground)
		a, b	c	d	e	Earth (ground)	a, b	c	d	e	a, b	c	d	e	Earth (ground)	
FR-XC-H75K FR-XC-H75K-PWM	50°C	60	60	1.25	3.5	22	1	1/0	16	11	50	70	1.5	4	35	
	40°C						1/0									
FR-XC-H160K FR-XC-H160K-PWM	50°C	100	100	1.25	8	38	3/0	4/0	8	95	95	120	10	70		
	40°C		125													
FR-XC-H220K FR-XC-H220K-PWM	50°C	150	150	1.25	8	60	300	300	8	150	150	185	10	95		
	40°C		200													

- *1 It is the gauge of the cable with continuous maximum permissible temperature of 90°C or more (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.). It assumes a surrounding air temperature of 50°C or less and the wiring distance of 20 m or less from the power supply to the converter.
- *2 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (THHN cable).
(For the use in the United States or Canada, refer to the FR-XC Instruction Manual.)
- *3 It is the gauge of the cable with the continuous maximum permissible temperature of 90°C (XLPE cable).
(Selection example mainly for use in Europe.)
- *4 Refer to the Inverter Instruction Manual.
- *5 When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.

Power regeneration mode 2

◆ Circuit breaker and magnetic contactor

• 200 V class

FR-XC series converter model	Molded case circuit breaker (MCCB)/ earth leakage circuit breaker (ELB) (NF, NV type)
FR-XC-7.5K	50 A
FR-XC-11K	60 A
FR-XC-15K	75 A
FR-XC-22K FR-XC-18.5K-PWM	125 A
FR-XC-30K FR-XC-22K-PWM	175 A
FR-XC-37K FR-XC-37K-PWM	200 A
FR-XC-55K FR-XC-55K-PWM	250 A

• 400 V class

FR-XC series converter model	Molded case circuit breaker (MCCB)/ earth leakage circuit breaker (ELB) (NF, NV type)
FR-XC-H7.5K	30 A
FR-XC-H11K	30 A
FR-XC-H15K	40 A
FR-XC-H22K FR-XC-H18.5K-PWM	75 A
FR-XC-H30K FR-XC-H22K-PWM	100 A
FR-XC-H37K FR-XC-H37K-PWM	125 A
FR-XC-H55K FR-XC-H55K-PWM	150 A
FR-XC-H75K FR-XC-H75K-PWM	50°C rating: 200 A 40°C rating: 225 A
FR-XC-H160K FR-XC-H160K-PWM	400 A
FR-XC-H220K FR-XC-H220K-PWM	50°C rating: 500 A 40°C rating: 600 A

◆ Fuse

Installation of a fuse between the multifunction regeneration converter and the inverter is recommended.

Select a fuse according to the capacity of the converter. (Refer to the FR-XC Instruction Manual for wiring between the converter and the inverter.)

• 200 V class

FR-XC series converter capacity (kW)	Fuse rating (A)	Model (Part number/Item number) *1
FR-XC-7.5K	125	6.9 URD 30 TTF 0125
FR-XC-11K	160	6.9 URD 30 TTF 0160
FR-XC-15K	200	6.9 URD 30 TTF 0200
FR-XC-22K FR-XC-18.5K-PWM	315	6.9 URD 30 TTF 0315
FR-XC-30K FR-XC-22K-PWM	400	6.9 URD 30 TTF 0400
FR-XC-37K FR-XC-37K-PWM	500	6.9 URD 30 TTF 0500
FR-XC-55K FR-XC-55K-PWM	700	6.9 URD 31 TTF 0700

• 400 V class

FR-XC series converter capacity (kW)	Fuse rating (A)	Model (Part number/Item number) *1
FR-XC-H7.5K	50	6.9 URD 30 TTF 0050
FR-XC-H11K	80	6.9 URD 30 TTF 0080
FR-XC-H15K	125	6.9 URD 30 TTF 0125
FR-XC-H22K FR-XC-H18.5K-PWM	160	6.9 URD 30 TTF 0160
FR-XC-H30K FR-XC-H22K-PWM	200	6.9 URD 30 TTF 0200
FR-XC-H37K FR-XC-H37K-PWM	250	6.9 URD 30 TTF 0250
FR-XC-H55K FR-XC-H55K-PWM	350	6.9 URD 30 TTF 0350

*1 Manufacturer: Mersen Japan KK
Contact: Sun-Wa Technos Corporation

NOTE

- Install fuses across terminals P/+ and P/+, and across terminals N/- and N/- of the multifunction regeneration converter and the inverter.

[Estimated lifespan of fuses].

Components	Estimated lifespan*1	Replacement method
Fuse	10 years	Replace by new one

*1 Estimated lifespan for when the yearly average surrounding air temperature is 50°C. (without corrosive gas, flammable gas, oil mist, dust and dirt etc.)

NOTE

- If the fuse melts down, wiring failure such as a short circuit may be the cause. Find out the cause and remove it before replacing the fuse.

MEMO

Protective Functions

When a fault occurs in the converter, the protective function is automatically activated to shut off the converter output and show an indication on the PU and on the operation status 7-segment LED display of the converter.

Indication on the operation status 7-segment LED display of the converter		Name
Error message*2	—	Operation panel lock (HOLD)
	—	Write disable error (Er1)
	—	Copy operation fault (rE1 to rE4)
Warning*3	Lb	LB Overload signal detection
	Lc	LC Electronic thermal relay function pre-alarm
	Ld	LD PU stop
	Le	LE Maintenance signal output*7
	CP	CP Parameter copy
	Lg	LG Power supply not detected
	Lh	LH Converter operation disabled
Alarm*4	LA	LJ Box-type reactor overheat pre-alarm
Fault*5	EA	LA Fan alarm
	Ea	E.A Overcurrent trip
	Eb	E.B Overvoltage trip
	Ec	E.C Converter overload trip (electronic thermal relay function)*1
	Ed	E.D Heatsink overheat
	Ee	E.E Instantaneous power failure
	Ef	E.F Undervoltage
	EG	E.G Input phase loss
	EH	E.H External thermal relay operation*6*7
	EJ	E.J PU disconnection*7
	EK	E.K Retry count excess*7
	EL	E.L CPU fault Internal circuit fault
	EM	E.M 24 VDC power output short circuit
	EN	E.N Inrush current limit circuit fault
	EP	E.P Parameter storage device fault
	EQ	E.Q Communication option fault
	ET	E.T Connection mode fault
	EU	E.U Unsupported control selection
	EV	E.V Box-type reactor overheat protection
	EW	E.W Box-type reactor power supply short circuit protection
E1	E.1 Option fault	
E6	E.6 Main circuit power supply detection fault	
E8	E.8 Input power supply fault 1	

*1 Resetting the converter initializes the internal cumulative heat value of the electronic thermal relay function.

*2 A message regarding an operational fault or a setting fault on the PU is displayed. The converter output is not shut off.

*3 The converter output is not shut off even when a warning is displayed. However, failure to take appropriate measures will lead to a fault.

*4 The converter output is not shut off. The Alarm (LF) signal can be output depending on the parameter setting.

*5 When a protective function is activated, the converter output is shut off and the Fault (ALM) signal is output.

*6 A protective function leading to the External thermal relay operation fault is enabled only when the OH signal is assigned to an input terminal by using Pr.3, Pr.4, or Pr.7 (Input terminal function selection).

*7 This protective function is not available in the initial status.

Option list

Name		Model	Applications, Specifications, etc.
Dedicated stand-alone	Stand-alone reactor dedicated to the FR-XC series converter	FR-XCL-(H)[]K FR-XCG-(H)[]K	Used for the FR-XC series converter. FR-XCL: common bus regeneration mode, FR-XCG: power regeneration mode 2.
	Box-type reactor dedicated to the FR-XC series converter	FR-XCB-(H)[]K	Used for the FR-XC series converter in harmonic suppression mode.
	Converter installation attachment for enclosure	FR-XCCP[]	Used to install the FR-XC series converter in an enclosure.
	IP20 compatible attachment for the FR-XC converter	FR-XCCU[]	Used to achieve the IP20 compliant protective structure of the FR-XC series converter.
Plug-in Communication	CC-Link communication	FR-A8NC	Used to give commands to the FR-XC series converter from a programmable controller for operating or monitoring the converter or changing the parameter settings in the converter.
Common stand-alone	Parameter unit (8 languages)	FR-PU07	Parameters can be set in an interactive manner on the LCD display.
	Parameter unit with battery pack	FR-PU07BB	Parameters can be set without power supply from the FR-XC series converter.
	Parameter unit connection cable	FR-CB20[]	Cable for connection of operation panel or parameter unit. [] indicates a cable length. (1 m, 3 m, 5 m)
	Operation panel connection connector	FR-ADP	Used for the connection between the inverter operation panel (FR-DU08) and the parameter unit connection cable.
	Radio noise filter	FR-BIF(H)	Used for radio noise reduction (when installed on the input side of the converter).
	Line noise filter	FR-BSF01/FR- BLF	Used for line noise reduction.

Precautions on Selection and Operation

Precautions on Selection and Operation

◆ Safety instructions

- To use the product safely and correctly, make sure to read the Instruction Manual of the product before the use.
- This product has not been designed or manufactured for use with any equipment or system operated under life-threatening conditions.
- Please contact our sales representative when considering using this product in special applications such as passenger mobile, medical, aerospace, nuclear, power or undersea relay equipment or system.
- Although this product was manufactured under conditions of strict quality control, install safety devices to prevent serious accidents when it is used in facilities where breakdowns of the product or other failures are likely to cause a serious accident.
- Use only dedicated inverters.

◆ Precautions for installation

- Wiring distance:
For the wiring length, refer to the following tables.
[Wiring between the FR-XC series converter and the inverter]

	Common bus regeneration mode	Harmonic suppression mode	Power regeneration mode 2
Main circuit	5 m or less	50 m or less	5 m or less
Control circuit	30 m or less	30 m or less	30 m or less

[Wiring between the FR-XCL reactor and the FR-XC series converter]

	Common bus regeneration mode	Harmonic suppression mode	Power regeneration mode 2
Main circuit	10 m or less	—	10 m or less

[Wiring between the FR-XCB reactor and the FR-XC series converter]

	Common bus regeneration mode	Harmonic suppression mode	Power regeneration mode 2
Main circuit	—	10 m or less	—
Control circuit	—	5 m or less	—

- Dedicated reactor installed between power supply and the FR-XC series converter:
The terminals R/L1, S/L2, and T/L3 on the converter are control terminals to detect power phases of the power supply. For wiring, the voltage phase must be consistent between terminals R2/L12, S2/L22, and T2/L32 and terminals R/L1, S/L2, and T/L3. If these terminals are not connected correctly, the converter does not operate properly.
If the inverter is operated while the converter terminals R/L1, S/L2, and T/L3 are not connected to the power supply, the converter will be damaged.
- In the common bus regeneration mode, always connect between the converter terminal RYB and the inverter terminal to which the X10 (MRS) signal is assigned, and also connect between the converter terminal SE and the inverter terminal SD. If the terminals are not connected, the converter may be damaged.
- For use of the FR-XC series converter in the common bus regeneration mode, the control logic (sink/source) of the converter and the inverter must be matched. The converter does not operate properly if the control logic is not consistent with each other. (Refer to the Instruction Manual of the converter/inverter for the switching of the control logic of the converter/inverter.)
- For use of the FR-XC series converter in the common bus regeneration mode, keep the wiring length between terminals as short as possible.

◆ Precautions for use

- Since the FR-XC series converter in harmonic suppression mode achieves $K5$ (the conversion factor) = 0, it is assumed by the Harmonic suppression guidelines that the converter generates no harmonics. However, it does not mean that harmonic components completely disappear.
- To maintain the security (confidentiality, integrity, and availability) of the drive unit and the system against unauthorized access, DoS^{*1} attacks, computer viruses, and other cyberattacks from external devices via network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.
We shall have no responsibility or liability for any problems involving drive unit trouble and system trouble by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

*1 DoS: A denial-of-service (DoS) attack disrupts services by overloading systems or exploiting vulnerabilities, resulting in a denial-of-service (DoS) state.

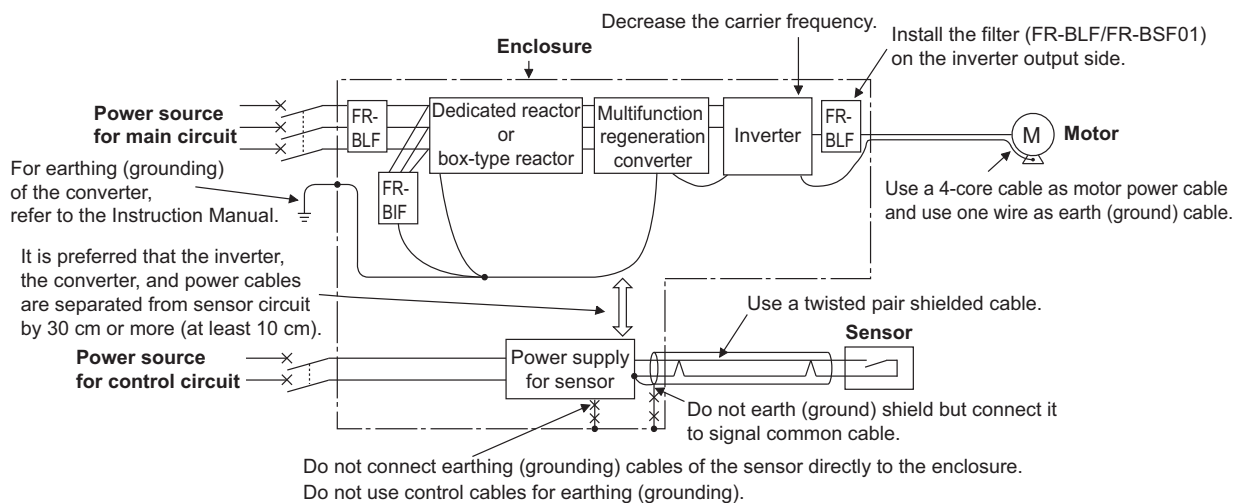
◆ Precautions when selecting the inverter and reactor

- **Applicable Inverter:**
Prepare an inverter that is compatible with DC input.
For the MELTRAC series inverters and FR-A500L/F500L series inverters, make sure that an inverter to be applied is compatible with the FR-XC series converter. Use of the FR-XC series converter with an incompatible inverter will damage the inverter and the converter.
- **Dedicated reactor:**
Use the FR-XC series converter in combination with the dedicated stand-alone reactor (FR-XCL or FR-XCG) or the dedicated box-type reactor (FR-XCB).
The combination depends on the connection mode.
Common bus regeneration mode: FR-XCL
Harmonic suppression mode: FR-XCB
Power regeneration mode 2: FR-XCG

◆ Precautions on peripheral device selection

- **Selection and installation of molded case circuit breaker**
Install a molded case circuit breaker (MCCB) on the input side of the FR-XC series converter to protect the wiring on that side. For selection of the MCCB, refer to the following pages: **page 42** (common bus regeneration mode), **page 56** (harmonic suppression mode), **page 70** (power regeneration mode 2). (Check the documents related to the applicable breaker.) As an earth leakage current breaker, use the Mitsubishi Electric earth leakage current breaker designed for harmonics and surge suppression.
- **EMI measures**
The FR-XC series converter can generate electromagnetic noises. In a system including the converter in harmonic suppression mode, the noise created by the system increases when both the converter and an inverter are operated. If these noises cause peripheral devices to malfunction, EMI measures should be taken to suppress noises. Techniques differ slightly depending on EMI paths.
The FR-BIF radio noise filter is useful for suppressing noise on AM radio broadcasting.
The FR-BSF01/FR-BLF line noise filter is useful for preventing malfunction of sensors, etc.
As precautions against the induced noise emitted from power cables of the converter and inverter, it is preferable to keep a distance of 30 cm or more between the sensor circuit and noise sources such as the converter, the inverter, and their power cables. However if this is not possible, keep a distance of at least 10 cm. Use shielded twisted pair cable for signal cables of the sensor. Do not earth (ground) the shield, and connect the shield to the signal common terminal.

[EMI measure example]



◆ Others

- It is not a fault if noise comes from the dedicated reactor during regenerative driving of the converter (in other words, it is a fault if noise comes despite the stop state of the converter by the Converter stop (SOF) signal).
If needed, devise methods of reducing noise by modifying the enclosure in which the reactor is installed.

Warranty

Warranty

When using this product, make sure to understand the warranty described below.

1. Warranty period and coverage

We will repair any failure or defect (hereinafter referred to as "failure") in our FA equipment (hereinafter referred to as the "Product") arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve months after your purchase or delivery of the Product to a place designated by you or eighteen months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged.
However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - 1) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - 2) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - 3) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - 4) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - 5) any replacement of consumable parts (condenser, cooling fan, etc.)
 - 6) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - 7) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - 8) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas

Our regional FA Center in overseas countries will accept the repair work of the Product; however, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi Electric shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi Electric.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi Electric products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

- (1) For the use of our product, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in product, and a backup or fail-safe function should operate on an external system to product when any failure or malfunction occurs.
- (2) Our product is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.
We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

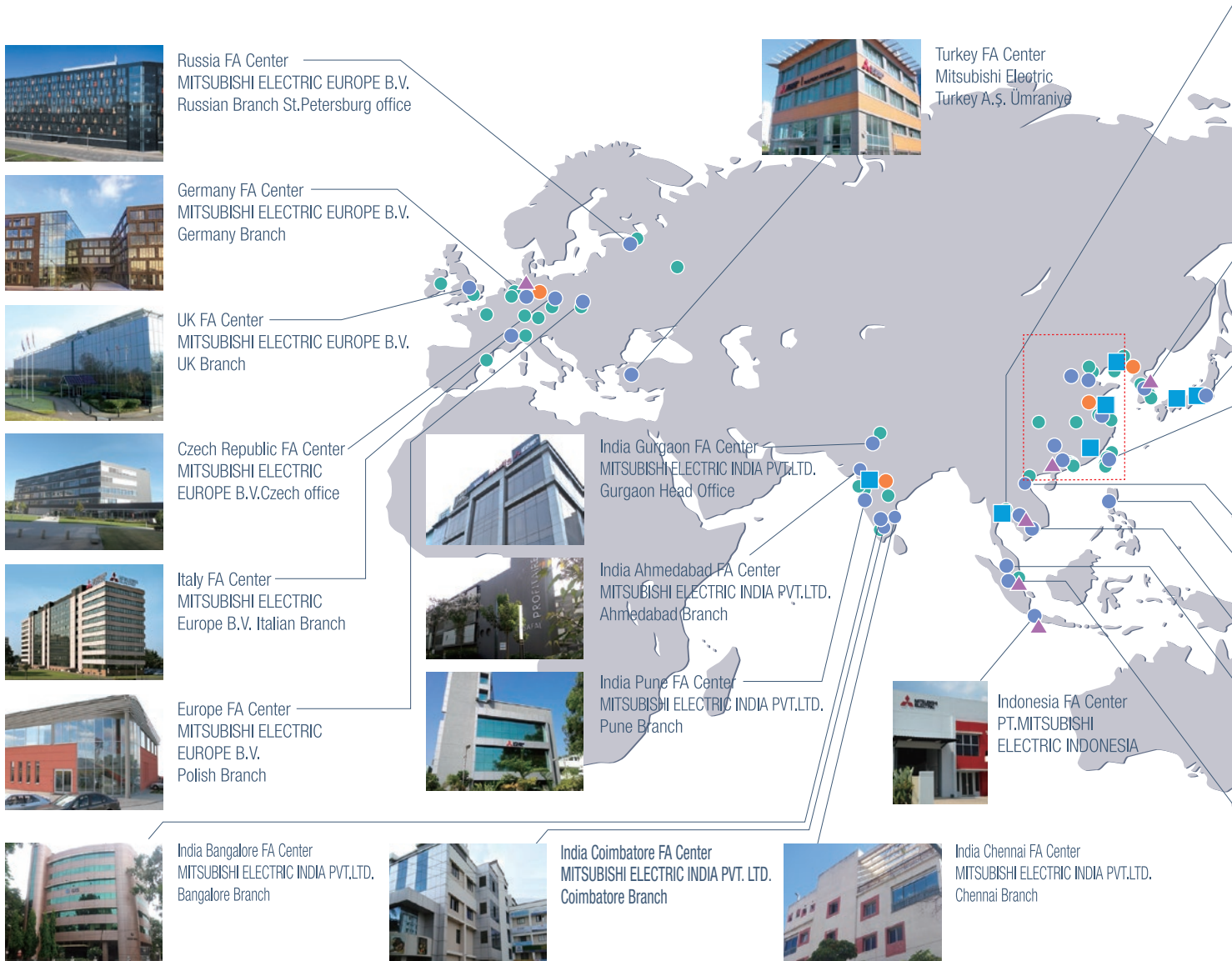
MEMO

MEMO

MEMO

Mitsubishi Electric's global FA network delivers reliable technologies and security around the world.

■ Production base
 ● Development center
 ● Global FA Center
 ▲ Mechatronics showroom
 ● Mitsubishi Electric sales office



Production bases Under the lead of Nagoya Works, we form a powerful network to optimize our manufacturing processes.

Domestic bases

Nagoya Works



Shinshiro Factory
Kani Factory

Production bases overseas

MDI Mitsubishi Electric Dalian Industrial Products Co., Ltd.



MEAMC Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd.

MEATH Mitsubishi Electric Automation (Thailand) Co., Ltd.

MEI Mitsubishi Electric India Pvt.



Thailand FA Center
MITSUBISHI ELECTRIC FACTORY
AUTOMATION (THAILAND) CO.,LTD



Korea FA Center
MITSUBISHI ELECTRIC
AUTOMATION KOREA CO.,LTD.



MITSUBISHI ELECTRIC CORPORATION
Factory Automation Systems Group



Taichung FA Center
MITSUBISHI ELECTRIC
TAIWAN CO.,LTD



Taipei FA Center
SETSUYO ENTERPRISE CO.,LTD



Philippines FA Center
MELCO FACTORY AUTOMATION
PHILIPPINES INC.



Malaysia FA Center



ASEAN FA Center
MITSUBISHI ELECTRIC
ASIA PTE.LTD.



Beijing FA Center
MITSUBISHI ELECTRIC
AUTOMATION (CHINA)



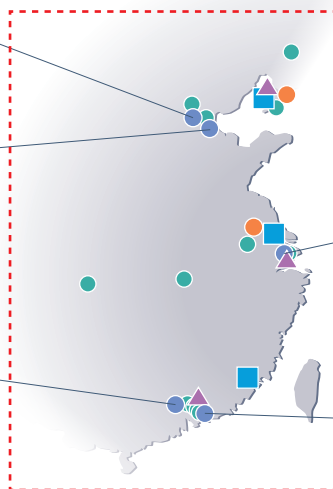
Tianjin FA Center
MITSUBISHI ELECTRIC
AUTOMATION (CHINA)



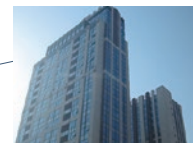
Guangzhou FA Center
MITSUBISHI ELECTRIC
AUTOMATION (CHINA)LTD.



China



Shanghai FA Center
MITSUBISHI ELECTRIC
AUTOMATION (CHINA) LTD.



Shenzhen FA Center
MITSUBISHI ELECTRIC
AUTOMATION (CHINA) LTD.



Service bases are established around the world to provide the same services as in Japan globally. Overseas bases are opening one after another to support our customers' business expansion.

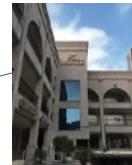
Area	Our overseas	FA centers
EMEA	39	7
China	25	4
Asia	49	16
Americas	19	6
Total	132	33

*As of March 2021

North America FA Center
MITSUBISHI ELECTRIC
AUTOMATION,INC.



Mexico Monterrey FA Center
Monterrey Office, Mitsubishi
Electric Automation, Inc.



Mexico FA Center
Querétaro Office, Mitsubishi
Electric Automation, Inc.



Mexico City FA Center
Mexico FA Center
Mexico Branch, Mitsubishi
Electric Automation, Inc.



Brazil FA Center
Mitsubishi Electric do Brasil
Comércio e Serviços Ltda.



Brazil Votorantim FA Center
MELCO CNC do Brasil
Comércio e Serviços S.A.

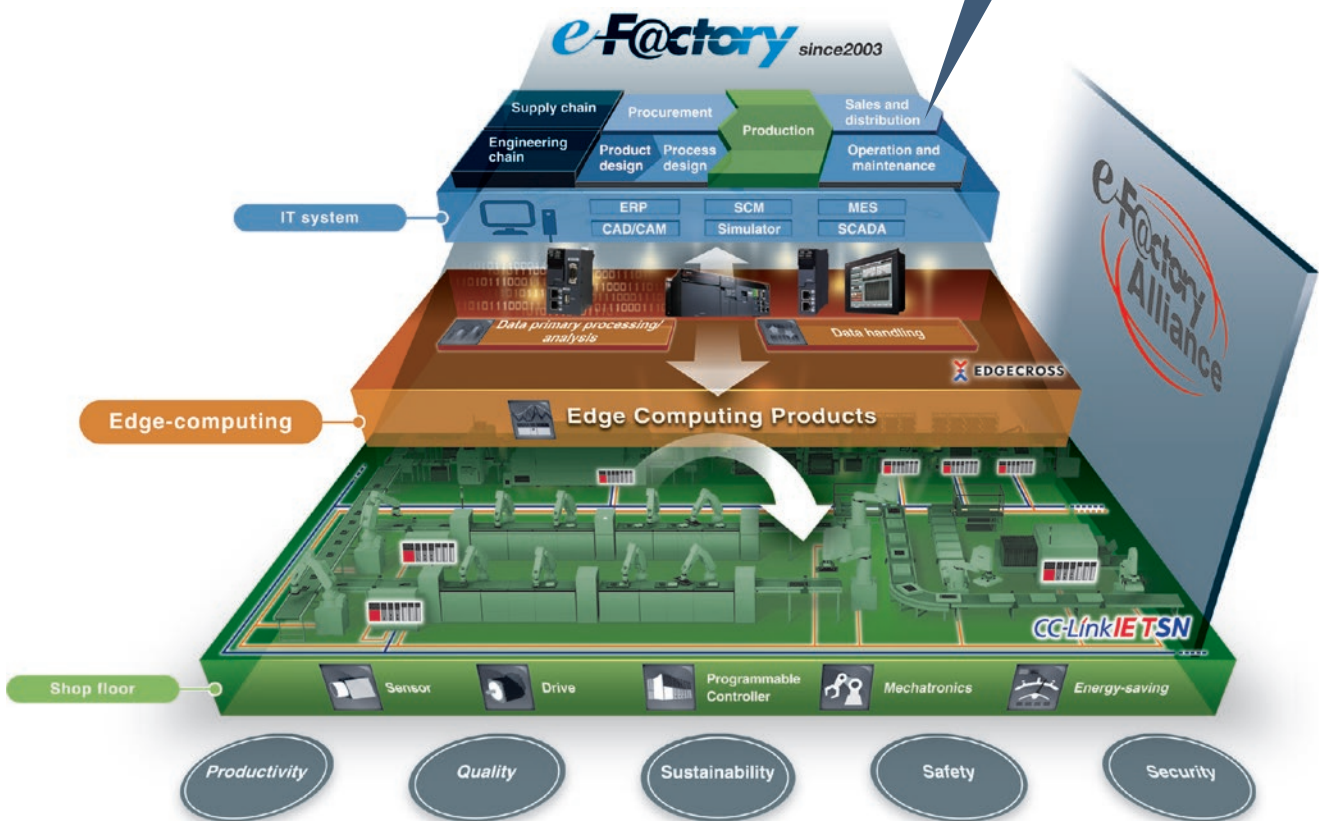
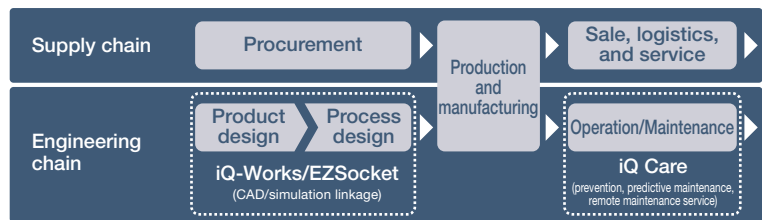


This solution solves customers' issues and concerns by enabling visualization and analysis that lead to improvements and increase availability at production sites.

Utilizing our FA and IT technologies and collaborating with e-F@ctory Alliance partners, we reduce the total cost across the entire supply chain and engineering chain, and support the improvement initiatives and one-step-ahead manufacturing of our customers.

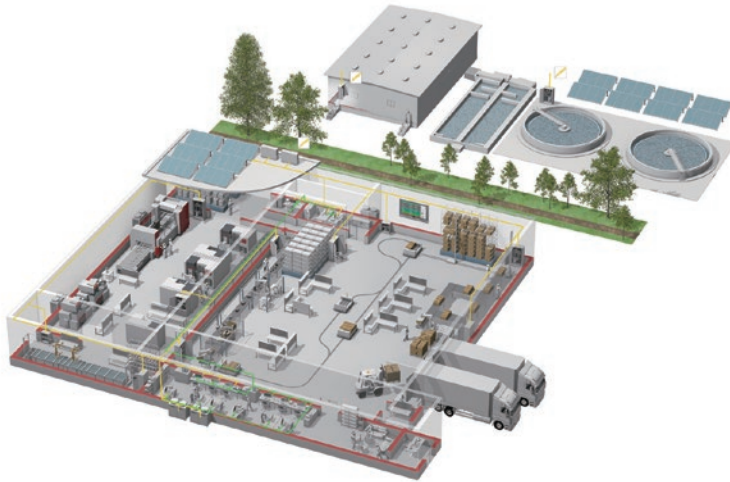


FA integrated solutions reduce total cost



Overall production information is captured in addition to energy information, enabling the realization of efficient production and energy use (energy savings).

YOUR SOLUTION PARTNER



Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation, established in 1921, is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 183 factories, laboratories and offices worldwide in over 140 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over \$40 billion), employing over 146,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.



Low-voltage Power Distribution Products



Transformers, Med-voltage Distribution Products



Power Monitoring and Energy Saving Products



Power (UPS) and Environmental Products



Compact and Modular Controllers



Servos, Motors and Inverters



Visualization: HMIs



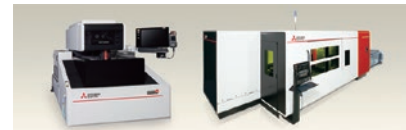
Edge Computing Products



Numerical Control (NC)



Collaborative and Industrial Robots



Processing machines: EDM, Lasers

* Not all products are available in all countries.

mitsubishi electric corporation

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