Chapter 4 Wiring

After removing the front cover, verify that the power and control terminals are clearly noted. Read the following precautions before wiring.

- ☑ **Turn off the AC motor drive power** before doing any wiring. A charge with hazardous voltages may remain in the DC bus capacitors even after the power has been turned off for a short time. Measure the remaining voltage with a DC voltmeter on +1/DC+ and DC- before doing any wiring. For your safety, do not start wiring before the voltage drops to a safe level (less than 25 V_{DC}). Installing wiring with a residual voltage may cause personal injury, sparks and short circuit.
- ☑ Only qualified personnel familiar with AC motor drives are allowed to perform installation, wiring and commissioning. Make sure the power is turned off before wiring to prevent electric shock.
- ☑ Make sure that power is only applied to the R/L1, S/L2 and T/L3 terminals. Failure to comply may result in damage to the equipment. The voltage and current must be in the range indicated on the nameplate (refer to Section 1-1 Nameplate Information for details).
- ☑ All units must be grounded directly to a common ground terminal to prevent damage from a lightning strike or electric shock and reduce noise interference.
- ☑ Tighten the screws of the main circuit terminals to prevent sparks caused by screws loosened due to vibration.

- ☑ For your safety, choose wires that comply with local regulations when wiring.
- ☑ Check the following items after finishing the wiring:
  1. Are all connections correct?
  2. Are there any loose wires?
  3. Are there any short circuits between the terminals or to ground?

4-1 System Wiring Diagram

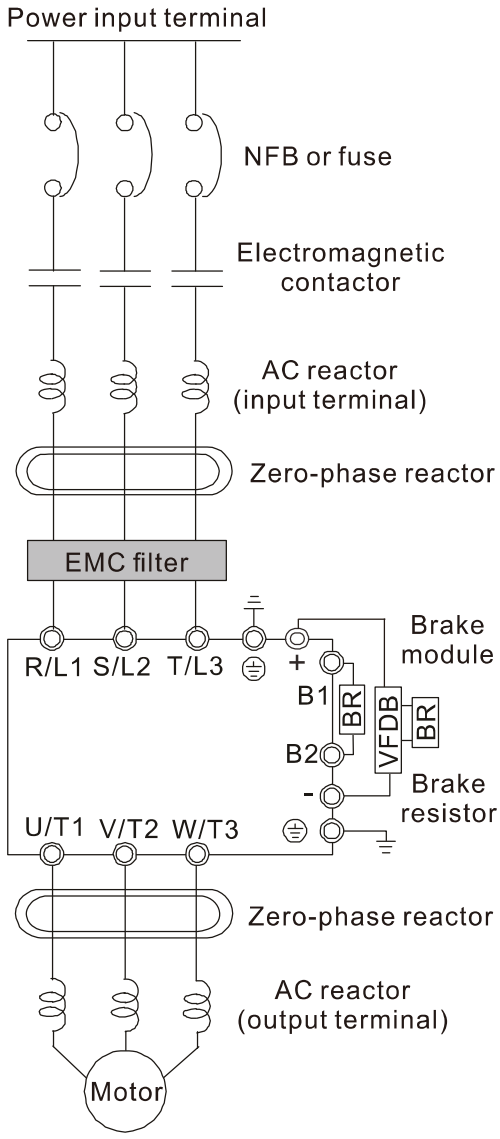

Figure 4-1

Note: Please refer to Section 4-2 Wiring Diagram for detailed wiring information.

Power input terminal	Supply power according to the rated power specifications indicated in the manual (refer to Chapter 9 Specification).
NFB or fuse	There may be a large inrush current during power on. Refer to Section 7-2 NFB to select a suitable NFB or Section 7-3 Fuse Specification Chart.
Electromagnetic contactor	Switching the power ON/OFF on the primary side of the electromagnetic contactor can turn the drive ON/OFF, but frequent switching can cause machine failure. Do not switch ON/OFF more than once an hour. Do not use the electromagnetic contactor as the power switch for the drive; doing so shortens the life of the drive. Refer to Section 7-2 Magnetic Contactor / Air Circuit Breaker to select the electromagnetic contactor that meets your requirement.
AC reactor (input terminal)	When the mains power supply capacity is greater than 500 kVA, or when it switches into the phase capacitor, the instantaneous peak voltage and current generated may destroy the internal circuit of the drive. It is recommended that you install an input side AC reactor in the drive. This also improves the power factor and reduces power harmonics. The wiring distance should be within 10 m. Refer to Section 7-4 AC / DC Reactor for details. Refer to Chapter 7-4.
Zero phase reactor	Used to reduce radiated interference, especially in environments with audio devices, and reduce input and output side interference. The effective range is AM band to 10 MHz. Refer to Section 7-5 Zero Phase Reactors for details.
EMC filter	Can be used to reduce electromagnetic interference. Refer to Section 7-6 EMC Filter for details.
Brake module & Brake resistor (BR)	Used to shorten the deceleration time of the motor. Refer to Section 7-1 Brake Resistors and Brake Units Used in AC Motor Drives for details.
AC reactor (output terminal)	The motor cable length affects the size of the reflected wave on the motor end. It is recommended that you install an AC output reactor when the motor wiring length exceeds the value listed in Section 7-4.

Table 4-1

4-2 Wiring

4-2-1 Wiring

Wiring Diagram for Frame A–C

Input: 3-phase power

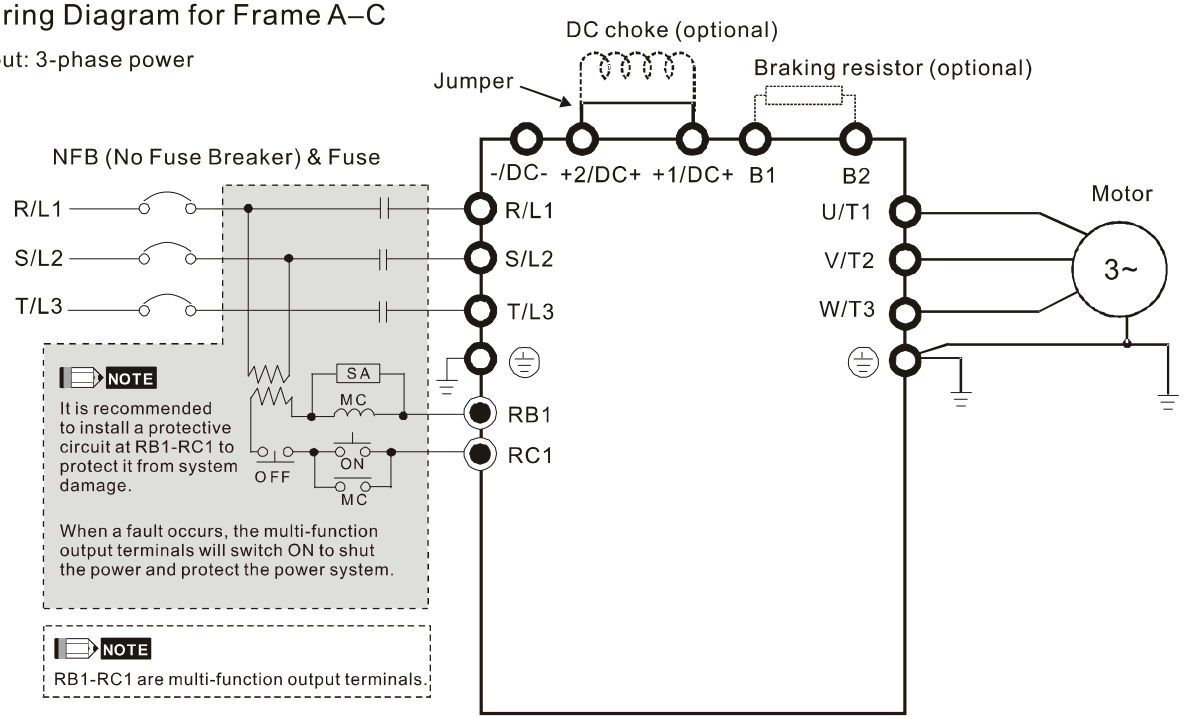

Figure 4-2

Wiring Diagram for Frame D–F

Input: 3-phase power

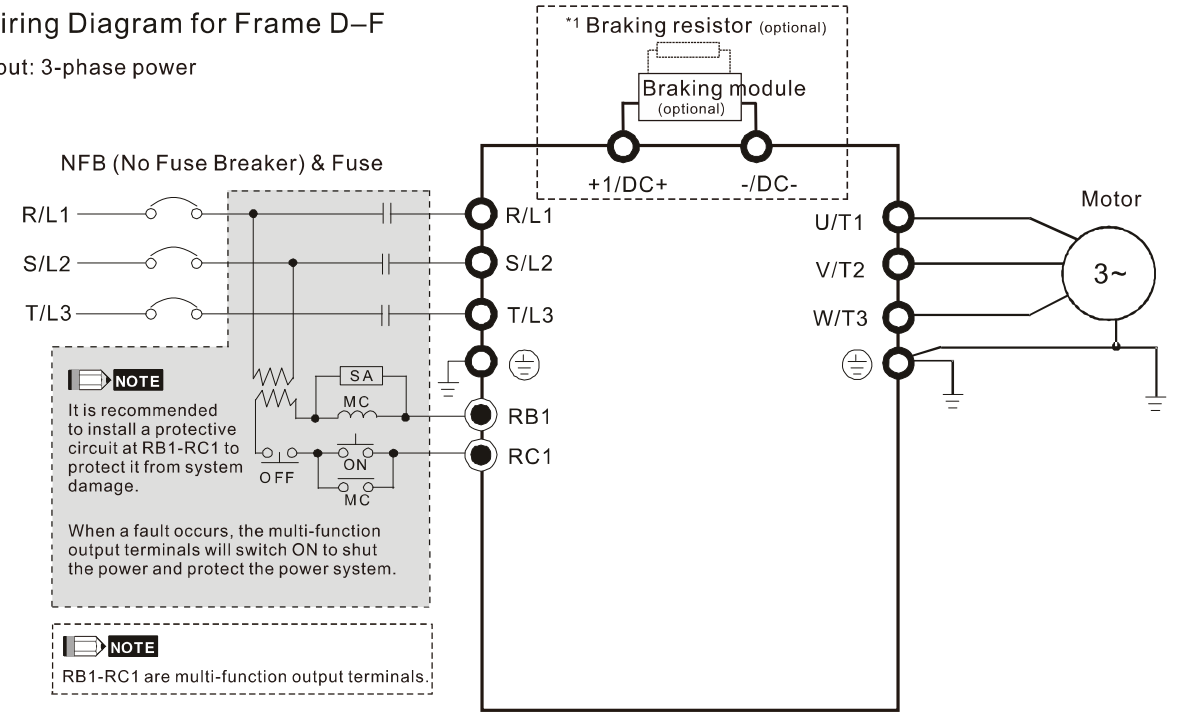

Figure 4-3

*1 Refer to Section 7-1 for brake units and resistors selection

Wiring Diagram for Frame G–H

Input: 12-pulse rectifier

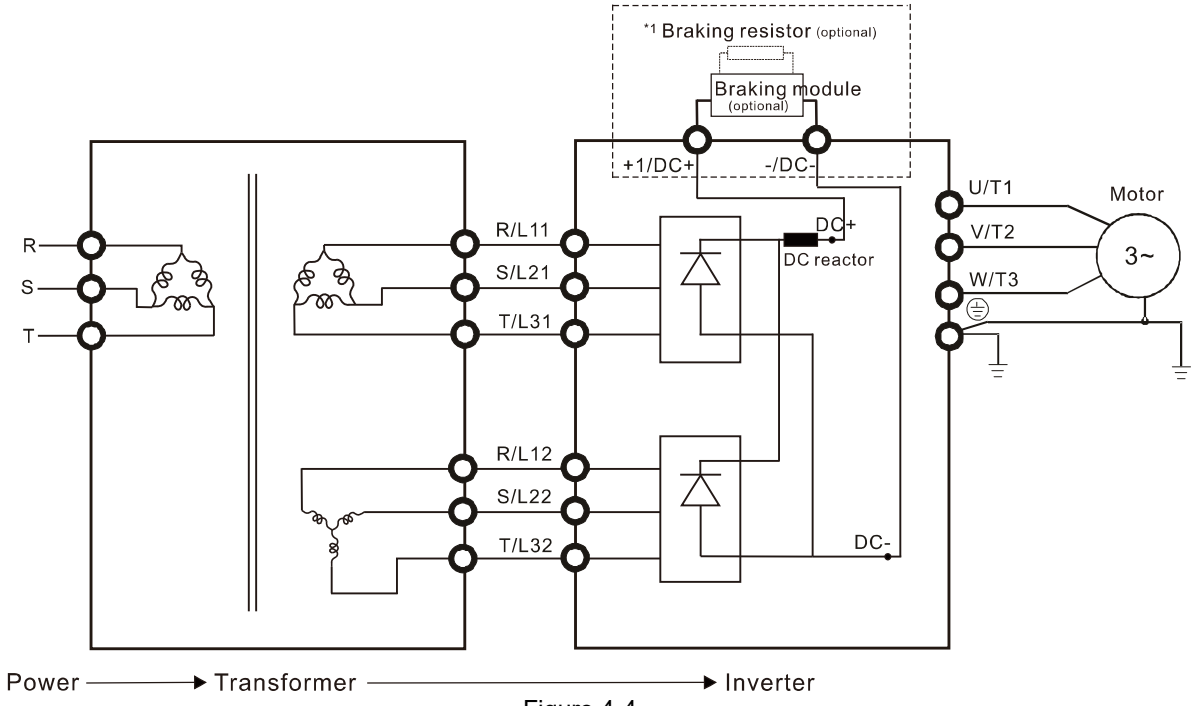

Figure 4-4

*1 Refer to Section 7-1 for brake units and resistors selection.

Note: When wiring for 12 Pulse Input, strictly follow above wiring diagram

Wiring Diagram for Frame A–H

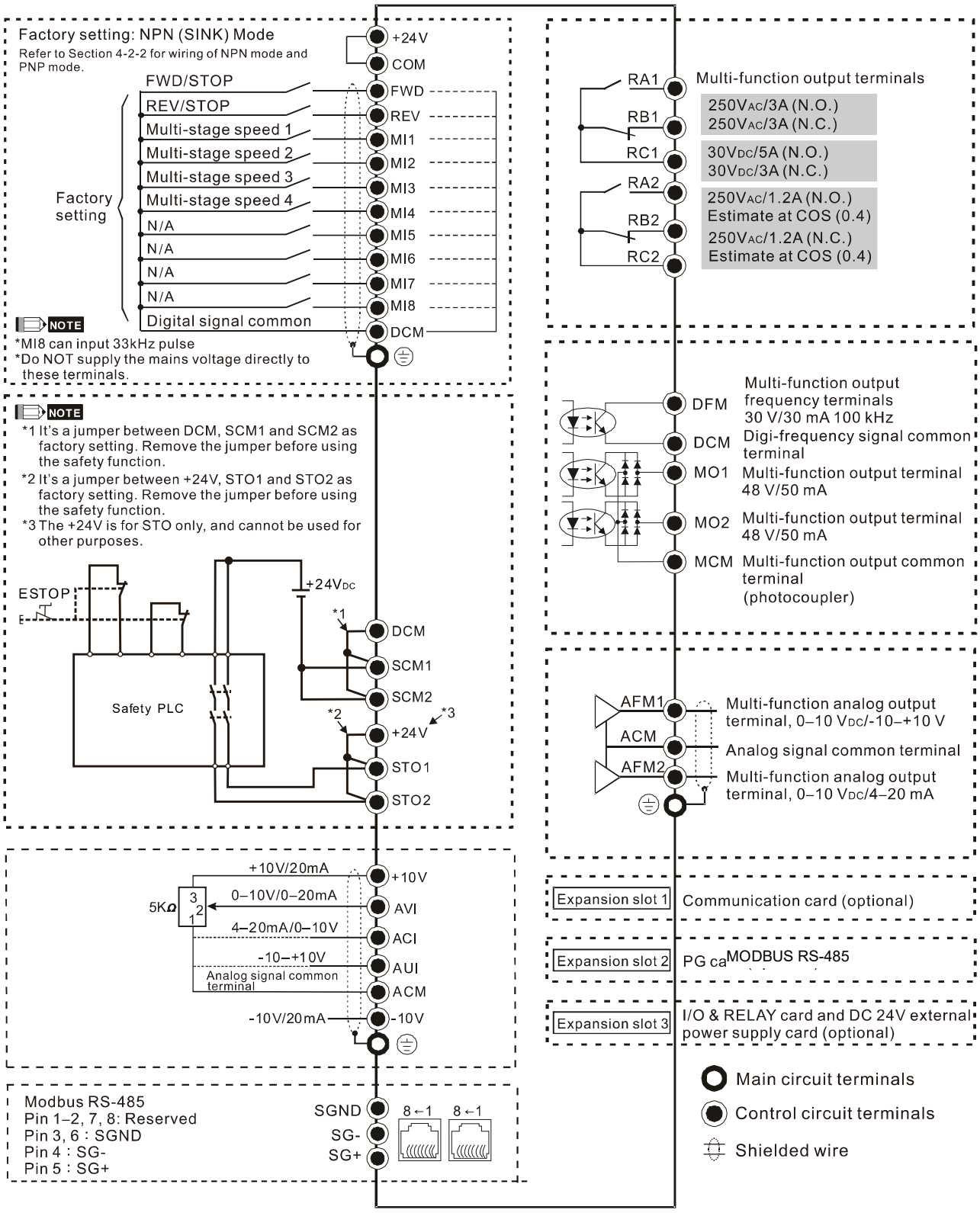

Figure 4-5

4-2-2 SINK (NPN) / SOURCE (PNP) Mode

① Sink Mode
with internal power (+24V$_{DC}$)

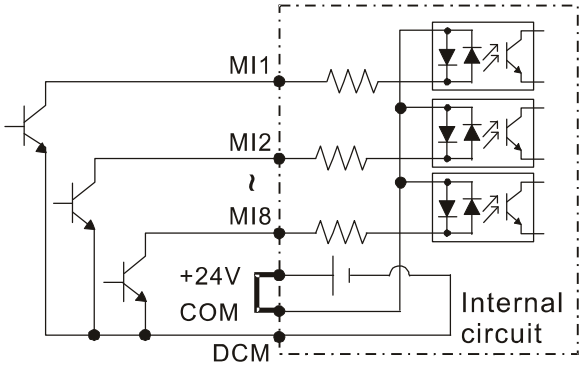

Figure 4-6

② Source Mode
with internal power (+24V$_{DC}$)

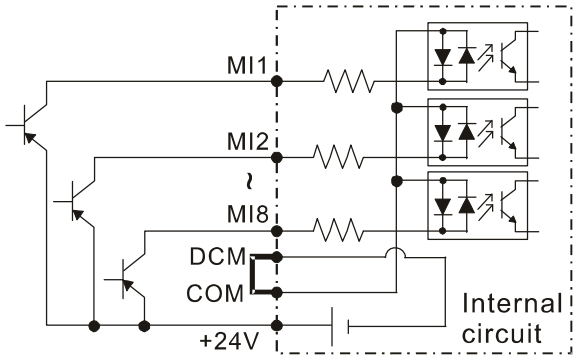

Figure 4-7

③ Sink Mode
with external power

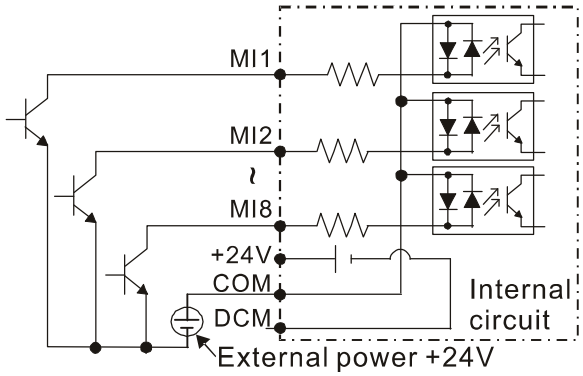

Figure 4-8

④ Source Mode
with external power

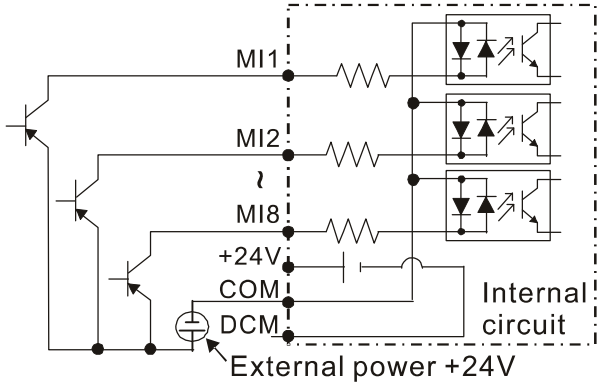

Figure 4-9