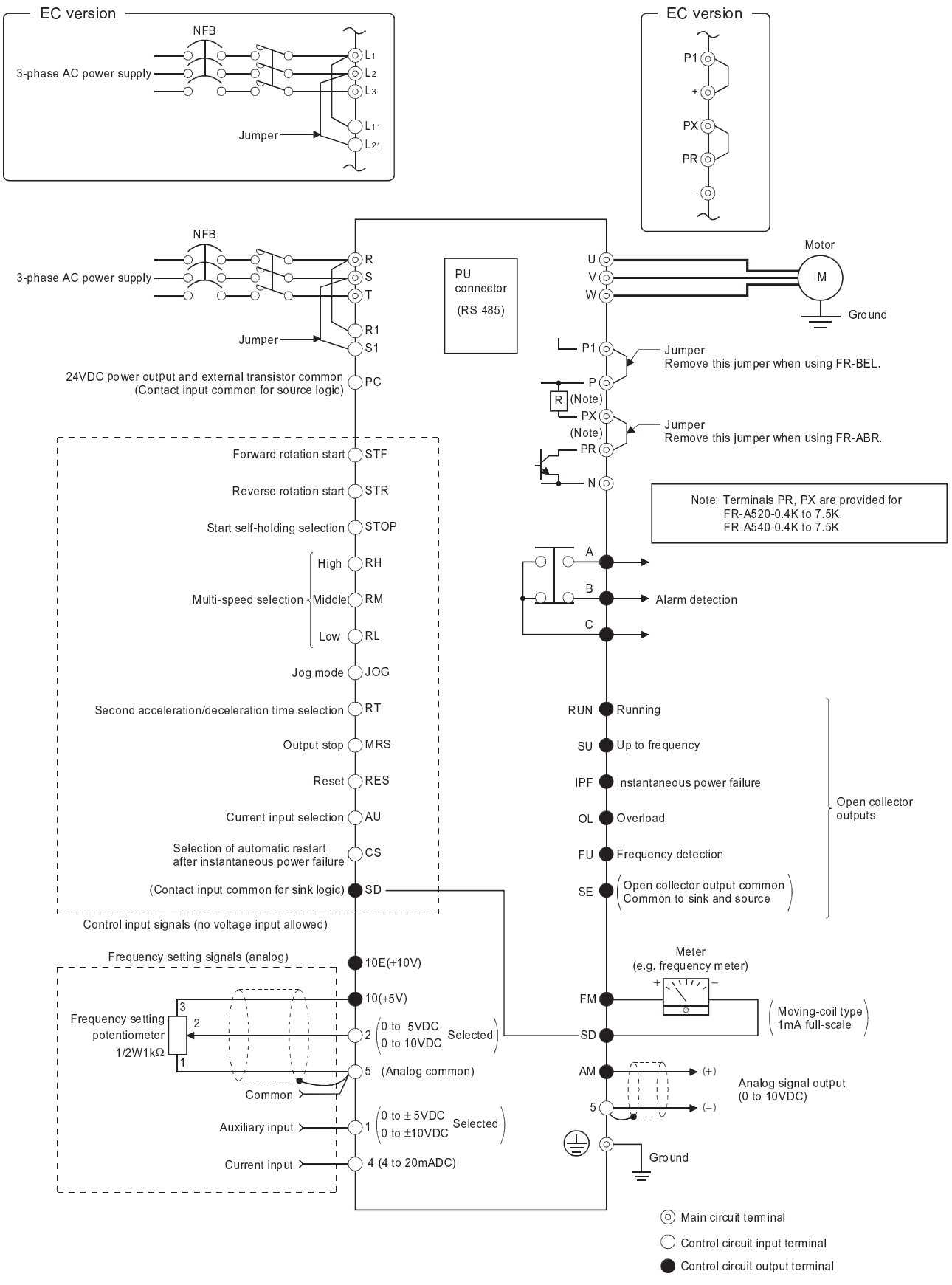
2.2 Wiring

2.2.1 Terminal connection diagram



(1) Description of main circuit terminals

Symbol	Terminal Name	Description
R, S, T ⟨L1, L2, L3⟩	AC power input	Connect to the commercial power supply. Keep these terminals unconnected when using the high power factor converter (FR-HC).
U, V, W	Inverter output	Connect a three-phase squirrel-cage motor.
R1, S1 ⟨L11, L21⟩	Power supply for control circuit	Connected to the AC power supply terminals R and S ⟨L1 and L2⟩. To retain the alarm display and alarm output or when using the high power factor converter (FR-HC), remove the jumpers from terminals R-R1 and S-S1 ⟨L1-L11 and L2-L21⟩ and apply external power to these terminals.
P, PR ⟨+, PR⟩	Brake resistor connection	Disconnect the jumper from terminals PR-PX and connect the optional brake resistor (FR-ABR) across terminals P-PR.
P, N ⟨+, −⟩	Brake unit connection	Connect the optional FR-BU brake unit, power return converter (FR-RC) or high power factor converter (FR-HC).
P, P1 ⟨+, P1⟩	Power factor improving DC reactor connection	Disconnect the jumper from terminals P-P1 ⟨+ -P1⟩ and connect the optional power factor improving reactor (FR-BEL).
PR, PX	Built-in brake circuit connection	When the jumper is connected across terminals PX-PR (factory setting), the built-in brake circuit is valid. (Provided for 7.5K or less.)
⏚	Ground	For grounding the inverter chassis. Must be earthed.

Note: ⟨ ⟩ Terminal names in parentheses are those of the EC version.

(2) Description of control circuit terminals

Type		Symbol	Terminal Name	Description	
Input signals	Contacts, e.g. start (STF), stop (STOP) etc.	STF	Forward rotation start	Turn on the STF signal to start forward rotation and turn it off to stop. Acts as a programmed operation start signal in the programmed operation mode. (Turn on to start and turn off to stop.)	When the STF and STR signals are turned on simultaneously, the stop command is given.
		STR	Reverse rotation start	Turn on the STR signal to start reverse rotation and turn it off to stop.	
		STOP	Start self-holding selection	Turn on the STOP signal to select the self-holding of the start signal.	
		RH•RM•RL	Multi-speed selection	Use the RH, RM and RL signals as appropriate to select multiple speeds.	Input terminal function selection (Pr. 180 to Pr. 186) change terminal functions.
		JOG	JOG mode selection	Turn on the JOG signal to select jog operation (factory setting). Jog operation can be performed with the start signal (STF or STR).	
		RT	Second acceleration/ deceleration time selection	Turn on the RT signal to select the second acceleration/ deceleration time. When the second functions such as "second torque boost" and "second V/F (base frequency)" functions have been set, these functions can also be selected by turning on the RT signal.	
		MRS	Output stop	Turn on the MRS signal (20ms or longer) to stop the inverter output. Used to shut off the inverter output to bring the motor to a stop by the magnetic brake.	
		RES	Reset	Used to reset the protective circuit activated. Turn on the RES signal for more than 0.1 second, then turn it off.	
		AU	Current input selection	Only when the AU signal is turned on, the inverter can be operated with the 4-20mADC frequency setting signal.	Input terminal function selection (Pr. 180 to Pr. 186) change terminal functions.
		CS	Automatic restart after instantaneous power failure selection	With the CS signal on, restart can be made automatically when the power is restored after an instantaneous power failure. Note that this operation requires restart parameters to be set. When the inverter is shipped from the factory, it is set to disallow restart.	
		SD	Contact input common (sink)	Common to the contact input terminals and terminal FM. Common output terminal for 24VDC 0.1A power (PC terminal).	
		PC	24VDC power and external transistor common Contact input common (source)	When transistor output (open collector output), such as a programmable controller, is connected, connect the external power supply common for transistor output to this terminal to prevent a fault caused by leakage current. This terminal can be used as a 24VDC, 0.1A power output. When source logic has been selected, this terminal serves as a contact input common.	

Type		Symbol	Terminal Name	Description		
Input signals	Analog frequency setting	10E	Frequency setting power supply	10VDC, permissible load current 10mA	When the frequency setting potentiometer is connected in the factory-set state, connect it to terminal 10. When it is connected to terminal 10E, change the input specifications of terminal 2.	
		10		5VDC, permissible load current 10mA		
		2	Frequency setting (voltage)	By entering 0 to 5VDC (0 to 10VDC), the maximum output frequency is reached at 5V (or 10V) and I/O are proportional. Switch between input 0 to 5VDC (factory setting) and 0 to 10VDC from the operation panel. Input resistance 10kΩ. Maximum permissible voltage 20V.		
		4	Frequency setting (current)	By entering 4 to 20mADC, the maximum output frequency is reached at 20mA and I/O are proportional. This input signal is valid only when the AU signal is on. Input resistance 250Ω. Maximum permissible current 30mA.		
		1	Auxiliary frequency setting	By entering 0 to ±5VDC 0 to ±10VDC, this signal is added to the frequency setting signal of terminal 2 or 4. Switch between input 0 to ±5VDC and 0 to ±10VDC (factory setting) from the operation panel. Input resistance 10kΩ. Maximum permissible voltage ±20V.		
		5	Frequency setting input common	Common to the frequency setting signal (terminal 2, 1 or 4) and analog output terminal AM. Do not earth.		
Output signals	Contact	A, B, C	Alarm output	Change-over contact output indicating that the output has been stopped by the inverter protective function activated. 200VAC 0.3A, 30VDC 0.3A. Alarm: discontinuity across B-C (continuity across A-C), normal: continuity across B-C (discontinuity across A-C).		Output terminal function selection (Pr. 190 to Pr. 195) change terminal functions.
	Open collector	RUN	Inverter running	Switched low when the inverter output frequency is equal to or higher than the starting frequency (factory set to 0.5Hz, variable). Switched high during stop or DC dynamic brake operation (*2). Permissible load 24VDC 0.1A.		
		SU	Up to frequency	Switched low when the output frequency has reached within ±10% of the set frequency (factory setting, variable). Switched high during acceleration, deceleration or stop (*2). Permissible load 24VDC 0.1A.		
		OL	Overload alarm	Switched low when the stall prevention function has caused stall prevention to be activated. Switched high when stall prevention is reset (*2). Permissible load 24VDC 0.1A.		
		IPF	Instantaneous power failure	Switched low when instantaneous power failure or undervoltage protection is activated (*2). Permissible load 24VDC 0.1A.		
		FU	Frequency detection	Switched low when the output frequency has reached or exceeded the detection frequency set as appropriate. Switched high when below the detection frequency (*2). Permissible load 24VDC 0.1A		
		SE	Open collector output common	Common to the RUN, SU, OL, IPF and FU terminals.		
	Pulse	FM	For meter	One selected from 16 monitoring items, such as output frequency, is output. (*3)	Factory setting of output item: Frequency Permissible load current 1mA 1440 pulses/second at 60Hz	
	Analog	AM	Analog signal output	The output signal is proportional to the magnitude of each monitoring item.	Factory setting of output item: Frequency Output signal 0 to 10VDC Permissible load current 1mA	
Communication	RS-485	——	PU connector	With the operation panel connector, communication can be made through RS-485. · Conforming Standard : EIA Standard RS-485 · Transmission format : Multi-drop link · Communication speed : Maximum 19200 baud rates · Overall length : 500m		

*1: Terminals PR and PX are provided for the FR-A520-0.4K to 7.5K, FR-A540-0.4K to 7.5K.

*2: Low indicates that the open collector outputting transistor is on (conducts). High indicates that the transistor is off (does not conduct).

*3: Not output while the inverter is reset.