

## VFD - D700 Series Specifications

The latest low-cost variable speed control solution for **centrifugal pumps**.



- Built-in PID Control to maintain pressure, flow, measured value, and much more
- 125% overload protection for 130 seconds, 150% overload protection for 60 seconds, 200% overload protection for 3 seconds,
- Available in single-phase 115V supply power up to 1HP
- Available in single-phase 240V supply power up to 3HP
- Available in three-phase 240V and 480V supply power up to 10HP
- Internal power supply: 24VDC up to 100mA
- General-purpose Magnetic Flux Vector Control for improved starting torque and smooth low speed motor operation
- Output frequency range of 0.2 to 400Hz
- Standard RS485 serial communications supporting Modbus<sup>®</sup> RTU
- Password protected for “Read” & “Write”
- Supports remote I/O function via network
- Delivers rated current at 50°C and 14.5kHz carrier frequency with minimal de-rating
- 0 to 10V analog output
- Standard 5-year warranty

## D700 Selection & Dimensions

Output Amps	HP	Model Number	Dimensions in inches (mm)			Weight Lbs (kg)	Stock
			Height	Width	Depth		
1-Phase 100~120VAC Input / 3-Phase 200-230VAC Output							
0.8	1/8	FR-D710W-008-NA	5.0 (128)	2.7 (68)	3.2 (81)	1.1 (0.5)	S
1.4	1/4	FR-D710W-014-NA	5.0 (128)	2.7 (68)	4.4 (113)	1.3 (0.6)	S
2.5	1/2	FR-D710W-025-NA	5.0 (128)	2.7 (68)	5.6 (143)	2.0 (0.9)	S
4.2	1	FR-D710W-042-NA	5.0 (128)	6.7 (170)	5.9 (150)	3.8 (1.7)	S

Output Amps	HP	Model Number	Dimensions in inches (mm)			Weight Lbs (kg)	Stock
			Height	Width	Depth		
1-Phase 200~240VAC Input / 3-Phase 200-230VAC Output							
0.8	1/8	FR-D720S-008-NA	5.0 (128)	2.7 (68)	3.2 (81)	1.1 (0.5)	S
1.4	1/4	FR-D720S-014-NA	5.0 (128)	2.7 (68)	3.2 (81)	1.3 (0.6)	S
2.5	1/2	FR-D720S-025-NA	5.0 (128)	2.7 (68)	5.6 (143)	2.0 (0.9)	S
4.2	1	FR-D720S-042-NA	5.0 (128)	2.7 (68)	6.5 (163)	2.5 (1.1)	S
7.0	2	FR-D720S-070-NA	5.0 (128)	4.3 (108)	6.2 (156)	3.3 (1.5)	S
10	3	FR-D720S-100-NA	5.9 (150)	5.5 (140)	5.7 (145)	4.2 (1.9)	S
3-Phase 200~240VAC Input & Output							
0.8	1/8	FR-D720-008-NA	5.0 (128)	2.7 (68)	3.2 (81)	1.1 (0.5)	S
1.4	1/4	FR-D720-014-NA	5.0 (128)	2.7 (68)	3.2 (81)	1.1 (0.5)	S
2.5	1/2	FR-D720-025-NA	5.0 (128)	2.7 (68)	4.4 (113)	1.8 (0.8)	S
4.2	1	FR-D720-042-NA	5.0 (128)	2.7 (68)	5.2 (133)	2.2 (1.0)	S
7.0	2	FR-D720-070-NA	5.0 (128)	4.3 (108)	5.3 (136)	3.1 (1.4)	S
10	3	FR-D720-100-NA	5.0 (128)	4.3 (108)	5.3 (136)	3.1 (1.4)	S
16.5	5	FR-D720-165-NA	5.0 (128)	6.7 (170)	5.6 (143)	3.8 (1.7)	S
23.8	7 1/2	FR-D720-238-NA	5.9 (150)	8.7 (220)	6.1 (155)	7.5 (3.4)	S
31.8	10	FR-D720-318-NA	5.9 (150)	8.7 (220)	6.1 (155)	7.5 (3.4)	S
3-Phase 380~480VAC Input & Output							
1.2	1/2	FR-D740-012-NA	5.0 (128)	4.3 (108)	5.1 (130)	2.7 (1.2)	S
2.2	1	FR-D740-022-NA	5.0 (128)	4.3 (108)	5.1 (130)	2.7 (1.2)	S
3.6	2	FR-D740-036-NA	5.0 (128)	4.3 (108)	5.4 (136)	2.9 (1.3)	S
5	3	FR-D740-050-NA	5.0 (128)	4.3 (108)	6.2 (156)	3.1 (1.4)	S
8	5	FR-D740-080-NA	5.0 (128)	4.3 (108)	6.6 (166)	3.3 (1.5)	S
12	7 1/2	FR-D740-120-NA	5.9 (150)	8.7 (220)	6.1 (155)	6.9 (3.1)	S
16	10	FR-D740-160-NA	5.9 (150)	8.7 (220)	6.1 (155)	6.9 (3.1)	S

# D700 Series General Specifications

Control Specifications	Control Method		Soft-PWM control/high carrier frequency PWM control (V/F control, general-purpose magnetic flux vector control, optimum excitation control can be selected)
	Output Frequency Range		0.2 to 400Hz
	Frequency Setting Resolution	Analog Input	0.06Hz/60Hz (terminal2, 4: 0 to 10V/10bit) 0.12Hz/60Hz (terminal2, 4: 0 to 5V/9bit) 0.06Hz/60Hz (terminal4: 4 to 20mA/10bit)
		Digital Input	0.01Hz
	Frequency Accuracy	Analog Input	Within $\pm 1\%$ of the max. output frequency (25°C $\pm 10^\circ\text{C}$ )
		Digital Input	Within 0.01% of the set output frequency
	Voltage/Frequency Characteristics		Base frequency can be set from 0 to 400Hz Constant torque/variable torque pattern can be selected
	Starting Torque		150% or more (at 1Hz) when general-purpose magnetic flux vector control and slip compensation is set
	Torque Boost		Manual torque boost
	Acceleration/Deceleration Time Setting		0.1 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode can be selected.
	DC Injection Brake		Operation frequency (0 to 120Hz), operation time (0 to 10s), operation voltage (0 to 30%) variable
	Stall Prevention Operation Level		Operation current level can be set (0 to 200% adjustable), whether to use the function or not can be selected
Operation Specifications	Frequency Setting Signal	Analog Input	<u>Two points</u> Terminal 2: 0 to 10V, 0 to 5V can be selected Terminal 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected
		Digital Input	Entered from operation panel and parameter unit. Frequency setting increments is selectable
	Start Signal		Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.
	Input Signal		<u>Five points</u> You can select from among multi-speed selection, remote setting, second function selection, terminal 4 input selection, JOG operation selection, PID control valid terminal, external thermal input, PU-external operation switchover, V/F switchover, output stop, start

			self-holding selection, traverse function selection, forward rotation, reverse rotation command, inverter reset, PU-NET operation switchover, external-NET operation switchover, command source switchover, inverter operation enable signal, and PU operation external interlock	
	Operational Functions		Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, automatic restart after instantaneous power failure operation, forward/reverse rotation prevention, remote setting, second function, multi-speed operation, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, PID control, computer link operation (RS-485), optimum excitation control, power failure stop, speed smoothing control, Modbus-RTU	
	Output Signal	Output Signal Points	Open Collector Output	One point
			Relay Output	One point
		Operating Status		You can select from among inverter operation, up-to-frequency, overload alarm, output frequency detection, regenerative brake pre-alarm, electronic thermal relay function pre-alarm, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward/reverse rotation output, brake opening request, fan alarm*2, heatsink overheat pre-alarm, deceleration at an instantaneous power failure, PID control activated, PID output interruption, during retry, life alarm, current average value monitor, remote output, alarm output, fault output, fault output 3, and maintenance timer alarm
		For Meter Output Points	Pulse Output	MAX 2.4kHz: one point
		For Meter		You can select from among output frequency, motor current (steady), output voltage, frequency setting, converter output voltage, regenerative brake duty, electronic thermal relay function load factor, output current peak value, converter output voltage peak value, reference voltage output, motor load factor, PID set point, PID measured value, output power, PID deviation, motor thermal load factor, inverter thermal load factor, pulse train output (1440 pulses/full scale)
Indication	Operation Panel Parameter Unit (FR-PU07)	Operating Status	You can select from among output frequency, motor current (steady), output voltage, frequency setting, cumulative energization time, actual operation time, converter output voltage, regenerative brake duty, electronic thermal relay function load factor, output current peak value, converter output voltage peak value, motor load factor, PID set point, PID measured value, PID deviation, inverter I/O terminal monitor, output power, cumulative power, motor thermal load factor, and inverter thermal load factor, PTC thermistor resistance	

		<b>Fault Definition</b>	Fault definition is displayed when the fault occurs and the past 8 fault definitions (output voltage/current/frequency/cumulative energization time right before the fault occurs) are stored
	<b>Additional Display By The Parameter Unit (FR-PU04/FR-PU07) Only</b>	<b>Operating Status</b>	Not used
		<b>Fault Definition</b>	Output voltage/current/frequency/cumulative energization time immediately before the fault occurs
		<b>Interactive Guidance</b>	Function (help) for operation guide
<b>Protective &amp; Warning Function</b>			<u>Protective functions</u> Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, motor protection thermal operation, heatsink overheat, input phase failure (*4 *5), output side earth (ground) fault overcurrent at start (*4), output phase failure, external thermal relay operation (*4), PTC thermistor operation (*4), parameter error, PU disconnection, retry count excess (*4), CPU fault, brake transistor alarm, inrush resistance overheat, analog input error, stall prevention operation, output current detection value exceeded <u>Warning functions</u> Fan alarm (*2), overcurrent stall prevention, overvoltage stall prevention, PU stop, parameter write error, regenerative brake pre-alarm (*4), electronic thermal relay function pre-alarm, maintenance output (*4), undervoltage, operation panel lock, password locked, inverter reset
<b>Environment</b>	<b>Ambient Temperature</b>		-10°C to +50°C (14°F to 122°F) (non-freezing), -10°C to +40°C (14°F to 104°F) for totally-enclosed structure feature (*3)
	<b>Ambient Humidity</b>		90%RH maximum (non-condensing)
	<b>Storage Temperature (*1)</b>		-20°C to +65°C (-4°F to 149°F)
	<b>Atmosphere</b>		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt etc.)
	<b>Altitude/Vibration</b>		Maximum 1000m (3280.80 feet) above sea level, 5.9m/s <sup>2</sup> or less

**Notes:**

\*1. Temperatures applicable for a short time, e.g. in transit.

\*2. As the 0.75K or less is not provided with the cooling fan, this alarm does not function.

\*3. When using the inverters at the ambient temperature of 40°C (104°F) or less, the inverters can be installed closely attached (0cm clearance).

\*4. This protective function does not function in the initial status.

\*5. This protective function is available with the three-phase power input specification model only.

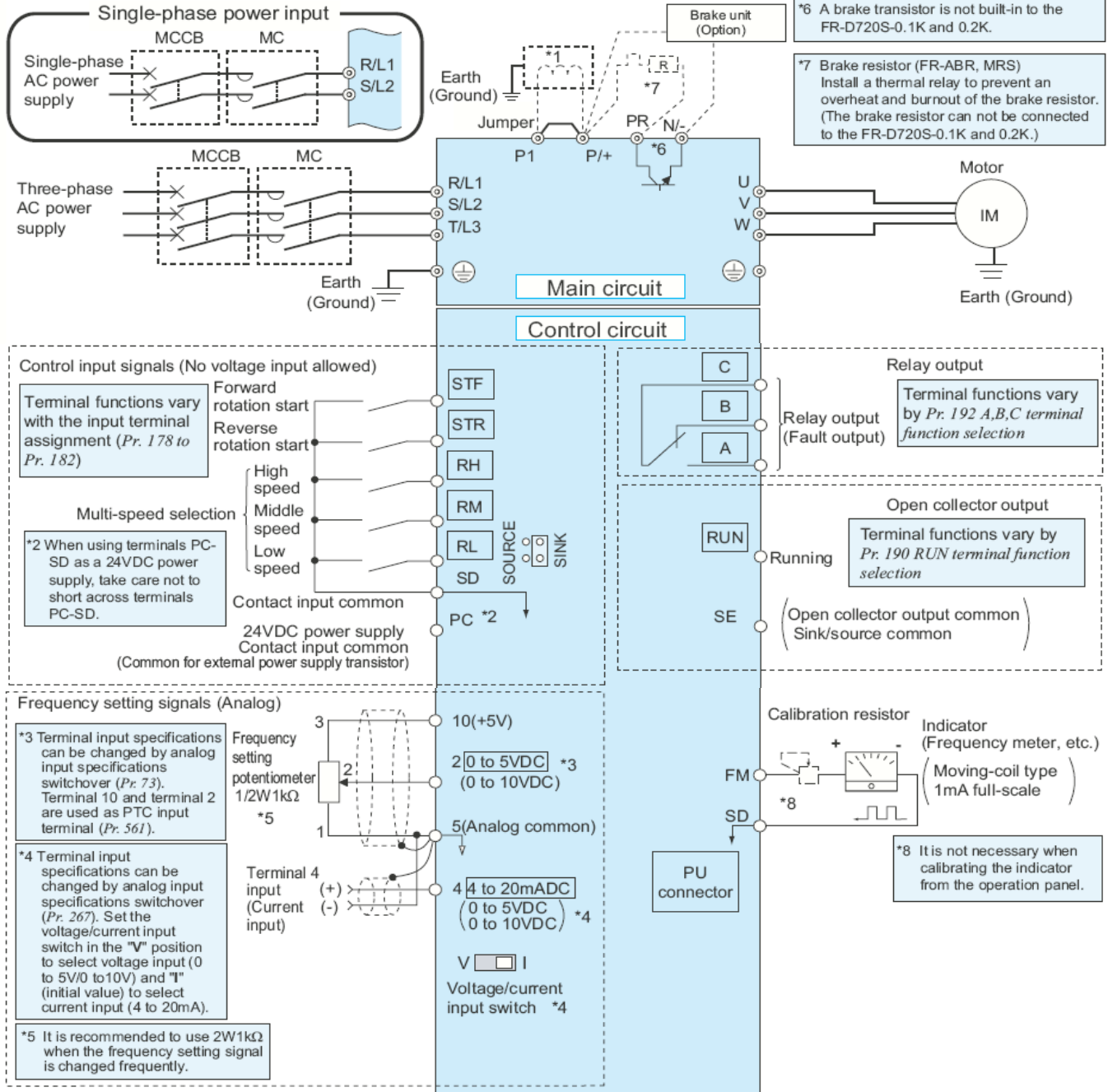
# Terminal Connection Diagram

- Three-Phase 200V power input
- Three-Phase 400V power input
- Single-Phase 115V power input
- Single-Phase 200V power input

Source logic

⊙ Main circuit terminal

○ Control circuit terminal



## NOTE

- To prevent a malfunction caused by noise, separate the signal cables more than 10cm (3.93inch) from the power cables. Also separate the main circuit wire of the input side and the output side.
- After wiring, wire offcuts must not be left in the inverter.
- Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.
- The output of the single-phase power input specification is three-phase 200V.