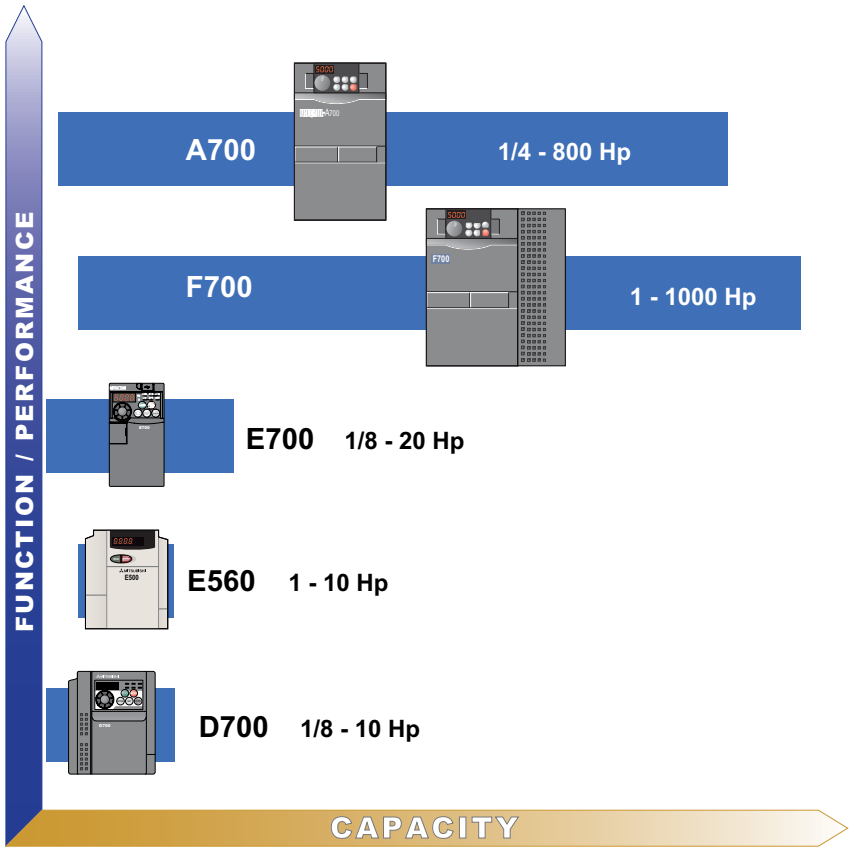
# Variable Frequency Drives






**Stock Product:** Stock product is product MEAU makes every effort to have on hand for immediate shipment. There may be instances when we are out of stock due to unexpected large requirements. All stock product will be indicated in this book by an "S" in the Stocked Item columns/rows.

**Non-Stock Product:** Non-stock product is product supplied on an "as-needed" basis. Standard lead times of 12 - 16 weeks apply, product is non-returnable and non-cancelable. Product listed as non-stock may change to stock product subject to increases in sales and usage. All non-stock product will be indicated in this book by a dash "-" in the Stocked Item columns/rows.

# Variable Frequency Drives Family

**Standard Features:**

- RS-485 serial communications (Mitsubishi VFD protocol)
- PID control
- Adjustable carrier frequency (Low Noise) up to 14.5kHz
- Soft PWM
- Packaged solutions available Setup Software available
- User selectable Sink (default) / Source I/O

| Model Series | | D700 | | | | E560 | E700 | | | | F700 | | A700 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage Range (VAC) | | 115 1Ø | 240 1Ø | 240 | 480 | 600 | 115 1Ø | 240 1Ø | 240 | 480 | 240 | 480 | 240 | 480 | 600 |
| HP Range | Constant Torque | 1/8~1 | 1/8~3 | 1/8~10 | 1/2~10 | 1~10 | 1/8~1 | 1/8~3 | 1/8~20 | 1/2~20 | 1~200 | 1~1000 | 1/2~125 | 1/2~800 | 1~650 |
| | Variable Torque | | | | | | | | | | | | 1~200 | 1~1000 | 2~850 |
| Control Algorithm | Open-Loop Flux Vector Speed | Yes | | | | Yes | Yes | | | | No | | Yes | | |
| | Open-Loop Torque | No | | | | No | No | | | | No | | Yes | | |
| | Closed-Loop Speed | No | | | | No | No | | | | No | | Yes | | |
| | Closed-Loop Torque | No | | | | No | No | | | | No | | Yes | | |
| | Closed-Loop Position | No | | | | No | No | | | | No | | Yes | | |
| Inputs | Digital Inputs | 5 (2 additional for Safety) | | | | 7 | 7 (expandable) | | | | 12 (expandable) | | 12 (expandable) | | |
| | 0~5 / 10VDC | Yes | | | | Yes | Yes | | | | No | | No | | |
| | 0~±5 / ±10VDC | No | | | | No | No | | | | Yes | | Yes | | |
| | 4~20mA | No | | | | Yes | No | | | | No | | No | | |
| | 4~20mA or 0~5/10VDC | Yes | | | | No | Yes | | | | Yes (2 ports) | | Yes (2 ports) | | |
| | Pulse (Speed) | No | | | | No | No | | | | No | | Yes | | |
| Outputs | Digital Outputs | 1 | | | | 2 | 2 (expandable) | | | | 5 (expandable) | | 5 (expandable) | | |
| | Relay Outputs | 1 | | | | 1 | 1 (expandable) | | | | 2 (expandable) | | 2 (expandable) | | |
| | 0~10VDC | Yes | | | | Yes | Yes | | | | Yes | | Yes (expandable) | | |
| | 0~20mA | No | | | | No | No | | | | Yes | | (optional) | | |
| | Pulse | No | | | | No | No | | | | No | | Yes | | |
| Communications | Modbus RTU | Standard | | | | No | Standard | | | | Standard | | Standard | | |
| | CC-Link | No | | | | Option | Option | | | | Option | | Option | | |
| | DeviceNet | No | | | | Option | Option | | | | Option | | Option | | |
| | Profibus-DP | No | | | | Option | Option | | | | Option | | Option | | |
| | LonWorks | No | | | | Option | Option | | | | Option | | Option | | |
| | SSCNETIII | No | | | | No | No | | | | No | | Option | | |
| | ControlNET | No | | | | No | No | | | | No | | Option | | |
| | Metasys N2 | Option | | | | Option | Option | | | | Option | | Option | | |
| | Siemens FLN | Option | | | | Option | Option | | | | Option | | Option | | |
| | BACnet/MSTP | Option | | | | Option | Option | | | | Option | | Option | | |
| | EtherNet/IP | Option | | | | Option | Option | | | | Option | | Option (2 types) | | |
| | Modbus TCP/IP | Option | | | | Option | Option | | | | Option | | Option | | |
| | BACnet/IP | No | | | | No | Option | | | | Option | | Option | | |
| Brake Transistor | | Yes (1/2HP and above) | | | | Yes | Yes (1/2HP and above) | | | | No | | Up to 30HP | | |
| Brake Resistor | | Option | | | | Option | Option | | | | No | | Up to 10HP | | Up to 5HP |
| EMC Filter | | Option | | | | No | Option | | | | Standard | | Standard | | No |
| DC Reactor | | Option | | | | No | Option | | | | Option (standard 100HP and above) | | | | |
| Safety Stop Function | | Standard | | | | No | Option | | | | No | | No | | |
| Communications Ports | | 1 (RS-485) | | | | 1 (RS485) | 2 (RS-485 & USB) | | | | 2 (RS-485) | | 3 (2x RS-485 & USB) | | |
| Plug-in Option Ports | | 0 | | | | 1 | 1 | | | | 1 | | 3 | | |
| Operator Interface | | Standard | | | | Option | Standard | | | | Standard | | Standard | | |
| Alpha/Numeric Keypad Option | | FR-PU07 | | | | FR-PU04 | FR-PU07 | | | | FR-PU07<br>FR-PU07-01 | | FR-PU07 | | |
| Alarm History | | Last 8 | | | | Last 8 | Last 8 | | | | Last 8 | | Last 8 | | |

# D700 Series

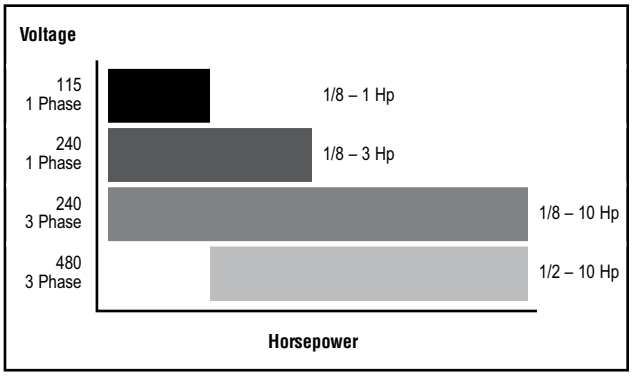
Low Cost Micro VFD with Mitsubishi Electric Quality.

- **Simple to Use:** The D700 is perfect for a wide range of applications
- **Simple to Set Up:** The integrated digital setting dial with display makes configuration fast and easy
- **Simple Operation:** Control remotely or with the built-in digital control
- **Simple to Choose:** Low cost and with Mitsubishi Electric quality ensuring long operation life
- Capacity from 1/8 to 10 HP
- Safety Stop function meets EN954-1 Category 3 and IEC60204-1 Stop Category 0
- Integrated brake chopper circuit
- Modbus RTU included as standard via the RJ45 port
- 150% torque at 1Hz and 200% torque at 3Hz using General-purpose Magnetic Flux Vector Control
- Optimum Excitation Control for increased energy savings when motor is not loaded
- Frequency Search Function for catching a spinning load
- Dancer Control allows position signal to control roll tension
- Password Function for parameter setting protection
- Internal diagnostics function for monitoring status of critical components
- RoHS compliant
- 10 year maintenance free design

## FR-D720 – 008 – NA

| Symbol | Voltage Class |
|---|---|
| D710W | Single-phase 115V class |
| D720S | Single-phase 240V class |
| D720 | Three-phase 240V class |
| D740 | Three-phase 480V class |

Inverter capacity amperage / 10 (008 = 0.8A output)




### D700 Series

| Rating (CT & VT) | | IP20 Open Chassis | Dimensions in inches (mm) | | | Weight Lbs (kg) | Stocked Item |
|---|---|---|---|---|---|---|---|
| HP | Rated Amps | Model Number | Height | Width | Depth | | |
| **1-Phase 100~120VAC Input / 3-Phase 200~240VAC Output** | | | | | | | |
| 1/8 | 0.8 | FR-D710W-008-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/4 | 1.4 | FR-D710W-014-NA | 5.0 (128) | 2.7 (68) | 4.4 (110.5) | 1.3 (0.6) | S |
| 1/2 | 2.5 | FR-D710W-025-NA | 5.0 (128) | 2.7 (68) | 5.6 (142.5) | 2.0 (0.9) | S |
| 1 | 4.2 | FR-D710W-042-NA | 5.0 (128) | 4.3 (108) | 5.9 (149.5) | 3.1 (1.4) | S |
| **1-Phase 200~240VAC Input / 3-Phase 200~240VAC Output** | | | | | | | |
| 1/8 | 0.8 | FR-D720S-008-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/4 | 1.4 | FR-D720S-014-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.3 (0.6) | S |
| 1/2 | 2.5 | FR-D720S-025-NA | 5.0 (128) | 2.7 (68) | 5.6 (142.5) | 2.0 (0.9) | S |
| 1 | 4.2 | FR-D720S-042-NA | 5.0 (128) | 2.7 (68) | 6.5 (162.5) | 2.5 (1.1) | S |
| 2 | 7 | FR-D720S-070-NA | 5.0 (128) | 4.3 (108) | 6.2 (155.5) | 3.3 (1.5) | S |
| 3 | 10 | FR-D720S-100-NA | 5.9 (150) | 5.5 (140) | 5.7 (145) | 4.4 (2.0) | S |
| **3-Phase 200~240VAC Input & Output** | | | | | | | |
| 1/8 | 0.8 | FR-D720-008-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/4 | 1.4 | FR-D720-014-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/2 | 2.5 | FR-D720-025-NA | 5.0 (128) | 2.7 (68) | 4.5 (112.5) | 1.8 (0.8) | S |
| 1 | 4.2 | FR-D720-042-NA | 5.0 (128) | 2.7 (68) | 5.3 (132.5) | 2.2 (1.0) | S |
| 2 | 7 | FR-D720-070-NA | 5.0 (128) | 4.3 (108) | 5.4 (135.5) | 3.1 (1.4) | S |
| 3 | 10 | FR-D720-100-NA | 5.0 (128) | 4.3 (108) | 5.4 (135.5) | 3.1 (1.4) | S |
| 5 | 16.5 | FR-D720-165-NA | 5.0 (128) | 6.7 (170) | 5.6 (142.5) | 4.0 (1.8) | S |
| 7 1/2 | 23.8 | FR-D720-238-NA | 5.9 (150) | 8.7 (220) | 6.1 (155) | 8.0 (3.6) | S |
| 10 | 31.8 | FR-D720-318-NA | 5.9 (150) | 8.7 (220) | 6.1 (155) | 8.0 (3.6) | S |
| **3-Phase 380~480VAC Input & Output** | | | | | | | |
| 1/2 | 1.2 | FR-D740-012-NA | 5.0 (128) | 4.3 (108) | 5.1 (129.5) | 2.9 (1.3) | S |
| 1 | 2.2 | FR-D740-022-NA | 5.0 (128) | 4.3 (108) | 5.1 (129.5) | 2.9 (1.3) | S |
| 2 | 3.6 | FR-D740-036-NA | 5.0 (128) | 4.3 (108) | 5.4 (135.5) | 3.1 (1.4) | S |
| 3 | 5 | FR-D740-050-NA | 5.0 (128) | 4.3 (108) | 6.2 (155.5) | 3.3 (1.5) | S |
| 5 | 8 | FR-D740-080-NA | 5.0 (128) | 4.3 (108) | 6.6 (165.5) | 3.3 (1.5) | S |
| 7 1/2 | 12 | FR-D740-120-NA | 5.9 (150) | 8.7 (220) | 6.1 (155) | 7.3 (3.3) | S |
| 10 | 16 | FR-D740-160-NA | 5.9 (150) | 8.7 (220) | 6.1 (155) | 7.3 (3.3) | S |

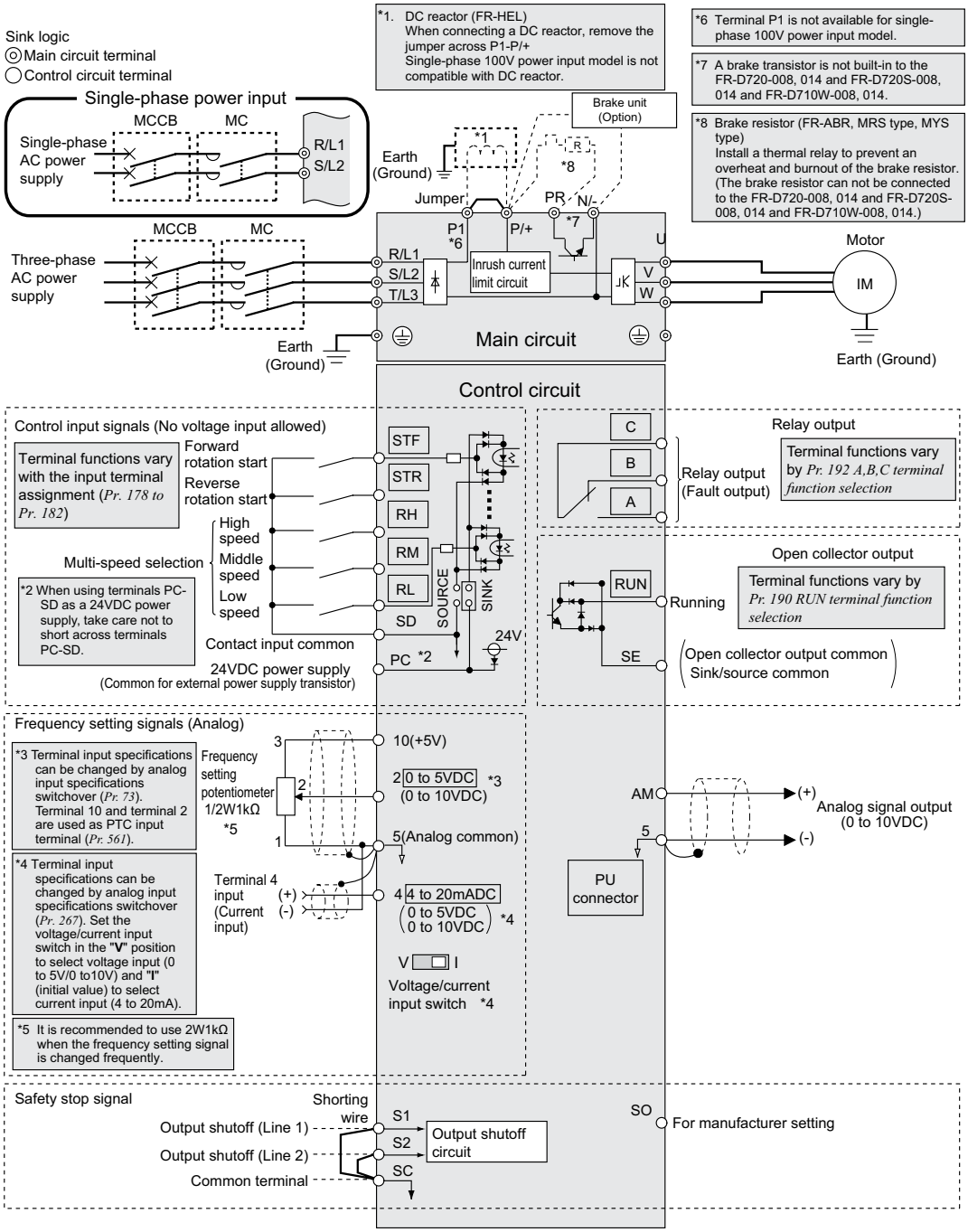
## D700 General Specifications

| | | | | |
|---|---|---|---|---|
| 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: 0 to 20mA/10bit) |
| | | | Digital Input | 0.01Hz |
| | Frequency Accuracy | | Analog Input | Within ±1% of the max. output frequency (25°C ±10°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 |
| | Accel. /Decel. Time Setting | | | 0.01 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode can be selected. |
| | Braking Torque | | Regeneration (*1) | FR-D720-008 and 014, FR-D720S-008 and 014, FR-D710W-008 and 014 ... 150%, FR-D720-025 and 042, FR-D740-012 and 022, FR-D720S-025 and 042, FR-D710W-025 and 042 ... 100%, FR-D720-070, FR-D740-036, FR-D720S-070 ... 50%, FR-D720-100 or more, FR-D740-050 or more, FR-D720S-100 ... 20% |
| | | | 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 | Two points<br>Terminal 2: 0 to 10V, 0 to 5V can be selected<br>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 | | | Five points. 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, 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 prealarm, electronic thermal relay function prealarm, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward/reverse rotation output, fan alarm (*3), 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 | Analog Output | 0 to 10VDC: one point |
| | | For Meter | | You can select from among output frequency, output 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 0 to 10VDC |
| Indication | Operation Panel Parameter Unit (FR-PU07) | | Operating Status | You can select from among output frequency, output 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, inverter thermal load factor, PTC thermistor resistance. |
| | | | Fault Definition | 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 |
| | Additional Display By The Parameter Unit (FR-PU04/ FR-PU07) Only | | Operating Status | Not used |
| | | | Fault Definition | Output voltage/current/frequency/cumulative energization time immediately before the fault occurs |
| | | | Interactive Guidance | Function (help) for operation guide |
| Protective Functions | | | | 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 loss (*5, *6), output side earth (ground) fault overcurrent at start (*5), output phase loss, external thermal relay operation (*5), PTC thermistor operation (*5), parameter error, PU disconnection, retry count excess (*5), CPU fault, brake transistor alarm, inrush resistance overheat, analog input error, stall prevention operation, output current detection value exceeded (*5), safety circuit fault |
| Warning Functions | | | | Fan alarm (*3), overcurrent stall prevention, overvoltage stall prevention, PU stop, parameter write error, regenerative brake prealarm (*5), electronic thermal relay function prealarm, maintenance output (*5), undervoltage, operation panel lock, password locked, inverter reset, safety stop |
| Environment | Surrounding Air Temperature | | | -10°C to +50°C (14°F to 122°F) (non-freezing) (*4) |
| | Ambient Humidity | | | 90%RH maximum (non-condensing) |
| | Storage Temperature (*2) | | | -20°C to +65°C (-4°F to 149°F) |
| | Atmosphere | | | Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.) |
| | Altitude/Vibration | | | Maximum 1000m (3280.80 feet) above sea level, 5.9m/s$^2$ or less at 10 to 55Hz (directions of X, Y, Z axes) |

**Notes:**

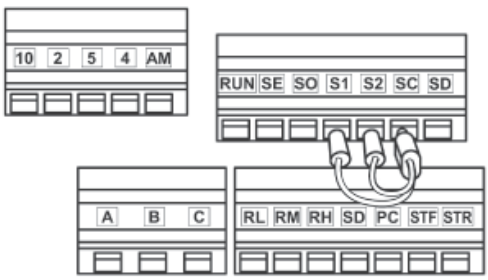
1. The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regenerative energy is large. A brake unit (FR-BU2) may also be used.
2. Temperatures applicable for a short time, e.g. in transit.
3. As the FR-D720-042 or less, FR-D740-022 or less, FR-D720S-042 or less, FR-D710W-042 or less are not provided with the cooling fan, this alarm does not function.
4. When using the inverters at the surrounding air temperature of 40°C (104°F) or less, the inverters can be installed closely attached (0cm clearance).
5. This protective function does not function in the initial status.
6. This protective function is available with the three-phase power input specification model only.

## D700 Series Terminal Connection Diagram




Terminal Block Layout

Recommended wire size:
0.3mm² 0.75mm²



## D700 Series Options

| Model Number | Description | Notes | Stocked Item |
|---|---|---|---|
| **FR-PU07** | Alpha-Numeric multi-language keypad | | S |
| **FR-PA07** | Panel mount basic keypad | | S |
| **FR-CONFIGURATOR** | Programming and diagnostic software | | S |
| **SC-FRPC** | Serial communications cable | | S |
| **FR-CB201** | Remote cable for connecting keypad | 1 meter cable | S |
| **FR-CB203** | Remote cable for connecting keypad | 3 meter cable | S |
| **FR-CB205** | Remote cable for connecting keypad | 5 meter cable | S |
| **FR-ABR-_ _ K** | External braking resistor | | S |
| **FR-RJ45-HUB4** | Serial Network Hub - 2 Stations | | - |
| **FR-RJ45-HUB10** | Serial Network Hub - 8 Stations | | - |
| **FR-RJ45-TR** | Terminating Resistor for FR-RJ45-HUB | | - |

**Note:** _ _ represents KW rating.

## Input Radio Noise Filter

This filter is connected to the input of the drive and helps to reduce radiated noise in the radio frequencies.

| Drive Voltage | Kit Model Number | Leakage Current (mA) | Dimensions mm (in) | | | Stocked Item |
|---|---|---|---|---|---|---|
| | | | L | W | D | |
| 208 - 230 | FR-BIF | 4 | 58 (2.3) | 44 (1.8) | 42 (1.7) | S |
| 460 | FR-BIF-H | 4 | 58 (2.3) | 44 (1.8) | 42 (1.7) | - |

## Line Noise Filter

Provides a toroid for line noise reduction.

| Drive Hp | Kit Model Number | Dimensions mm (in) | | | Stocked Item |
|---|---|---|---|---|---|
| | | L | W | D | |
| 0.5 - 5 | FR-BSF01 | 110 (4.33) | 22.5 (0.89) | 65 (2.56) | S |
| 0.5 - 75 | FR-BLF | 180 (7.07) | 31.5 (1.24) | 83 (3.27) | S |

## D700 EMC Filters

This attachment allows the VFD to be mounted onto the filter.

| Model Number | Drive Model | Stocked Item |
|---|---|---|
| **FFR-CS-050-14A-RF1** | D720S-008 to 042 | - |
| **FFR-CS-080-20A-RF1** | D720S-070 | - |
| **FFR-CS-110-26A-RF1** | D720S-100 | - |
| **FFR-CSH-036-8A-RF1** | D740-012 to 036 | - |
| **FFRCSH-080-16A-RF1** | D740-050 to 080 | - |
| **FFRMSH-170-30A-RF1** | D740-120 to 160 | - |

## DIN Rail Mounting Attachment

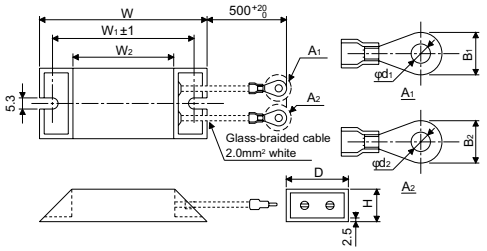
This attachment allows the D700 Series inverter to mount on a 35mm DIN rail.

| Model Number | Drive Model | | | | Stocked Item |
|---|---|---|---|---|---|
| | D710W | D720S | D720 | D740 | |
| **FR-UDA01** | 008-025 | 008-042 | 008-042 | - | S |
| **FR-UDA02** | 042 | 070 | 070-100 | 012-080 | S |
| **FR-UDA03** | - | - | 165 | - | - |

## D700 Demonstration Unit

| Model Number | Description | Stocked Item |
|---|---|---|
| **VFD-MICRO-DEMO** | Includes E720 and D720 1HP, pre-wired digital input switches, led outputs and speed potentiometer | S |
| **VFD-MOTOR-DEMO** | Includes 1/2HP motor with quick connection to VFD-MICRO-DEMO | S |

## Brake Resistors




| Brake Resistor Model | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| | W | W1 | W2 | D | H |
| **200V Class** | | | | | |
| **FR-ABR-0.4K** | 140 | 125 | 100 | 40 | 21 |
| **FR-ABR-0.75K** | 215 | 200 | 175 | 40 | 21 |
| **FR-ABR-2.2K** | 240 | 225 | 200 | 50 | 26 |
| **FR-ABR-3.7K** | 215 | 200 | 175 | 61 | 33 |
| **FR-ABR-5.5K** | 335 | 320 | 295 | 61 | 33 |
| **FR-ABR-7.5K** | 400 | 385 | 360 | 80 | 40 |
| **FR-ABR-11K** | 400 | 385 | 360 | 100 | 50 |
| **FR-ABR-15K (*1)** | 300 | 285 | 260 | 100 | 50 |
| **400V Class** | | | | | |
| **FR-ABR-H0.4K** | 115 | 100 | 75 | 40 | 21 |
| **FR-ABR-H0.75K** | 140 | 125 | 100 | 40 | 21 |
| **FR-ABR-H1.5K** | 215 | 200 | 175 | 40 | 21 |
| **FR-ABR-H2.2K** | 240 | 225 | 200 | 50 | 26 |
| **FR-ABR-H3.7K** | 215 | 200 | 175 | 61 | 33 |
| **FR-ABR-H5.5K** | 335 | 320 | 295 | 61 | 33 |
| **FR-ABR-H7.5K** | 400 | 385 | 360 | 80 | 40 |
| **FR-ABR-H11K** | 400 | 385 | 360 | 100 | 50 |
| **FR-ABR-H15K (*2)** | 300 | 285 | 260 | 100 | 50 |

**Notes:**
1. For the 15K, connect the two supplied resistors (18 ohms) in parallel
2. For the H15K, connect the two supplied resistors (18 ohms) in series.

## D700 Conduit Kits

| Kit Model Number | Part Number | | | | Stocked Item |
|---|---|---|---|---|---|
| | FR-D710W- | FR-D720S- | FR-D720- | FR-D740- | |
| **FR-E7FN-01** | 008/014 | 008/014 | 008/014 | - | S |
| **FR-E7FN-02** | - | - | 025 | - | S |
| **FR-E7FN-03** | - | - | 042 | - | S |
| **FR-E7FN-04** | - | - | 070/100 | 036 | S |
| **FR-E7FN-06** | - | - | - | - | S |
| **FR-E7FN-07** | - | - | 165 | - | S |
| **FR-E7FN-08** | - | - | 238/318 | 120/160 | S |
| **FR-E7FN-11** | - | - | - | 012/022 | - |
| **FR-E7FN-12** | - | - | - | 050/080 | - |

## D700 Heatsink Extension Kits

| Kit Model Number | Part Number | | | | Stocked Item |
|---|---|---|---|---|---|
| | FR-D710W- | FR-D720S- | FR-D720- | FR-D740- | |
| FR-E7CN-02 | 025 | 025 | 025 | - | S |
| FR-E7CN-03 | - | 042 | 042 | - | S |
| FR-E7CN-04 | - | 070 | 070/100 | 036 to 080 | S |
| FR-E7CN-06 | - | 100 | - | - | S |
| FR-E7CN-07 | - | - | 165 | - | S |
| FR-E7CN-08 | 042 | - | 238/318 | 120/160 | S |
| FR-E7CN-11 | - | - | - | 012/022 | - |

## D700 Building Management Options

| Network Type / Model | | ETH-1000 (*2, *3) | XLTR-1000 (*2, *3) |
|---|---|---|---|
| Gateway Communication | BACnet/IP | X | - |
| | EtherNet/IP | X | - |
| | Modbus/TCP | X | - |
| | Profinet IO | X | - |
| | BACnet MS/TP | X | X |
| | Metasys N2 | X | X |
| Stocked Item | | - | - |

**Notes:**
1. For additional information, visit www.iccdesigns.com
2. Communication to multiple VFD's is possible
3. Mounted and powered external to VFD

## D700 Series Watt Loss and Efficiency Data

| HP-CT | 115VAC 1-Phase Input | | | | 240VAC 1-Phase Input | | | | 240VAC 3-Phase Input | | | | 480VAC 3-Phase Input | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Part Number | Rated Watts | Watts Loss | Efficiency | Part Number | Rated Watts | Watts Loss | Efficiency | Part Number | Rated Watts | Watts Loss | Efficiency | Part Number | Rated Watts | Watts Loss | Efficiency |
| | FR-D710W- | | | | FR-D720S- | | | | FR-D720- | | | | FR-D740- | | | |
| 1/8 | 008 | 100 | 14 | 86% | 008 | 100 | 14 | 86% | 008 | 100 | 14 | 86% | - | - | - | - |
| 1/4 | 015 | 200 | 20 | 90% | 015 | 200 | 20 | 90% | 014 | 200 | 20 | 90% | - | - | - | - |
| 1/2 | 030 | 400 | 38 | 91% | 030 | 400 | 32 | 92% | 025 | 400 | 32 | 92% | 012 | 400 | 40 | 90% |
| 1 | 050 | 750 | 50 | 93% | 050 | 750 | 50 | 93% | 042 | 750 | 50 | 93% | 022 | 750 | 55 | 93% |
| 2 | - | - | - | - | 070 | 1500 | 80 | 95% | 070 | 1500 | 80 | 95% | 036 | 1500 | 90 | 94% |
| 3 | - | - | - | - | 100 | 2200 | 110 | 95% | 100 | 2200 | 100 | 95% | 050 | 2200 | 100 | 95% |
| 5 | - | - | - | - | - | - | - | - | 165 | 3700 | 160 | 96% | 080- | 3700 | 180 | 95% |
| 7.5 | - | - | - | - | - | - | - | - | 238 | 5500 | 270 | 95% | 120 | 5500 | 240 | 96% |
| 10 | - | - | - | -- | - | - | - | - | 318 | 7500 | 360 | 95% | 160 | 7500 | 280 | 96% |

**General Notes:**
1. The amount of heat generated by the inverter is based on one inverter connected to one motor of the same capacity.
2. The amount of heat generated in the above table is the amount of heat generated when the inverter is operated at its rated current.
3. The amount of heat generated will decrease according to the motor load and usage (duty).

## D700 Standby Power

| HP-CT | 115VAC 1-Phase Input | | | 240VAC 1-Phase Input | | | 240VAC 3-Phase Input | | | 480VAC 3-Phase Input | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Part Number | Stand-By Power Consumption | | Part Number | Stand-By Power Consumption | | Part Number | Stand-By Power Consumption | | Part Number | Stand-By Power Consumption | |
| | FR-D710W- | Min | Max | FR-D720S- | Min | Max | FR-D720- | Min | Max | FR-D740- | Min | Max |
| 1/8 | 008 | 5.5 | 10.5 | 008 | 5.5 | 10.5 | 008 | 5.5 | 10.5 | - | - | - |
| 1/4 | 015 | 5.5 | 10.5 | 015 | 5.5 | 10.5 | 014 | 5.5 | 10.5 | - | - | - |
| 1/2 | 030 | 5.5 | 10.5 | 030 | 5.5 | 10.5 | 025 | 5.5 | 10.5 | 012 | 10.5 | 15 |
| 1 | 050 | 5.5 | 10.5 | 050 | 5.5 | 10.5 | 042 | 5.5 | 10.5 | 022 | 10.5 | 15 |
| 2 | - | - | - | 070 | 5.5 | 14 | 070 | 5.5 | 14 | 036 | 10.5 | 17 |
| 3 | - | - | - | 100 | 5.5 | 14 | 100 | 5.5 | 14 | 050 | 10.5 | 17 |
| 5 | - | - | - | - | - | - | 165 | 6 | 15 | 080 | 10.5 | 17 |
| 7.5 | - | - | - | - | - | - | 238 | 13 | 22.5 | 120 | 13.5 | 22.5 |
| 10 | - | - | - | - | - | - | 318 | 13 | 22.5 | 160 | 13.5 | 22.5 |

**General Notes:**
1. The maximum is generated with PC terminal operating 100mA load, external parameter unit, and cooling fan operating.
2. The minimum is generated with no load on PC terminal, no external parameter unit, and cooling fan off.

### D700 Dynamic Braking

All Mitsubishi Electric VFD's have some inherent braking capability. During controlled deceleration, motor regenerative losses are dissipated in the motor, wire, and VFD circuitry. The built-in DC injection braking allows for low speed braking and stopping.

When the above capabilities are inadequate for an application, it is necessary to add a power transistor brake unit and resistor unit in series across the DC bus. Motor regeneration causes the DC bus voltage to increase, and when the voltage exceeds a specified threshold, the transistor turns on to pass current through the resistor. Motor kinetic energy is converted to heat energy. VFD overcurrent and overvoltage protective circuits are active at all times, and will fault-trip the VFD if the brake size is inadequate.

Two main factors must be considered when sizing the brake, the effective duty cycle (%ED) and the short time duty rating. The effective duty cycle is increased when an external resistor is added. It is preferable to profile the effective duty cycle of the units of time. With this information, the short time duty is known and the %ED can be calculated, as shown in the below example.

%ED = Braking time / total time for complete operating cycle *100

Example: Complete cycle is:
5 sec: Acceleration time to reach set speed
60 sec: Run time at set speed
3 sec: Deceleration time to come to a complete stop
12 sec: Time period motor remains stopped

%ED = 3 / (5 + 60 + 3 + 12) * 100 = 3.6%
The tables shown assume 100% brake torque, when brake torque is represented by its percentage to the rated torque of the applied motor.
Torque (kg.m) = 974 * Power (kW) / Speed (rpm).

### 240VAC Dynamic Braking Resistor at 100% Braking Torque

| Resistor Kit Model Number | Weight | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | D710W & D720(S) | % ED | |
| FR-ABR-0.4K | 0.2 (0.5) | 200 | 60 | 1/2 | 025 | 10% | S |
| FR-ABR-0.75K | 0.4 (0.9) | 100 | 80 | 1 | 042 | 10% | S |
| FR-ABR-2.2K | 0.5 (1.1) | 60 | 120 | 2 & 3 | 070 / 100 | 10% | S |
| FR-ABR-3.7K | 0.8 (1.8) | 40 | 155 | 5 | 165 | 10% | S |
| FR-ABR-5.5K | 1.3 (2.9) | 25 | 185 | 7 1/2 | 238 | 10% | S |
| FR-ABR-7.5K | 2.2 (4.9) | 20 | 340 | 10 | 318 | 10% | S |

### 480VAC Dynamic Braking Resistor at 100% Braking Torque

| Resistor Kit Model Number | Weight | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | D740 | % ED | |
| FR-ABR-H0.4K | 0.2 (0.5) | 1200 | 45 | 1/2 | 012 | 10% | S |
| FR-ABR-H0.75K | 0.2 (0.5) | 700 | 75 | 1 | 022 | 10% | S |
| FR-ABR-H1.5K | 0.4 (0.9) | 350 | 115 | 2 | 036 | 10% | S |
| FR-ABR-H2.2K | 0.5 (1.1) | 250 | 120 | 3 | 050 | 10% | S |
| FR-ABR-H3.7K | 0.8 (1.8) | 150 | 155 | 5 | 080 | 10% | S |
| FR-ABR-H5.5K | 1.3 (2.9) | 110 | 185 | 7 1/2 | 120 | 10% | S |
| FR-ABR-H7.5K | 2.2 (4.9) | 75 | 340 | 10 | 160 | 10% | S |

# E700 Series

The cost-effective variable speed control solution for general purpose applications.

- Available in 115V, 240V and 480V up to 20HP
- Advanced Magnetic Flux Vector Control for improved starting torque and smooth low speed motor operation
- Auto-tuning allows improved performance using virtually any manufacturer's motor
- All capacities include built-in brake chopper
- Safety Stop function meets EN954-1 Category 3 and IEC60204-1 Stop Category 0
- USB communications allow fast commissioning and troubleshooting
- Standard RS-485 serial communications supporting Modbus® RTU
- Sink / Source selectable I/O
- Supports remote I/O function via network
- Built-in PID Control
- Delivers rated current at 50°C and 14.5kHz carrier frequency with minimal de-rating
- 200% overload for 3 seconds
- 0 to 10V analog output
- CC-Link®, DeviceNet™, Profibus-DP, LonWorks®, EtherNet/IP
- Standard 5 year warranty

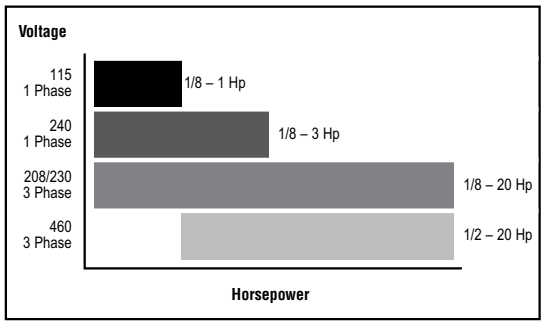

## FR-E720 – 175SC – NA

| Symbol | Voltage Class |
|---|---|
| E710W* | Single-phase 115V class |
| E720S* | Single-phase 240V class |
| E720 | Three-phase 200V class |
| E740 | Three-phase 400V class |

Inverter capacity Amperage/10 (175 = 17.5A output)

Safety Version 3 Phase Only

* Contact MEAU for SC Version availablitiy.




### E700 Series

| HP | Output Amps | Model Number | Dimensions in inches (mm) | | | Weight Lbs (kg) | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | Height | Width | Depth | | |
| **1-Phase 100~120VAC Input / 3-Phase 200~240VAC Output** | | | | | | | |
| 1/8 | 0.8 | FR-E710W-008-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/4 | 1.5 | FR-E710W-015-NA | 5.0 (128) | 2.7 (68) | 4.4 (110.5) | 1.3 (0.6) | S |
| 1/2 | 3 | FR-E710W-030-NA | 5.0 (128) | 2.7 (68) | 4.5 (112.5) | 2.0 (0.9) | S |
| 1 | 5 | FR-E710W-050-NA | 5.0 (128) | 6.7 (170) | 6.1 (155) | 7.5 (3.4) | S |
| **1-Phase 200~240VAC Input / 3-Phase 200~240VAC Output** | | | | | | | |
| 1/8 | 0.8 | FR-E720S-008-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/4 | 1.5 | FR-E720S-015-NA | 5.0 (128) | 2.7 (68) | 3.2 (80.5) | 1.1 (0.5) | S |
| 1/2 | 3 | FR-E720S-030-NA | 5.0 (128) | 2.7 (68) | 6.2 (157.6) | 1.3 (0.6) | S |
| 1 | 5 | FR-E720S-050-NA | 5.0 (128) | 4.3 (108) | 5.4 (135.5) | 3.1 (1.4) | S |
| 2 | 8 | FR-E720S-080-NA | 5.0 (128) | 4.3 (108) | 6.4 (161) | 3.1 (1.4) | S |
| 3 | 11 | FR-E720S-110-NA | 5.9 (150) | 5.5 (140) | 6.2 (155.5) | 4.2 (1.9) | S |
| **3-Phase 200~240VAC Input & Output** | | | | | | | |
| 1/8 | 0.8 | FR-E720-008SC-NA | 5.0 (128) | 2.7 (68) | 3.4 (87) | 1.1 (0.5) | S |
| 1/4 | 1.5 | FR-E720-015SC-NA | | | | | S |
| 1/2 | 3 | FR-E720-030SC-NA | 5.0 (128) | 2.7 (68) | 4.7 (120) | 1.6 (0.7) | S |
| 1 | 5 | FR-E720-050SC-NA | 5.0 (128) | 2.7 (68) | 5.5 (139) | 2.2 (1.0) | S |
| 2 | 8 | FR-E720-080SC-NA | 5.0 (128) | 4.3 (108) | 5.6 (142) | 3.1 (1.4) | S |
| 3 | 11 | FR-E720-110SC-NA | | | | | S |
| 5 | 17.5 | FR-E720-175SC-NA | 5.0 (128) | 6.7 (170) | 5.9 (149) | 3.8 (1.7) | S |
| 7 1/2 | 24 | FR-E720-240SC-NA | 10.3 (260) | 7.1 (180) | 6.9 (171) | 9.5 (4.3) | S |
| 10 | 33 | FR-E720-330SC-NA | | | | | S |
| 15 | 47 | FR-E720-470SC-NA | 10.3 (260) | 8.7 (220) | 7.7 (196) | 19.9 (9) | S |
| 20 | 60 | FR-E720-600SC-NA | | | | | S |
| **3-Phase 380~480VAC Input & Output** | | | | | | | |
| 1/2 | 1.6 | FR-E740-016SC-NA | 5.9 (150) | 5.5 (140) | 4.7 (120) | 3.1 (1.4) | S |
| 1 | 2.6 | FR-E740-026SC-NA | | | | | S |
| 2 | 4 | FR-E740-040SC-NA | 5.9 (150) | 5.5 (140) | 5.6 (142) | 4.2 (1.9) | S |
| 3 | 6 | FR-E740-060SC-NA | | | | | S |
| 5 | 9.5 | FR-E740-095SC-NA | | | | | S |
| 7 1/2 | 12 | FR-E740-120SC-NA | 5.9 (150) | 8.7 (220) | 6.0 (153) | 7.1 (3.2) | S |
| 10 | 17 | FR-E740-170SC-NA | | | | | S |
| 15 | 23 | FR-E740-230SC-NA | 10.3 (260) | 8.7 (220) | 7.7 (196) | 19.9 (9) | S |
| 20 | 30 | FR-E740-300SC-NA | | | | | S |

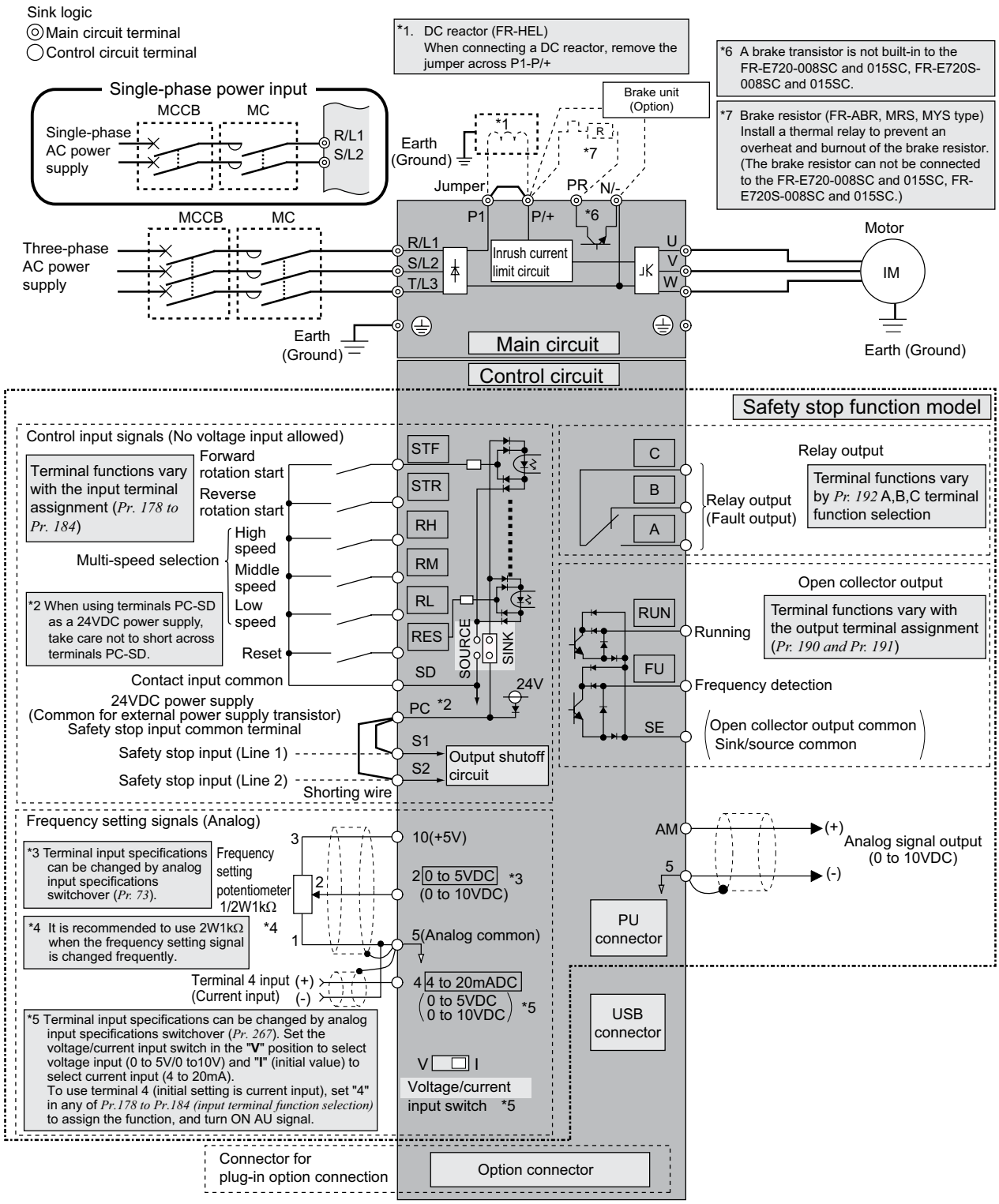
## E700 General Specifications

| | | | | |
|---|---|---|---|---|
| Control Specifications | Control Method | | | Soft-PWM control/high carrier frequency PWM control (V/F control, Advanced magnetic flux vector control, General-purpose magnetic flux vector control, Optimum excitation control are available) |
| | Output Frequency Range | | | 0.2 to 400Hz |
| | Frequency Setting Resolution | | Analog Input | 0.06Hz/60Hz (terminal2, 4: 0 to 10V/10bit)<br>0.12Hz/60Hz (terminal2, 4: 0 to 5V/9bit)<br>0.06Hz/60Hz (terminal4: 0 to 20mA/10bit) |
| | | | Digital Input | 0.01Hz |
| | Frequency Accuracy | | Analog Input | Within ±0.5% of the max. output frequency (25°C ±10°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 | | | 200% or more (at 0.5Hz) when Advanced magnetic flux vector control is set (3.7K or less) |
| | Torque Boost | | | Manual torque boost |
| | Accel/Decel Time Setting | | | 0.01 to 360s, 0.1 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern accel/decel modes are available. |
| | DC Injection Brake | | | Operation frequency (0 to 120Hz), operation time (0 to 10s), operation voltage (0 to 30%) can be changed. |
| | 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 | Two terminals<br>Terminal 2: 0 to 10V, 0 to 5V can be selected<br>Terminal 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected |
| | | | Digital Input | The signal is entered from the operation panel or parameter unit.<br>Frequency setting increment can be set.<br>4 digit BCD or 16bit binary data (when the option FR-A7AX E kit is used) |
| | Start Signal | | | Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected. |
| | Input Signal Standard (Control circuit terminal model: Seven terminals Safety stop function model: Six terminals) | | | The following signals can be assigned to Pr. 178 to Pr.184 (input terminal function selection): multi-speed selection, remote setting, stop-on contact selection, second function selection, terminal 4 input selection, JOG operation selection, PID control valid terminal, brake opening completion signal, external thermal input, PU-External operation switchover, V/F switchover, output stop, start self-holding 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, brake sequence, second function, multi-speed operation, stop-on contact control, droop control, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, PID control, computer link operation (RS-485) |
| | Safety stop function (*1) | | | Safety shutoff signal can be input from terminals S1 and S2. (compliant with EN954-1 Cat.3) |
| | Output Signal | Output Signal Points | Open Collector Output | Two terminals |
| | | | Relay Output | One terminal |
| | | Operating Status | | The following signals can be assigned to Pr.190 to Pr.192 (output terminal function selection): inverter operation, upto-frequency, overload alarm, output frequency detection, regenerative brake prealarm, electronic thermal relay function prealarm, 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, heatsink overheat prealarm, deceleration at an instantaneous power failure, PID control activated, safety monitor output (*1), safety monitor output2 (*1), 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 | Analog Output | 0 to 10VDC: one terminal |
| | | For Meter | | The following signals can be assigned to Pr.158 AM terminal function selection: output frequency, motor current (steady), output voltage, frequency setting, motor torque, 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 0 to 10VDC |
| Indication | Operation Panel Parameter Unit (FR-PU07) | | Operating Status | The following operating status can be displayed: output frequency, motor current (steady), output voltage, frequency setting, cumulative energization time, actual operation time, motor torque, 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, I/O terminal option monitor, output power, cumulative power, motor thermal load factor, and inverter thermal load factor. |
| | | | Fault Definition | 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 |
| | | | Interactive Guidance | Function (help) for operation guide (*2) |
| Protective Function | | | | 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), output side earth (ground) fault overcurrent at start (*4), output phase failure, external thermal relay operation (*3), option fault (*3), parameter error, internal board fault, PU disconnection, retry count excess (*4), CPU fault, brake transistor alarm, inrush resistance overheat, communication error, analog input error, USB communication error, brake sequence error 4 to 7 (*3), safety circuit fault (*1) |
| Warning Function | | | | Fan alarm, overcurrent stall prevention, overvoltage stall prevention, PU stop, parameter write error, regenerative brake prealarm (*3), electronic thermal relay function prealarm, maintenance output (*3), undervoltage, operation panel lock, password locked, inverter reset, safety stop (*1) |
| Environment | Ambient Temperature | | | -10°C to +50°C (14°F to 122°F) (non-freezing) (*5) |
| | Ambient Humidity | | | 90%RH maximum (non-condensing) |
| | Storage Temperature (*6) | | | -20°C to +65°C (-4°F to 149°F) |
| | Atmosphere | | | Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt etc.) |
| | Altitude/Vibration | | | Maximum 1000m (3280.80 feet) above sea level, 5.9m/s$^2$ or less at 10 to 55Hz (directions of X, Y, Z axes) |

**Notes:**
1. This function is only available for the safety stop function model.
2. This operation guide is only available with option parameter unit (FR-PU07).
3. This protective function does not function in the initial status.
4. This protective function is available with the three-phase power input model only.
5. When using the inverters at the surrounding air temperature of 40°C (104°F) or less, the inverters can be installed closely attached (0cm clearance).
6. Temperatures applicable for a short time, e.g. in transit.

**E700 Series Terminal Connection Diagram**

One-phase 100V power input
Three-phase 200V power input
Three-phase 400V power input



### E700 Series Plug-In Options

| Model Number | Description | Stocked Item |
|---|---|---|
| **FR-A7NC E KIT** | CC-Link Network Option | S |
| **FR-A7ND E KIT** | DeviceNet Network Option | S |
| **FR-A7NP E KIT** | Profibus-DP Network Option | S |
| **FR-A7NL E KIT** | LonWorks Network Option | S |
| **FR-A7AX E KIT** | Additional 16-bit Digital Input | S |
| **FR-A7AY E KIT** | Additional Analog & Digital Output | S |
| **FR-A7AR E KIT** | Additional Relay Output | S |
| **FR-E7TR** | Multidrop for Serial Communication | S |

### E700 Series External Options

| Model Number | Description | Stocked Item |
|---|---|---|
| **FR-PU07** | Alpha-Numeric multi-language keypad | S |
| **FR-PU07BB-L** | Battery powered Alpha-Numeric multi-language keypad | S |
| **FR-CB20_** | Keypad extension cable | S |
| **SC-FRPC** | Serial communications cable | S |
| **FR-ABR-_ _K** | External brake resistor | S |
| **FR-RJ45-HUB4** | Serial Network Hub - 2 Stations | - |
| **FR-RJ45-HUB10** | Serial Network Hub - 8 Stations | - |
| **FR-RJ45-TR** | Terminating Resistor For FR-RJ45-HUB | - |

**Note:** _ _ represents drive kW rating

### E700 Dynamic Braking

All Mitsubishi Electric VFD's have some inherent braking capability. During controlled deceleration, motor regenerative losses are dissipated in the motor, wire, and VFD circuitry. The built-in DC injection braking allows for low speed braking and stopping.

When the above capabilities are inadequate for an application, it is necessary to add a power transistor brake unit and resistor unit in series across the DC bus. Motor regeneration causes the DC bus voltage to increase, and when the voltage exceeds a specified threshold, the transistor turns on to pass current through the resistor. Motor kinetic energy is converted to heat energy. VFD overcurrent and overvoltage protective circuits are active at all times, and will fault-trip the VFD if the brake size is inadequate.

Two main factors must be considered when sizing the brake, the effective duty cycle (%ED) and the short time duty rating. The effective duty cycle is increased when an external resistor is added. It is preferable to profile the effective duty cycle of the units of time. With this information, the short time duty is known and the %ED can be calculated, as shown in the below example.

%ED = Braking time / total time for complete operating cycle *100

Example: Complete cycle is:
5 sec: Acceleration time to reach set speed
60 sec: Run time at set speed
3 sec: Deceleration time to come to a complete stop
12 sec: Time period motor remains stopped

%ED = 3 / (5 + 60 + 3 + 12) x 100 = 3.6%
The tables shown assume 100% brake torque, when brake torque is represented by its percentage to the rated torque of the applied motor. Torque (kg.m) = 974 x Power (kW) / Speed (rpm).

### 240VAC Dynamic Braking Resistor at 100% Braking Torque

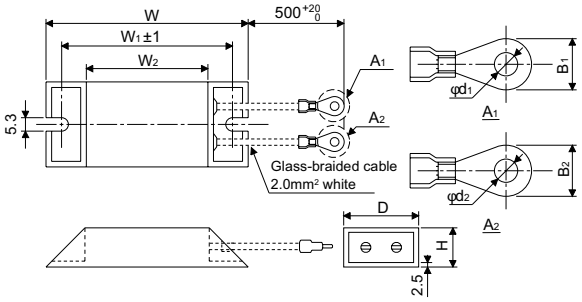
| Resistor Kit Model Number | Weight | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | E710W & E720(S) | % ED | |
| FR-ABR-0.4K | 0.2 (0.5) | 200 | 60 | 1/2 | 030 | 10% | S |
| FR-ABR-0.75K | 0.4 (0.9) | 100 | 80 | 1 | 050 | 10% | S |
| FR-ABR-2.2K | 0.5 (1.1) | 60 | 120 | 2 & 3 | 080 / 110 | 10% | S |
| FR-ABR-3.7K | 0.8 (1.8) | 40 | 155 | 5 | 175 | 10% | S |
| FR-ABR-5.5K | 1.3 (2.9) | 25 | 185 | 7 1/2 | 240 | 10% | S |
| FR-ABR-7.5K | 2.2 (4.9) | 20 | 340 | 10 | 330 | 10% | S |
| FR-ABR-11K | 3.4 (7.5) | 13 | 560 | 15 | 470 | 6% | S |
| FR-ABR-15K (2 resistors in parallel) | 2.4 (5.3) x 2 | 9 (18 / 2) | 805 | 20 | 600 | 6% | S |

### 480VAC Dynamic Braking Resistor at 100% Braking Torque

| Resistor Kit Model Number | Weight | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | E740 | % ED | |
| FR-ABR-H0.4K | 0.2 (0.5) | 1200 | 45 | 1/2 | 016 | 10% | S |
| FR-ABR-H0.75K | 0.2 (0.5) | 700 | 75 | 1 | 026 | 10% | S |
| FR-ABR-H1.5K | 0.4 (0.9) | 350 | 115 | 2 | 040 | 10% | S |
| FR-ABR-H2.2K | 0.5 (1.1) | 250 | 120 | 3 | 060 | 10% | S |
| FR-ABR-H3.7K | 0.8 (1.8) | 150 | 155 | 5 | 095 | 10% | S |
| FR-ABR-H5.5K | 1.3 (2.9) | 110 | 185 | 7 1/2 | 120 | 10% | S |
| FR-ABR-H7.5K | 2.2 (4.9) | 75 | 340 | 10 | 170 | 10% | S |
| FR-ABR-H11K | 3.4 (7.5) | 52 | 530 | 15 | 230 | 6% | S |
| FR-ABR-H15K (2 resistors in series) | 2.4 (5.3) x 2 | 36 (18 x 2) | 870 | 20 | 300 | 6% | S |

## Brake Resistors

| Brake Resistor Model | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| | W | W1 | W2 | D | H |
| **200V Class** | | | | | |
| FR-ABR-0.4K | 140 | 125 | 100 | 40 | 21 |
| FR-ABR-0.75K | 215 | 200 | 175 | 40 | 21 |
| FR-ABR-2.2K | 240 | 225 | 200 | 50 | 26 |
| FR-ABR-3.7K | 215 | 200 | 175 | 61 | 33 |
| FR-ABR-5.5K | 335 | 320 | 295 | 61 | 33 |
| FR-ABR-7.5K | 400 | 385 | 360 | 80 | 40 |
| FR-ABR-11K | 400 | 385 | 360 | 100 | 50 |
| FR-ABR-15K (*1) | 300 | 285 | 260 | 100 | 50 |
| **400V Class** | | | | | |
| FR-ABR-H0.4K | 115 | 100 | 75 | 40 | 21 |
| FR-ABR-H0.75K | 140 | 125 | 100 | 40 | 21 |
| FR-ABR-H1.5K | 215 | 200 | 175 | 40 | 21 |
| FR-ABR-H2.2K | 240 | 225 | 200 | 50 | 26 |
| FR-ABR-H3.7K | 215 | 200 | 175 | 61 | 33 |
| FR-ABR-H5.5K | 335 | 320 | 295 | 61 | 33 |
| FR-ABR-H7.5K | 400 | 385 | 360 | 80 | 40 |
| FR-ABR-H11K | 400 | 385 | 360 | 100 | 50 |
| FR-ABR-H15K (*2) | 300 | 285 | 260 | 100 | 50 |




**Notes:**
1. For the 15K, connect the two supplied resistors (18 ohms) in parallel.
2. For the H15K, connect the two supplied resistors (18 ohms) in series.

## Input Radio Noise Filter

This filter is connected to the input of the drive and helps to reduce radiated noise in the radio frequencies.

| Drive Voltage | Kit Model Number | Leakage Current (mA) | Dimensions mm (in) | | | Stocked Item |
|---|---|---|---|---|---|---|
| | | | L | W | D | |
| 208 - 230 | FR-BIF | 4 | 58 (2.3) | 44 (1.8) | 42 (1.7) | S |
| 460 | FR-BIF-H | 4 | 58 (2.3) | 44 (1.8) | 42 (1.7) | - |

## Line Noise Filter

Provides a toroid for line noise reduction.

| Drive Hp | Kit Model Number | Dimensions mm (in) | | | Stocked Item |
|---|---|---|---|---|---|
| | | L | W | D | |
| 0.5 - 5 | FR-BSF01 | 110 (4.33) | 22.5 (0.89) | 65 (2.56) | S |
| 0.5 - 75 | FR-BLF | 180 (7.07) | 31.5 (1.24) | 83 (3.27) | S |

## DIN Rail Mounting Attachment

This attachment allows the E700 Series inverter to mount on a 35mm DIN rail.

| Model Number | Drive Model | Stocked Item |
|---|---|---|
| | E720 (*1) | |
| FR-UDA01 | 008-050 | S |
| FR-UDA02 | 080-110 | S |
| FR-UDA03 | 175 | - |

**Notes:**
1. Not available for 400V models.

## E740 EMC Filters

This attachment allows the VFD to be mounted onto the filter.

| Model Number | Drive Model | Stocked Item |
|---|---|---|
| FFR-MSH-040-8A-RF1 | E740-016 to 040 | - |
| FFRMSH-095-16A-RF1 | E740-060/095 | - |
| FFRMSH-170-30A-RF1 | E740-120/170 | - |
| FFRMSH-300-50A-RF1 | E740-230/300 | - |

## Building Management Options

| Network Type / Model | | Internal Mount - Powered by VFD | | | | External Mount | |
|---|---|---|---|---|---|---|---|
| | | Safety Version | | Regular Version | | | |
| | | FR-A7N-ETH (*1, *2) | FR-A7N-XLT (*1,*3,) | FR-A7N-ETH (*1,*3) | FR-A7N-XLT (*1,*3,) | ETH-1000 (*4,*5,) | XLTR-1000 (*4,*5) |
| Gateway Communication | BACnet/IP | X | - | X | - | X | - |
| | EtherNet/IP | X | - | X | - | X | - |
| | Modbus TCP | X | - | X | - | X | - |
| | PROFINET IO | X | - | X | - | X | - |
| | BACnet MS/TP | - | X | - | X | X | X |
| | Metasys N2 | - | X | - | X | X | X |
| | Siemens FLN | - | X | - | X | - | - |
| Stocked Item | | S | S | S | S | - | - |

**Notes:**
For additional information, visit www.iccdesigns.com
1. Cable E700-NET-CBL required accessory
2. Deeper cover required A7A-EKITCVR-SCSP
3. Deeper cover A7A-EKITCVR-SC required accessory
4. Communication to multiple VFDs is possible
5. Mounted and powered external to VFD

### Installation Interchange Attachment

This attachment allows the E700 Series inverter to be mounted using the installation holes from the previous series VFDs.

| Model Number | Installation Model E700 Series | Previous Model | | | | Stocked Item |
|---|---|---|---|---|---|---|
| | | E500 Series | A0x4 Series | Z024 Series | A200E Series | |
| FR-E5T-10 | E720-008 | Direct Replacement | FR-A024-0.1K-UL | FR-Z024-0.1K-UL | - | S |
| | E720-015 | | FR-A024-0.2K-UL | FR-Z024-0.2K-UL | - | |
| | E720-030 | | FR-A024-0.4K-UL | FR-Z024-0.4K-UL | - | |
| | E720-050 | | FR-A024-0.75K-UL | - | - | |
| FR-E5T-11 | E720-050 | | - | FR-Z024-0.75K-UL | - | - |
| | E720-080 | | FR-A024-1.5K-UL | FR-Z024-1.5K-UL | - | |
| FR-E5T | E720-110 | | FR-A024-2.2K-UL | FR-Z024-2.2K-UL | - | - |
| | E720-175 | | FR-A024-3.7K-UL | FR-Z024-3.7K-UL | - | |
| FR-E5T-02 | E720-240 | | - | - | FR-A220E-5.5K-UL | - |
| | E720-330 | | - | - | FR-A220E-7.5K-UL | |
| Direct Attachment | E740-016 | | FR-A044-0.4K-UL | - | - | - |
| | E740-026 | | FR-A044-0.75K-UL | - | - | |
| FR-E5T-14 | E740-040 | | FR-A044-1.5K-UL | - | - | - |
| | E740-060 | | FR-A044-2.2K-UL | - | - | |
| | E740-095 | | FR-A044-3.7K-UL | - | - | |

### E700 Installation Interchange Attachment

This attachment allows the E700 Series inverter to be mounted at a 90° angle so that the depth is reduced to 80 mm.

| Model Number | Installation Model | Previous Model | | | Stocked item |
|---|---|---|---|---|---|
| | E700 Series | E500 Series | A0x4 Series | Z024 Series | |
| FR-E5T-L | E720-030 | Direct Replacement | FR-A024-0.4K-UL | FR-Z024-0.4K-UL | - |
| | E720-050 | | FR-A024-0.75K-UL | - | - |

### E700 Series Watt Loss and Efficiency Data

| HP-CT | 115VAC 1-Phase Input | | | | 240VAC 1-Phase Input | | | | 240VAC 3-Phase Input | | | | 480VAC 3-Phase Input | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Part Number FR-E710W- | Rated Watts | Watts Loss | Efficiency | Part Number FR-E720S- | Rated Watts | Watts Loss | Efficiency | Part Number FR-E720- | Rated Watts | Watts Loss | Efficiency | Part Number FR-E740- | Rated Watts | Watts Loss | Efficiency |
| 1/8 | 008 | 100 | 14 | 86% | 008 | 100 | 14 | 86% | 008 | 100 | 14 | 86% | - | - | - | - |
| 1/4 | 015 | 200 | 20 | 90% | 015 | 200 | 20 | 90% | 015 | 200 | 20 | 90% | - | - | - | - |
| 1/2 | 030 | 400 | 38 | 91% | 030 | 400 | 32 | 92% | 030 | 400 | 32 | 92% | 016 | 400 | 45 | 89% |
| 1 | 050 | 750 | 50 | 93% | 050 | 750 | 50 | 93% | 050 | 750 | 50 | 93% | 026 | 750 | 50 | 93% |
| 2 | - | - | - | - | 080 | 1500 | 80 | 95% | 080 | 1500 | 80 | 95% | 040 | 1500 | 85 | 94% |
| 3 | -- | - | - | - | 110 | 2200 | 110 | 95% | 110 | 2200 | 100 | 95% | 060 | 2200 | 100 | 95% |
| 5 | - | - | - | - | - | - | - | - | 175 | 3700 | 160 | 96% | 095 | 3700 | 160 | 96% |
| 7.5 | - | - | - | - | - | - | - | - | 240 | 5500 | 290 | 95% | 120 | 5500 | 310 | 94% |
| 10 | - | - | - | - | - | - | - | - | 330 | 7500 | 380 | 95% | 170 | 7500 | 420 | 94% |
| 15 | - | - | - | - | - | - | - | - | 470 | 11000 | 520 | 95% | 230 | 11000 | 560 | 95% |
| 20 | - | - | - | - | - | - | - | - | 600 | 15000 | 600 | 96% | 300 | 15000 | 640 | 96% |

**General Notes:**
1. The amount of heat generated by the inverter is based on one inverter connected to one motor of the same capacity.
2. The amount of heat generated in the above table is the amount of heat generated when the inverter is operated at its rated current.
3. The amount of heat generated will decrease according to the motor load and usage (duty).

### Conduit Kits

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-E7FN-01 | Conduit kit for E720-008/015 | S |
| FR-E7FN-02 | Conduit kit for E720-030 | S |
| FR-E7FN-03 | Conduit kit for E720-050 | S |
| FR-E7FN-04 | Conduit kit for E720-080/110 | S |
| FR-E7FN-05 | Conduit kit for E740-016/026 | S |
| FR-E7FN-06 | Conduit kit for E740-040/060/090 | S |
| FR-E7FN-07 | Conduit kit for E720-175 | S |
| FR-E7FN-08 | Conduit kit for E740-120/170 | S |
| FR-E7FN-09 | Conduit kit for E720-240/330 | S |
| FR-E7FN-10 | Conduit kit for E720-470/600 E740-230/300 | S |

### E700 Heatsink Extension Kits

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-E7CN-02 | Heatsink Extension kit for E720-030 | S |
| FR-E7CN-03 | Heatsink Extension kit for E720-050 | S |
| FR-E7CN-04 | Heatsink Extension kit for E720-080/110 | S |
| FR-E7CN-05 | Heatsink Extension kit for E740-016/026 | S |
| FR-E7CN-06 | Heatsink Extension kit for E740-040/060/090 | S |
| FR-E7CN-07 | Heatsink Extension kit for E720-175 | S |
| FR-E7CN-08 | Heatsink Extension kit for E740-120/170 | S |
| FR-E7CN-09 | Heatsink Extension kit for E720-240/330 | S |
| FR-A7CN02 | Heatsink Extension kit for E720-470/600 E740-230/300 | S |

### E700 Demonstration Unit

| Model Number | Description | Stocked Item |
|---|---|---|
| VFD-MICRO-DEMO | Includes E720 and D720 1HP, pre-wired digital input switches, led outputs and speed potentiometer | S |
| VFD-MOTOR-DEMO | Includes 1/2HP motor with quick connection to VFD-MICRO-DEMO | S |

# E560 Series

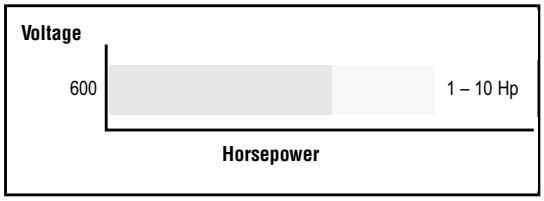
The cost-effective variable speed control solution for general purpose applications.

- Up to 10 Hp at 600VAC
- Advanced Magnetic Flux Vector Control
- Auto-tuning
- 50°C maximum ambient temperature
- RS-485 serial communication (standard)
- Selectable cooling fan operation mode
- Built-in PID control
- Adjustable carrier frequency (0.7kHz to 14.5kHz)
- Optional keypad interface (FR-PA02-02)
- Compatible with FR-PU04 user interface
- UL & cUL listed / CE marked
- Open-network communication options
  - DeviceNet
  - CC-Link
  - Profibus DP
- Brake Transistor


## FR-E560 – 3.7 K – NA

| Symbol | Voltage Class |
|---|---|
| E560 | Three-phase 600V class |

Inverter capacity "kW"




**E560 Series**

| Rating (CT & VT) | | IP20 Open Chassis | Dimensions | | | | Stocked Item |
|---|---|---|---|---|---|---|---|
| Hp | Output Current Amps | Model Number | Height mm (in) | Width mm (in) | Depth mm (in) | Weight kg (lbs) | |
| **3-Phase 575 - 600VAC Input / Output** | | | | | | | |
| 1 | 1.7 | FR-E560-0.75K-NA | 150 (5.9) | 140 (5.5) | 136 (5.4) | 1.8 (4.0) | S |
| 2 | 2.7 | FR-E560-1.5K-NA | 150 (5.9) | 140 (5.5) | 136 (5.4) | 2.0 (4.7) | S |
| 3 | 4.0 | FR-E560-2.2K-NA | 150 (5.9) | 140 (5.5) | 136 (5.4) | 2.0 (4.7) | S |
| 5 | 6.1 | FR-E560-3.7K-NA | 150 (5.9) | 220 (8.7) | 148 (5.8) | 3.8 (8.4) | S |
| 7.5 | 9.0 | FR-E560-5.5K-NA | 150 (5.9) | 220 (8.7) | 148 (5.8) | 3.8 (8.4) | S |
| 10 | 12 | FR-E560-7.5K-NA | 150 (5.9) | 220 (8.7) | 148 (5.8) | 3.8 (8.4) | S |

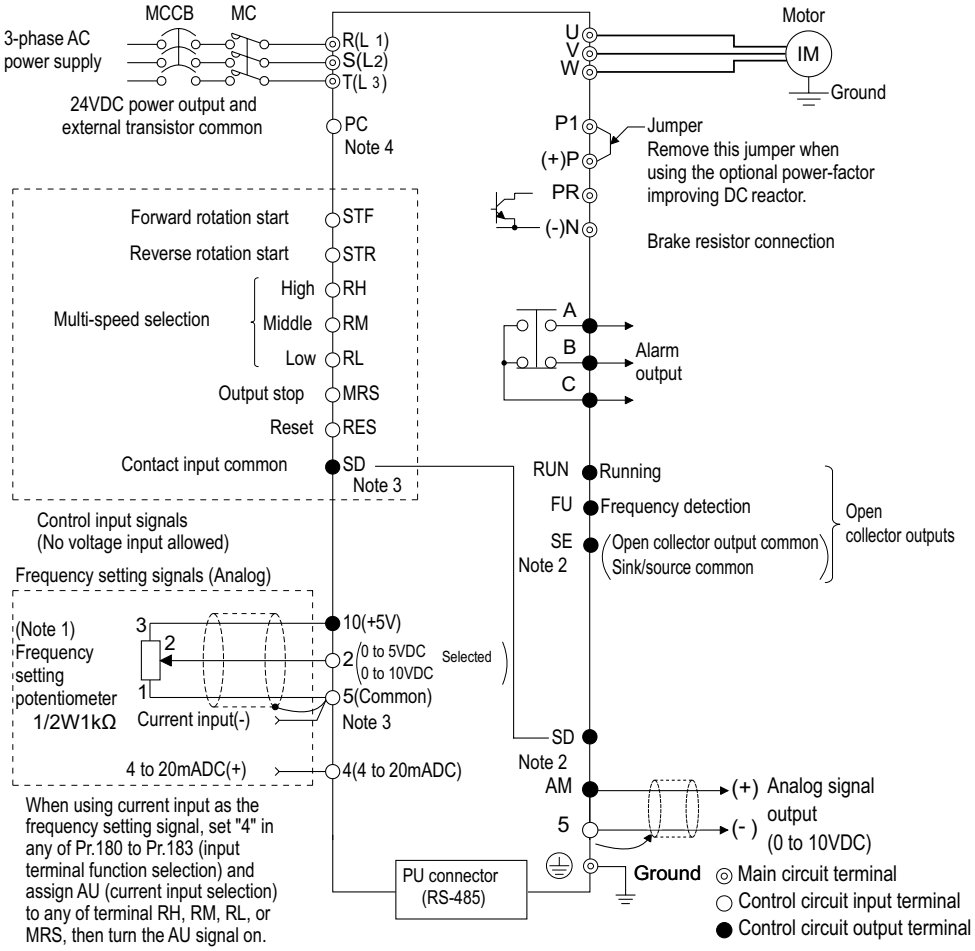
## E560 General Specifications

| | | | | |
|---|---|---|---|---|
| Control Specifications | Control Method | | Soft-PWM control / high carrier frequency PWM control can be selected. V / F control or general-purpose magnetic flux vector control can be selected. | |
| | Output Frequency Range | | 0.2 to 400Hz (starting frequency variable between 0 and 60Hz) | |
| | Frequency Control | Analog Input | Across terminals 2-5: 1/500 of maximum set frequency (5VDC input), 1/1000 (10VDC, 4-20mADC input). | |
| | | Digital Input | 0.01Hz (less than 100Hz), 0.1Hz (100Hz or more) when digital setting is made using the control panel. | |
| | Frequency Precision | Analog Input | Within ±0.5% of maximum output frequency (25°C ±10°C) / 59°F to 95°F. | |
| | | Digital Input | Within 0.01% of set output frequency when setting is made from control panel. | |
| | Voltage / Frequency Characteristics | | Base frequency set as required between 0 and 400Hz. Constant torque or variable torque pattern can be selected. | |
| | Starting Torque | | 150% or more (at 1Hz), 200% or more (at 3Hz) when general-purpose magnetic flux vector control or slip compensation is selected. | |
| | Torque Boost | | Manual torque boost, 0 to 30% may be set. | |
| | Acceleration / Deceleration Time Setting | | 0.01, 0.1 to 3600 sec. (accel. and decel. can be set individually), linear or S-pattern accel./decel. mode can be selected | |
| | Braking Torque | Regenerative | 0.1K, 0.2K...150% or more, 0.4K, 0.75K... 00% or more, 1.5K...50% or more, 2.2K, 3.7K, 5.5K, 7.5K ... 20% or more (*1) | |
| | | DC Dynamic Brake | Operation frequency (0 to 120Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable. | |
| | Stall Prevention Operation Level | | Operation current level can be set (0 to 200% variable), presence or absence can be selected. | |
| | Voltage Stall Prevention Operation Level | | Operation level is fixed, presence or absence can be selected. | |
| | Fast-Response Current Limit Level | | Operation level is fixed, presence or absence can be selected. | |
| Input Signals | Frequency Setting Signal | Analog Input | 0 to 5VDC, 0 to 10VDC, 4 to 20mADC. | |
| | | Digital Input | Entered from control panel (FR-PA02-02). | |
| | Starting Signal | | Forward and reverse rotation, start signal automatic self-holding input (3-wire input) can be selected. | |
| | Alarm Reset | | Used to reset alarm output provided when protective function is activated. | |
| | Multi-Speed Selection | | Up to 15 speeds can be selected. (Each speed can be set between 0 and 400Hz, running speed can be changed during operation from the control panel.) | |
| | Second Function Selection | | Used to select second functions (accel. time, decel. time, torque boost, freq., electronic overcurrent protection). | Use Pr. 180 to Pr. 183 for selection. |
| | Output Stop | | Instantaneous shut-off of inverter output (frequency, voltage). | |
| | Current Input Selection | | Used to select input of frequency setting signal 4 to 20mADC (terminal 4). | |
| | Start Signal Automatic Self-Holding Selection | | Used to select start signal automatic self-holding input. (3-wire input) | |
| | External Thermal Relay Input | | Thermal relay contact input for use when the inverter is stopped by the external thermal relay. | |
| | PU Operation-External Operation Switching | | Used to switch between PU operation and external operation from outside the inverter. | |
| | V/F-General-Purpose Magnetic Flux Switching | | Used to switch between V/F control and general-purpose magnetic flux vector from outside the inverter. | |
| | Operation Functions | | Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, automatic restart operation after instantaneous power failure, forward/reverse rotation prevention, slip comp., operation mode selection, off-line auto tuning function, PID control, computer link operation (RS-485). | |
| | Output Signals | Operation Status | 2 open collector output signals can be selected from inverter running, up to frequency, frequency detection, overload alarm, zero current detection, output current detection, PID upper limit, PID lower limit, PID forward/reverse rotation, operation ready, minor fault and alarm, and 1 contact output (230VAC 0.3A, 30VDC 0.3A) can be selected. | |
| | | For Meter | 1 signal can be selected from output frequency, motor current and output voltage. Pulse train output (1440 pulses/second/full scale). | |
| Display | Control Panel Display | Operating Status | Output voltage, output current, set frequency, running. | |
| | | Alarm Definition | Alarm definition is displayed when protective function is activated. 4 alarm definitions are stored. | |
| | LED Display | | Power application (POWER) | |
| Protective And Warning Functions | | | Overcurrent shut-off (during acceleration, deceleration, constant speed), regenerative overvoltage shut-off, undervoltage (*2) , instantaneous power failure (*2), overload shut-off (electronic overcurrent protection), brake transistor alarm, output short circuit, stall prevention, brake resistor overheat protection, fan overheat, fan failure, parameter error, PU disconnection, ground fault protection. | |
| Environment | Ambient Temperature | | Constant torque: -10°C to +50°C (non-freezing) 14°F to 122°F | |
| | Ambient Humidity | | 90%RH or less (non-condensing) | |
| | Storage Temperature (*3 ) | | -20°C to +65°C / -4°F to 149°F | |
| | Atmosphere | | Indoors, no corrosive and flammable gases, oil mist, dust and dirt. | |
| | Altitude | | Maximum 1000m (3300 ft.) above sea level for standard operation. After that derate by 3% for every extra 500m up to 2500m (91%). | |
| | Vibration | | 5.9 m/s2 (0.6G max.) based on JIS C 0911. | |

**Notes:**

1. The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regenerative energy is large. (The optional brake resistor cannot be used with 0.1K and 0.2K.) A brake unit (BU) may also be used.
2. When undervoltage or instantaneous power failure has occurred, alarm display or alarm output is not provided but the inverter itself is protected. Overcurrent, regenerative overvoltage or other protection may be activated at power restoration according to the operating status (load size, etc.).
3. Temperature applicable for a short period in transit, etc.

## E500 Series Terminal Connection Diagram




**Notes:**
1. If the potentiometer is to be operated often use a 2W1kΩ potentiometer.
2. Terminals SD and SE are electrically isolated.
3. Terminals SD and 5 are common. Do not connect them to each other or to ground.
4. To avoid damage to the VFD, do not allow a short circuit between terminals PC and SD. If they are shorted, the VFD will be damaged

## Terminal Block Layout

600V class

| | |
|---|---|
| RH | A |
| RM | B |
| RL | C |
| MRS | 10 |
| RES | 2 |
| SD | 5 |
| AM | 4 |
| PC | SD |
| SE | STF |
| RUN | STR |
| FU | SD |

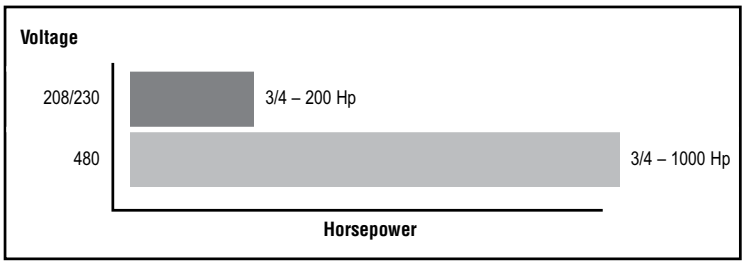
## E500 Series Options

| Model Number | Description | Notes | Stocked Item |
|---|---|---|---|
| **FR-PA02-02** | Keypad for E500 VFD | For mounting on E500 VFD | S |
| **FR-E5P** | Keypad Panel Mounting Adapter | For use only on FR-PA02-02 and FR-CB20_ | S |
| **FR-DU04** | LED Parameter Unit | Also used with A500(L). | S |
| **FR-PU04** | LCD Parameter Unit | Also used with A500(L). | S |
| **FR-E5ND** | E560 DeviceNet Interface | Plug-in Option. Not for use with E520 or E510W. | - |
| **FR-E5NP** | E560 Profibus DP Interface | Plug-in Option. Not for use with E520 or E510W. | S |
| **FR-E5NC** | E560 CC-Link Interface | Plug-in Option. Not for use with E520 or E510W. | - |
| **FR-E5NL** | E560 LonWorks Interface | Plug-in Option. Not for use with E520 or E510W. | - |
| **FR-CB201** | Remote cable | 1m cable | S |
| **FR-CB203** | Remote Cable | 3m cable | S |
| **FR-CB205** | Remote Cable | 5m cable | S |
| **SH(NA)3193** | FR-A500 / E500 Technical Manual | Only available for download. | - |
| **IB(NA)0600003** | FR-E5NC, CC-Link Instruction Manual | Only available for download. | - |
| **IB(NA)0600006** | FR-E5ND, DeviceNet Instruction Manual | Only available for download. | - |
| **IB(NA)0600007** | FR-E5NP, Profibus Instruction Manual | Only available for download. | - |
| **IB(NA)0600204** | FR-E560 Instruction Manual | Only available for download. | - |
| **SC-FRPC** | Serial Communication Cable | | S |

# F700 Series

The truly fantastic specifications of the F700, make this VFD from Mitsubishi Electric an absolute must for your drive systems.

- NEMA 1 UL Type 1 Enclosure Designs: Drive can be mounted as a stand-alone unit where required. (Plenum rated)
- Built-in BACnet MS/TP
- Built-in PLC; programs using GX Developer
- Two I/O cards can be installed simultaneously
- Remote I/O capability: All the drive I/O can be read or controlled over a network
- Optional FR-PU07-01 keypad can be mounted remotely, display HAND/AUTO, and display the value of three monitors
- Energy Savings: Optimum Excitation Control
- 3 user programmable skip frequencies
- Windmill start: Catch a reverse spinning load
- Pre-charge mode
- PID sleep mode
- Second PID function
- Regeneration avoidance
- Standard RS-485 communications
- Mitsubishi or Modbus RTU protocol
- Built-in EMC filter: Conforms to EN61800-3 2nd environmental
- UL Listed for single phase input





### F700 Ratings 200-240V Class

| Input: 1 Phase/3 Phase - Output Voltage: 3 Phase 200-240V at 60Hz<br>Voltage Tolerance: 170-264V at 60Hz Available Braking Torque: 15% Torque Continuous | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLD (40°C) | | LD | | Model Number (*4) | Frame Size | Cooling Method | Protective Rating | Stocked Item |
| 110% OL / 1min | | 120% OL / 1min | | | | | | |
| 120% OL / 3 sec | | 150% OL / 3 sec | | | | | | |
| Hp (*1) | FLA | Hp (*1) | FLA | | | | | |
| 1 | 4.6 | 1 | 4.2 | FR-F720-00046-NA | A | Self Cooling | UL Type 1 - Plenum Rated | S |
| 2 | 7.7 | 2 | 7 | FR-F720-00077-NA | B | | | S |
| 3 | 10.5 | 3 | 9.6 | FR-F720-00105-NA | C | Forced Air Cooled | | S |
| 5 | 16.7 | 5 | 15.2 | FR-F720-00167-NA | C | | | S |
| 7.5 | 25 | 7.5 | 23 | FR-F720-00250-NA | C | | | S |
| 10 | 34 | 10 | 31 | FR-F720-00340-NA | D | | | S |
| 15 | 49 | 15 | 45 | FR-F720-00490-NA | D | | | S |
| 20 | 63 | 20 | 58 | FR-F720-00630-NA | E | | | S |
| 25 | 77 | 25 | 70 | FR-F720-00770-NA | F | | | S |
| 30 | 93 | 30 | 85 | FR-F720-00930-NA | F | | | S |
| 40 | 125 | 40 | 114 | FR-F720-01250-NA | F | | IP00 (*2) | S |
| 50/60 | 154 | 50 | 140 | FR-F720-01540-NA | G | | | S |
| 60 | 187 | 60 | 170 | FR-F720-01870-NA | H | | | S |
| 75 | 233 | 75 | 212 | FR-F720-02330-NA | H | | | S |
| 40 | 125 | 40 | 114 | FR-F720-01250-NAN1 | F | | NEMA 1 | - |
| 50/60 | 154 | 50 | 140 | FR-F720-01540-NAN1 | G | | | - |
| 60 | 187 | 60 | 170 | FR-F720-01870-NAN1 | H | | | - |
| 75 | 233 | 75 | 212 | FR-F720-02330-NAN1 | H | | | - |
| 100/125 | 316 | 100 | 288 | FR-F720-03160-NA | K | | IP00 (*2) | S |
| 150 | 380 | 125 | 346 | FR-F720-03800-NA | K | | | S |
| 200 | 475 | 150 | 432 | FR-F720-04750-NA | K | | | - |

**Notes:** See next page.

## F700 Ratings 480V Class

| Input: 1 Phase / 3 Phase • Output Voltage: 3 Phase 380-480V at 50/60Hz<br>Voltage Tolerance: 323-528V at 50/60Hz • Available Braking Torque: 15% Torque Continuous | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLD (40°C) | | LD | | Model Number (*4) | Frame Size | Cooling Method | Protective Rating | Stocked Item |
| 110% OL / 1min | | 120% OL / 1min | | | | | | |
| 120% OL / 3 sec | | 150% OL / 3 sec | | | | | | |
| Hp (*1) | FLA | Hp (*1) | FLA | | | | | |
| 1 | 2.3 | 1 | 2.1 | FR-F740-00023-NA | C | Self Cooling | UL Type 1 - Plenum rated | S |
| 2 | 3.8 | 2 | 3.5 | FR-F740-00038-NA | C | | | S |
| 3 | 5.2 | 3 | 4.8 | FR-F740-00052-NA | C | | | S |
| 5 | 8.3 | 5 | 7.6 | FR-F740-00083-NA | C | | | S |
| 7.5 | 12.6 | 7.5 | 11.5 | FR-F740-00126-NA | C | | | S |
| 10 | 17 | 10 | 16 | FR-F740-00170-NA | D | Forced Air Cooled | | S |
| 15 | 25 | 15 | 23 | FR-F740-00250-NA | D | | | S |
| 20 | 31 | 20 | 29 | FR-F740-00310-NA | E | | | S |
| 25 | 38 | 25 | 35 | FR-F740-00380-NA | E | | | S |
| 30 | 47 | 30 | 43 | FR-F740-00470-NA | F | | | S |
| 40 | 62 | 40 | 57 | FR-F740-00620-NA | F | | | S |
| 50/60 | 77 | 50 | 70 | FR-F740-00770-NA | G | | IP00 (*3) | S |
| 60 | 93 | 60 | 85 | FR-F740-00930-NA | H | | | S |
| 75 | 116 | 75 | 106 | FR-F740-01160-NA | H | | | S |
| 50/60 | 77 | 50 | 70 | FR-F740-00770-NAN1 | G | | NEMA 1 | - |
| 60 | 93 | 60 | 85 | FR-F740-00930-NAN1 | H | | | - |
| 75 | 116 | 75 | 106 | FR-F740-01160-NAN1 | H | | | - |

**Notes:** See below.

| Input: 1 Phase / 3 Phase • Output Voltage: 3 Phase 380-480V at 50/60Hz • Voltage Tolerance: 323-550V at 50/60Hz<br>Available Braking Torque: 15% Torque Continuous • DC Link Choke is Included With The VFD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLD (40°C) | | LD | | Model Number (*4) | Frame Size | Fan | Protective Rating | Stocked Item |
| 110% OL / 1min | | 120% OL / 1min | | | | | | |
| 120% OL / 3 sec | | 150% OL / 3 sec | | | | | | |
| Hp (*1) | FLA | Hp (*1) | FLA | | | | | |
| 100/150 | 180 | 100 | 144 | FR-F740-01800-NA | H | Forced Air Cooled | IP00 (*2) | S |
| 150 | 216 | 150 | 180 | FR-F740-02160-NA | J | | | S |
| 200 | 260 | 150 | 216 | FR-F740-02600-NA | J | | | S |
| 250 | 325 | 200 | 260 | FR-F740-03250-NA | K | | | S |
| 300 | 361 | 250 | 325 | FR-F740-03610-NA | K | | | S |
| 350 | 432 | 300 | 361 | FR-F740-04320-NA | L | | | S |
| 400 | 481 | 350 | 432 | FR-F740-04810-NA | L | | | S |
| 450 | 547 | 400 | 481 | FR-F740-05470-NA | M | | | S |
| 500 | 610 | 450 | 547 | FR-F740-06100-NA | M | | | S |
| 550 | 683 | 500 | 610 | FR-F740-06830-NA | M | | | S |
| 650 | 770 | 550 | 683 | FR-F740-07700-NA | N | | IP000 (*3) | S |
| 700 | 866 | 650 | 770 | FR-F740-08660-NA | N | | | S |
| 800 | 962 | 700 | 866 | FR-F740-09620-NA | P | | | S |
| 900 | 1094 | 800 | 962 | FR-F740-10940-NA | P | | | - |
| 1000 | 1212 | 900 | 1094 | FR-F740-12120-NA | P | | | - |

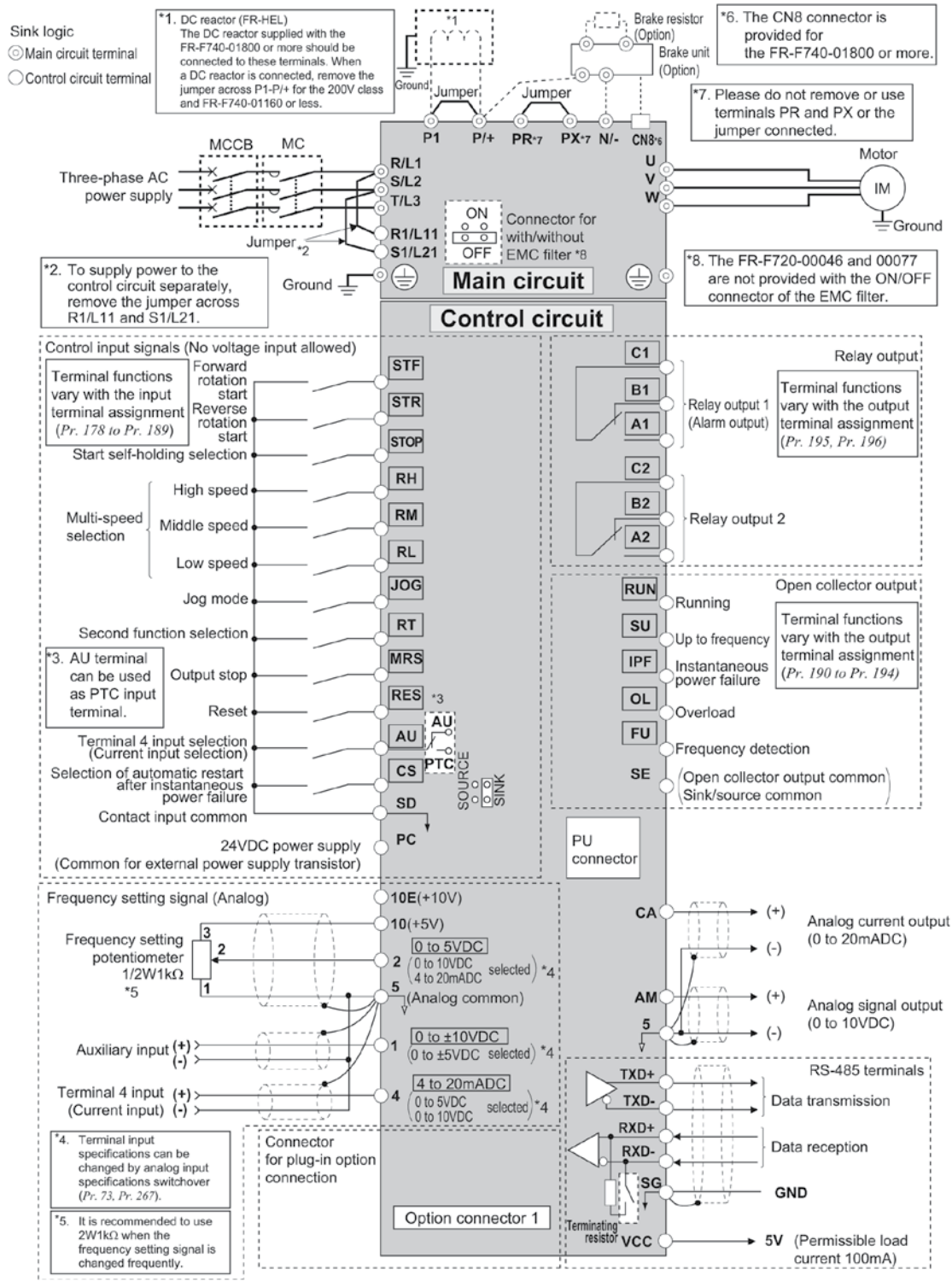
**Notes:**
1. Motor ratings shown are intended as guidelines only - based on 4 pole standard induction motors.
2. NEMA 1 conduit adapter option required for types 01250 - 04750 200V class product.
3. NEMA 1 conduit adapter option required for types 00770 - 06830 400V class product.
4. For single phase input, derate output current by 40% (Models up to F720-03800-NA, F740-04810-NA.)

## F700 General Specifications

| | | | | |
|---|---|---|---|---|
| Control Specifications | Control System | | | High carrier frequency PWM control (V/F control)/optimum excitation control/simple magnetic flux vector control |
| | Output Frequency Range | | | 0.5 to 400Hz |
| | Frequency Setting Resolution | | Analog Input | 0.015Hz/0 to 60Hz (terminal 2, 4: 0 to 10V/12bit); 0.03Hz/0 to 60Hz (terminal 2, 4: 0 to 5V/11bit, 0 to 20mA/approx. 11bit, terminal 1: -10V to +10V/11bit); 0.06Hz/0 to 60Hz (terminal 1: 0 to ±5V/10bit) |
| | | | Digital Input | 0.01Hz |
| | Frequency Accuracy | | Analog Input | Within ±0.2% of the max. output frequency (25°C ± 10°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 or adjustable 5 points V/F can be selected |
| | Starting Torque | | | 120% (3Hz) when set to simple magnetic flux vector control and slip compensation |
| | Acceleration/Deceleration Time Setting | | | 0 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 150% adjustable), whether to use the function or not can be selected |
| Operation Specifications | Frequency Setting Signal | | Analog Input | Terminal 2, 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected. Terminal 1: -10 to +10V, -5 to 5V can be selected. |
| | | | Digital Input | Four-digit BCD or 16-bit binary using the setting dial of the operation panel (when used with the option FR-A7AX) |
| | Start Signal | | | Available individually for forward and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected. |
| | Input Signals | | | Select any twelve signals using Pr.178 to Pr.189 (input terminal function selection) from among multi-speed selection, second function selection, terminal 4 input selection, JOG operation selection, selection of automatic restart after instantaneous power failure, external thermal relay input, HC connection (inverter operation enable signal), HC connection (instantaneous power failure detection), PU operation/external interlock signal , PID control enable terminal, PU operation, external operation switchover, output stop, start self-holding selection, forward rotation command, reverse rotation command, inverter reset, PTC thermistor input, PID forward reverse operation switchover, PU-NET operation switchover, NET-external operation switchover, command source switchover. |
| | Operational Functions | | | Max. and min. frequency settings, frequency jump operation, external thermal relay input selection, polarity reversible operation, automatic restart after instantaneous power failure operation, continuous operation at an instantaneous power failure, commercial power supply, inverter switchover operation, forward/reverse rotation prevention, operation mode selection, PID control, computer link operation (RS-485). |
| | Output Signals | Operating Status | | Select any seven signals using Pr.190 to Pr.196 (output terminal function selection) from among inverter running, up-to-speed, instantaneous power failure/undervoltage, overload warning, output frequency detection, second output frequency detection, electronic thermal relay function pre-alarm, PU operation mode, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward rotation reverse rotation output, commercial power supply-inverter switchover MC1, commercial power supply-inverter switchover MC2, commercial power supply-inverter switchover MC3, fan fault output, heatsink overheat pre-alarm, inverter running start command on, deceleration at an instantaneous power failure, PID control activated, during retry, during PID output suspension, life alarm, input MC stop signal, power savings average value update timing, current average monitor, alarm output 2, maintenance timer alarm, remote output, minor failure output, alarm output. Open collector output (5 points), relay output (2 points) and alarm code of the inverter can be output (4 bit) from the open collector. |
| | | When Used With The FR-A7AY (Option) | | Select any seven signals using Pr. 313 to Pr. 319 (extension output terminal function selection) from among control circuit capacitor life, main circuit capacitor life, cooling fan life, inrush current limit circuit life. |
| | Analog Output | | | Select from output frequency, motor current (steady or peak value), output voltage, frequency setting value, running speed, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, reference voltage output, motor load factor, energy saving effect, PID set value, PID process value using Pr. 54 “CA terminal function selection (analog current output)” and Pr. 158 “AM terminal function selection (analog output)”. |
| Display | Parameter Unit (FR-DU07/ FR-PU04) | Operating Status | | Output frequency, motor current (steady or peak value), output voltage, alarm indication, frequency setting, running speed, converter output voltage (steady or peak value), electronic thermal load factor, input voltage, output voltage, road meter, cumulative energization time, actual operation time, motor load factor, cumulative energization power, power saving effect, cumulative saving power, PID set point, PID process value, PID deviation value, inverter I/O terminal monitor, input terminal option monitor (*1), output terminal option monitor (*1), option fitting status monitor (*2), terminal assignment status (*2) |
| | | Alarm Definition | | Alarm definition is displayed when the protective function is activated, the output voltage/current/frequency/cumulative energization time right before the protection function was activated and the past 8 alarm definitions are stored. |
| | | Interactive Guidance | | Operation guide/troubleshooting with a help function. (*2) |
| Protective/Warning Function | | | | Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, heatsink overheat, instantaneous power failure occurrence, undervoltage, input phase failure, motor overload, output side earth (ground) fault overcurrent, output phase failure, external thermal relay operation, PTC thermistor operation, option alarm, parameter error, PU disconnection, retry count excess, CPU alarm, power supply short for operation panel, 24VDC power output short, output current detection value over, inrush resistance overheat, communication alarm (inverter), analog input alarm, internal circuit alarm (15V power supply), fan fault, overcurrent stall prevention, overvoltage stall prevention, electronic thermal prealarm, PU stop, maintenance timer alarm (*1), parameter write error, copy operation error, operation panel lock. |
| Environment | Ambient Temperature | | | -10°C to +50°C (non-freezing) |
| | Ambient Humidity | | | 90% RH or less (non-condensing) |
| | Storage Temperature (*3) | | | -20°C to +65°C |
| | Atmosphere | | | Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.) |
| | Altitude, Vibration | | | Maximum 1000m above sea level, 5.9m/s$^2$ or less (conforms to JIS C 0040) |

**Notes:**
1. Can be displayed only on the operation panel (FR-DU07).
2. Can be displayed only on the parameter unit (FR-PU04/FR-PU07).
3. Temperature applicable for a short period in transit, etc.

## F700 Series Terminal Connection Diagram




## F700 Control Terminal Layout

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | B1 | C1 | A2 | B2 | C2 | 10E | 10 | 2 | 5 | 4 | |
| RL | RM | RH | RT | AU | STOP | MRS | RES | SD | CA | AM | 1 |
| SE | RUN | SU | IPF | OL | FU | SD | SD | STF | STR | JOG | CS | PC |

## F700 Factory Supplied DC Link Chokes

| Standard With VFD | | | | | Dimensions inches (mm) | | | Approx. Weight lb (kg) |
|---|---|---|---|---|---|---|---|---|
| FR-F700 Series | DC Link Model Number | mH | Amps | Watt Loss | Height | Width | Depth | |
| FR-F740-01800-NA | FR-HEL-H90K | 0.3 | 191 | 130 | 13.4 (340) | 5.9 (150) | 7.5 (190) | 20 (44) |
| FR-F740-02160-NA | FR-HEL-H110K | 0.246 | 233 | 130 | 13.4 (340) | 5.9 (150) | 7.7 (195) | 22 (48) |
| FR-F740-02600-NA | FR-HEL-H132K | 0.204 | 281 | 140 | 15.9 (405) | 6.9 (175) | 7.9 (200) | 26 (57) |
| FR-F740-03250-NA | FR-HEL-H160K | 0.171 | 335 | 140 | 15.9 (405) | 6.9 (175) | 8 (205) | 28 (62) |
| FR-F740-03610-NA | FR-HEL-H185K | 0.148 | 389 | 170 | 15.9 (405) | 6.9 (175) | 9.4 (240) | 29 (64) |
| FR-F740-04320-NA | FR-HEL-H220K | 0.124 | 462 | 230 | 15.9 (405) | 6.9 (175) | 9.4 (240) | 30 (66) |
| FR-F740-04810-NA | FR-HEL-H250K | 0.109 | 524 | 240 | 17.3 (440) | 7.5 (190) | 9.8 (250) | 35 (77) |
| FR-F740-05470-NA | FR-HEL-H280K | 0.098 | 585 | 270 | 17.3 (440) | 7.5 (190) | 10 (255) | 38 (84) |
| FR-F740-06100-NA | FR-HEL-H315K | 0.087 | 658 | 300 | 19.5 (495) | 8.3 (210) | 9.8 (250) | 42 (92) |
| FR-F740-06830-NA | FR-HEL-H355K | 0.077 | 742 | 360 | 19.5 (495) | 8.3 (210) | 9.8 (250) | 46 (101) |
| FR-F740-07700-NA | FR-HEL-H400K | 0.069 | 836 | 360 | 19.7 (500) | 8.7 (220) | 9.8 (250) | 50 (110) |
| FR-F740-08660-NA | FR-HEL-H450K | 0.061 | 940 | 450 | 19.7 (500) | 8.7 (220) | 10.6 (270) | 57 (125) |
| FR-F740-09620-NA | FR-HEL-H500K | 0.055 | 1045 | 450 | 17.8 (455) | 8.5 (215) | 13.6 (345) | 67 (1147) |
| FR-F740-10940-NA | FR-HEL-H560K | 0.049 | 1170 | 470 | 18.1 (460) | 8.5 (215) | 14.2 (360) | 85 (187) |
| FR-F740-12120-NA | FR-HEL-H630K | 0.044 | 1317 | 500 | 18.1 (460) | 8.5 (215) | 14.2 (360) | 95 (209) |

## F700 Frame Size

| Frame Size | Dimensions inches (mm) | | | Weight Without Reactor lbs (kg) |
|---|---|---|---|---|
| | Height | Width | Depth | |
| A | 10.2 (260) | 4.3 (110) | 4.3 (110) | 4.2 (1.9) |
| B | 10.2 (260) | 4.3 (110) | 4.9 (125) | 5 (2.3) |
| C | 10.2 (260) | 5.9 (150) | 5.5 (140) | 9.3 (4.2) |
| D | 10.2 (260) | 8.7 (220) | 6.7 (170) | 17.7 (8) |
| E | 11.8 (300) | 8.7 (220) | 7.5 (190) | 19.4 (8.8) |
| F | 15.8 (400) | 9.8 (250) | 7.5 (190) | 32.6 (14.8) |
| G | 21.7 (550) | 12.8 (325) | 7.7 (195) | 77.1 (35) |
| H | 21.7 (550) | 17.1 (435) | 9.8 (250) | 134.4 (61) |
| J | 27.6 (700) | 18.3 (465) | 9.8 (250) | 134.4 (61) |
| K | 29.1 (740) | 18.3 (465) | 14.2 (360) | 244.5 (111) |
| L | 39.8 (1010) | 19.6 (498) | 15 (380) | 378.9 (172) |
| M | 39.8 (1010) | 26.8 (680) | 15 (380) | 385 (175) |
| N | 52.4 (1330) | 31.1 (790) | 17.3 (440) | 572 (260) |
| P | 62.2 (1580) | 39.2 (995) | 17.3 (440) | 814 (370) |

# F700 Series Options

### Conduit Attachments

| Model Number | Drive Model | | Length (in) (*4) | Weight (lbs) | Stocked Item |
|---|---|---|---|---|---|
| | F720 (*1) | F740 (*1) | | | |
| FR-A7FN05 (*3) | 01250 | - | 5.9 | 5 | - |
| FR-A7FN06 (*3) | 01540 | 00770 | 6.2 | 5 | S |
| FR-A7FN07 (*3) | 01870, 02330 | 00930, 01160 | 9 | 15 | S |
| FR-A7FN-10 (*2) | - | 01800 | 24 | 37 | S |
| FR-A7FN-11 (*2) | - | 02160, 02600 | 24 | 41 | S |
| FR-A7FN-12 (*2) | 03160, 03800, 04750 | 03250, 03610 | 24 | 45 | S |
| FR-A7FN-13 (*2) | - | 04320, 04810 | 26 | 50 | S |
| FR-A7FN-14 (*2) | - | 05470, 06100, 06830 | 26 | 64 | S |

**Notes:**
1. For FR-F700s smaller than listed above, they are UL Type 1, and conduit attachment is standard.
2. Mounting hardware included for standard DC chokes which ship with VFD. Kits are powder coated similar to VFD, charcoal gray.
3. Kits are coated zinc clear.
4. Width and depth of kit match the associated VFD.

### External Heatsink Attachment

| Model Number (*1) | Drive Model | | Stocked Item |
|---|---|---|---|
| | F720 | F740 | |
| FR-A7CN01 | 00105 to 00250 | 00023 to 00126 | S |
| FR-A7CN02 | 00340, 00490 | 00170, 00250 | S |
| FR-A7CN03 | 00630 | 00310, 00380 | S |
| FR-A7CN04 | 00770 to 01250 | 00470, 00620 | S |
| FR-A7CN05 | 01540 | - | S |
| FR-A7CN06 | - | 00770 | S |
| FR-A7CN07 | 01870, 02330 | 00930, 01160, 01800 | S |
| FR-A7CN08 | - | 02160 | - |
| FR-A7CN09 | - | 02600 | - |
| FR-A7CN10 | 03160, 03800, 04750 | 03250, 03610 | - |

**Note:**
1. Kits are coated zinc clear.

### Option Cards

| | | Model No. | Stocked Item |
|---|---|---|---|
| Function | Relay Output | FR-A7AR | S |
| | 12 Bit Digital Input | FR-A7AX | S |
| | Digital Output | FR-A7AY | S |
| | Ext. Analog Output | | |
| | BiPolar Analog Input | FR-A7AZ | - |
| | High Res Analog Input | | |
| | Motor Thermistor | | |
| Communication | CC-Link | FR-A7NC | S |
| | DeviceNet | FR-A7ND | S |
| | LonWorks | FR-A7NL | S |
| | Profibus DP | FR-A7NP | S |

### F700 Demonstration Unit

| Model Number | Description | Stocked Item |
|---|---|---|
| VFD-F700-DEMO-2 | Includes F720 1HP, pre-wired digital input switches, LED outputs, speed potentiometer and analog meter | S |
| VFD-MOTOR-DEMO | Includes 1/2HP motor with quick connection to VFD-F700-DEMO | S |

### Instruction Manuals

| Description | Model Number | Stocked Item |
|---|---|---|
| FR-F700 Installation Manual - Contains instructions for installer and parameter list. (Included with VFD, plus CD with all versions of VFD and option manuals.) | IB(NA)0600218 | - |
| FR-F700-NAPLC Function Programming Manual | IB(NA)0600420 | - |
| FR-F700 Basic Manual - Contains wiring details, VFD layout drawings, alarm definitions and parameter list. | IB(NA)0600216 | - |
| FR-F700 Applied Manual - Contains wiring details, VFD layout drawings, alarm definitions and complete parameter list with definitions and setting examples. | IB(NA)0600217 | - |
| FR-PU07 Manual - Contains complete instruction sets and screen definitions. | IB(NA)0600240 | - |

Manuals available for download at www.meau.com

### Parameter Units / Parameter Copy Units

Parameter units are used for operator control, reading and writing parameters, and drive monitoring. Parameter Copy Units also read the drive parameter settings and copy them into non-volatile memory, and can write them into other drives.

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-CB201 | Extension cable straight plugs on both ends - 1 meter | S |
| FR-CB203 | Extension cable straight plugs on both ends - 3 meters | S |
| FR-CB205 | Extension cable straight plugs on both ends - 5 meters | S |
| FR-DU07 | Control Panel for F700 | S |
| FR-PU07 | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. Stores settings in non-volatile memory. Built-in parameter copy capability. (F/A700 based) | S |
| FR-PU07-01 | PU07 with hand/auto and enhanced display functions | S |
| FR-ADP | FR-DU07 panel mounting adapter | S |
| FR-PU04 | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. | S |
| SC-FRPC | Serial Communication Cable | S |
| FR-PU07BB-L | Battery Powered PU07 | S |
| FR-RJ45-HUB4 | Serial Network Hub - 2 Stations | - |
| FR-RJ45-HUB10 | Serial Network Hub - 8 Stations | - |
| FR-RJ45-TR | Terminating Resistor for FR-RJ45-HUB | - |

### Building Management Options

| Network Type / Model | | FR-A7N-ETH (*1,*2) | FR-A7N-XLT (*1,*2) | ETH-1000 (*3,*4) | XLTR-1000 (*3,*4) |
|---|---|---|---|---|---|
| Gateway Communication | BACnet/IP | X | - | X | - |
| | EtherNet/IP | X | - | X | - |
| | Modbus TCP | X | - | X | - |
| | PROFINET IO | X | - | X | - |
| | BACnet MS/TP (*5) | - | X | X | X |
| | Metasys N2 | - | X | X | X |
| | Siemens FLN | - | X | - | - |
| Stocked Item | | S | S | - | - |

**Notes:**
For additional information, visit www.iccdesigns.com
1. Physically mounts within VFD and powered by VFD
2. FR-E7TR option recommended. (PU connector not available for use)
3. Communication to multiple VFD's is possible
4. Mounted and powered external to VFD
5. BACnet MS/TP is built in to F700. Gateway required for pre August 2010 production.

### Software

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-CONFIGURATOR | Programming and diagnostic software | S |

## Parameter Unit/Cable Reference List

| VFD Model | | E560 | D700 | E700 | A700<br>F700 |
|---|---|---|---|---|---|
| Parameter Unit | FR-PA02 | 1 / 2 b | - | - | - |
| | FR-PA02-02 | 1 / 2 b | - | - | - |
| | FR-DU04 | 2 a | - | 2 a | 2 a |
| | FR-PU04 | 2 a | 2 a | 2 a | 2 a |
| | FR-DU07 | - | 2 a | 2 a | c |
| | FR-PU07 | - | 2 a | 2 a | 1 |
| | FR-PU07BB-L | - | - | 2 a | 2 a |
| | FR-PA07 | - | 2 a | 2 a | 2 a |
| Software | FR-CONFIGURATOR | 3 | 3 | 3 | 3 |

**Extension cables**
1 = Direct mount
2 = FR-CB201, FR-CB203, FR-CB205 - Where 1, 3, 5 indicate length in meters
3 = SC-FRPC

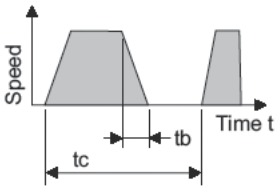
**Notes:**
1. a = Will not mount directly on drive's cover - cable required.
2. b = To remote mount on the enclosure panel, an extension cable and gender change adapter (FR-E5P for E500, SD-54258-8811 for F700) are required.
3. c = Included standard with VFD.

## Dynamic Braking Options

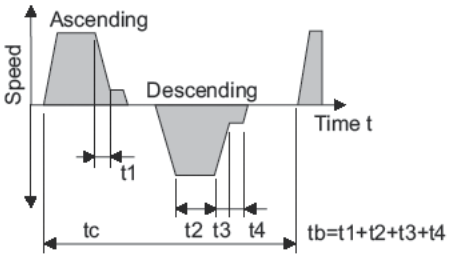
Select the brake unit according to the motor capacity.
To obtain braking torque greater than 200%, use a larger inverter capacity.
Up to 10 FR-BU2 brake units can be connected in parallel for increased braking capacity.

Regeneration duty factor (operation frequency) $\%ED = \frac{tb}{tc} \times 100$ tb<15s(continuous operation time)

Example 1 Travel operation




Example 2 Lift operation




### %ED or Time at Short-Time Rating When Braking Torque is 100%

| Brake Unit Model No. | | Stocked Item | Brake Resistor Model No. | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | 30 s | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | - | 30 s | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | - | - | 30 s | 30 s | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | - | - | - | - | 80% | 40% | 15% | 10% | - | - | - | - | - | - |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | - | - | - | - | - | - | 65% | 30% | 25% | 15% | 10% | - | - | - |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | - | - | - | - | - | - | - | - | 90% | 60% | 30% | 20% | 15% | 10% |
| 460V | FR-BU2-H7.5K | S | 2 x BU-3700-TEIKOUKI | - | - | - | 30 s | 30 s | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-H15K | S | FR-BR-H15K-UL | S | - | - | - | - | 80% | 40% | 15% | 10% | - | - | - | - | - | - |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | - | - | - | - | - | - | 65% | 30% | 25% | 15% | 10% | - | - | - |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | - | - | - | - | - | - | - | - | 90% | 60% | 30% | 20% | 15% | 10% |

| Brake Unit Model No. | | Stocked Item | Brake Resistor Model No. | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | |
| 460V | FR-BU2-H75K | S | MT-BR5-H75K | - | 10% | 5% | - | - | - | - | - | - | - | - | - | - | - | |
| | 2 x FR-BU2-H75K | S | 2 x MT-BR5-H75K | - | 40% | 25% | 15% | 10% | 5% | - | - | - | - | - | - | - | - | |
| | 3 x FR-BU2-H75K | S | 3 x MT-BR5-H75K | - | 90% | 60% | 40% | 20% | 14% | 10% | 5% | 5% | - | - | - | - | - | |
| | 4 x FR-BU2-H75K | S | 4 x MT-BR5-H75K | - | - | 95% | 70% | 40% | 25% | 15% | 13% | 10% | 5% | 5% | - | - | - | |
| | 5 x FR-BU2-H75K | S | 5 x MT-BR5-H75K | - | - | - | - | 60% | 40% | 25% | 20% | 15% | 12% | 10% | 5% | 5% | - | |
| | 6 x FR-BU2-H75K | S | 6 x MT-BR5-H75K | - | - | - | - | 90% | 55% | 40% | 25% | 25% | 15% | 14% | 10% | 5% | 5% | |
| | 7 x FR-BU2-H75K | S | 7 x MT-BR5-H75K | - | - | - | - | - | 80% | 55% | 40% | 35% | 20% | 15% | 13% | 10% | 5% | |
| | 8 x FR-BU2-H75K | S | 8 x MT-BR5-H75K | - | - | - | - | - | - | 70% | 50% | 45% | 30% | 25% | 15% | 13% | 10% | |

**Braking Torque (%) at Short-Time Rating of 30 Sec. for 5HP and Less**
**Braking Torque (%) at Short-Time Rating of 15 Sec. for 7.5HP and Larger**

| Brake Unit Model No. | | Stocked Item | Brake Resistor Model No. | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | 100% | 50% | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | - | 100% | 50% | 50% | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | - | - | 100% | 100% | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | - | - | - | - | 280% | 200% | 120% | 100% | 80% | 70% | - | - | - | - |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | - | - | - | - | - | - | 260% | 180% | 160% | 130% | 100% | 80% | 70% | - |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | - | - | - | - | - | - | - | - | 300% | 250% | 180% | 150% | 120% | 100% |
| 460V | FR-BU2-H15K | S | FR-BR-H15K-UL | S | - | - | - | - | 280% | 200% | 120% | 100% | 80% | 70% | - | - | - | - |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | - | - | - | - | - | - | 260% | 180% | 160% | 130% | 100% | 80% | 70% | - |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | - | - | - | - | - | - | - | - | 300% | 250% | 180% | 150% | 120% | 100% |

| Brake Unit Model No. | | Stocked Item | Brake Resistor Model No. | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
| 460V | FR-BU2-H75K | S | MT-BR5-H75K | - | 100% | 80% | 65% | 50% | 40% | 30% | 28% | 26% | 22% | 20% | - | - | - |
| | 2 x FR-BU2-H75K | S | 2 x MT-BR5-H75K | - | 200% | 165% | 135% | 100% | 80% | 65% | 55% | 53% | 44% | 40% | 33% | 28% | 25% |
| | 3 x FR-BU2-H75K | S | 3 x MT-BR5-H75K | - | 300% | 250% | 200% | 150% | 120% | 100% | 85% | 80% | 65% | 60% | 50% | 43% | 37% |
| | 4 x FR-BU2-H75K | S | 4 x MT-BR5-H75K | - | - | 300% | 270% | 200% | 160% | 135% | 115% | 105% | 85% | 80% | 65% | 55% | 50% |
| | 5 x FR-BU2-H75K | S | 5 x MT-BR5-H75K | - | - | - | 300% | 250% | 200% | 170% | 140% | 130% | 110% | 100% | 83% | 70% | 62% |
| | 6 x FR-BU2-H75K | S | 6 x MT-BR5-H75K | - | - | - | - | 300% | 240% | 200% | 170% | 160% | 130% | 120% | 100% | 85% | 75% |
| | 7 x FR-BU2-H75K | S | 7 x MT-BR5-H75K | - | - | - | - | - | 280% | 235% | 200% | 185% | 155% | 140% | 115% | 100% | 85% |
| | 8 x FR-BU2-H75K | S | 8 x MT-BR5-H75K | - | - | - | - | - | - | 270% | 230% | 210% | 175% | 160% | 130% | 110% | 100% |

**Dynamic Braking Unit & Resistor Specifications**

| Brake Unit Model No. | | Stocked Item | Brake Resistor Model No. | Stocked Item | Weight kg / lbs | Resistance (Ohms) | Rated (Watts) | Continuous Permissible Power (Watts) |
|---|---|---|---|---|---|---|---|---|
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | - | 50 | 300 | 100 |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | - | 30 | 900 | 300 |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | - | 20 | 1800 | 600 |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | 15 / 33 | 8 | 4000 | 990 |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | 30 / 66 | 4 | 8000 | 1990 |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | 70 / 154 | 2 | 16000 | 3910 |
| 460V | FR-BU2-H7.5K | S | 2 x BU-3700-TEIKOUKI | - | - | 60 | 1800 | 600 |
| | FR-BU2-H15K | S | FR-BR-H15K-UL | S | 15 / 33 | 32 | 4000 | 990 |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | 30 / 66 | 16 | 8000 | 1990 |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | 70 / 154 | 8 | 16000 | 3910 |
| | FR-BU2-H75K | S | MT-BR5-H75K | - | 70 / 154 | 6.5 | 30000 | 7500 |

### F700 Dynamic Braking Units and Resistors - UFS Series

- A more economical solution to regenerative braking applications
- UL and cUL listing for the brake units
- Internal Form-C relay
- Adjustable DC bus brake turn-on voltage
- Configurable master / slave brake configuration. Allows connection of up to 5 brake units (1 master / 4 slaves)

### 240V Series

| | | Motor Capacity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Braking Torque** | **HP** | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| | **kW** | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| **100% For 15 Secs.** | **Brake Unit** | UFS22J | | | | | UFS40J | | 2 x UFS40J | | |
| | **Brake Resistor** | RUFC15J | | | RUFC22J | | RUFC40J | | 2 x RUFC40J | | |
| **Electrical Data** | **Continuous Permissible Power (W)** | UFS22J - 1500W | | | | | UFS40J - 2000W | | 2ea x UFS40J - 4000W | | |
| | **Resistance (Overall)** | RUFC15J - 24ohms | | | RUFC22J - 12ohms | | RUFC40J - 7.5ohms | | 2ea x RUFC40J - 3.75ohms | | |
| | **Continuous Current (Amps)** | 7A | | | 10A | | 14.6A | | 29.2A | | |

### 460V Series

| | | Motor Capacity | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Braking Torque** | **HP** | 7.5 | 10 | 15 | 25 | 30 | 40 | 50 | 60 | 75 |
| | **kW** | 5.5 | 7.5 | 11 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| **100% For 15 Secs.** | **Brake Unit** | UFS22 | | | | | | UFS40 | | |
| | **Brake Resistor** | RUFC15/480 | | RUFC22/480 | | | | RUFC40/480 | | |
| **Electrical Data** | **Continuous Permissible Power (W)** | UFS22 - 2000W | | | | | | UFS40 - 4000W | | |
| | **Resistance (Overall)** | RUFC15/480 - 44ohms | | RUFC22/480 - 27ohms | | | | RUFC40/480 - 15ohms | | |
| | **Continuous Current (Amps)** | 6A | | 7.7A | | | | 14.6 | | |

| | | Motor Capacity | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Braking Torque** | **HP** | 100 | 125 | 150 | 175 | 215 | 300 | 375 |
| | **kW** | 75 | 90 | 110 | 132 | 160 | 220 | 280 |
| **100% For 15 Secs.** | **Brake Unit** | UFS110 | | | | 2 X UFS110 | | |
| | **Brake Resistor** | RUFC110/480 | | | | 2 X RUFC110/480 | | |
| **Electrical Data** | **Continuous Permissible Power (W)** | UFS110 - 8000W | | | | 2 x UFS110 - 16000W | | |
| | **Resistance (Overall)** | RUFC110/480 - 6.8ohms | | | | 2 x RUFC110/480 - 3.4ohms | | |
| | **Continuous Current (Amps)** | 30.7A | | | | 61.4A | | |

### Dimensions

| **Model Number** | | **Height** | | **Width** | | **Depth** | | **Approximate Weight** | | **Stocked Item** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **mm** | **inches** | **mm** | **inches** | **mm** | **inches** | **kg** | **lbs** | |
| **240V** | **UFS20J** | 250 | 9.8 | 100 | 3.9 | 175 | 6.9 | 2.5 | 5.5 | S |
| | **UFS40J** | | | | | | | | | S |
| | **RUFC15J** | 240 | 9.5 | | | 75 | 3 | 2.8 | 6.2 | S |
| | **RUFC22J** | 310 | 12.2 | | | | | 3.5 | 7.7 | S |
| | **RUFC40J** | 365 | 14.4 | | | | | 4.3 | 9.5 | S |
| **480V** | **UFS22** | 250 | 9.8 | 100 | 3.9 | 175 | 6.9 | 2.5 | 5.5 | S |
| | **UFS40** | | | | | | | | | S |
| | **UFS110** | | | 107 | 4.2 | 195 | 7.7 | 3.9 | 8.6 | S |
| | **RUFC15/480** | 310 | 12.2 | 100 | 3.9 | 75 | 3 | 3.5 | 7.7 | S |
| | **RUFC22/480** | 365 | 14.4 | | | | | 4.2 | 9.3 | S |
| | **RUFC40/480** | 2 x 365 | 2 x 14.4 | 2 x 100 | 2 x 3.9 | 2 x 75 | 2 x 3 | 8.7 | 19.2 | S |
| | **RUFC110/480** | 4 x 365 | 4 x 14.4 | 4 x 100 | 4 x 3.9 | 4 x 75 | 4 x 3 | 17.3 | 38.1 | S |

## F700 VFD Efficiency Values

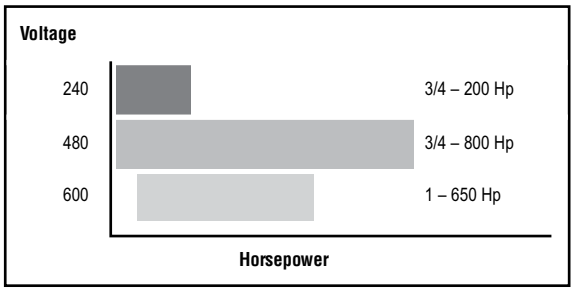
| 240VAC 3-Phase Input | | | | | | 480VAC 3-Phase Input | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Model Number** | **Rated Watts** | **Watts Loss SLD** | **Efficiency SLD** | **Watts Loss LD** | **Efficiency LD** | **Model Number** | **Rated Watts** | **Watts Loss SLD** | **Efficiency SLD** | **Watts Loss LD** | **Efficiency LD** |
| FR-F720-00046-NA | 750 | 70 | 91% | 60 | 92% | FR-F740-00023-NA | 750 | 60 | 92% | 50 | 93% |
| FR-F720-00077-NA | 1500 | 110 | 93% | 100 | 93% | FR-F740-00038-NA | 1500 | 80 | 95% | 80 | 95% |
| FR-F720-00105-NA | 2200 | 140 | 94% | 130 | 94% | FR-F740-00052-NA | 2200 | 100 | 95% | 90 | 96% |
| FR-F720-00167-NA | 3700 | 210 | 94% | 190 | 95% | FR-F740-00083-NA | 3700 | 160 | 96% | 140 | 96% |
| FR-F720-00250-NA | 5500 | 300 | 95% | 260 | 95% | FR-F740-00126-NA | 5500 | 190 | 97% | 180 | 97% |
| FR-F720-00340-NA | 7500 | 370 | 95% | 340 | 95% | FR-F740-00170-NA | 7500 | 240 | 97% | 220 | 97% |
| FR-F720-00490-NA | 11000 | 590 | 95% | 530 | 95% | FR-F740-00250-NA | 11000 | 340 | 97% | 310 | 97% |
| FR-F720-00630-NA | 15000 | 660 | 96% | 580 | 96% | FR-F740-00310-NA | 15000 | 390 | 97% | 350 | 98% |
| FR-F720-00770-NA | 18500 | 910 | 95% | 810 | 96% | FR-F740-00380-NA | 18500 | 490 | 97% | 440 | 98% |
| FR-F720-00930-NA | 22000 | 1050 | 95% | 940 | 96% | FR-F740-00470-NA | 22000 | 580 | 97% | 520 | 98% |
| FR-F720-01250-NA | 30000 | 1540 | 95% | 1370 | 95% | FR-F740-00620-NA | 30000 | 810 | 97% | 710 | 98% |
| FR-F720-01540-NA | 37000 | 1490 | 96% | 1320 | 96% | FR-F740-00770-NA | 37000 | 1000 | 97% | 930 | 97% |
| FR-F720-01870-NA | 45000 | 1680 | 96% | 1490 | 97% | FR-F740-00930-NA | 45000 | 1170 | 97% | 1030 | 98% |
| FR-F720-02330-NA | 55000 | 2210 | 96% | 1950 | 96% | FR-F740-01160-NA | 55000 | 1510 | 97% | 1320 | 98% |
| FR-F720-03160-NA | 75000 | 2825 | 96% | 2500 | 96% | FR-F740-01800-NA | 75000 | 2700 | 96% | 2250 | 97% |
| FR-F720-03800-NA | 90000 | 3165 | 96% | 2800 | 96% | FR-F740-02160-NA | 90000 | 3300 | 96% | 2700 | 97% |
| FR-F720-04750-NA | 110000 | 4070 | 96% | 3600 | 96% | FR-F740-02600-NA | 110000 | 3960 | 96% | 3300 | 97% |
| - | - | - | - | - | - | FR-F740-03250-NA | 132000 | 4800 | 96% | 3960 | 97% |
| - | - | - | - | - | - | FR-F740-03610-NA | 160000 | 5550 | 97% | 4800 | 97% |
| - | - | - | - | - | - | FR-F740-04320-NA | 185000 | 6600 | 96% | 5550 | 97% |
| - | - | - | - | - | - | FR-F740-04810-NA | 220000 | 7500 | 97% | 6600 | 97% |
| - | - | - | - | - | - | FR-F740-05470-NA | 250000 | 8400 | 97% | 7500 | 97% |
| - | - | - | - | - | - | FR-F740-06100-NA | 280000 | 9450 | 97% | 8400 | 97% |
| - | - | - | - | - | - | FR-F740-06830-NA | 315000 | 10650 | 97% | 9450 | 97% |
| - | - | - | - | - | - | FR-F740-07700-NA | 355000 | 12000 | 97% | 10650 | 97% |
| - | - | - | - | - | - | FR-F740-08660-NA | 400000 | 13500 | 97% | 12000 | 97% |
| - | - | - | - | - | - | FR-F740-09620-NA | 450000 | 15000 | 97% | 13500 | 97% |
| - | - | - | - | - | - | FR-F740-10940-NA | 500000 | 16800 | 97% | 15000 | 97% |
| - | - | - | - | - | - | FR-F740-12120-NA | 560000 | 18900 | 97% | 16800 | 97% |

**General Notes:**
1. The amount of heat generated by the inverter is based on one inverter connected to one motor of the same capacity.
2. The amount of heat generated in the above table is the amount of heat generated when the inverter is operated at its rated current.
3. The amount of heat generated will decrease according to the motor load and usage (duty).
4. When using the external heat sink attachment watt loss decreases by 60%.

# A700 Series

Mitsubishi Electric's RSV technology gives you class-leading power, control and flexibility.


- Wide Speed Range: 200:1 operating range is possible - even when the drive is used 'open loop'
- PLC Feature: A700 programmability provides true intelligence inside the drive - a simple solution for complex applications
- Easy Gain Tuning: Compensates automatically for changes in load inertia to ensure smooth and consistent operation
- Fast Response: Up to 300 radians / second speed response means lightning fast reaction to sudden load changes
- USB Port: Allows simple connection to the new FR-Configurator Software for quick and easy commissioning
- Power Down Braking: Keeps the motor under control even if the supply power is lost
- Remote I / O Capability: All of the drive I/O can be read or controlled over a network
- Brake Transistor Circuit: Included in all sizes up to 30 Hp
- Integral Radio Filter: Limits Radio Noise emissions to meet EU Directive - all sizes of drive
- Speed Control: with or without torque limit allows 200:1 Speed range, driving or overhauling
- Open Loop Torque Control: including torque at zero speed
- UL Listed for single-phase input




### A700 Ratings 240V Class

Output voltage: 3 phase 200-240V at 60Hz - Voltage Tolerance 170-264V at 60Hz

| ND (50°C) 150% OL / 1 min 200% OL / 3 sec | | HD (50°C) 200% OL / 1 min 250% OL / 3 sec | | LD (50°C) 120% OL / 1 min 150% OL / 3 sec | | SLD (40°C) 110% OL / 1 min 120% OL / 3 sec | | Model Number (*6) | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | | | | | | |
| 1/2 | 3 | 1/4 | 1.5 | 1 | 4.2 | 1 | 4.6 | FR-A720-00030-NA | A | Self Cooling | NEMA 1 (*2) | 150% torque / 3% ED | S |
| 1 | 5 | 1/2 | 3 | 2 | 6.5 | 2 | 7.1 | FR-A720-00050-NA | B | | | | S |
| 2 | 8 | 1 | 5 | 3 | 9.6 | 3 | 10.5 | FR-A720-00080-NA | C | | | | S |
| 3 | 11 | 2 | 8 | 5 | 15.2 | 5 | 16.7 | FR-A720-00110-NA | C | Forced Air Cooling | | 100% torque / 3% ED | S |
| 5 | 17.5 | 3 | 11 | 7.5 | 24 | 7.5 | 25 | FR-A720-00175-NA | C | | | | S |
| 7.5 | 24 | 5 | 17.5 | 10 | 31 | 10 | 34 | FR-A720-00240-NA | D | | | 100% torque / 2% ED | S |
| 10 | 33 | 7.5 | 24 | 15 | 45 | 15 | 49 | FR-A720-00330-NA | D | | | | S |
| 1/2 | 3 | 1/4 | 1.5 | 1 | 4.2 | 1 | 4.6 | FR-A720-00030-N4 | A (*5) | Self Cooling | UL Type 1 - Plenum Rated | 150% torque / 3% ED | - |
| 1 | 5 | 1/2 | 3 | 2 | 6.5 | 2 | 7.1 | FR-A720-00050-N4 | B (*5) | | | | - |
| 2 | 8 | 1 | 5 | 3 | 9.6 | 3 | 10.5 | FR-A720-00080-N4 | C (*5) | | | | - |
| 3 | 11 | 2 | 8 | 5 | 15.2 | 5 | 16.7 | FR-A720-00110-N4 | C (*5) | Forced Air Cooling | | 100% torque / 3% ED | - |
| 5 | 17.5 | 3 | 11 | 7.5 | 24 | 7.5 | 25 | FR-A720-00175-N4 | C (*5) | | | | - |
| 7.5 | 24 | 5 | 17.5 | 10 | 31 | 10 | 34 | FR-A720-00240-N4 | D (*5) | | | 100% torque / 2% ED | - |
| 10 | 33 | 7.5 | 24 | 15 | 45 | 15 | 49 | FR-A720-00330-N4 | D (*5) | | | | - |
| 15 | 46 | 10 | 33 | 20 | 58 | 20 | 63 | FR-A720-00460-NA | E | | | 20% torque / continuous (brake transistor included) | S |
| 20 | 61 | 15 | 46 | 25 | 70 | 25 | 77 | FR-A720-00610-NA | F | | | | S |
| 25 | 76 | 20 | 61 | 30 | 85 | 30 | 93 | FR-A720-00760-NA | F | | | | S |
| 30 | 90 | 25 | 76 | 40 | 114 | 40 | 125 | FR-A720-00900-NA | F | | | | S |
| 40 | 115 | 30 | 90 | 50 | 140 | 50/60 | 154 | FR-A720-01150-NA | G | | IP00 (*3) | 20% torque / continuous | S |
| 50 | 145 | 40 | 115 | 60 | 170 | 60 | 187 | FR-A720-01450-NA | H | | | | S |
| 60 | 175 | 50 | 145 | 75 | 212 | 75 | 233 | FR-A720-01750-NA | H | | | | S |
| 75 | 215 | 60 | 175 | 100 | 288 | 100/125 | 316 | FR-A720-02150-NA | JA | | | | S |

### A700 Ratings 240V Class

Output voltage: 3 phase 200-240V at 60Hz - Voltage Tolerance 170-264V at 60Hz - DC Link Choke is included with the VFD

| ND (50°C) 150% OL / 1 min 200% OL / 3 sec | | HD (50°C) 200% OL / 1 min 250% OL / 3 sec | | LD (50°C) 120% OL / 1 min 150% OL / 3 sec | | SLD (40°C) 110% OL / 1 min 120% OL / 3 sec | | Model Number (*6) | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hp | FLA | Hp | FLA | Hp | FLA | Hp | FLA | | | | | | |
| 100 | 288 | 75 | 215 | 125 | 346 | 150 | 380 | FR-A720-02880-NA | K | Forced Air Cooling | IP00 (*3) | 10% torque / continuous | - |
| 125 | 346 | 100 | 288 | 150 | 432 | 200 | 475 | FR-A720-03460-NA | K | | | | - |

**Notes:** See next page.

### A700 Ratings 480V Class

Output voltage: 3 phase 380-480V at 60Hz - Voltage Tolerance 323-528V at 60Hz.

| ND (50°C) | | HD (50°C) | | LD (50°C) | | SLD (40°C) | | Model Number (*6) | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150% OL / 1 min | | 200% OL / 1 min | | 120% OL / 1 min | | 110% OL / 1 min | | | | | | | |
| 200% OL / 3 sec | | 250% OL / 3 sec | | 150% OL / 3 sec | | 120% OL / 3 sec | | | | | | | |
| Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | | | | | | |
| 1/2 | 1.5 | 1/4 | 0.8 | 1 | 2.1 | 1 | 2.3 | FR-A740-00015-NA | C | Self Cooling | NEMA 1 (*2) | 100% torque / 2% ED | S |
| 1 | 2.5 | 1/2 | 1.5 | 2 | 3.5 | 2 | 3.8 | FR-A740-00025-NA | C | | | | S |
| 2 | 4 | 1 | 2.5 | 3 | 4.8 | 3 | 5.2 | FR-A740-00040-NA | C | | | | S |
| 3 | 6 | 2 | 4 | 5 | 7.6 | 5 | 8.3 | FR-A740-00060-NA | C | Forced Air Cooling | | | S |
| 5 | 9 | 3 | 6 | 7.5 | 11.5 | 7.5 | 12.6 | FR-A740-00090-NA | C | | | | S |
| 7.5 | 12 | 5 | 9 | 10 | 16 | 10 | 17 | FR-A740-00120-NA | D | | | | S |
| 10 | 17 | 7.5 | 12 | 15 | 23 | 15 | 25 | FR-A740-00170-NA | D | | | | S |
| 1/2 | 1.5 | 1/4 | 0.8 | 1 | 2.1 | 1 | 2.3 | FR-A740-00015-N4 | C (*5) | Self Cooling | UL Type 1 - Plenum Rated | 100% torque / 2% ED | - |
| 1 | 2.5 | 1/2 | 1.5 | 2 | 3.5 | 2 | 3.8 | FR-A740-00025-N4 | C (*5) | | | | - |
| 2 | 4 | 1 | 25 | 3 | 4.8 | 3 | 5.2 | FR-A740-00040-N4 | C (*5) | | | | - |
| 3 | 6 | 2 | 4 | 5 | 7.6 | 5 | 8.3 | FR-A740-00060-N4 | C (*5) | Forced Air Cooling | | | - |
| 5 | 9 | 3 | 6 | 7.5 | 11.5 | 7.5 | 12.6 | FR-A740-00090-N4 | C (*5) | | | | - |
| 7.5 | 12 | 5 | 9 | 10 | 16 | 10 | 17 | FR-A740-00120-N4 | D (*5) | | | | - |
| 10 | 17 | 7.5 | 12 | 15 | 23 | 15 | 25 | FR-A740-00170-N4 | D (*5) | | | | - |
| 15 | 23 | 10 | 17 | 20 | 29 | 20 | 31 | FR-A740-00230-NA | E | | | 20% torque / continuous (brake transis-tor included) | S |
| 20 | 31 | 15 | 23 | 25 | 35 | 25 | 38 | FR-A740-00310-NA | E | | | | S |
| 25 | 38 | 20 | 31 | 30 | 43 | 30 | 47 | FR-A740-00380-NA | F | | | | S |
| 30 | 44 | 25 | 38 | 40 | 57 | 40 | 62 | FR-A740-00440-NA | F | | | | S |
| 40 | 57 | 30 | 44 | 50 | 70 | 50/60 | 77 | FR-A740-00570-NA | G | | IP00 (*4) | 20% torque / continuous | S |
| 50 | 71 | 40 | 57 | 60 | 85 | 60 | 93 | FR-A740-00710-NA | H | | | | S |
| 60 | 86 | 50 | 71 | 75 | 106 | 75 | 116 | FR-A740-00860-NA | H | | | | S |
| 75 | 110 | 60 | 86 | 100 | 144 | 100/150 | 180 | FR-A740-01100-NA | H | | | | S |

**Notes:** See below.

### A700 Ratings 480V Class

Output voltage: 3 phase 380-480V at 60Hz - Voltage Tolerance 323-528V at 60Hz - DC Link Choke is included with the VFD.

| ND (50°C) | | HD (50°C) | | LD (50°C) | | SLD (40°C) | | Model Number (*6) | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150% OL / 1 min | | 200% OL / 1 min | | 120% OL / 1 min | | 110% OL / 1 min | | | | | | | |
| 200% OL / 3 sec | | 250% OL / 3 sec | | 150% OL / 3 sec | | 120% OL / 3 sec | | | | | | | |
| Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | Hp (*1) | FLA | | | | | | |
| 100 | 144 | 75 | 110 | 150 | 180 | 150 | 216 | FR-A740-01440-NA | J | Forced Air Cooling | IP00 (*4) | 10% torque / continuous | S |
| 150 | 180 | 100 | 144 | 150 | 216 | 200 | 260 | FR-A740-01800-NA | J | | | | S |
| 150 | 216 | 150 | 180 | 200 | 260 | 250 | 325 | FR-A740-02160-NA | K | | | | S |
| 200 | 260 | 150 | 216 | 250 | 325 | 300 | 361 | FR-A740-02600-NA | K | | | | S |
| 250 | 325 | 200 | 260 | 300 | 361 | 350 | 432 | FR-A740-03250-NA | L | | | | S |
| 300 | 361 | 250 | 325 | 350 | 432 | 400 | 481 | FR-A740-03610-NA | L | | | | S |
| 350 | 432 | 300 | 361 | 400 | 481 | 450 | 547 | FR-A740-04320-NA | M | | | | S |
| 400 | 481 | 350 | 432 | 450 | 547 | 500 | 610 | FR-A740-04810-NA | M | | | | S |
| 450 | 547 | 400 | 481 | 500 | 610 | 550 | 683 | FR-A740-05470-NA | M | | | | S |
| 500 | 610 | 450 | 547 | 550 | 683 | 650 | 770 | FR-A740-06100-NA | N | | IP00 | | - |
| 550 | 683 | 500 | 610 | 650 | 770 | 700 | 866 | FR-A740-06830-NA | N | | | | - |
| 650 | 770 | 550 | 683 | 700 | 866 | 800 | 962 | FR-A740-07700-NA | P | | | | - |
| 700 | 866 | 650 | 770 | 800 | 962 | 900 | 1094 | FR-A740-08660-NA | P | | | | - |
| 800 | 962 | 700 | 866 | 900 | 1094 | 1000 | 1212 | FR-A740-09620-NA | P | | | | - |

**Notes:**
1. Motor ratings shown are intended as guidelines only - based on 4 pole standard inductions motors.
2. UL Type 1 version drives are available - replace "-NA" suffix with "-N4".
3. Conduit adapter option required for types 01150 - 03460.
4. Conduit adapter option required for types 00570 - 05470.
5. Depth is slightly extended to meet UL Type 1 requirements.
6. For single phase input, derate output current by 40% (Models up to FR-A720-02880-NA and FR-A740-03610-NA)

## A700 Ratings 600V Class

Output voltage: 3 phase 525-600V at 60Hz - Voltage Tolerance 472-660V at 60Hz

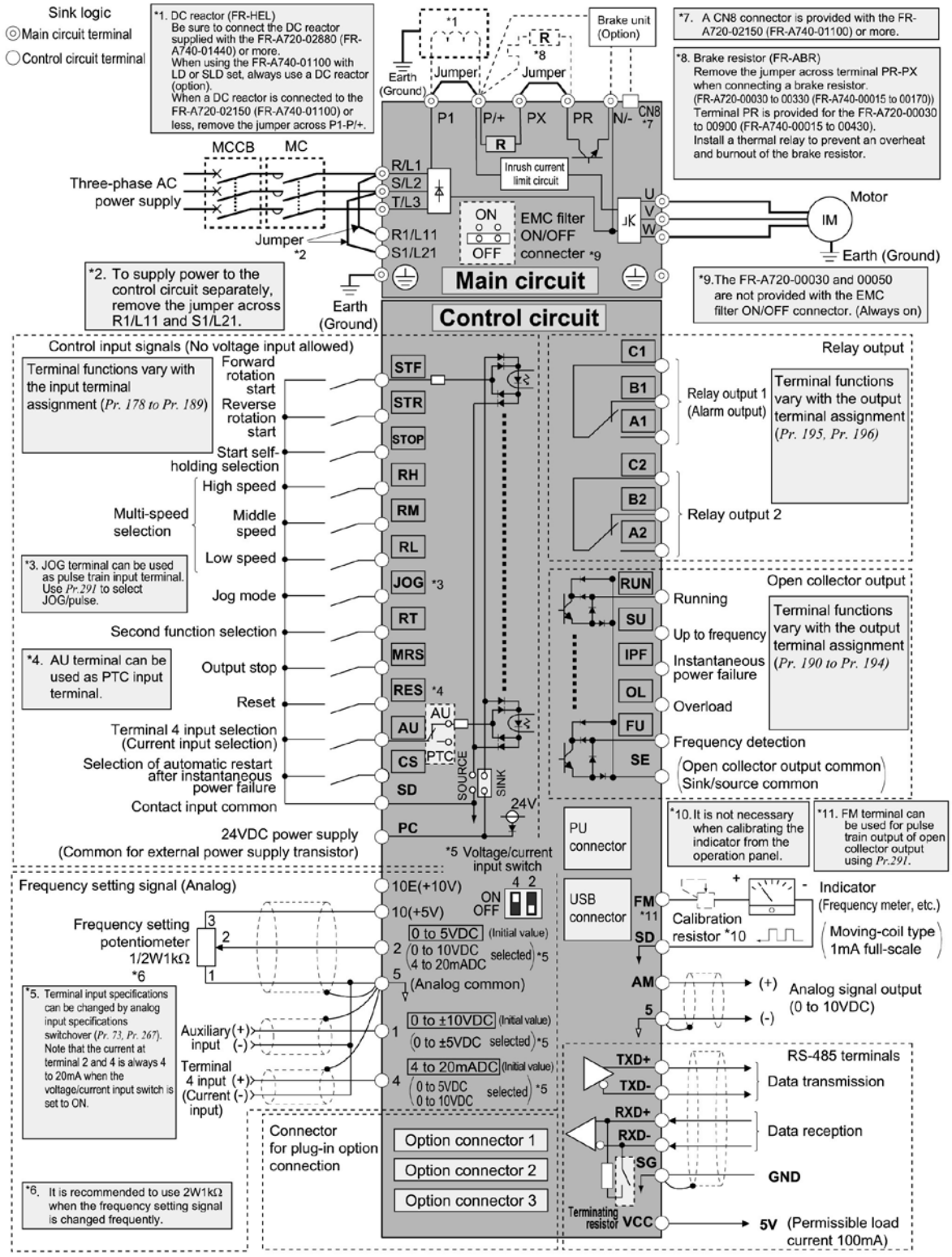
| ND (40°C) | | HD (40°C) | | LD (40°C) | | SLD (40°C) (30°C for 00040 or less) | | Model Number | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | DC Link Reactor | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150% OL / 1 min | | 200% OL / 1 min<br>250% OL / 3 sec. | | 120% OL / 1 min | | 110% OL / 1 min | | | | | | | | |
| 200% OL / 3 sec. | | 280% OL / 0.5 sec. | | 150% OL / 3 sec. | | 120% OL / 1 min | | | | | | | | |
| HP (*1) | FLA | HP (*1) | FLA | HP (*1) | FLA | HP (*1) | FLA | | | | | | | |
| 1 | 1.7 | 1/2 | 1.0 | 1 1/2 | 2.5 | 2 | 2.7 | FR-A760-00017-NA | C | Self cooling | UL Type 1 (*3) | 100% torque / 2% ED | Option | - |
| 3 | 4.0 | 2 | 2.7 | 3 | 5.6 | 5 | 6.1 | FR-A760-00040-NA | | Forced air cooling | | | | S |
| 5 | 6.1 | 3 | 4.0 | 5 | 8.2 | 7 1/2 | 9.0 | FR-A760-00061-NA | | | | | | S |
| 10 | 12 | 7 1/2 | 9.0 | 10 | 16 | 15 | 17 | FR-A760-00120-NA | D | | UL Type 1 | 20% torque / continuous (brake transistor included) | | S |
| 20 | 22 | 10 | 16 | 25 | 27 | 30 | 32 | FR-A760-00220-NA | E | | | | | S |
| 30 | 33 | 20 | 24 | 40 | 41 | 40 | 45 | FR-A760-00330-NA | F | | | | | S |
| 50 | 55 | 40 | 41 | 60 | 62 | 60 | 68 | FR-A760-00550-NA | H | | IP00 (*4) | 20% torque / continuous | | S |
| 75 | 84 | 60 | 63 | 100 | 99 (*2) | 100 | 108 (*2) | FR-A760-00840-NA | | | | | | S |

| ND (50°C) | | HD (40°C) | | LD (50°C) | | SLD (40°C) | | Model Number | Frame Size | Cooling Method | Protective Rating | Regenerative Braking Torque / Max Value (Permissible Duty) | DC Link Reactor | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150% OL / 1 min | | 200% OL / 1 min<br>250% OL / 3 sec. | | 120% OL / 1 min | | 110% OL / 1 min | | | | | | | | |
| 200% OL / 3 sec. | | 280% OL / 0.5 sec. | | 150% OL / 3 sec. | | 120% OL / 1 min | | | | | | | | |
| HP (*1) | FLA | HP (*1) | FLA | HP (*1) | FLA | HP (*1) | FLA | | | | | | | |
| 100 | 104 | 75 | 84 | 125 | 131 | 150 | 144 | FR-A760-01040-NA | J | Forced air cooling | IP00 (*4) | 20% torque / continuous | Standard | S |
| 125 | 131 | 100 | 104 | 150 | 152 | 150 | 167 | FR-A760-01310-NA | | | | | | S |
| 150 | 152 | 125 | 131 | 200 | 221 | 250 | 243 | FR-A760-01520-NA | | | | | | S |
| 200 | 221 | 150 | 152 | 250 | 255 | 300 | 289 | FR-A760-02210-NA | L | | | | | S |
| 250 | 255 | 200 | 202 | 300 | 304 | 350 | 336 | FR-A760-02550-NA | | | | | | - |
| 300 | 304 | 250 | 255 | 400 | 402 | 450 | 442 | FR-A760-03040-NA | M | | | | | S |
| 400 | 402 | 300 | 304 | 500 | 496 | 550 | 545 | FR-A760-04020-NA | N | | IP00 | | | - |
| 500 | 496 | 400 | 402 | 600 | 589 | 650 | 647 | FR-A760-04960-NA | P | | | | | S |
| 650 | 663 | 600 | 589 | 750 | 773 | 850 | 850 | FR-A760-06630-NA | | | | | | - |

**Notes:**

1. Motor ratings shown are intended as guidelines only - based on 4 pole standard induction motors.
2. To utilize these ratings, DC Link reactor is required.
3. These models supplied with an externally connected brake resistor. When the external brake resistor is used, protective rating is open type (NEMA1).
4. Conduit adapter option required for types 00550-03040.

## A700 Terminal Connection Diagram




## A700 Control Terminal Layout

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | B1 | C1 | A2 | B2 | C2 | 10E | 10 | 2 | 5 | 4 |
| RL | RM | RH | RT | AU | STOP | MRS | RES | SD | FM | AM | 1 | |
| SE | RUN | SU | IPF | OL | FU | SD | SD | STF | STR | JOG | CS | PC |

## A700 General Specifications

| | | | |
|---|---|---|---|
| Operation Specifications | **Control Method** | | Soft-PWM control/high carrier frequency PWM control (selectable from among V/F control, advanced magnetic flux vector control and real sensorless vector control) / vector control (when used with option FR-A7AP) (*1) |
| | **Output Frequency Range** | | 0.2 to 400Hz |
| | **Frequency Setting Resolution** | **Analog Input** | 0.015Hz/0 to 60Hz (terminal 2, 4: 0 to 10V/12 bit); 0.03Hz/0 to 60Hz (terminal 2, 4: 0 to 5V/11 bit, 0 to 20mA/about 11 bit, terminal 1: 0 to ±10V/12 bit) 0.06Hz/0 to 60Hz (terminal 1: 0 to ±5V/11 bit) |
| | | **Digital Input** | 0.01Hz |
| | **Frequency Accuracy** | **Analog Input** | Within ±0.2% of the max. output frequency (25°C ±10°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 or adjustable 5 points V/F can be selected |
| | **Starting Torque** | | 200% 0.3Hz (up to frame size C), 150% 0.3Hz (Frame Size D and above) (under real sensorless vector control or vector control) |
| | **Torque Boost** | | Manual torque boost |
| | **Acceleration / Deceleration Time Setting** | | 0 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration 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 220% adjustable), whether to use the function or not can be selected |
| | **Torque Limit Level** | | Torque limit value can be set (0 to 400% variable) |
| | **Frequency Setting Signal** | **Analog Input** | Terminal 2: 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected • Terminal 1:-10 to +10V, -5 to +5V can be selected |
| | | **Digital Input** | Input using the setting dial of the operation panel or parameter unit. Four-digit BCD or 16 bit binary (when used with option FR-A7AX) |
| | **Start Signal** | | Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected. |
| | **Input Signal** | | Select any twelve signals using Pr. 178 to Pr. 189 (input terminal function selection) from among multi speed selection, remote setting, stop-on-contact, second function selection, third function selection, terminal 4 input selection, JOG operation selection, selection of automatic restart after instantaneous power failure, flying start, external thermal relay input, inverter operation enable signal (FR-HC/FR-CV connection), FR-HC connection (instantaneous power failure detection), PU operation/external inter lock signal, external DC injection brake operation start, PID control enable terminal, brake opening completion signal, PU operation/external operation switchover, load pattern selection forward rotation reverse rotation boost, V/F switching, load torque high-speed frequency, S-pattern acceleration/deceleration C switchover, pre-excitation, output stop, start self-holding selection, control mode changing, torque limit selection, start-time tuning start external input, torque bias selection 1, 2 (*1), P/PI control switchover, forward rotation command, reverse rotation command, inverter reset, PTC thermistor input, PID forward reverse operation switchover, PU-NET operation switchover, NET-external operation switchover, and command source switchover, conditional position pulse train sign (*1), conditional position droop pulse clear (*1). |
| | **Pulse Train Input** | | 100kpps |
| | **Operational Functions** | | Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, polarity reversible operation, automatic restart after instantaneous power failure operation, commercial power supply-inverter switchover operation, forward/reverse rotation prevention, remote setting, brake sequence, second function, third function, multi-speed operation, original operation continuation at instantaneous power failure, stop-on-contact control, load torque high speed frequency control, droop control, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, online auto tuning function, PID control, computer link operation (RS-485), motor end orientation (*1), machine end orientation (*1), pre-excitation, notch filter, machine analyzer (*1), easy gain tuning, speed feed forward, and torque bias (*1) |
| | **Output Signals** | **Operating Status** | Select any signals using Pr. 190 to Pr. 196 (output terminal function selection) from among inverter running, up-to-frequency, instantaneous power failure/undervoltage, overload warning, output frequency (speed) detection, second output frequency (speed) detection, third output frequency (speed) detection, regenerative brake prealarm, electronic thermal relay function pre-alarm, PU operation mode, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward rotation reverse rotation output, commercial power supply-inverter switchover MC1, commercial power supply-inverter switchover MC2, commercial power supply-inverter switchover MC3, orientation completion (*1), brake opening request, fan fault output, heatsink overheat pre-alarm , inverter running/start command on, deceleration at an instantaneous power failure, PID control activated, during retry, PID output interruption, life alarm, alarm output 1, 2, 3 (power-off signal), power savings average value update timing, current average monitor, maintenance timer alarm, remote output, forward rotation output (*1), reverse rotation output (*1), low speed output, torque detection, regenerative status output (*1), start-time tuning completion, in-position completion (*1), minor failure output and alarm output. Open collector output (5 points), relay output (2 points) and alarm code of the inverter can be output (4 bit) from the open collector. |
| | | **Using FR-A7AY, FR-A7AR (optional)** | In addition to the above, select any signals using Pr. 313 to Pr. 319 (extension output terminal function selection) from among control circuit capacitor life, main circuit capacitor life, cooling fan life, inrush current limit circuit life (only positive logic can be set for extension terminals of the FR-A7AR). |
| | **Pulse Train Input** | | 500kpps |
| | **Pulse / Analog Output** | | Select any signals using Pr. 54 FM terminal function selection (pulse train output) and Pr. 158 AM terminal function selection (analog output) from among output frequency, motor current (steady or peak value), output voltage, frequency setting, operation speed, motor torque, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, motor excitation current, reference voltage output, motor load factor, power saving effect, regenerative brake duty, PID set point, PID measured value, motor output, torque command, torque current command, and torque monitor. |
| Indication | **PU (FR-DU07 / FR-PU07 / FR-PU04)** | **Operating Status** | Output frequency, motor current (steady or peak value), output voltage, frequency setting, running speed,motor torque, overload, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, motor excitation current, cumulative energization time, actual operation time, motor load factor, cumulative power, energy saving effect, cumulative saving power, regenerative brake duty, PID set point, PID measured value, PID deviation, inverter I/O terminal monitor, input terminal option monitor (*2), output terminal option monitor (*2), option fitting status (*3), terminal assignment status (*3), torque command, torque current command, feed back pulse (*1), motor output |
| | | **Alarm Definition** | Alarm definition is displayed when the protective function is activated, the output voltage/current/frequency/cumulative energization time right before the protection function was activated and past 8 alarm definitions are stored. |
| | | **Interactive Guidance** | Operation guide/trouble shooting with a help function (*3) |
| **Protective / Warning Function** | | | 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, instantaneous power failure occurrence, undervoltage, input phase failure, motor overload, output side earth (ground) fault overcurrent, output short circuit, main circuit element overheat, output phase failure, external thermal relay operation, PTC thermistor operation, option alarm, parameter error, PU disconnection, retry count excess, CPU alarm, operation panel power supply short circuit, 24VDC power output short circuit, output current detection value excess, inrush current limit circuit alarm, communication alarm (inverter), USB error, opposite rotation deceleration error, analog input error, fan fault, overcurrent stall prevention, overvoltage stall prevention, regenerative brake prealarm, electronic thermal relay function prealarm, PU stop, maintenance timer alarm (*2), brake transistor alarm, parameter write error, copy operation error, operation panel lock, parameter copy alarm, speed limit indication, encoder no-signal (*1), speed deviation large (*1), overspeed (*1), position error large (*1), encoder phase error (*1) |
| Environment | **Ambient Temperature** | | -10°C to +50°C (non-freezing) |
| | **Ambient Humidity** | | 90%RH maximum (non-condensing) |
| | **Storage Temperature (*4)** | | -20°C to +65°C |
| | **Atmosphere** | | Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt etc.) |
| | **Altitude / Vibration** | | Maximum 1000m above sea level, 0.6 G or less (*5) (conforms to JIS C 60068-2-6) |

**Notes:**
1. Available only when the option (FR-A7AP) is mounted
2. Can be displayed only on the operation panel (FR-DU07).
3. Can be displayed only on the parameter unit (FR-PU07/FR-PU04).
4. Temperature applicable for a short period in transit, etc.
5. 2.9m/s$^2$ or less for the FR-A740-03250 or more.

# A700 Options

## Function / Options

| | | Model No. | Stocked Item |
|---|---|---|---|
| Function | 120VAC Control Input | FR-A7AC | S |
| | Analog I/O | FR-A7AN | S |
| | Encoder Feedback | FR-A7AP | S |
| | Encoder Pulse Dividing Output | FR-A7AL | S |
| | Relay Output | FR-A7AR | S |
| | 12 Bit Digital Input | FR-A7AX | S |
| | Digital Output | FR-A7AY | S |
| | Ext. Analog Output | | |
| | BiPolar Analog Input | FR-A7AZ | - |
| | High Res Analog Input | | |
| | Motor Thermistor | | |
| Communication | CC-Link | FR-A7NC | S |
| | ControlNET | FR-A7NCN | S |
| | DeviceNet | FR-A7ND | S |
| | EtherNet/IP | FR-A7NE | S |
| | LonWorks | FR-A7NL | S |
| | Profibus DP | FR-A7NP | S |
| | SSCNET III | FR-A7NS | S |

## External Heatsink Attachment

| Drive Model | | | Model Number | Stocked Item |
|---|---|---|---|---|
| A720 | A740 | A760 | | |
| 00080 to 00175 | 00025 to 00090 | 00017, 00040, 00061 | FR-A7CN01 | S |
| 00240, 00330 | 00120, 00170 | 00120 | FR-A7CN02 | S |
| 00460 | 00230, 00310 | 00220 | FR-A7CN03 | S |
| 00610 to 00900 | 00380, 00440 | 00330 | FR-A7CN04 | S |
| 01150 | | - | FR-A7CN05 | S |
| | 00570 | - | FR-A7CN06 | S |
| 01450, 01750 | 00710 to 01100 | 00550, 00840 | FR-A7CN07 | S |
| | 01440 | 01040, 01310, 01520 | FR-A7CN08 | - |
| | 01800 | - | FR-A7CN09 | - |
| 03160, 03800, 04750 | 02160, 02600 | - | FR-A7CN10 | - |
| 02150 | | - | FR-A7CN11 | - |

## Software

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-CONFIGURATOR | Programming and diagnostic software | S |

## A700 Demonstration Unit

| Model Number | Description | Stocked Item |
|---|---|---|
| VFD-A700-DEMO | Includes A720 1/2HP, pre-wired digital input switches, LED outputs, two potentiometers, analog meter and encoder option | S |
| VFD-MOTOR-ENC-DEMO | Includes 1/2HP motor and encoder with quick connections to VFD-A700-DEMO | S |

## Instruction Manuals

| Description | Model Number |
|---|---|
| FR-A700 Installation Manual - Contains instructions for installer and parameter list. (Included with VFD, plus CD with all versions of VFD and option manuals.) | IB(NA)0600254 |
| FR-A700 Basic Manual - Contains wiring details, VFD layout drawings, alarm definitions and parameter list. | IB(NA)0600225 |
| FR-A700 Applied Manual - Contains wiring details, VFD layout drawings, alarm definitions and complete parameter list with definitions and setting examples. | IB(NA)0600255 |
| FR-A700 PLC Programming Manual - Contains complete instruction sets for PLC feature. | IB(NA)0600262 |
| FR-PU07 Manual - Contains complete instruction sets and screen definitions. | IB(NA)0600240 |

Manuals available for download at www.meau.com

## Building Management Options

| Network Type / Model | | FR-A7N-ETH (*1,*2) | FR-A7N-XLT (*1,*2) | ETH-1000 (*3,*4) | XLTR-1000 (*3,*4) |
|---|---|---|---|---|---|
| Gateway Communication | BACnet/IP | X | - | X | - |
| | EtherNet/IP | X | - | X | - |
| | Modbus TCP | X | - | X | - |
| | PROFINET IO | X | - | X | - |
| | BACnet MS/TP (*5) | - | X | X | X |
| | Metasys N2 | - | X | X | X |
| | Siemens FLN | - | X | - | - |
| Stocked Item | | S | S | - | - |

**Notes:**
For additional information, visit www.iccdesigns.com
1. Physically mounts within VFD and powered by VFD
2. FR-E7TR option recommended. (PU connector not available for use)
3. Communication to multiple VFD's is possible
4. Mounted and powered external to VFD
5. BACnet MS/TP is built in to F700. Gateway required for pre August 2010 production.

## Conduit Attachments

| Model Number | Drive Model | | | Length (in) (*5) | Weight (lbs) | Stkd. Item |
|---|---|---|---|---|---|---|
| | A720 (*1, *2) | A740 (*1, *2) | A760 (*1, *2) | | | |
| FR-A7FN05 (*4) | 00900 | - | - | 5.9 | 5 | - |
| FR-A7FN06 (*4) | 01150 | 00570 | - | 6.2 | 5 | S |
| FR-A7FN07 (*4) | 01450, 01750 | 00710 to 01100 | 00550, 00840 | 9 | 15 | S |
| FR-A7FN-11 (*3) | - | 01440, 01800 | 01040 to 01520 | 24 | 41 | S |
| FR-A7FN-12 (*3) | 02880, 03460 | 02160, 02600 | - | 24 | 45 | S |
| FR-A7FN-13 (*3) | - | 03250, 03610 | 02210, 02550 | 26 | 50 | S |
| FR-A7FN-14 (*3) | - | 04320 to 05470 | 03040 | 26 | 64 | S |

**Notes:**
1. FR-A720-00460 to 00760 & FR-A740-00230 to 00440 are UL Type 1: the conduit adapter is included as standard.
2. FR-A700 smaller than listed above, the UL Type 1 version (conduit adapter standard) is a special type: Change from suffix -NA to -N4.
3. Mounting hardware included for standard DC chokes which ship with VFD. Kits are powder coated similar to VFD charcoal gray.
4. Kits are coated zinc clear.
5. Width and depth of kit match the asscociated VFD

## Factory Supplied DC Link Chokes

| Standard With VFD | | | | Dimensions inches (mm) | | | Approx Weight lb (kg) |
|---|---|---|---|---|---|---|---|
| Drive Model | DC Link Model No. | mH | Amps | Height | Width | Depth | |
| FR-A740-01440-NA | FR-HEL-H110K | 0.246 | 233 | 13.4 (340) | 5.9 (150) | 7.7 (195) | 22 (48) |
| FR-A740-01880-NA | FR-HEL-H132K | 0.204 | 281 | 15.9 (405) | 6.9 (175) | 7.9 (200) | 26 (57) |
| FR-A740-02160-NA | FR-HEL-H160K | 0.171 | 335 | 15.9 (405) | 6.9 (175) | 8 (205) | 28 (62) |
| FR-A740-02600-NA | FR-HEL-H185K | 0.148 | 389 | 15.9 (405) | 6.9 (175) | 9.4 (240) | 29 (64) |
| FR-A740-03250-NA | FR-HEL-H220K | 0.124 | 462 | 15.9 (405) | 6.9 (175) | 9.4 (240) | 30 (66) |
| FR-A740-03610-NA | FR-HEL-H250K | 0.109 | 524 | 17.3 (440) | 7.5 (190) | 9.8 (250) | 35 (77) |
| FR-A740-04320-NA | FR-HEL-H280K | 0.098 | 585 | 17.3 (440) | 7.5 (190) | 10 (255) | 38 (84) |
| FR-A740-04810-NA | FR-HEL-H315K | 0.087 | 658 | 19.5 (495) | 8.3 (210) | 9.8 (250) | 42 (92) |
| FR-A740-05470-NA | FR-HEL-H355K | 0.077 | 742 | 19.5 (495) | 8.3 (210) | 9.8 (250) | 46 (101) |
| FR-A740-06100-NA | FR-HEL-H400K | 0.069 | 836 | 19.7 (500) | 8.7 (220) | 9.8 (250) | 50 (110) |
| FR-A740-06830-NA | FR-HEL-H450K | 0.061 | 940 | 19.7 (500) | 8.7 (220) | 10.6 (270) | 57 (125) |
| FR-A740-07700-NA | FR-HEL-H500K | 0.055 | 1045 | 17.8 (455) | 8.5 (215) | 13.6 (345) | 67 (147) |
| FR-A740-08660-NA | FR-HEL-H560K | 0.049 | 1170 | 18.1 (460) | 8.5 (215) | 14.2 (360) | 85 (187) |
| FR-A740-09620-NA | FR-HEL-H630K | 0.044 | 1317 | 18.1 (460) | 8.5 (215) | 14.2 (360) | 95 (209) |

## A700 Frame Size

| Frame Size | Drive Height x Width x Depth | | | Weight Without Reactor lbs (kg) |
|---|---|---|---|---|
| | Dimensions inches (mm) | | | |
| | Height | Width | Depth | |
| A | 10.2 (260) | 4.3 (110) | 4.3 (110) | 4.2 (1.9) |
| B | 10.2 (260) | 4.3 (110) | 4.9 (125) | 5 (2.3) |
| C | 10.2 (260) | 5.9 (150) | 5.5 (140) | 9.3 (4.2) |
| D | 10.2 (260) | 8.7 (220) | 6.7 (170) | 17.7 (8) |
| E | 11.8 (300) | 8.7 (220) | 7.5 (190) | 19.4 (8.8) |
| F | 15.8 (400) | 9.8 (250) | 7.5 (190) | 32.6 (14.8) |
| G | 21.7 (550) | 12.8 (325) | 7.7 (195) | 77.1 (35) |
| H | 21.7 (550) | 17.1 (435) | 9.8 (250) | 134.4 (61) |
| JA | 27.6 (700) | 18.3 (465) | 9.8 (250) | 134.4 (61) |
| J | 24.4 (620) | 18.3 (465) | 11.8 (300) | 176.2 (80) |
| K | 29.1 (740) | 18.3 (465) | 14.2 (360) | 244.5 (111) |
| L | 39.8 (1010) | 19.6 (498) | 15 (380) | 378.9 (172) |
| M | 39.8 (1010) | 26.8 (680) | 15 (380) | 385 (175) |
| N | 52.4 (1330) | 31.1 (790) | 17.3 (440) | 572 (260) |
| P | 62.2 (1580) | 39.2 (995) | 17.3 (440) | 814 (370) |

## Parameter Units / Parameter Copy Units

Parameter units are used for operator control, reading and writing parameters, and drive monitoring. Parameter Copy Units also read the drive parameter settings and copy them into non-volatile memory, and can write them into other drives.

| Model Number | Description | Stocked Item |
|---|---|---|
| **FR-CB201** | Extension cable straight plugs on both ends - 1 meter. | S |
| **FR-CB203** | Extension cable straight plugs on both ends - 3 meters. | S |
| **FR-CB205** | Extension cable straight plugs on both ends - 5 meters. | S |
| **FR-DU07** | Control Panel for A700 | S |
| **FR-PU07** | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. Stores settings in non-volatile memory. Built-in parameter copy capability. (F/A700 based) | S |
| **FR-ADP** | FR-DU07 panel mounting adapter | S |
| **FR-PU04** | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. | S |
| **SC-FRPC** | Serial Communication Cable | S |
| **FR-PU07BB-L** | Battery Powered PU07 | S |
| **FR-RJ45-HUB4** | Serial Network Hub - 2 Stations | - |
| **FR-RJ45-HUB10** | Serial Network Hub - 8 Stations | - |
| **FR-RJ45-TR** | Terminating Resistor For FR-RJ45-HUB | - |

### A700 Dynamic Braking

All Mitsubishi Electric VFD's have some inherent braking capability. During controlled deceleration, motor regenerative losses are dissipated in the motor, wire, and VFD circuitry. The built-in DC injection braking allows for low speed braking and stopping.

When the above capabilities are inadequate for an application, it is necessary to add a power transistor brake unit and resistor unit in series across the DC bus.

Motor regeneration causes the DC bus voltage to increase, and when the voltage exceeds a specified threshold, the transistor turns on to pass current through the resistor. Motor kinetic energy is converted to heat energy. VFD overcurrent and overvoltage protective circuits are active at all times, and will fault-trip the VFD if the brake size is inadequate.

Two main factors must be considered when sizing the brake, the effective duty cycle (%ED) and the short time duty rating. The effective duty cycle is increased when an external resistor is added. It is preferable to profile the effective duty cycle of the units of time. With this information, the short time duty is known and the %ED can be calculated, as shown in the below example.

%ED = Braking time / total time for complete operating cycle x 100

Example: Complete cycle is:
5 sec: Acceleration time to reach set speed
60 sec: Run time at set speed
3 sec: Deceleration time to come to a complete stop
12 sec: Time period motor remains stopped

%ED = 3 / (5 + 60 + 3 + 12) x 100 = 3.6%

The tables shown assume 100% brake torque, when brake torque is represented by its percentage to the rated torque of the applied motor.
Torque (kg.m) = 974 x Power (kW) / Speed (rpm).

### 240VAC Dynamic Braking Resistor at 100% Braking Torque

| Resistor Kit Model Number | Weight kg (lbs) | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | A720 | % ED | |
| FR-ABR-0.4K | 0.2 (0.5) | 200 | 60 | 1/2 | 00030 | 10% | S |
| FR-ABR-0.75K | 0.4 (0.9) | 100 | 80 | 1 | 00050 | 10% | S |
| FR-ABR-2.2K | 0.5 (1.1) | 60 | 120 | 2 & 3 | 00080 & 00110 | 10% | S |
| FR-ABR-3.7K | 0.8 (1.8) | 40 | 155 | 5 | 00175 | 10% | S |
| FR-ABR-5.5K | 1.3 (2.9) | 25 | 185 | 7 1/2 | 00240 | 10% | S |
| FR-ABR-7.5K | 2.2 (4.9) | 20 | 340 | 10 | 00330 | 10% | S |
| FR-ABR-11K | 3.4 (7.5) | 13 | 560 | 15 | 00460 | 6% | S |
| FR-ABR-15K (2 resistors in parallel) | 2.4 (5.3) x 2 | 9 (18 / 2) | 805 | 20 | 00610 | 6% | S |
| FR-ABR-22K (2 resistors in parallel) | 3.3 (6.6) x 2 | 6.5 (13 / 2) | 1120 | 25 | 00760 | 6% | S |
| | | | | 30 | 00900 | 6% | |

### 480VAC Dynamic Braking Resistor at 100% Braking Torque

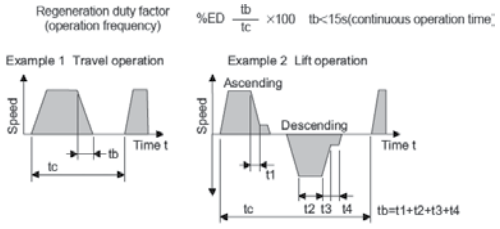
| Resistor Kit Model Number | Weight | Resistance (Ohms) | Continuous Permissible Power (W) | Motor (Hp) | Drive Model | | Stocked Item |
|---|---|---|---|---|---|---|---|
| | | | | | A740 | % ED | |
| FR-ABR-H0.4K | 0.2 (0.5) | 1200 | 45 | 1/2 | 00015 | 10% | S |
| FR-ABR-H0.75K | 0.2 (0.5) | 700 | 75 | 1 | 00025 | 10% | S |
| FR-ABR-H1.5K | 0.4 (0.9) | 350 | 115 | 2 | 00040 | 10% | S |
| FR-ABR-H2.2K | 0.5 (1.1) | 250 | 120 | 3 | 00060 | 10% | S |
| FR-ABR-H3.7K | 0.8 (1.8) | 150 | 155 | 5 | 00090 | 10% | S |
| FR-ABR-H5.5K | 1.3 (2.9) | 110 | 185 | 7 1/2 | 00120 | 10% | S |
| FR-ABR-H7.5K | 2.2 (4.9) | 75 | 340 | 10 | 00170 | 10% | S |
| FR-ABR-H11K | 3.4 (7.5) | 52 | 530 | 15 | 00230 | 6% | S |
| FR-ABR-H15K (2 resistors in series) | 2.4 (5.3) x 2 | 36 (18 x 2) | 870 | 20 | 00310 | 6% | S |
| FR-ABR-22K (2 resistors in parallel) | 3.3 (6.6) x 2 | 26 (52 / 2) | 1060 | 25 | 00380 | 6% | S |
| | | | | 30 | 00440 | 6% | |

### Instruction Manuals

| Model | Model Number | Stocked Item |
|---|---|---|
| FR-ABR(H) | IB(NA)66891 | - |
| FR-BU2 | IB(NA)0600292 | - |
| FR-BU2-C | IB(NA)0600379 | - |
| UFS | NT348E05 | - |

## Dynamic Braking Options

Select the brake unit according to the motor capacity.
To obtain braking torque greater than 200%, use a larger inverter capacity.
Up to 10 FR-BU2 brake units can be connected in parallel for increased braking capacity.




### %ED or Time at Short-Time Rating When Braking Torque is 100%

| Brake Unit Model Number | | Stocked Item | Brake Resistor Model Number | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | 30 s | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | - | 30 s | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | - | - | 30 s | 30 s | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | - | - | - | - | 80% | 40% | 15% | 10% | - | - | - | - | - | - |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | - | - | - | - | - | - | 65% | 30% | 25% | 15% | 10% | - | - | - |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | - | - | - | - | - | - | - | - | 90% | 60% | 30% | 20% | 15% | 10% |
| 460V | FR-BU2-H7.5K | S | 2 x BU-3700-TEIKOUKI | - | - | - | 30 s | 30 s | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-H15K | S | FR-BR-H15K-UL | S | - | - | - | - | 80% | 40% | 15% | 10% | - | - | - | - | - | - |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | - | - | - | - | - | - | 65% | 30% | 25% | 15% | 10% | - | - | - |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | - | - | - | - | - | - | - | - | 90% | 60% | 30% | 20% | 15% | 10% |
| 600V | FR-BU2-C22K | S | FR-BR-C3.7K | - | - | - | 30% | 10% | - | - | - | - | - | - | - | - | - | - |
| | | | FR-BR-C7.5K | - | - | - | - | 40% | 20% | 10% | - | - | - | - | - | - | - | - |
| | | | FR-BR-C22K | - | - | - | - | - | - | 85% | 40% | 20% | 15% | 10% | - | - | - | - |
| | 2 x FR-BU2-C22K | S | 2 x FR-BR-C22K | - | - | - | - | - | - | - | - | - | - | - | - | 15% | - | - |
| | 3 x FR-BU2-C22K | S | 3 x FR-BR-C22K | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15% |

| Brake Unit Model Number | | Stocked Item | Brake Resistor Model Number | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | |
| 460V | FR-BU2-H75K | S | MT-BR5-H75K | - | 10% | 5% | - | - | - | - | - | - | - | - | - | - | - | |
| | 2 x FR-BU2-H75K | S | 2 x MT-BR5-H75K | - | 40% | 25% | 15% | 10% | 5% | - | - | - | - | - | - | - | - | |
| | 3 x FR-BU2-H75K | S | 3 x MT-BR5-H75K | - | 90% | 60% | 40% | 20% | 14% | 10% | 5% | 5% | - | - | - | - | - | |
| | 4 x FR-BU2-H75K | S | 4 x MT-BR5-H75K | - | - | 95% | 70% | 40% | 25% | 15% | 13% | 10% | 5% | 5% | - | - | - | |
| | 5 x FR-BU2-H75K | S | 5 x MT-BR5-H75K | - | - | - | - | 60% | 40% | 25% | 20% | 15% | 12% | 10% | 5% | 5% | - | |
| | 6 x FR-BU2-H75K | S | 6 x MT-BR5-H75K | - | - | - | - | 90% | 55% | 40% | 25% | 25% | 15% | 14% | 10% | 5% | 5% | |
| | 7 x FR-BU2-H75K | S | 7 x MT-BR5-H75K | - | - | - | - | - | 80% | 55% | 40% | 35% | 20% | 15% | 13% | 10% | 5% | |
| | 8 x FR-BU2-H75K | S | 8 x MT-BR5-H75K | - | - | - | - | - | - | 70% | 50% | 45% | 30% | 25% | 15% | 13% | 10% | |

### Braking Torque (%) at Short-Time Rating of 30 Sec. for 5HP and Less
### Braking Torque (%) at Short-Time Rating of 15 Sec. for 7.5HP and Larger

| Brake Unit Model Number | | Stocked Item | Brake Resistor Model Number | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | 100% | 50% | - | - | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | - | 100% | 50% | 50% | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | - | - | 100% | 100% | - | - | - | - | - | - | - | - | - | - |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | - | - | - | - | 280% | 200% | 120% | 100% | 80% | 70% | - | - | - | - |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | - | - | - | - | - | - | 260% | 180% | 160% | 130% | 100% | 80% | 70% | - |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | - | - | - | - | - | - | - | - | 300% | 250% | 180% | 150% | 120% | 100% |
| 460V | FR-BU2-H15K | S | FR-BR-H15K-UL | S | - | - | - | - | 280% | 200% | 120% | 100% | 80% | 70% | - | - | - | - |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | - | - | - | - | - | - | 260% | 180% | 160% | 130% | 100% | 80% | 70% | - |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | - | - | - | - | - | - | - | - | 300% | 250% | 180% | 150% | 120% | 100% |
| 600V | FR-BU2-C22K | S | FR-BR-C3.7K | - | - | - | 170% | 100% | - | - | - | - | - | - | - | - | - | - |
| | | | FR-BR-C7.5K | - | - | - | 340% | 200% | 130% | 100% | - | - | - | - | - | - | - | - |
| | | | FR-BR-C22K | - | - | - | - | - | - | 300% | 200% | 145% | 120% | 100% | - | - | - | - |
| | 2 x FR-BU2-C22K | S | 2 x FR-BR-C22K | - | - | - | - | - | - | - | - | - | - | - | - | 120% | - | - |
| | 3 x FR-BU2-C22K | S | 3 x FR-BR-C22K | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 120% |

**Note:** FR-BU2-C22K is not UL or cUL listed for use with the FR-BR-C resistor. If UL or cUL is required, use the ASC-RES-C22K in place of FR-BR-C22K.

| Brake Unit Model Number | | Stocked Item | Brake Resistor Model Number | Stocked Item | Motor Capacity (HP) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | |
| 460V | FR-BU2-H75K | S | MT-BR5-H75K | - | 100% | 80% | 65% | 50% | 40% | 30% | 28% | 26% | 22% | 20% | - | - | - | |
| | 2 x FR-BU2-H75K | - | 2 x MT-BR5-H75K | - | 200% | 165% | 135% | 100% | 80% | 65% | 55% | 53% | 44% | 40% | 33% | 28% | 25% | |
| | 3 x FR-BU2-H75K | - | 3 x MT-BR5-H75K | - | 300% | 250% | 200% | 150% | 120% | 100% | 85% | 80% | 65% | 60% | 50% | 43% | 37% | |
| | 4 x FR-BU2-H75K | - | 4 x MT-BR5-H75K | - | - | 300% | 270% | 200% | 160% | 135% | 115% | 105% | 85% | 80% | 65% | 55% | 50% | |
| | 5 x FR-BU2-H75K | - | 5 x MT-BR5-H75K | - | - | - | 300% | 250% | 200% | 170% | 140% | 130% | 110% | 100% | 83% | 70% | 62% | |
| | 6 x FR-BU2-H75K | - | 6 x MT-BR5-H75K | - | - | - | - | 300% | 240% | 200% | 170% | 160% | 130% | 120% | 100% | 85% | 75% | |
| | 7 x FR-BU2-H75K | - | 7 x MT-BR5-H75K | - | - | - | - | - | 280% | 235% | 200% | 185% | 155% | 140% | 115% | 100% | 85% | |
| | 8 x FR-BU2-H75K | - | 8 x MT-BR5-H75K | - | - | - | - | - | - | 270% | 230% | 210% | 175% | 160% | 130% | 110% | 100% | |

### Dynamic Braking Unit & Resistor Specifications

| Brake Unit Model Number | | Stocked Item | Brake Resistor Model Number | Stocked Item | Weight kg / lbs | Resistance (Ohms) | Rated (Watts) | Continuous Permissible Power (Watts) |
|---|---|---|---|---|---|---|---|---|
| 230V | FR-BU2-1.5K | S | BU-1500-TEIKOUKI | - | n/a | 50 | 300 | 100 |
| | FR-BU2-3.7K | S | BU-3700-TEIKOUKI | - | n/a | 30 | 900 | 300 |
| | FR-BU2-7.5K | S | BU-7.5K-TEIKOUKI | - | n/a | 20 | 1800 | 600 |
| | FR-BU2-15K | S | FR-BR-15K-UL | S | 15 / 33 | 8 | 4000 | 990 |
| | FR-BU2-30K | S | FR-BR-30K-UL | S | 30 / 66 | 4 | 8000 | 1990 |
| | FR-BU2-55K | - | FR-BR-55K-UL | - | 70 / 154 | 2 | 16000 | 3910 |
| 460V | FR-BU2-H7.5K | S | 2 x BU-3700-TEIKOUKI | - | n/a | 60 | 1800 | 600 |
| | FR-BU2-H15K | S | FR-BR-H15K-UL | S | 15 / 33 | 32 | 4000 | 990 |
| | FR-BU2-H30K | S | FR-BR-H30K-UL | S | 30 / 66 | 16 | 8000 | 1990 |
| | FR-BU2-H55K | S | FR-BR-H55K-UL | S | 70 / 154 | 8 | 16000 | 3910 |
| | FR-BU2-H75K | S | MT-BR5-H75K | - | 70 / 154 | 6.5 | 30000 | 7500 |

### A700 Dynamic Braking Units and Resistors - UFS Series

- A more economical solution to regenerative braking applications.
- UL and cUL listing for the brake units
- Internal Form-C relay
- Adjustable DC bus brake turn-on voltage
- Configurable master / slave brake configuration. Allows connection of up to 5 brake units (1 master / 4 slaves)

### 240V Series

| | | Motor Capacity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Braking Torque | Hp | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| | kW | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| 100% for 15 secs. | Brake Unit | UFS22J | | | | | UFS40J | | 2 x UFS40J | | |
| | Brake Resistor | RUFC15J | | | RUFC22J | | RUFC40J | | 2 x RUFC40J | | |
| Electrical Data | Continuous Permissible Power (W) | UFS22J - 1500W | | | | | UFS40J - 2000W | | 2ea x UFS40J - 4000W | | |
| | Resistance (Overall) | RUFC15J - 24ohms | | | RUFC22J - 12ohms | | RUFC40J - 7.5ohms | | 2ea x RUFC40J - 3.75ohms | | |
| | Continuous Current (Amps) | 7A | | | 10A | | 14.6A | | 29.2A | | |

### 460V Series

| | | Motor Capacity | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Braking Torque | Hp | 7.5 | 10 | 15 | 25 | 30 | 40 | 50 | 60 | 75 |
| | kW | 5.5 | 7.5 | 11 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| 100% for 15 secs. | Brake Unit | UFS22 | | | | | | UFS40 | | |
| | Brake Resistor | RUFC15/480 | | RUFC22/480 | | | | RUFC40/480 | | |
| Electrical Data | Continuous Permissible Power (W) | UFS22 - 2000W | | | | | | UFS40 - 4000W | | |
| | Resistance (Overall) | RUFC15/480 - 44ohms | | RUFC22/480 - 27ohms | | | | RUFC40/480 - 15ohms | | |
| | Continuous Current (Amps) | 6A | | 7.7A | | | | 14.6A | | |

| | | Motor Capacity | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Braking Torque | Hp | 100 | 125 | 150 | 175 | 215 | 300 | 375 |
| | kW | 75 | 90 | 110 | 132 | 160 | 220 | 280 |
| 100% for 15 secs. | Brake Unit | UFS110 | | | | 2 X UFS110 | | |
| | Brake Resistor | RUFC110/480 | | | | 2 X RUFC110/480 | | |
| Electrical Data | Continuous Permissible Power (W) | UFS110 - 8000W | | | | 2 x UFS110 - 16000W | | |
| | Resistance (Overall) | RUFC110/480 - 6.8ohms | | | | 2 x RUFC110/480 - 3.4ohms | | |
| | Continuous Current (Amps) | 30.7A | | | | 61.4A | | |

### Dimensions

| Model Number | | Height | | Width | | Depth | | Approximate Weight | | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | inches | mm | inches | mm | inches | kg | lbs | |
| 240V | UFS20J | 250 | 9.8 | 100 | 3.9 | 175 | 6.9 | 2.5 | 5.5 | S |
| | UFS40J | | | | | | | | | S |
| | RUFC15J | 240 | 9.5 | | | 75 | 3 | 2.8 | 6.2 | S |
| | RUFC22J | 310 | 12.2 | | | | | 3.5 | 7.7 | S |
| | RUFC40J | 365 | 14.4 | | | | | 4.3 | 9.5 | S |
| 480V | UFS22 | 250 | 9.8 | 100 | 3.9 | 175 | 6.9 | 2.5 | 5.5 | S |
| | UFS40 | | | | | | | | | S |
| | UFS110 | | | 107 | 4.2 | 195 | 7.7 | 3.9 | 8.6 | S |
| | RUFC15/480 | 310 | 12.2 | 100 | 3.9 | 75 | 3 | 3.5 | 7.7 | S |
| | RUFC22/480 | 365 | 14.4 | | | | | 4.2 | 9.3 | S |
| | RUFC40/480 | 2 x 365 | 2 x 14.4 | 2 x 100 | 2 x 3.9 | 2 x 75 | 2 x 3 | 8.7 | 19.2 | S |
| | RUFC110/480 | 4 x 365 | 4 x 14.4 | 4 x 100 | 4 x 3.9 | 4 x 75 | 4 x 3 | 17.3 | 38.1 | S |

## A700 VFD Efficiency Values • ND Rating Based

| 240VAC 3-Phase Input | | | | 480VAC 3-Phase Input | | | | | 600VAC 3-Phase Input | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model Number | Rated Watts | Watts Loss | Efficiency | Model Number | Rated Watts | Watts Loss | Efficiency | Factory Supplied DC Choke Watts Loss | Model Number | Rated Watts | Watts Loss | Efficiency | Factory Supplied DC Choke Watts Loss |
| FR-A720-00030-NA | 400 | 50 | 88% | FR-A740-00015-NA | 400 | 50 | 88% | - | FR-A760-00017-NA | 750 | 40 | 95% | - |
| FR-A720-00050-NA | 750 | 70 | 91% | FR-A740-00025-NA | 750 | 65 | 91% | - | FR-A760-00040-NA | 2200 | 70 | 97% | - |
| FR-A720-00080-NA | 1500 | 110 | 93% | FR-A740-00040-NA | 1500 | 75 | 95% | - | FR-A760-00061-NA | 3700 | 110 | 97% | - |
| FR-A720-00110-NA | 2200 | 140 | 94% | FR-A740-00060-NA | 2200 | 100 | 95% | - | FR-A760-00120-NA | 7500 | 160 | 98% | - |
| FR-A720-00175-NA | 3700 | 190 | 95% | FR-A740-00090-NA | 3700 | 150 | 96% | - | FR-A760-00220-NA | 15000 | 260 | 98% | - |
| FR-A720-00240-NA | 5500 | 260 | 95% | FR-A740-00120-NA | 5500 | 200 | 96% | - | FR-A760-00330-NA | 22000 | 410 | 98% | - |
| FR-A720-00330-NA | 7500 | 360 | 95% | FR-A740-00170-NA | 7500 | 250 | 97% | - | FR-A760-00550-NA | 37000 | 650 | 98% | - |
| FR-A720-00460-NA | 11000 | 520 | 95% | FR-A740-00230-NA | 11000 | 300 | 97% | - | FR-A760-00840-NA | 55000 | 940 | 98% | - |
| FR-A720-00610-NA | 15000 | 670 | 96% | FR-A740-00310-NA | 15000 | 400 | 97% | - | FR-A760-01040-NA | 75000 | 1500 | 98% | 100 |
| FR-A720-00760-NA | 18500 | 770 | 96% | FR-A740-00380-NA | 18500 | 550 | 97% | - | FR-A760-01310-NA | 90000 | 1800 | 98% | 120 |
| FR-A720-00900-NA | 22000 | 940 | 96% | FR-A740-00440-NA | 22000 | 650 | 97% | - | FR-A760-01520-NA | 111000 | 2200 | 98% | 140 |
| FR-A720-01150-NA | 30000 | 1050 | 97% | FR-A740-00570-NA | 30000 | 800 | 97% | - | FR-A760-02210-NA | 132000 | 2600 | 98% | 180 |
| FR-A720-01450-NA | 37000 | 1270 | 97% | FR-A740-00710-NA | 37000 | 1100 | 97% | - | FR-A760-02550-NA | 185000 | 3200 | 98% | 200 |
| FR-A720-01750-NA | 45000 | 1610 | 96% | FR-A740-00860-NA | 45000 | 1300 | 97% | - | FR-A760-03040-NA | 220000 | 3700 | 98% | 230 |
| FR-A720-02150-NA | 55000 | 1880 | 97% | FR-A740-01100-NA | 55000 | 1550 | 97% | - | FR-A760-04020-NA | 280000 | 4800 | 98% | 310 |
| FR-A720-02880-NA | 75000 | 2530 | 97% | FR-A740-01440-NA | 75000 | 1900 | 97% | 130 | FR-A760-04960-NA | 355000 | 6000 | 98% | 340 |
| FR-A720-03460-NA | 90000 | 3110 | 97% | FR-A740-01800-NA | 90000 | 2400 | 97% | 130 | FR-A760-06630-NA | 400000 | 7500 | 98% | 390 |
| - | - | - | - | FR-A740-02160-NA | 110000 | 2500 | 98% | 140 | - | - | - | - | - |
| - | - | - | - | FR-A740-02600-NA | 132000 | 3000 | 98% | 140 | - | - | - | - | - |
| - | - | - | - | FR-A740-03250-NA | 160000 | 4000 | 98% | 170 | - | - | - | - | - |
| - | - | - | - | FR-A740-03160-NA | 185000 | 4200 | 98% | 230 | - | - | - | - | - |
| - | - | - | - | FR-A740-04320-NA | 220000 | 5000 | 98% | 240 | - | - | - | - | - |
| - | - | - | - | FR-A740-04810-NA | 250000 | 5500 | 98% | 270 | - | - | - | - | - |
| - | - | - | - | FR-A740-05470-NA | 280000 | 6500 | 98% | 300 | - | - | - | - | - |
| - | - | - | - | FR-A740-06100-NA | 315000 | 7000 | 98% | 360 | - | - | - | - | - |
| - | - | - | - | FR-A740-06830-NA | 355000 | 8000 | 98% | 360 | - | - | - | - | - |
| - | - | - | - | FR-A740-07700-NA | 400000 | 9000 | 98% | 450 | - | - | - | - | - |
| - | - | - | - | FR-A740-08660-NA | 450000 | 10500 | 98% | 450 | - | - | - | - | - |
| - | - | - | - | FR-A740-09620-NA | 500000 | 11500 | 98% | 470 | - | - | - | - | - |

**General Notes:**
1. The amount of heat generated by the inverter is based on one inverter connected to one motor of the same capacity.
2. The amount of heat generated in the above table is the amount of heat generated when the inverter is operated at it's rated current.
3. The amount of heat generated will decrease according to the motor load and usage (duty).
4. When using the external heat sink attachment watt loss decreases by 60%.

# A701 Series

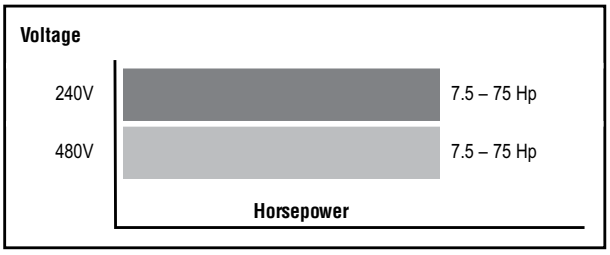
Vector VFD with built-in Line Regeneration.

- Ideal for applications with continuous overhauling or large inertia loads
- Capacity up to 75HP for 240V and 480V applications
- Braking Torque
  - 100% continuous
  - 150% for up to 60 sec.
- Vector mode with encoder allows Speed, Torque and Position control
- Real Sensorless mode allows Speed and Torque control without encoder
- Starting torque of 150% at 0.3Hz
- 2 serial ports (RS485) and 1 USB port
- 3 option ports for plug-in network or function expansion options
- 12 programmable digital inputs (sink/source selectable)
- 5 programmable digital outputs (sink/source selectable)
- 2 form C relays
- 3 analog inputs
- Terminal 2 (0~5VDC, 0~10VDC, 0~20mA selectable)
- Terminal 1 (0 to +/-5VDC or 0 to ±10VDC selectable)
- Terminal 4 (0~5VDC, 0~10VDC, 4~20mA selectable)
- 2 analog outputs (0~10VDC and pulse train out)
- Modbus RTU and Mitsubishi VFD serial protocol communications
- UL and cUL listed. CE marked (480V version only)

## FR-A721 – 5.5K

| Symbol | Voltage Class |
|---|---|
| A721 | Three phase 240V class |
| A741 | Three phase 480V class |

Inverter capacity in kilowatts
5.5K = 5.5KW
0.746kW = 1HP




### A701 Ratings

Note: There is no PLC function as included in the standard A700

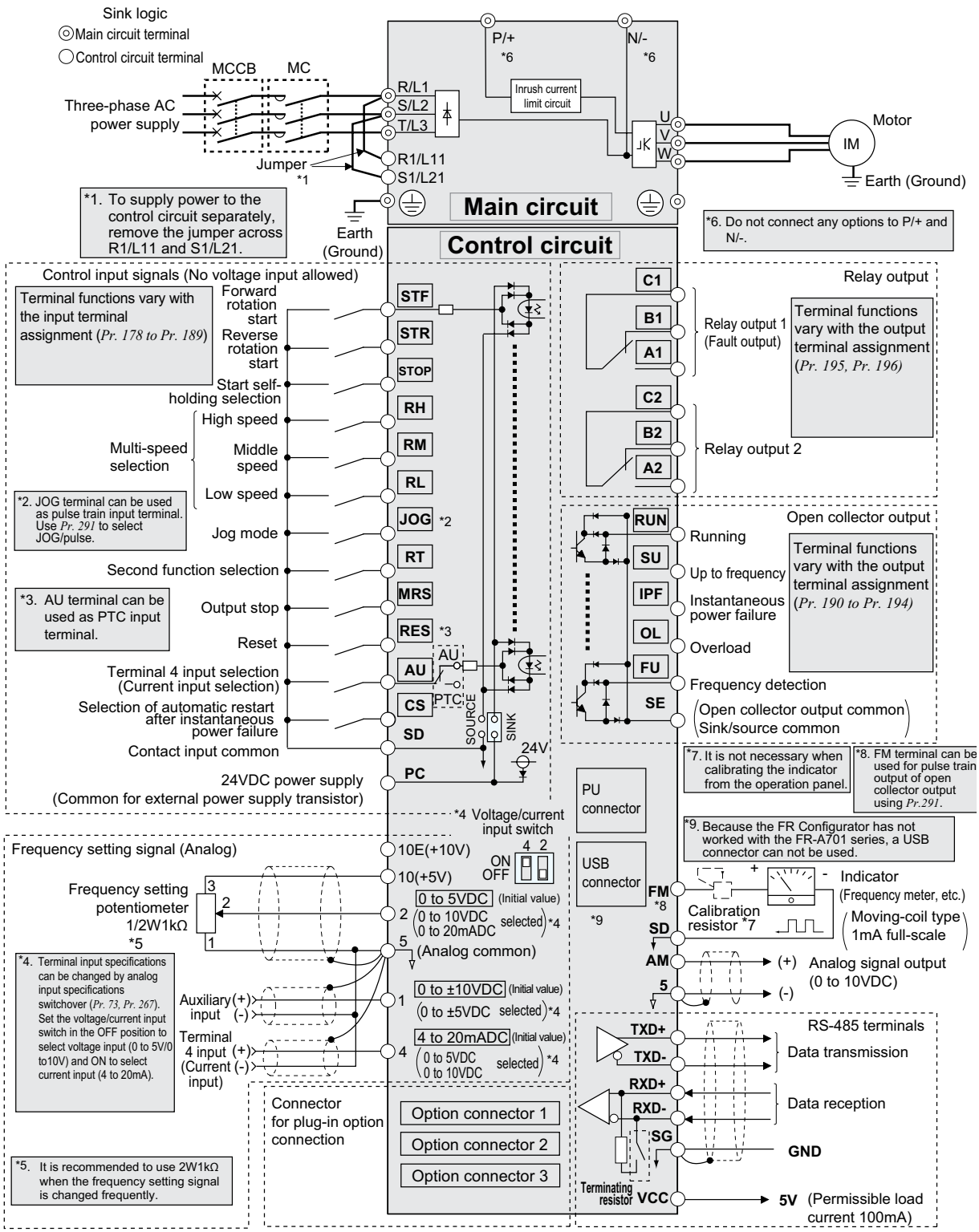
| Rating (CT & VT) | | IP00 Open Chassis Model Number | Dimensions in inches (mm) | | | Weight Lbs (kg) | Stocked Item |
|---|---|---|---|---|---|---|---|
| HP | Rated Amps | | Height | Width | Depth | | |
| **3-Phase 200~240VAC Input & Output** | | | | | | | |
| 7 1/2 | 24 | FR-A721-5.5K | 18.5 (470) | 9.9 (250) | 10.7 (270) | 44.1 (20) | - |
| 10 | 33 | FR-A721-7.5K | 18.5 (470) | 9.9 (250) | 10.7 (270) | 48.5 (22) | - |
| 15 | 46 | FR-A721-11K | 21.6 (540) | 11.9 (300) | 11.6 (294) | 72.7 (33) | - |
| 20 | 61 | FR-A721-15K | 21.6 (540) | 11.9 (300) | 11.6 (294) | 77.1 (35) | - |
| 25 | 76 | FR-A721-18.5K | 23.7 (600) | 15.4 (390) | 12.6 (320) | 110.2 (50) | - |
| 30 | 90 | FR-A721-22K | 23.7 (600) | 15.4 (390) | 12.6 (320) | 114.6 (52) | - |
| 40 | 115 | FR-A721-30K | 27.6 (700) | 17.8 (450) | 13.4 (340) | 152.0 (69) | - |
| 50 | 145 | FR-A721-37K | 27.6 (700) | 18.5 (470) | 14.5 (368) | 191.7 (87) | - |
| 60 | 175 | FR-A721-45K | 27.6 (700) | 18.5 (470) | 14.5 (368) | 198.3 (90) | - |
| 75 | 215 | FR-A721-55K | 35.5 (900) | 23.7 (600) | 16.0 (405) | 264.4 (120) | - |
| **3-Phase 380~480VAC Input & Output** | | | | | | | |
| 7 1/2 | 12 | FR-A741-5.5K | 18.5 (470) | 9.9 (250) | 10.7 (270) | 55.1 (25) | - |
| 10 | 17 | FR-A741-7.5K | 18.5 (470) | 9.9 (250) | 10.7 (270) | 57.3 (26) | - |
| 15 | 23 | FR-A741-11K | 21.6 (540) | 11.9 (300) | 11.6 (294) | 81.5 (37) | - |
| 20 | 31 | FR-A741-15K | 21.6 (540) | 11.9 (300) | 11.6 (294) | 88.1 (40) | - |
| 25 | 38 | FR-A741-18.5K | 23.7 (600) | 14.2 (360) | 12.6 (320) | 105.8 (48) | - |
| 30 | 44 | FR-A741-22K | 23.7 (600) | 14.2 (360) | 12.6 (320) | 108.0 (49) | - |
| 40 | 57 | FR-A741-30K | 27.6 (700) | 17.8 (450) | 13.4 (340) | 143.2 (65) | - |
| 50 | 71 | FR-A741-37K | 27.6 (700) | 18.5 (470) | 14.5 (368) | 176.3 (80) | - |
| 60 | 86 | FR-A741-45K | 27.6 (700) | 18.5 (470) | 14.5 (368) | 182.9 (83) | - |
| 75 | 110 | FR-A741-55K | 35.5 (900) | 23.7 (600) | 16.0 (405) | 253.3 (115) | - |

## A701 General Specifications

| | | | |
|---|---|---|---|
| Operation Specifications | Control Method | | Soft-PWM control/high carrier frequency PWM control (selectable from among V/F control, advanced magnetic flux vector control and real sensorless vector control) / vector control (*1) |
| | Output Frequency Range | | 0.2 to 400Hz (The maximum frequency is 120Hz under real sensorless vector control and vector control.) (*1) |
| | Frequency Setting Resolution | Analog Input | 0.015Hz/0 to 60Hz (terminal 2, 4: 0 to 10V/12bit); 0.03Hz/0 to 60Hz (terminal 2, 4: 0 to 5V/11bit, 0 to 20mA/about 11bit, terminal 1: 0 to ±10V/12bit) 0.06Hz/0 to 60Hz (terminal 1: 0 to ±5V/11bit) |
| | | Digital Input | 0.01Hz |
| | Frequency Accuracy | Analog Input | Within ±0.2% of the max. output frequency (25°C ±10°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 or adjustable 5 points V/F can be selected |
| | Starting Torque | | 150% 0.3Hz (under real sensorless vector control or vector control) (*1) |
| | Torque Boost | | Manual torque boost |
| | Acceleration / Deceleration Time Setting | | 0 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration 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 220% adjustable), whether to use the function or not can be selected |
| | Torque Limit Level | | Torque limit value can be set (0 to 400% variable) |
| | Frequency Setting Signal | Analog Input | Terminal 2, 4: 0 to 10V, 0 to 5V, 4 to 20mA (0 to 20mA) can be selected • Terminal 1: -10 to +10V, -5 to +5V can be selected |
| | | Digital Input | Input using the setting dial of the operation panel or parameter unit; Four-digit BCD or 16 bit binary (when used with option FR-A7AX) |
| | Start Signal | | Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected. |
| | Input Signal | | You can select any twelve signals using Pr. 178 to Pr. 189 (input terminal function selection) from among multi speed selection, remote setting, stop-on-contact, second function selection, third function selection, terminal 4 input selection, JOG operation selection, selection of automatic restart after instantaneous power failure, flying start, external thermal relay input, PU operation/external inter lock signal , external DC injection brake operation start, PID control enable terminal, brake opening completion signal, PU operation/external operation switchover, load pattern selection forward rotation reverse rotation boost, V/F switching, load torque high-speed frequency, S-pattern acceleration/deceleration C switchover, pre-excitation, output stop, start self-holding selection, control mode changing, torque limit selection, start-time tuning start external input, torque bias selection 1, 2 (*1), P/PI control switchover, forward rotation command, reverse rotation command, inverter reset, PTC thermistor input, PID forward reverse operation switchover, PU-NET operation switchover, NET-external operation switchover, and command source switchover, conditional position pulse train sign (*1), conditional position droop pulse clear (*1), magnetic flux decay output shutoff. |
| | Pulse Train Input | | 100kpps |
| | Operational Functions | | Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, polarity reversible operation, automatic restart after instantaneous power failure operation, electronic bypass operation, forward/reverse rotation prevention, remote setting, brake sequence, second function, third function, multi-speed operation, original operation continuation at instantaneous power failure, stop-on-contact control, load torque high speed frequency control, droop control, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, online auto tuning function, PID control, computer link operation (RS-485), motor end orientation (*1), pre-excitation, notch filter, easy gain tuning, speed feed forward, and torque bias (*1) |
| | Output Signals | Operating Status | You can select any signals using Pr. 190 to Pr. 196 (output terminal function selection) from among inverter running, up-to-frequency, instantaneous power failure/undervoltage, overload warning, output frequency (speed) detection, second output frequency (speed) detection, third output frequency (speed) detection, electronic thermal relay function pre-alarm, PU operation mode, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward rotation reverse rotation output, electronic bypass MC1, electronic bypass MC2, electronic bypass MC3, orientation complete (*1), brake opening request, fan fault output, heatsink overheat pre-alarm , inverter running/start command on, deceleration at an instantaneous power failure, PID control activated, during retry, PID output interruption, life alarm, fault output 1, 2, 3 (power-off signal), power savings average value update timing, current average monitor, maintenance timer alarm, remote output, forward rotation output (*1), reverse rotation output (*1), low speed output, torque detection, regenerative status output (*1), start-time tuning completion, in-position completion (*1), alarm output and fault output. Open collector output (5 points), relay output (2 points) and alarm code of the inverter can be output (4 bit) from the open collector. |
| | | When used with the FR-A7AY, FR-A7AR (optional) | In addition to the above, you can select any signals using Pr. 313 to Pr. 319 (extension output terminal function selection) from among control circuit capacitor life, main circuit capacitor life, cooling fan life, inrush current limit circuit life. (only positive logic can be set for extension terminals of the FR-A7AR) |
| | Pulse Train Input | | 500kpps |
| | Pulse / Analog Output | | Select any signals using Pr. 54 FM terminal function selection (pulse train output) and Pr. 158 AM terminal function selection (analog output) from among output frequency, motor current (steady or peak value), output voltage, frequency setting, operation speed, motor torque, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, motor excitation current, reference voltage output, motor load factor, power saving effect, PID set point, PID measured value, motor output, torque command, torque current command, and torque monitor. |
| Indication | PU (FR-DU07 / FR-PU07 / FR-PU04) | Operating Status | Output frequency, motor current (steady or peak value), output voltage, frequency setting, running speed, motor torque, overload, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, motor excitation current, cumulative energization time, actual operation time, motor load factor, cumulative power, energy saving effect, cumulative saving power, PID set point, PID measured value, PID deviation, inverter I/O terminal monitor, input terminal option monitor (*2), output terminal option monitor (*2), option fitting status (*3), terminal assignment status (*3), torque command, torque current command, feed back pulse (*1),motor output |
| | | Fault Definition | Fault definition is displayed during the fault occurs, the output voltage/current/frequency/cumulative energization time right before the fault occurs and past 8 fault definitions are stored. |
| | | Interactive Guidance | Operation guide/trouble shooting with a help function (*3) |
| Protective / Warning Function | | | 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, instantaneous power failure occurrence, undervoltage, input phase failure, motor overload, output side earth (ground) fault overcurrent, output short circuit, main circuit element overheat, output phase failure, external thermal relay operation (*5), PTC thermistor operation (*5), option alarm, parameter error, PU disconnection, retry count excess (*5), CPU alarm, operation panel power supply short circuit, 24VDC power output short circuit, output current detection value excess (*5), inrush current limit circuit alarm, communication alarm (inverter), opposite rotation deceleration error*5, analog input error, fan fault, overcurrent stall prevention, overvoltage stall prevention, electronic thermal relay function prealarm, PU stop, maintenance timer alarm (*2) (*5), parameter write error, copy operation error, operation panel lock, parameter copy alarm, speed limit indication, signal loss detection (*1) (*5), speed deviation large (*1) (*5), overspeed (*1) (*5), excessive position error (*1) (*5), brake sequence error (*5), encoder phase error (*1) (*5), regeneration converter overcurrent, regeneration converter circuit fault, regeneration converter transistor protection thermal |
| Environment | Ambient Temperature | | -10°C to +50°C (non-freezing) |
| | Ambient Humidity | | 90%RH maximum (non-condensing) |
| | Storage Temperature (*4) | | -20°C to +65°C |
| | Atmosphere | | Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt etc.) |
| | Altitude / Vibration | | Maximum 1000m above sea level, 5.9m/s² or less |

**Notes:**
1. Available only when the option (FR-A7AP) is mounted
2. Can be displayed only on the operation panel (FR-DU07).
3. Can be displayed only on the parameter unit (FR-PU07/FR-PU04).
4. Temperature applicable for a short period in transit, etc.
5. This protective function does not function in the initial status.

## A701 Terminal Connection Diagram




## A701 Control Terminal Layout

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | B1 | C1 | A2 | B2 | C2 | 10E | 10 | 2 | 5 | 4 | |
| RL | RM | RH | RT | AU | STOP | MRS | RES | SD | FM | AM | 1 |
| SE | RUN | SU | IPF | OL | FU | SD | SD | STF | STR | JOG | CS | PC |

# A701 Options

## Function/Options

| | | Model No. | Stocked Item |
|---|---|---|---|
| Function | 120VAC Control Input | FR-A7AC | S |
| | Analog I/O | FR-A7AN | S |
| | Encoder Feedback | FR-A7AP | S |
| | Encoder Pulse Dividing Output | FR-A7AL | S |
| | Relay Output | FR-A7AR | S |
| | 12 Bit Digital Input | FR-A7AX | S |
| | Digital Output | FR-A7AY | S |
| | Ext. Analog Output | | |
| | BiPolar Analog Input | FR-A7AZ | - |
| | High Res Analog Input | | |
| | Motor Thermistor | | |
| Communication | CC-Link | FR-A7NC | S |
| | ControlNET (*1) | FR-A7NCN | S |
| | DeviceNet | FR-A7ND | S |
| | EtherNet/IP (*1) | FR-A7NE | S |
| | LonWorks | FR-A7NL | S |
| | Profibus DP | FR-A7NP | S |
| | SSCNET III | FR-A7NS | S |

A701 series supports only the above listed plug-in options.
Those options not listed cannot be used with the A701 series.

## Parameter Units / Parameter Copy Units

Parameter units are used for operator control, reading and writing parameters, and drive monitoring. Parameter Copy Units also read the drive parameter settings and copy them into non-volatile memory, and can write them into other drives.

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-CB201 | Extension cable straight plugs on both ends - 1 meter | S |
| FR-CB203 | Extension cable straight plugs on both ends - 3 meters | S |
| FR-CB205 | Extension cable straight plugs on both ends - 5 meters | S |
| FR-DU07 | Control Panel for F700 | S |
| FR-PU07 | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. Stores settings in non-volatile memory. Built-in parameter copy capability. (F/A700 based) | S |
| FR-ADP | FR-DU07 panel mounting adapter | S |
| FR-PU04 | LCD Multi-lingual Parameter Copy Unit (English, French, Spanish, German, Italian, Swedish, Finnish, Japanese) for operator control, parameter read/write and monitoring. | S |
| SC-FRPC | Serial Communication Cable | S |
| FR-PU07BB-L | Battery Powered PU07 | S |
| FR-RJ45-HUB4 | Serial Network Hub - 2 Stations | - |
| FR-RJ45-HUB10 | Serial Network Hub - 8 Stations | - |
| FR-RJ45-TR | Terminating Resistor for FR-RJ45-HUB | - |

## Software

| Model Number | Description | Stocked Item |
|---|---|---|
| FR-CONFIGURATOR | Programming and diagnostic software (ver. 3.20 or greater) | S |

## Instruction Manuals

| Description | Model Number |
|---|---|
| FR-A701 Applied Manual - Contains wiring details, VFD layout drawings, alarm definitions and complete parameter list with definitions and setting examples | IB(NA)0600337 |
| FR-A701 Basic Manual - Contains wiring details, VFD layout drawings, alarm definitions and parameter list | IB(NA)0600331 |
| FR-PU07 - Contains complete instruction sets and screen definitions | IB(NA)0600240 |

Manuals available for download at www.meau.com

## Building Management Options

| Network Type / Model | | FR-A7N-ETH (*2,*3,*4) | FR-A7N-XLT (*2,*3,*4) | ETH-1000 (*5,*6) | XLTR-1000 (*5,*6) |
|---|---|---|---|---|---|
| Gateway Communication | BACnet/IP | X | - | X | - |
| | EtherNet/IP | X | - | X | - |
| | Modbus TCP | X | - | X | - |
| | PROFINET IO | X | - | X | - |
| | BACnet MS/TP | - | X | X | X |
| | Metasys N2 | - | X | X | X |
| | Siemens FLN | - | X | - | - |
| Stocked Item | | S | S | - | - |

**Notes:**
1. For additional information, visit www.iccdesigns.com
2. Physically mounts within VFD and powered by VFD
3. Deep control cover is required
4. FR-E7TR option recommended. (PU connector not available for use)
5. Communication to multiple VFD's is possible
6. Mounted and powered external to VFD

# V500 Series

Variable Frequency Drives True, Closed Loop Vector Control

This series achieves high precision and fast response that exceeds the performance of conventional general-purpose inverters. They can be used in specialized applications such as line control and elevators.

By incorporating our original all-digital vector control, high starting torque and high speed response have been made possible for both velocity and torque control modes.

- 2 to 75 Horsepower at 240V
- 2 to 75 Horsepower at 480V
- 100% continuous torque at Zero speed
- Auto Tuning to other manufacturer's constant torque motor with encoder
- Easy to use Parameter Unit
- 4-Quadrant torque control standard
- Multiple parameters for tailoring to a wide variety of applications
- Simple positioning included as standard
- DC Link Reactor standard (V500L)
- Peripheral devices such as power regenerative converter (FR-CV, FR-RC, MT-RC) available
- Communications options: DeviceNet, Profibus DP, CC-Link, Modbus Plus, SSCNet

| Constant Torque | | Model Number | Stocked Item |
|---|---|---|---|
| Hp | Output Amps | | |
| **3-Phase 240VAC Input / Output** | | | |
| 2 | 9.0 | FR-V520-1.5K-NA | S |
| 3 | 13.0 | FR-V520-2.2K-NA | S |
| 5 | 20.0 | FR-V520-3.7K-NA | S |
| 7.5 | 28.5 | FR-V520-5.5K-NA | - |
| 10 | 37.5 | FR-V520-7.5K-NA | - |
| 15 | 54 | FR-V520-11K-NA | - |
| 20 | 72.8 | FR-V520-15K-NA | - |
| 25 | 88 | FR-V520-18.5K-NA | - |
| 30 | 103.5 | FR-V520-22K-NA | S |
| 40 | 126.5 | FR-V520-30K-NA | - |
| 50 | 166.8 | FR-V520-37K-NA | - |
| 60 | 198.0 | FR-V520-45K-NA | - |
| 75 | 264.0 | FR-V520-55K-NA | - |

| Constant Torque | | Model Number | Stocked Item |
|---|---|---|---|
| Hp | Output Amps | | |
| **3-Phase 480VAC Input / Output** | | | |
| 2 | 4.5 | FR-V540-1.5K-NA | S |
| 3 | 6.5 | FR-V540-2.2K-NA | S |
| 5 | 10.0 | FR-V540-3.7K-NA | S |
| 7.5 | 14.5 | FR-V540-5.5K-NA | - |
| 10 | 18.5 | FR-V540-7.5K-NA | - |
| 15 | 27.5 | FR-V540-11K-NA | S |
| 20 | 35.5 | FR-V540-15K-NA | S |
| 25 | 44.0 | FR-V540-18.5K-NA | - |
| 30 | 51.8 | FR-V540-22K-NA | - |
| 40 | 67.0 | FR-V540-30K-NA | - |
| 50 | 86.0 | FR-V540-37K-NA | S |
| 60 | 99.0 | FR-V540-45K-NA | S |
| 75 | 132.0 | FR-V540-55K-NA | - |

### V500 Ratings 240V Class 1.5K - 55K

| Model FR-V520-_ _K-NA | | | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output | Horsepower Rating (Hp) | | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| | Rated Current (A) | | 9.0 | 13.0 | 20.0 | 28.5 | 37.5 | 54.0 | 72.8 | 88.0 | 103.5 | 126.5 | 166.0 | 198.0 | 264.0 |
| | Overload Current Rating (*1) | | 150% 60 sec., 200% 0.5 sec. (inverse time characteristics) | | | | | | | | | | | | |
| | Voltage (*2) | | 3-Phase 200-220V 50 Hz, 200-240V 60 Hz | | | | | | | 3-Phase 200-220V 50 Hz, 200-230V 60 Hz | | | | | |
| | Regenerative Breaking Torque | Max. Time | 100%/5 sec. | | | | 20% (*5) | | | | | | | | |
| | | Tolerable Work Rate | 3% ED (*5) | | 2% ED (*5) | | Continuous (*5) | | | | | | | | |
| Power Supply | Rated Input, AC Volt. and Frequency | | 3-Phase 200-220 V 50 Hz, 200-240V 60 Hz | | | | | | | 3-Phase 200-220 V 50 Hz, 200-230V 60 Hz | | | | | |
| | Tolerable AC Voltage Fluctuation | | 170-242V 50 Hz, 200-264V 60 Hz | | | | | | | 170-242V 50 Hz, 170-253V 60 Hz | | | | | |
| | Tolerable Frequency Fluctuation | | ±5% | | | | | | | | | | | | |
| | Amount of Instantaneous Voltage Drop that can be Withstood | | When operated at or above 165 V continuously and voltage falls from rated voltage to under 165 V, 15 ms of continuous operation | | | | | | | | | | | | |
| | Supply (kVA) (*3) | | 5.0 | 6.5 | 10 | 14 | 19 | 23 | 33 | 39 | 48 | 57 | 77 | 90 | 123 |
| Protective Structure (JEM 1030) | | | Enclosed type (IP20) (*4) | | | | | | | Open type (IP00) | | | | | |
| Cooling Method | | | Forced air cooling | | | | | | | | | | | | |
| Approximate Weight | | kg | 3.5 | 3.5 | 6 | 6 | 6 | 14 | 14 | 21 | 30 | 40 | 40 | 55 | 58 |
| | | lbs | 7.7 | 7.7 | 13.2 | 13.2 | 13.2 | 30.8 | 30.8 | 46.2 | 66 | 88 | 88 | 121 | 128 |
| Width | | mm | 150 | 150 | 220 | 220 | 250 | 250 | 250 | 250 | 340 | 450 | 450 | 480 | 480 |
| | | inches | 5.9 | 5.9 | 8.7 | 8.7 | 9.9 | 9.9 | 9.9 | 9.9 | 13.4 | 17.7 | 17.7 | 18.9 | 18.9 |
| Height | | mm | 260 | 260 | 260 | 260 | 400 | 400 | 400 | 400 | 550 | 550 | 550 | 700 | 700 |
| | | inches | 10.2 | 10.2 | 10.2 | 10.2 | 15.8 | 15.8 | 15.8 | 15.8 | 21.7 | 21.7 | 21.7 | 27.6 | 27.6 |
| Depth | | mm | 163 | 163 | 193 | 193 | 218 | 218 | 218 | 218 | 195 | 250 | 250 | 250 | 270 |
| | | inches | 6.4 | 6.4 | 7.6 | 7.6 | 8.6 | 8.6 | 8.6 | 8.6 | 7.7 | 9.9 | 9.9 | 9.9 | 10.6 |

**Notes**: See next page.

## V500 Ratings 480V Class 1.5K - 55K

| Model FR-V540-_ _K-NA | | | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output | Horsepower Rating (Hp) | | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| | Rated Current (A) | | 4.5 | 6.5 | 10.0 | 14.5 | 18.5 | 27.5 | 35.5 | 44.0 | 51.8 | 67.0 | 86.0 | 99.0 | 132.0 |
| | Overload Current Rating (*1) | | 150% 60 sec., 200% 0.5 sec. (inverse time characteristics) | | | | | | | | | | | | |
| | Voltage (*2) | | 3-Phase 380-480V 50 Hz/60 Hz | | | | | | | | | | | | |
| | Regenerative Breaking Torque | Max. Time | 100% / 5 sec. | | | | 20% (*5) | | | | | | | | |
| | | Tolerable Work Rate | 2% ED (*5) | | | | Continuous (*5) | | | | | | | | |
| Power Supply | Rated Input, AC Volt. and Frequency | | 3-Phase 380-480 V 50 Hz/60 Hz | | | | | | | | | | | | |
| | Tolerable AC Voltage Fluctuation | | 323-528V 50 Hz/60 Hz | | | | | | | | | | | | |
| | Tolerable Frequency Fluctuation | | ±5% | | | | | | | | | | | | |
| | Amount of Instantaneous Voltage Drop that can be Withstood | | When operated at or above 320 V continuously and voltage falls from rated voltage to under 320 V, 15 ms of continuous operation | | | | | | | | | | | | |
| | Supply (kVA) (*3) | | 5.0 | 6.5 | 10.2 | 14 | 19 | 23 | 33 | 39 | 48 | 57 | 77 | 90 | 123 |
| Protective Structure (JEM 1030) | | | Enclosed type (IP20) (*4) | | | | | | | Open type (IP00) | | | | | |
| Cooling System | | | Forced air cooling | | | | | | | | | | | | |
| Approximate Weight | | kg | 3.5 | 3.5 | 6 | 6 | 14 | 14 | 14 | 14 | 30 | 35 | 35 | 36 | 65 |
| | | lbs | 7.7 | 7.7 | 13.2 | 13.2 | 30.8 | 30.8 | 30.8 | 30.8 | 66 | 77 | 77 | 79 | 143 |
| Width | | mm | 150 | 150 | 220 | 220 | 250 | 250 | 250 | 250 | 340 | 450 | 450 | 480 | 480 |
| | | inches | 5.9 | 5.9 | 8.7 | 8.7 | 9.9 | 9.9 | 9.9 | 9.9 | 13.4 | 17.7 | 17.7 | 18.9 | 18.9 |
| Height | | mm | 260 | 260 | 260 | 260 | 400 | 400 | 400 | 400 | 550 | 550 | 550 | 700 | 700 |
| | | inches | 10.2 | 10.2 | 10.2 | 10.2 | 15.8 | 15.8 | 15.8 | 15.8 | 21.7 | 21.7 | 21.7 | 27.6 | 27.6 |
| Depth | | mm | 163 | 163 | 193 | 193 | 218 | 218 | 218 | 218 | 195 | 250 | 250 | 250 | 270 |
| | | inches | 6.4 | 6.4 | 7.6 | 7.6 | 8.6 | 8.6 | 8.6 | 8.6 | 7.7 | 9.9 | 9.9 | 9.9 | 10.6 |

**Notes:**
1. The overload current % value indicates the percentage to the inverter's rated output current. For repeated duty, allow time for the inventer and motor to return to or below the temperature when at 100% load.
2. The maximum output voltage cannot exceed the power supply voltage. The maximum output voltage can be set below the power supply voltage.
3. The power capacity will vary according to the power supply side impedance (including input reactor and power lines) value.
4. When the wiring cover for the network option is removed and built-in options are installed, the protective structure will become open type (IP00).
5. For inverter capacities 1.5K to 15K, using the optional high-duty brake resistor (FR-ABR) will provide 100% torque/10% ED.

## Dedicated Options V500 Series

| Model Number | Description | Installation Manual | Stocked Item |
|---|---|---|---|
| FR-PU04V | Parameter unit used for operation control, reading and writing parameters, drive monitoring, parameter copy and multi-language | IB(NA)0600079 | S |
| FR-V5AP | Pulse train input for advanced position control. Differential line receiver: 500kpps, open collector 200kpps | IB(NA)0600087 | S |
| FR-V5AX | 6 additional multi-function digital inputs and high resolution analog input (16-bit) | IB(NA)0600083 | - |
| FR-V5AY | 3 additional multi-function digital outputs and encoder pulse ratio output (differential or open collector output) | IB(NA)0600085 | - |
| FR-V5AM | When used with additional encoder, machine side orientation can be performed | IB(NA)0600089 | - |
| FR-V5NS | SSCNET motion control network operation | IB(NA)0600106E | S |
| FR-V5NE | Ethernet option for inverter setup and monitoring using LAN | IB(NA)0600108E | - |
| FR-V5AH | 3-digit BCD or 12-bit binary code input for high accuracy speed control | IB(NA)0600110E | - |
| T-TRC50 | Memory option used with setup software (FR-SW1-SETUP-WE) to analyze internal inverter trace data | Contact MEAU | - |

## SSCNET II Cables

| Model Number | Length | Description | Stocked Item |
|---|---|---|---|
| FR-V5NSCBL005 | 0.5 meter | Connection of Q172CPU to FR-V5NS, FR-V5NS to FR-V5NS | S |
| FR-V5NSCBL01 | 1 meter | | S |
| FR-V5NSCBL05 | 5 meters | | S |
| FR-V5NSCBL10 | 10 meters | | - |
| FR-V5NSCBL20 | 20 meters | | - |

## Instruction Manuals

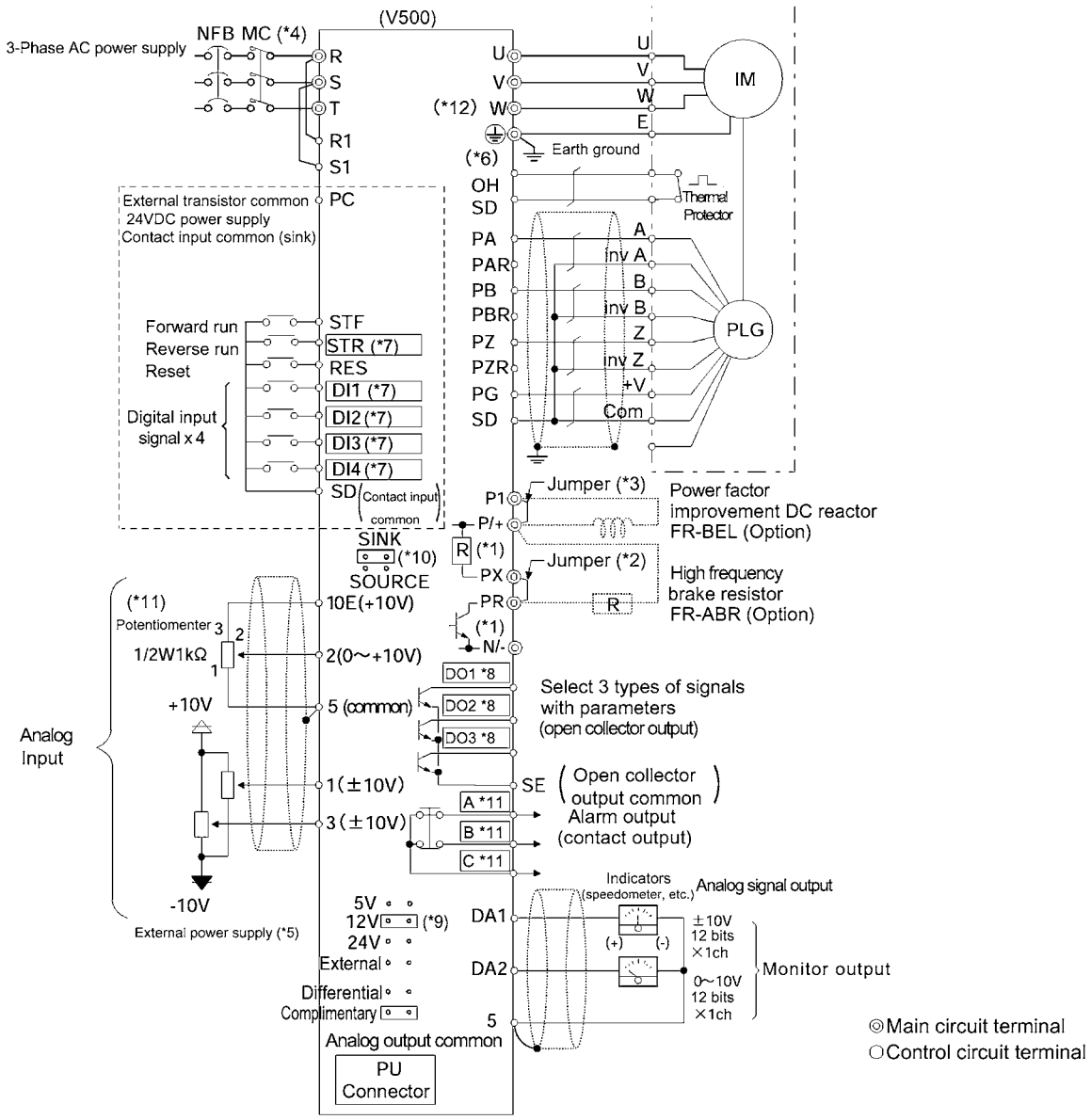
| Model | | Model Number |
|---|---|---|
| FR-V520 | Basic | IB(NA)06000064 |
| FR-V540 | Detailed | IB(NA)06000065 |
| FR-V560 | Basic | IB(NA)0600134 |
| | Detailed | IB(NA)0600135 |
| FR-V500L | Basic | IB-T7311 |
| | Detailed | IB-T7312 |

## V500 General Specifications

| | | | | | |
|---|---|---|---|---|---|
| **Control Specifications** | | | | | |
| **Control System** | | Soft- PWM control or high carrier frequency sine-wave PWM control can be selected. Vector control or V/F control can be selected. | | | |
| **Control Mode** | | Speed control, torque control, position control | | | |
| **Frequency Control Resolution** | **Analog Input** | 0.03% of maximum set speed | | | |
| | **Digital Input** | 0.003% against maximum settings (0.1 rpm units for minimum setting) | | | |
| **Acceleration / Deceleration Time** | | 0 to 3600 sec (0.1 second increments) | | | |
| **Acceleration / Deceleration Pattern** | | Linear, S pattern (3 types) or backlash compensation acceleration/deceleration can be selected | | | |
| **Torque Restriction Level** | | Torque restriction value can be set (0 to 400% variable) | | | |
| **Input Signal** | | | | | |
| **Analog Setting Signal** | | Terminal No. | Setting Range | Speed Control | Torque Control |
| | | 2 | 0 to 10V (resolution 0.03%) | Main speed setting | Speed restriction |
| | | 1 | 0 to ±10V (resolution 0.05%) | Auxiliary speed setting, magnetic flux command regenerative torque restriction | Speed restriction compensation, magnetic flux command, driving side speed restriction |
| | | 3 | 0 to ±10V (resolution 0.05%) | Torque restriction (Torque bias) | Torque command |
| **With Option FR-V5AX** | | 6 | 0 to ±10V (resolution 0.003%) | Main speed setting (in this case, terminals 1 and 2 are invalid) Torque restriction | Speed restriction (at this time, terminal 2 is invalid) / Torque command (at this time, terminal 3 is valid) |
| **Environment** | | | | | |
| **Contact Signal** | | 3 fixed function terminals | Forward rotation command, alarm reset, external thermal relay | | |
| | | 5 multi-function terminals | Selection can be made from reverse rotation command, multi-speed setting (max. 15 speeds), remote setting, jog operation, second function selection, third function selection, output stop, three-wire control, pre-excitation, control mode switchover, torque restriction selection, S pattern switchover, PID control terminal, orientation command, brake opening completion signal, PU operation/external operation switchover, torque bias selection 1, torque bias selection 2, P control selection, servo on, HC connection, PU/external interlock, external DC brake start, and commanded position selection. | | |
| **With Option (FR-V5AX)** | | 6 multi-function terminals | | | |
| **Contact Signal** | | 1 Form C Relay (230VAC 0.3A, 30VDC 0.3A) | Selection con be made from inverter running, up to speed, instantaneous power failure (undervoltage) speed detection, second speed detection, third speed detection, PU operation mode, overload alarm, regenerative brake pre-alarm, electronic thermal relay pre-alarm, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward /reverse output, operation ready, operation ready 2. brake opening request, fan fault output, fin overheat pre-alarm, orientation in-position, forward rotation output, reverse rotation output, low speed output, torque detection, regenerative status output, minor fault output, alarm output, maintenance timer output, remote output, speed detection, in-position and trace status | | |
| **Open Collector Signal** | | 3 multi-function terminals | | | |
| **With Option (FR-V5AY)** | | 3 multi-function terminals | | | |
| **With Option (FR-V5AM)** | | 1 multi-function terminal | | | |
| **With Option (FR-A5AY)** | | 7 multi-function terminals | | | |
| **Analog Output** | | 0 to ±10V, 12 bits x 1CH 0 to 10V, 12 bits x 1CH | Selection can be made from speed, output current, output voltage, preset speed, output frequency, motor torque, converter output voltage, regenerative brake duty, electronic thermal relay load factor, output current peak value, converter output voltage peak value, load meter, motor exciting current, motor output, reference voltage | | |
| **With Option (FR-A5AY)** | | 0 to ±10V, 10 bits x 1CH 0 to 20mA, 10 bits x 1CH | | | |
| **Encoder Pulse Output Option (FR-V5AY)** | | A phase, B phase, Z phase, (A and B phases can be divided) Open collector/differential line driver | | | |
| **Operational Functions** | | Maximum/minimum speed setting, speed jump, external thermal relay input selection, polarity reversible operation, override function, automatic restart operation after instantaneous power failure, forward/reverse operation prevention, operation mode selection, offline auto tuning function, online auto tuning function, easy gain tuning, computer link operation, remote setting, brake sequence, second function, third function, multi-speed operation, coasting to stop, power failure stop, PID control, speed feed forward, model adaptive speed control, master/slave, torque bias, 12-bit digital command (FR-A5AX option), pulse train input (FR-A5AP option), motor thermistor interface (FR-V5AX option), and simple positioning | | | |
| **Ambient Temperature** | | -10°C to +50°C (Non-freezing) / 14°F to 122°F | | | |
| **Ambient Humidity** | | 90% RH or less (Noncondensing) | | | |
| **Storage Temperature (*1)** | | -20°C to +65°C / -4°F to 149°F | | | |
| **Atmosphere** | | For indoor use; no corrosive gasses, flammable gasses, oil mist, dust or dirt present | | | |
| **Attitude** | | 1000m above sea level. Contact factory for higher altitude deratings. | | | |
| **Vibration** | | 5.9 m/s² (0.6G max.) based on JIS C 0911 | | | |
| **Display** | | | | | |
| **Parameter Unit (FR-DU04-1/ FR-PU04V)** | | Selection can be made from speed, output current, output voltage, preset speed, output frequency, motor torque, converter output voltage, regenerative brake duty, electronic thermal relay load factor, output current peak value, converter output voltage, peak value, input terminal status (PU04V), load meter, motor exciting current, position pulse, cumulative energization time, actual operation time, motor load factor, torque command, torque current command, feedback pulse, motor output, trace status | | | |
| **Alarm Definition** | | Alarm definition is displayed when protective function is activated. 8 past alarm definitions are stored. (Only 4 alarm definitions are stored in the DU04-1) | | | |
| **Protective Functions** | | Overcurrent shut-off (acceleration, deceleration, constant speed), regenerative overvoltage shut-off (acceleration, deceleration, constant speed), undervoltage, instantaneous power failure, overload shut-off (electronic thermal relay), brake transistor alarm, earth (ground) fault current, power output short circuit, stall prevention, external thermal relay, fin overheat, fan fault, option alarm, parameter error, PU disconnection, encoder no-signal, large speed deviation, overspeed large position error, CPU error, encoder phase error, output phase loss excessive retries, brake sequence error | | | |

**Note:**
1. Temperature that can be applied for short times, such as in transit.

## V500 Series Terminal Connection Diagram




**Notes:**

1. Terminal PR is provided on the 15kW and smaller capacities, and terminal PX is provided on the 5.5kW and smaller capacities.
2. When using FR-ABR with the 5.5kW or smaller capacity, remove this jumper.
3. Remove this jumper when using FR-BEL for 55kW and smaller capacities. DC link reactor included with 75kW and larger.
4. The converter's life will be shortened by repeated in-rush currents when the power is turned ON, so do not turn the power ON and OFF frequently.
5. Prepare a ± 10V external power supply for terminals 1 and 3.
6. When using a motor without a thermal protector, set Pr.876 "Thermal protector input" to 0 and set Pr.9 (Pr.452) "Electronic thermal (2nd electronic thermal).
7. The terminal functions can be changed with the input terminal function selection (Pr.180 to Pr.183, Pr.187)
8. The terminal functions can be changed with the output terminal function selection (Pr.190 to Pr.192, Pr.195)
9. Change the connector according to the encoder power supply specifications.
10. The sink logic and source logic will change when the connector is changed.
11. Use of the 2W1kW is recommended when the settings are changed frequently.
12. Always ground the inverter and motor.

# Packaged Solutions

Manufactured to the highest standards in UL approved facilities, The Packaged Solutions program takes Mitsubishi's high performance control products and engineers them into ready-to-use form.

**Standard Packaged Solutions**

Based on many years of practical industry experience, Standard Packaged Solutions are pre-engineered to meet the needs of a wide range of different applications within industrial, agricultural and commercial sectors, ensuring low cost and quick delivery.

**Custom Packaged Solutions**

Mitsubishi designs and constructs fully customized Packaged Solutions that meet the most exacting specifications. A Custom Packaged Solution could be anything from a single enclosure to a complete shipping container full of pre-commissioned control equipment, and can be made to US requirements or to meet the standards of any other country around the world

Every Package is supplied with full documentation and is backed up with a comprehensive 2 year warranty.

### Custom Packaged Solutions Offer:

- Competitive and innovative designs
- Solutions built to your exact specifications
- Integrated VFD panels from 1/8th HP to 1000 HP
- Support from factory trained engineers
- Help with interpreting specfications
- Global standards compliance - UL, cUL, CSA, CE
- Full documentation including AutoCAD drawings
- Designs archived for future reference or repeat orders
- Field installation and start-up services
- A full range of Mitsubishi Electric equipment integrated with 3rd party products
- Technical support and advice from beginning to end
- Complete solutions covered by 2 year warranty

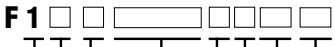
Custom Packaged Solutions offer the performance and reliability of Mitsubishi products in packages tailored to your exact specification.

# FR-F700 Based VFD Complete Bypass System - NEMA 1, NEMA 12, NEMA 3R

**Base System Includes:**

- PowerGate bypass controller with LCD display
- 3 contactor bypass with TEST mode
- Auto / Manual bypass versions
- Bi-directional Coasting Motor Restart (anti-windmill)
- Adjustable Class 20 overload relay
- Programming / display keypad and speed setting dial
- DC link choke as standard
- Choice of fused disconnect, non-fused disconnect or circuit breaker
- Control transformer, fused primary and secondary
- Terminal blocks for control connections
- RS-485 Modbus RTU and BACnet MS/TP as standard
- Complete Standard Mitsubishi testing
- 2 Year Warranty
- Mitsubishi 'Energy Oprimization' System
- 5 Second Power Dip Ride Through
- 2 independent PID loops
- AutoCAD documentation package
- Instruction Manuals for VFD and controller
- UL / cUL508
- Hardware options :
  - Input reactor (3 or 5%)
  - Damper Vane Actuator relay
  - Extended Analog Output
  - Hand-Off-Auto with potentiometer
  - Alphanumeric Keypad
- Extended Communications :
  - Metasys N2
  - LonWorks
  - Siemens FLN (P1)
  - EtherNet/IP
  - BACnet/IP
  - Modbus TCP/IP
  - PROFINET
- For NEMA 3R Systems :
  - Thermostatic cabinet control
  - Screened entrance for cooling air

**Part Number Structure - Sized up to 40HP (208-240V) and 75HP (380 - 480V)**




| Symbol | Horsepower Rating |
|---|---|
| 001 - 250 | 1 - 250 HP* |

* Maximum HP varies according to voltage and enclosure type.

| Symbol | Input Voltage |
|---|---|
| 2V | 208 - 240V |
| 4V | 380 - 480V |

| Symbol | Disconnect Type |
|---|---|
| C | UL 489 Circuit Breaker |
| D | Non-Fused Disconnect (option) |
| F | Fused Disconnect (200kA) (option) |

| Symbol | Enclosure Type |
|---|---|
| 1 | NEMA 1 |
| 2 | NEMA 12 |
| 3 | NEMA 3R |

| Symbol | Choke/Reactor Type |
|---|---|
| D | DC Link Choke |
| 3 | 3% Input Reactor (option) |
| 5 | 5% Input Reactor (option) |

| Symbol | Bypass Type |
|---|---|
| B | Manual 3 contactor bypass |
| N | Non bypass |
| A | Auto bypass |

| Symbol | Options |
|---|---|
| S1 | Damper vane actuator relay fitted |
| S2 | Hand-Off-Auto switch with potentiometer |
| S3 | Extended analog output |
| S4 | Alphanumeric keypad |
| S5 | Drive trip/run relay (non-bypass only) |
| S6 | 100kA SCCR rating (fused types) |

Up to 3 options maybe selected.

| Symbol | Network Type |
|---|---|
| RS | Enhanced RS-485 capability Modbus RTU and BACnet, MS/TP are standard. Siemens FLN, Metasys N2 |
| LN | Lonworks |
| ET | Ethernet Communications (Ethernet IP, Modbus TCP/IP, BACnet IP, ProfiNET) |

Select one option if required.

## FR-F700 Based VFD Complete Bypass System - NEMA 1

| Standard Product with Circuit Breaker & 3 Contactor Bypass VFD System | | 208V Based VFD System | | | Panel Size | 460V Based VFD System | | | Panel Size |
|---|---|---|---|---|---|---|---|---|---|
| HP | KW | Model Number | Stk. Item | Amps | | Model Number | Stk. Item | Amps | |
| 1 | 0.75 | F1C2V001BD | - | 4.2 | N1A | F1C4V001BD | - | 2.1 | N1A |
| 2 | 1.5 | F1C2V002BD | S | 7 | N1A | F1C4V002BD | S | 3.5 | N1A |
| 3 | 2.2 | F1C2V003BD | S | 9.6 | N1A | F1C4V003BD | S | 4.8 | N1A |
| 5 | 3.7 | F1C2V005BD | S | 15.2 | N1A | F1C4V005BD | S | 7.6 | N1A |
| 7.5 | 5.5 | F1C2V007BD | S | 23 | N1B | F1C4V007BD | S | 11.5 | N1A |
| 10 | 7.5 | F1C2V010BD | S | 31 | N1B | F1C4V010BD | S | 16 | N1A |
| 15 | 11 | F1C2V015BD | S | 45 | N1B | F1C4V015BD | S | 23 | N1B |
| 20 | 15 | F1C2V020BD | S | 58 | N1B | F1C4V020BD | S | 29 | N1B |
| 25 | 18.5 | F1C2V025BD | S | 70 | N1C | F1C4V025BD | S | 35 | N1C |
| 30 | 22 | F1C2V030BD | S | 85 | N1C | F1C4V030BD | S | 43 | N1C |
| 40 | 30 | F1C2V040BD | S | 114 | N1D | F1C4V040BD | S | 57 | N1C |
| 50 | - | - | - | - | - | F1C4V050BD | S | 70 | N1D |
| 60 | - | - | - | - | - | F1C4V060BD | S | 85 | N1D |
| 75 | - | - | - | - | - | F1C4V075BD | S | 106 | N1D |

| Panel | Lbs | H (in) | W (in) | D (in) |
|---|---|---|---|---|
| N1A | 70 | 32.3 | 12.5 | 10.8 |
| N1B | 150 | 50 | 16.5 | 13 |
| N1C | 200 | 60.3 | 25.5 | 13.8 |
| N1D | 285 | 65.7 | 25.5 | 15.3 |
| Floor Mount | 850 | 78 | 47.25 | 20 |

## FR-F700 Based VFD Complete Bypass System - NEMA 12

| Standard Product with Circuit Breaker & 3 Contactor Bypass VFD System | | 208V Based VFD System | | | Panel Size | 460V Based VFD System | | | Panel Size |
|---|---|---|---|---|---|---|---|---|---|
| HP | KW | Model Number | Stk. Item | Amps | | Model Number | Stk. Item | Amps | |
| 1 | 1 | F2C2V001BD | - | 4.2 | N12A | F2C4V001BD | - | 2.1 | N12A |
| 2 | 1.5 | F2C2V002BD | - | 7 | N12A | F2C4V002BD | - | 3.5 | N12A |
| 3 | 2.2 | F2C2V003BD | - | 9.6 | N12A | F2C4V003BD | - | 4.8 | N12A |
| 5 | 3.7 | F2C2V005BD | - | 15.2 | N12A | F2C4V005BD | - | 7.6 | N12A |
| 7.5 | 5.5 | F2C2V007BD | - | 23 | N12A | F2C4V007BD | - | 11.5 | N12A |
| 10 | 7.5 | F2C2V010BD | - | 31 | N12B | F2C4V010BD | - | 16 | N12B |
| 15 | 11 | F2C2V015BD | - | 45 | N12B | F2C4V015BD | - | 23 | N12B |
| 20 | 15 | F2C2V020BD | - | 58 | N12B | F2C4V020BD | - | 29 | N12C |
| 25 | 18.5 | F2C2V025BD | - | 70 | N12C | F2C4V025BD | - | 35 | N12C |
| 30 | 22 | F2C2V030BD | - | 85 | N12C | F2C4V030BD | - | 43 | N12C |
| 40 | 30 | F2C2V040BD | - | 114 | N12C | F2C4V040BD | - | 57 | N12C |
| 50 | 37 | F2C2V050BD | - | 140 | N12D | F2C4V050BD | - | 70 | N12D |
| 60 | 45 | F2C2V060BD | - | 170 | N12F | F2C4V060BD | - | 85 | N12D |
| 75 | 55 | F2C2V075BD | - | 212 | N12F | F2C4V075BD | - | 106 | N12E |
| 100 | 75 | F2C2V100BD | - | 288 | N12F | F2C4V100BD | - | 144 | N12E |
| 125 | - | - | - | - | - | F2C4V125BD | - | 180 | N12E |
| 150 | - | - | - | - | - | F2C4V150BD | - | 216 | N12F |
| 200 | - | - | - | - | - | F2C4V200BD | - | 260 | N12F |
| 250 | - | - | - | - | - | F2C4V250BD | - | 325 | N12F |

| Panel | Lbs | H (in) | W (in) | D (in) | Type |
|---|---|---|---|---|---|
| N12A | 88 | 29 | 22 | 10 | Wall |
| N12B | 121 | 31 | 24 | 11.5 | Wall |
| N12C | 174 | 38 | 32 | 12 | Wall |
| N12D | 394 | 49 | 36 | 18 | Wall |
| N12E | 562 | 60 | 36 | 24 | Wall |
| N12F | 779 | 77 | 32 | 29 | Floor |

### FR-F700 Based VFD Complete Bypass System - NEMA 3R

| Standard Product with Circuit Breaker & 3 Contactor Bypass VFD System | | 208V Based VFD System | | | Panel Size | 460V Based VFD System | | | Panel Size |
|---|---|---|---|---|---|---|---|---|---|
| HP | KW | Model Number | Stk. Item | Amps | | Model Number | Stk. Item | Amps | |
| 1 | 1 | F3C2V001BD | - | 4.2 | N3A | F3C4V001BD | - | 2.1 | N3A |
| 2 | 1.5 | F3C2V002BD | - | 7 | N3A | F3C4V002BD | - | 3.5 | N3A |
| 3 | 2.2 | F3C2V003BD | - | 9.6 | N3A | F3C4V003BD | - | 4.8 | N3A |
| 5 | 3.7 | F3C2V005BD | - | 15.2 | N3A | F3C4V005BD | - | 7.6 | N3A |
| 7.5 | 5.5 | F3C2V007BD | - | 23 | N3A | F3C4V007BD | - | 11.5 | N3A |
| 10 | 7.5 | F3C2V010BD | - | 31 | N3B | F3C4V010BD | - | 16 | N3B |
| 15 | 11 | F3C2V015BD | - | 45 | N3C | F3C4V015BD | - | 23 | N3B |
| 20 | 15 | F3C2V020BD | - | 58 | N3C | F3C4V020BD | - | 29 | N3C |
| 25 | 18.5 | F3C2V025BD | - | 70 | N3D | F3C4V025BD | - | 35 | N3C |
| 30 | 22 | F3C2V030BD | - | 85 | N3D | F3C4V030BD | - | 43 | N3C |
| 40 | 30 | F3C2V040BD | - | 114 | N3D | F3C4V040BD | - | 57 | N3C |
| 50 | 37 | F3C2V050BD | - | 140 | N3E | F3C4V050BD | - | 70 | N3D |
| 60 | 45 | - | - | - | - | F3C4V060BD | - | 85 | N3D |
| 75 | 55 | - | - | - | - | F3C4V075BD | - | 106 | N3E |
| 100 | 75 | - | - | - | - | F3C4V100BD | - | 144 | N3E |
| 125 | 90 | - | - | - | - | F3C4V125BD | - | 180 | N3E |

| Panel | Lbs | H (in) | W (in) | D (in) | Type |
|---|---|---|---|---|---|
| N3A | 88 | 29 | 22 | 10 | Wall |
| N3B | 121 | 31 | 24 | 11.5 | Wall |
| N3C | 174 | 38 | 32 | 12 | Wall |
| N3D | 394 | 49 | 36 | 18 | Wall |
| N3E | 562 | 60 | 36 | 24 | Wall |

## F3IP Agricultural Pump Drive Solutions

A3IP is a dedicated controller for agricultural irrigation systems allowing the intelligent control and scheduling of multiple pumps. Available in sizes up to 150HP (230V) and 600HP (480V), units are supplied in NEMA 3R wall-mounted cabinets. A door-mounted display screen allows simple operation and display of critical information.

### Part Number Structure

**F 3 I P** □ □ □ □ □ □

| Symbol | Input Voltage |
|---|---|
| 2V | 208 - 240V |
| 4V | 380 - 480V |

| Symbol | Enclosure Type |
|---|---|
| A3IP | Mitsubishi NEMA 3R Irrigation Pump Drive A700-NA5 PLC |

| Symbol | Choke/Reactor Type |
|---|---|
| D | DC Link Choke |
| 3 | 3% Input Reactor (option) |
| 5 | 5% Input Reactor (option) |

| Symbol | Horsepower Rating |
|---|---|
| 001 | 1HP |
| 002 | 2HP |
| 003 | 3HP |
| 005 | 5HP |
| 007 | 7.5HP |
| 110 | 10HP |
| 015 | 15HP |
| 020 | 20HP |
| 025 | 25HP |
| 030 | 30HP |
| (motor frame sizes up to 600HP) | |
| 600 | 600HP |

| Symbol | Options |
|---|---|
| S4 | Alphanumeric keypad |

| Symbol | Network Type |
|---|---|
| RS | Enhanced RS-485 Capability (BACnet, Siemens FLN, Metasys N2) Modbus RTU is standard |
| LN | Lonworks |
| ET | Ethernet Communications (Ethernet IP, Modbus TCP/IP, BACnet IP, ProfiNET) |

Select one option if required.

## F3IP Agricultural Pump Drive Solutions - NEMA 3R

| Standard Product with Circuit Breaker & 3 Contactor Bypass VFD System | | 208V Based VFD System | | | Panel Size | 460V Based VFD System | | | Panel Size |
|---|---|---|---|---|---|---|---|---|---|
| HP | KW | Model Number | Stk. Item | Amps | | Model Number | Stk. Item | Amps | |
| 1 | 1 | F3IPC2V001ND | - | 4.2 | N3A | F3IPC4V001ND | - | 2.1 | N3A |
| 2 | 1.5 | F3IPC2V002ND | - | 7 | N3A | F3IPC4V002ND | - | 3.5 | N3A |
| 3 | 2.2 | F3IPC2V003ND | - | 9.6 | N3A | F3IPC4V003ND | - | 4.8 | N3A |
| 5 | 3.7 | F3IPC2V005ND | - | 15.2 | N3A | F3IPC4V005ND | - | 7.6 | N3A |
| 7.5 | 5.5 | F3IPC2V007ND | - | 23 | N3A | F3IPC4V007ND | - | 11.5 | N3A |
| 10 | 7.5 | F3IPC2V010ND | - | 31 | N3B | F3IPC4V010ND | - | 16 | N3B |
| 15 | 11 | F3IPC2V015ND | - | 45 | N3B | F3IPC4V015ND | - | 23 | N3B |
| 20 | 15 | F3IPC2V020ND | - | 58 | N3B | F3IPC4V020ND | - | 29 | N3B |
| 25 | 18.5 | F3IPC2V025ND | - | 70 | N3C | F3IPC4V025ND | - | 35 | N3B |
| 30 | 22 | F3IPC2V030ND | - | 85 | N3C | F3IPC4V030ND | - | 43 | N3C |
| 40 | 30 | F3IPC2V040ND | - | 114 | N3C | F3IPC4V040ND | - | 57 | N3C |
| 50 | 37 | F3IPC2V050ND | - | 140 | N3D | F3IPC4V050ND | - | 70 | N3D |
| 60 | 45 | F3IPC2V060ND | - | 170 | N3D | F3IPC4V060ND | - | 85 | N3D |
| 75 | 55 | F3IPC2V075ND | - | 212 | N3D | F3IPC4V075ND | - | 106 | N3D |
| 100 | 75 | F3IPC2V100ND | - | 288 | N3E | F3IPC4V100ND | - | 144 | N3D |
| 125 | 93 | F3IPC2V125ND | - | 346 | N3E | F3IPC4V125ND | - | 180 | N3D |
| 150 | 112 | F3IPC2V150ND | - | 432 | N3E | F3IPC4V150ND | - | 216 | N3E |
| 200 | 149 | - | - | - | - | F3IPC4V200ND | - | 260 | N3E |
| 250 | 187 | - | - | - | - | F3IPC4V250ND | - | 325 | N3E |
| 300 | 225 | - | - | - | - | F3IPC4V300ND | - | 361 | N3F |
| 350 | 261 | - | - | - | - | F3IPC4V350ND | - | 432 | N3F |
| 400 | 299 | - | - | - | - | F3IPC4V400ND | - | 481 | N3F |
| 450 | 336 | - | - | - | - | F3IPC4V450ND | - | 547 | N3G |
| 500 | 373 | - | - | - | - | F3IPC4V500ND | - | 610 | N3G |
| 550 | 410 | - | - | - | - | F3IPC4V550ND | - | 683 | N3G |
| 650 | 485 | - | - | - | - | F3IPC4V650ND | - | 770 | N3G |
| 700 | 522 | - | - | - | - | F3IPC4V700ND | - | 866 | N3H |

| Panel | Lbs | H (in) | W (in) | D (in) | Type |
|---|---|---|---|---|---|
| N3A | 88 | 29 | 22 | 10 | Wall |
| N3B | 121 | 31 | 24 | 11.5 | Wall |
| N3C | 174 | 38 | 32 | 12 | Wall |
| N3D | 394 | 49 | 36 | 18 | Wall |
| N3E | 562 | 60 | 36 | 24 | Wall |
| N3F | 779 | 72 | 32 | 24 | Floor |
| N3G | 1025 | 84 | 39 | 24 | Floor |
| N3H | 1225 | 90 | 48 | 24 | Floor |

# F8 Type 18 Pulse Controllers

F8 controllers are intended for the control of pumps and fans. 18 pulse technology is used to ensure that the quality of the site power supply is maintained. These 460VAC Drives (10-800 HP) are LD rated at 120% overload for one minute, available in both bypass and non-bypass configurations in NEMA 12 Ventilated Floor mounted cabinets. UL508A rated to meet IEEE519-1992 standards.

**Base System Includes:**

- NEMA 12 ventilated construction
- Standard Hoffman ANSI 61 gray paint
- 18 Pulse Clean Power Design Technology
- 3 contactor bypass with TEST mode
- Choice of bypass or non-bypass units
- Catch a spinning load / windmill start activated
- Adjustable overload relay, class 20 equivalent
- Programming / display keypad and speed setting dial
- Choice of fused disconnect or circuit breaker (standard)
- Control transformer, fused primary and secondary
- Terminal blocks for control connections
- RS-485, Modbus RTU Communication standard, EMI / RFI filter standard
- AutoCAD documentation packet
- Instruction manuals for VFD and controller
- UL / cUL 508A
- Hardware options: Damper vane actuator relay, extended analog output, hand-off autoswitch with potentiometer, PU07 keypad / display door mounted
- Communications Options: BACnet® MS/TP, Metasys® N2, LonWorks®, Siemens® FLN(P1), EtherNet/IP™, BACnet® IP, Modbus® TCP/IP, PROFINET
- 2 year warranty

**Part Number Structure**

**F 8 □ 4V □ □ □ □**

| Symbol | Horsepower Rating |
|---|---|
| 010 | 10HP |
| 015 | 15HP |
| 020 | 20HP |
| 025 | 25HP |
| 030 | 30HP |
| 040 | 40HP |
| (Motor frame sizes up to 800HP) | |
| 800 | 800HP |

| Symbol | Input Voltage |
|---|---|
| 4V | 380 - 480V |

| Symbol | Disconnect Type |
|---|---|
| C | UL 489 circuit breaker |
| F | Fused disconnect (100kA) (option) |

| Symbol | Enclosure Type |
|---|---|
| 8 | 18 Pulse NEMA 12V |

| Symbol | Network Type |
|---|---|
| RS | Enhanced RS-485 capability (BACnet, Siemens FLN, Metasys N2) Modbus RTU is standard |
| LN | Lonworks |
| ET | Ethernet Communications (Ethernet IP, Modbus TCP/IP, BACnet IP, ProfiNET) |

Select one option if required.

| Symbol | Bypass Type |
|---|---|
| B | Manual 3 contactor bypass |
| N | 3 contactor non-bypass (option) |

| Symbol | Options |
|---|---|
| S1 | Damper vane actuator relay fitted |
| S2 | Hand Off autoswitch with potentiometer |
| S3 | Extended analog output |
| S4 | Alphanumeric keypad |
| S5 | Drive trip/run relay (non-bypass only) |

Up to 3 options may be selected.

For further information, please refer to our website, www.MEAU.com

# Type C Conveyor Drives

These Constant Torque Conveyor Drives are specifically designed to meet the needs of the Material Handling Industry. Both 230VAC and 460VAC drives (1-20 HP) are ND rated at 150% overload for one minute. Options include circuit breaker or disconnect switch with a lockable handle and a solid state brake relay.

**Base System Includes:**

- Hang down frame construction
- Conveniently mounts beneath the conveyor
- Protective roof and sides around the drive
- D700 / E700 controller with LCD keypad / display
- ND Rated 150% overload for one minute
- AutoCAD documentation package
- Instruction manuals for VFD and controller
- Hardware options: Input circuit breaker or disconnect switch and a solid state brake relay
- 5 year warranty

C □ □ □ □

| Symbol | Input/Output Voltage |
|---|---|
| 2V | 3/60/208 (230/240)VAC |
| 4V | 3/60/460 (480)VAC |

| Symbol | Disconnect Type |
|---|---|
| D | D700 Drive |
| E | E700 Drive |

| Symbol | Enclosure Type |
|---|---|
| C | Conveyor Drive |

| Symbol | Horsepower Rating |
|---|---|
| 001 | 1HP |
| 002 | 2HP |
| 003 | 3HP |
| 005 | 5HP |
| 007 | 7.5HP |
| 010 | 10HP |
| 015 | 15HP |
| 020 | 20HP |

| Symbol | Options |
|---|---|
| S1 | Circuit Breaker and Handle |
| S2 | Disconnect Switch and Handle |
| S3 | Brake Relay |

Up to 3 options may be selected.

For further information, please refer to our website, www.MEAU.com

# Type CK Conduit Mounting Kits

The CK range of Type 1 Conduit Mounting Kits is intended for use with D700 and E700 Series VFDs. This kit allows the drive to be mounted outside of a normal enclosure.

**Main Features**

- Available for all 3 phase D700 and E700 VFDs
- Provides conduit holes on both sides and the bottom
- Knockout conduits provided
- Supplied as a kit to be installed in the field
- Units available from stock
- 7 frame sizes
- Drive mounting screws provided
- Ample box area for easy wiring with generous wire bend radius
- Suitable for 208/230V and 460/480V drives

**Conduit Kit Selection Chart**

| D700 Series VFD | Model Number |
|---|---|
| FR-D720-008-NA | CKDE1 |
| FR-D720-025-NA | |
| FR-D720-042-NA | |
| FR-D720-070-NA | |
| FR-D720-100-NA | |
| FR-D720-165-NA | CKDE3 |
| FR-D720-238-NA | CKDE4 |
| FR-D720-318-NA | |
| FR-D740-012-NA | CKDE1 |
| FR-D740-022-NA | |
| FR-D740-036-NA | |
| FR-D740-050-NA | |
| FR-D740-080-NA | |
| FR-D740-120-NA | CKDE4 |
| FR-D740-160-NA | |

| E700 Series VFD | Model Number |
|---|---|
| FR-E720-008 | CKDE1 |
| FR-E720-015 | |
| FR-E720-030 | |
| FR-E720-050 | |
| FR-E720-080 | |
| FR-E720-110 | |
| FR-E720-175 | CKDE3 |
| FR-E720-240 | CKDE5 |
| FR-E720-330 | |
| FR-E720-470 | |
| FR-E720-600 | |
| FR-E740-016 | CKDE2 |
| FR-E740-026 | |
| FR-E740-040 | |
| FR-E740-060 | |
| FR-E740-095 | |
| FR-E740-120 | CKDE4 |
| FR-E740-170 | |
| FR-E740-230 | CKDE5 |
| FR-E740-300 | |

* Drive not included

# Type G General Purpose Controllers

## For D700 and E700 VFD – NEMA 12 or NEMA 3R Construction

Type G controllers are general purpose packaged drives suitable for a wide range of applications where a remote mounted VFD is required. Any Mitsubishi VFD up to 700HP can be configured into a type G package with either a NEMA 12 or NEMA 3R enclosure.

**Base System Includes:**

- RAL 7035 light gray paint
- Bottom mounted inlet and exhaust vents
- D700 controller with LCD keypad / display
- Rated 150% overload for one minute, 200% for 3 seconds
- DC Link Choke included as standard
- Thermostatically controlled space heater
- Choice of fused disconnect or UL 489 circuit breaker (standard)
- Modbus RTU Communication standard
- AutoCAD documentation package
- VFD instruction manual
- UL / cUL 508
- Hardware options: Input reactor, (3% or 5%), door mounted PU07 keypad / display
- 2 year warranty

G □□□□□□□□

| Symbol | Input/Output Voltage |
|---|---|
| 2V | 3/60/208 (230/240)VAC |
| 4V | 3/60/460 (480)VAC |

| Symbol | Input Voltage |
|---|---|
| C | Circuit Breaker |
| F | Fused Disconnect |

| Symbol | Input Voltage |
|---|---|
| 2 | NEMA 12 Ventilated |
| 3 | NEMA 3R |

| Symbol | Disconnect Type |
|---|---|
| D | D700 Drive |
| E | E700 Drive |

| Symbol | Enclosure Type |
|---|---|
| G | General Purpose |

| Symbol | Choke/Reactor Type |
|---|---|
| D | DC Link Choke |
| 3 | 3% Input Reactor (option) |
| 5 | 5% Input Reactor (option) |

| Symbol | Horsepower Rating |
|---|---|
| 001 | 1HP |
| 002 | 2HP |
| 003 | 3HP |
| 005 | 5HP |
| 007 | 7.5HP |
| 010 | 10HP |

| Symbol | Options |
|---|---|
| S4 | Alphanumeric keypad |

## For A700 and F700 VFD – NEMA 12 or NEMA 3R Construction

**Base System Includes:**

- RAL 7035 light gray paint
- Bottom mounted inlet and exhaust vents
- F700 controller with LCD keypad / display
- LD Rated 120% overload for one minute
- DC Link Choke included as standard
- Choice of fused disconnect or UL 489 circuit breaker (standard)
- RS-485, Modbus RTU Communication standard, EMI/RFI filter standard
- AutoCAD documentation package
- Instruction manuals for VFD and controller
- UL / cUL 508
- Hardware options: Input reactor, (3% or 5%), PU07 keypad / display
- Communications Options: BACnet® MS/TP, Metasys® N2, LonWorks®, Siemens® FLN(P1), EtherNet/IP™, BACnet® IP, Modbus® TCP/IP, CC-Link®, DeviceNet™, PROFIBUS-DP
- 2 year warranty

G □□□□□□□□□□

| Symbol | Input/Output Voltage |
|---|---|
| 2V | 3/60/208 (230/240)VAC |
| 4V | 3/60/460 (480)VAC |

| Symbol | Input Voltage |
|---|---|
| C | Circuit Breaker |
| F | Fused Disconnect |

| Symbol | Input Voltage |
|---|---|
| 2 | NEMA 12 Ventilated |
| 3 | NEMA 3R |

| Symbol | Disconnect Type |
|---|---|
| A | A700 Drive |
| F | F700 Drive |

| Symbol | Enclosure Type |
|---|---|
| G | General Purpose |

| Symbol | Choke/Reactor Type |
|---|---|
| D | DC Link Choke |
| 3 | 3% Input Reactor (option) |
| 5 | 5% Input Reactor (option) |

| Symbol | Horsepower Rating |
|---|---|
| 001 | 1HP |
| 002 | 2HP |
| 003 | 3HP |
| 005 | 5HP |
| 007 | 7.5HP |
| 101 | 10HP |
| 015 | 15HP |
| 020 | 20HP |
| 025 | 25HP |
| 030 | 30HP |
| (motor frame sizes up to 700HP) | |
| 700 | 700HP |

| Symbol | Options |
|---|---|
| S4 | Alphanumeric keypad |

| Symbol | Network Type |
|---|---|
| LN | Lonworks (FR-A7NL) |
| ET | Ethernet (FR-A7NE) |
| RS | RS485 (FR-A7N-XLT) |
| CC | CC-Link (FR-A7NC) |
| DN | DeviceNet (FR-A7ND) |
| DP | Profibus (FR-A7NP) |

# General Options

### RFI Filters

| Model No. | Filter Amps RMS | 208V - Hp With >3% Reactor | 208V - Hp* Without Reactor | 240V - Hp* With >3% Reactor | 240V - Hp* Without Reactor | 480V - Hp* With >3% Reactor | 480V - Hp* Without Reactor | 600V - Hp* With >3% Reactor | 600V - Hp* Without Reactor | Stocked Item |
|---|---|---|---|---|---|---|---|---|---|---|
| RF3-0006-4 | 6 | 1-1.5 Hp | 1 Hp | 1-1.5 Hp | 1 Hp | 1-3 Hp | 1-2 Hp | - | - | - |
| RF3-0010-4 | 10 | 2 Hp | 1.5 Hp | 2-3 Hp | 1.5-2 Hp | 5 Hp | 3-5 Hp | - | - | - |
| RF3-0018-4 | 18 | 3-5 Hp | 2-3 Hp | 5 Hp | 3 Hp | 7.5-10 Hp | 7.5 Hp | - | - | - |
| RF3-0025-4 | 25 | 7.5 Hp | 5 Hp | 7.5 Hp | 5 Hp | 15 Hp | 10 Hp | - | - | - |
| RF3-0033-4 | 33 | 10 Hp | 7.5 Hp | 10 Hp | 7.5 Hp | 20 Hp | 15 Hp | - | - | - |
| RF3-0050-4 | 50 | 15 Hp | 10 Hp | 15 Hp | 10 Hp | 25-30 Hp | 20-25 Hp | - | - | - |
| RF3-0070-4 | 70 | 20 Hp | 15 Hp | 20 Hp | 15 Hp | 40-50 Hp | 30 Hp | - | - | - |
| RF3-0090-4 | 90 | 25 Hp | 20 Hp | 25-30 Hp | 20 Hp | 60 Hp | 40-50 Hp | - | - | - |
| RF3-0130-4 | 130 | 30-40 Hp | 25-30 Hp | 40 Hp | 25-30 Hp | 75-100 Hp | 60 Hp | - | - | - |
| RF3-0150-4 | 150 | 50 Hp | - | 50 Hp | 40 Hp | - | 75 Hp | - | - | - |
| RF3-0330-4 | 330 | 60-100 Hp | 40-75 Hp | 60-125 Hp | 50-100 Hp | 125-250 Hp | 100-200 Hp | - | - | - |
| RF3-0006-6 | 6 | - | - | - | - | - | - | 1-3 Hp | 1-3 Hp | - |
| RF3-0010-6 | 10 | - | - | - | - | - | - | 5-7.5 Hp | 5 Hp | - |
| RF3-0018-6 | 18 | - | - | - | - | - | - | 10-15 Hp | 7.5-10 Hp | - |
| RF3-0025-6 | 25 | - | - | - | - | - | - | 20 Hp | 15 Hp | - |
| RF3-0033-6 | 33 | - | - | - | - | - | - | 25-30 Hp | 20 Hp | - |
| RF3-0050-6 | 50 | - | - | - | - | - | - | 40 Hp | 25-30 Hp | - |
| RF3-0070-6 | 70 | - | - | - | - | - | - | 50-60 Hp | 40-50 Hp | - |
| RF3-0090-6 | 90 | - | - | - | - | - | - | 75 Hp | 60 Hp | - |
| RF3-0130-6 | 130 | - | - | - | - | - | - | 100-125 Hp | 75-100 Hp | - |
| RF3-0150-6 | 150 | - | - | - | - | - | - | 150 Hp | - | - |
| RF3-0330-6 | 330 | - | - | - | - | - | - | 200-300 Hp | 125-200 Hp | - |

* Hp Based on NEC motor current ratings

### RFI Filter Electrical Data

| Model No. | Dissipation Watts | Leakage Current mA | Fig. | A | A | B | B | C | C | D | D | E | E | Weight (lb.) | Mass (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | in | mm | in | mm | in | mm | in | mm | in | mm | | |
| RF3-0006-4 | 3.5 | 1.5 | A | 7 | 179 | 1.8 | 45 | 3.1 | 79 | 6.57 | 167 | 1.26 | 32 | 1.4 | 0.65 |
| RF3-0010-4 | 4.2 | 1.4 | A | 7 | 179 | 1.8 | 45 | 3.1 | 79 | 6.57 | 167 | 1.26 | 32 | 1.5 | 0.7 |
| RF3-0018-4 | 11 | 1.5 | A | 9 | 229 | 2.2 | 55 | 4.5 | 114 | 8.54 | 217 | 1.65 | 42 | 2.4 | 1.1 |
| RF3-0025-4 | 11 | 2.8 | A | 9 | 229 | 2.2 | 55 | 4.5 | 114 | 8.54 | 217 | 1.65 | 42 | 2.9 | 1.3 |
| RF3-0033-4 | 16 | 3.7 | B | 10.7 | 272 | 2.9 | 74 | 6.3 | 161 | 10.16 | 258 | 2.36 | 60 | 6 | 2.7 |
| RF3-0050-4 | 16 | 4.8 | B | 12.3 | 312 | 3.7 | 93 | 7.5 | 190 | 11.73 | 298 | 3.11 | 79 | 8.2 | 3.7 |
| RF3-0070-4 | 19 | 4.4 | B | 12.3 | 312 | 3.7 | 93 | 7.5 | 190 | 11.73 | 298 | 3.11 | 79 | 9.3 | 4.2 |
| RF3-0090-4 | 18 | 6.4 | B | 12.6 | 319 | 5 | 126 | 8.8 | 224 | 11.73 | 298 | 4.41 | 112 | 13.5 | 6.1 |
| RF3-0130-4 | 25 | 8.6 | B | 12.6 | 319 | 5 | 126 | 8.8 | 224 | 11.73 | 298 | 4.41 | 112 | 13.5 | 6.1 |
| RF3-0150-4 | 28 | 9.8 | B | 13.1 | 334 | 5 | 126 | 8.8 | 224 | 11.73 | 298 | 4.41 | 112 | 19.6 | 8.9 |
| RF3-0330-4 | 40 | 6 | C | 15.2 | 386 | 10.2 | 260 | 4.6 | 116 | 4.72 | 120 | 9.25 | 235 | 24.3 | 11 |
| RF3-0006-6 | 3.5 | 1.5 | C | 7.2 | 183 | 1.8 | 45 | 3.1 | 79 | 6.57 | 167 | 1.26 | 32 | 1.4 | 0.65 |
| RF3-0010-6 | 4.2 | 1.5 | C | 7.2 | 183 | 1.8 | 45 | 3.1 | 79 | 6.57 | 167 | 1.26 | 32 | 1.5 | 0.7 |
| RF3-0018-6 | 11 | 4.9 | C | 9.2 | 233 | 2.2 | 55 | 4.5 | 114 | 8.54 | 217 | 1.65 | 42 | 2.4 | 1.1 |
| RF3-0025-6 | 11 | 4.9 | C | 9.2 | 233 | 2.2 | 55 | 4.5 | 114 | 8.54 | 217 | 1.65 | 42 | 2.9 | 1.3 |
| RF3-0033-6 | 16 | 6.5 | B | 10.7 | 272 | 2.9 | 74 | 6.3 | 161 | 10.16 | 258 | 2.36 | 60 | 6 | 2.7 |
| RF3-0050-6 | 16 | 9.9 | B | 12.3 | 312 | 3.7 | 93 | 7.5 | 190 | 11.73 | 298 | 3.11 | 79 | 8.2 | 3.7 |
| RF3-0070-6 | 19 | 9.9 | B | 12.3 | 312 | 3.7 | 93 | 7.5 | 190 | 11.73 | 298 | 3.11 | 79 | 9.3 | 4.2 |
| RF3-0090-6 | 19 | 9.9 | B | 12.3 | 312 | 3.7 | 93 | 7.5 | 190 | 11.73 | 298 | 3.11 | 79 | 9.3 | 4.2 |
| RF3-0130-6 | 28 | 14.1 | B | 13.1 | 334 | 5 | 126 | 8.8 | 224 | 11.73 | 298 | 4.41 | 112 | 19.6 | 8.9 |
| RF3-0150-6 | 28 | 14.1 | B | 13.1 | 334 | 5 | 126 | 8.8 | 224 | 11.73 | 298 | 4.41 | 112 | 19.6 | 8.9 |
| RF3-0330-6 | 40 | 9.9 | C | 15.2 | 386 | 10.2 | 260 | 4.6 | 116 | 4.72 | 120 | 9.25 | 235 | 24.3 | 11 |

For additional information visit http://www.mtecorp.com/rfiemi.html

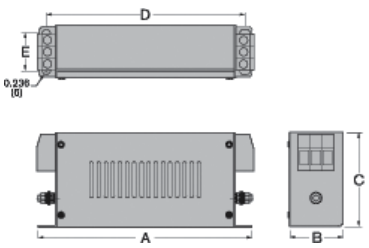


Figure A

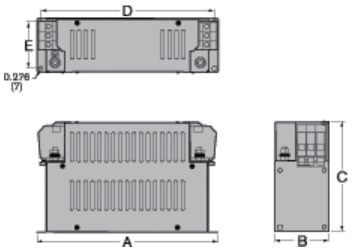


Figure B

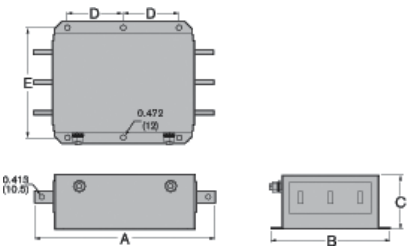


Figure C

## Line / Load Reactors

| Input or Output Reactors | | | | | | |
|---|---|---|---|---|---|---|
| Open Type Model No. | Stocked Item | NEMA 1 Type Model No. | Stocked Item | 3 Phase Voltage Class | | |
| | | | | 208-240V | 480V | 600V |
| MRL-00101 | - | MRL-00111 | - | - | - | 1/4-1/3Hp @ 5% |
| MRL-00102 | - | MRL-00112 | - | - | 1/4-1/3Hp @ 5% | 1/4-1/3Hp @ 3%, 1/2Hp @ 5% |
| MRL-00103 | - | MRL-00113 | - | - | 1/4-1/3Hp @ 3%, 1/2Hp @ 5% | 1/4-1/3Hp @ 1.5%. 1/2Hp @ 3% |
| MRL-00104 | - | MRL-00114 | - | - | 1/4-1/2Hp @ 1.5%. 1/2Hp @ 3% | 1/2Hp @ 1.5% |
| MRL-00201 | - | MRL-00211 | - | 1//4Hp @ 3%, 1/3-3/4Hp @ 5% | 3/4-1.5Hp @ 3% | 3/4-1.5Hp @ 1.5% |
| MRL-00202 | - | MRL-00212 | - | 1/4Hp @ 5% | 3/4-1.5Hp @ 5% | 3/4-1.5Hp @ 3% |
| MRL-00203 | - | MRL-00213 | - | - | - | 3/4-1.5Hp @ 5% |
| MRL-00204 | - | MRL-00214 | - | 1/3-3/4Hp @ 3% | 3/4-1.5Hp @ 5% | - |
| MRL-00401 | - | MRL-00411 | - | 1Hp @ 3% | 2-3Hp @ 1.5% | - |
| MRL-00402 | S | MRL-00412 | - | 1Hp @ 5% | 2-3Hp @ 3% | 2-3Hp @ 1.5% |
| MRL-00403 | S | MRL-00413 | - | - | 2-3Hp @ 5% | 2-3Hp @ 3% |
| MRL-00404 | - | MRL-00414 | - | - | - | 2-3Hp @ 5% |
| MRL-00801 | - | MRL-00811 | - | 1.5-2Hp @ 3% | 5Hp @ 1.5% | 7.5Hp @ 1.5% |
| MRL-00802 | S | MRL-00812 | - | 1.5-2Hp @ 5% | 5Hp @ 3% | 5Hp @ 1.5%, 7.5Hp @ 3% |
| MRL-00803 | - | MRL-00813 | - | - | 5Hp @ 5% | 5Hp @ 3%, 7.5Hp @ 5% |
| MRL-00804 | - | MRL-00814 | - | - | - | 5Hp @ 5% |
| MRL-01201 | - | MRL-01211 | - | 3Hp @ 3% | 7.5Hp @ 1.5% | 10Hp @ 1.5% |
| MRL-01202 | S | MRL-01212 | - | 3Hp @ 5% | 7.5Hp @ 3% | 10Hp @ 3% |
| MRL-01203 | - | MRL-01213 | - | - | 7.5Hp @ 5% | 10Hp @ 5% |
| MRL-01801 | S | MRL-01811 | - | 5Hp @ 3% | 10Hp @ 1.5% | 15Hp @ 1.5% |
| MRL-01802 | S | MRL-01812 | - | 5Hp @ 5% | 10Hp @ 3% | 15Hp @ 3% |
| MRL-01803 | - | MRL-01813 | - | - | 10Hp @ 5% | 15Hp @ 5% |
| MRL-02501 | - | MRL-02511 | - | 7.5Hp @ 3% | 15Hp @ 1.5% | 20-25Hp @ 1.5% |
| MRL-02502 | S | MRL-02512 | - | 7.5Hp @ 5% | 15Hp @ 3% | 20-25Hp @ 3% |
| MRL-02503 | - | MRL-02513 | - | - | 15Hp @ 5% | 20-25Hp @ 5% |
| MRL-03501 | S | MRL-03511 | - | 10Hp @ 3% | 20-25Hp @ 1.5% | 30Hp @ 1.5% |
| MRL-03502 | S | MRL-03512 | - | 10Hp @ 5% | 20-25Hp @ 3% | 30Hp @ 3% |
| MRL-03503 | S | MRL-03513 | - | - | 20-25Hp @ 5% | 30Hp @ 5% |
| MRL-04501 | S | MRL-04511 | - | 15Hp @ 3% | 30Hp @ 1.5% | 40Hp @ 1.5% |
| MRL-04502 | S | MRL-04512 | - | 15Hp @ 5% | 30Hp @ 3% | 40Hp @ 3% |
| MRL-04503 | - | MRL-04513 | - | - | 30Hp @ 5% | 40Hp @ 5% |
| MRL-05501 | S | MRL-05511 | - | 20Hp @ 3% | 40Hp @ 1.5% | 50Hp @ 1.5% |
| MRL-05502 | S | MRL-05512 | - | 20Hp @ 5% | 40Hp @ 3% | 50Hp @ 3% |
| MRL-05503 | - | MRL-05513 | - | - | 40Hp @ 5% | 50Hp @ 5% |
| MRL-08001 | - | MRL-08011 | - | 25-30Hp @ 3% | 50-60Hp @ 1.5% | 60-75Hp @ 1.5% |
| MRL-08002 | S | MRL-08012 | - | 25-30Hp @ 5% | 50-60Hp @ 3% | 60-75 Hp @ 3% |
| MRL-08003 | - | MRL-08013 | - | - | 50-60Hp @ 5% | 60-75 Hp @ 5% |
| MRL-10001 | - | MRL-10011 | - | 40Hp @ 3% | 75Hp @ 1.5% | 100Hp @ 1.5% |
| MRL-10002 | S | MRL-10012 | - | 40Hp @ 5% | 75Hp @ 3% | 100Hp @ 3% |
| MRL-10003 | - | MRL-10013 | - | - | 75Hp @ 5% | 100Hp @ 5% |
| MRL-13001 | - | MRL-13011 | - | 50Hp @ 3% | 100Hp @ 1.5% | 125Hp @ 1.5% |
| MRL-13002 | - | MRL-13012 | - | 50Hp @ 5% | 100Hp @ 3% | 125Hp @ 3% |
| MRL-13003 | - | MRL-13013 | - | - | 100Hp @ 5% | 125Hp @ 5% |
| MRL-16001 | - | MRL-16011 | - | 60Hp @ 3% | 125Hp @ 1.5% | 150Hp @ 1.5% |
| MRL-16002 | - | MRL-16012 | - | 60Hp @ 5% | 125Hp @ 3% | 150Hp @ 3% |
| MRL-16003 | - | MRL-16013 | - | - | 125Hp @ 5% | 150Hp @ 5% |
| MRL-20001B14 | - | MRL-20011B14 | - | 75Hp @ 3% | 150Hp @ 1.5% | 200Hp @ 1.5% |
| MRL-20002B14 | S | MRL-20012B14 | - | 75Hp @ 5% | 150Hp @ 3% | 200Hp @ 3% |
| MRL-20003B14 | - | MRL-20013B14 | - | - | 150Hp @ 5% | 200Hp @ 5% |
| MRL-25001B14 | - | MRL-25011B14 | - | 100Hp @ 3% | 200Hp @ 1.5% | 250Hp @ 1.5% |
| MRL-25002B14 | - | MRL-25012B14 | - | 100Hp @ 5% | 200Hp @ 3% | 250Hp @ 3% |
| MRL-25003B14 | - | MRL-25013B14 | - | - | 200Hp @ 5% | 250Hp @ 5% |
| MRL-32001B14 | - | MRL-32011B14 | - | 125Hp @ 3% | 250Hp @ 1.5% | 300Hp @ 1.5% |
| MRL-32002B14 | - | MRL-32012B14 | - | 125Hp @ 5% | 250Hp @ 3% | 300Hp @ 3% |
| MRL-32003B14 | - | MRL-32013B14 | - | - | 250Hp @ 5% | 300Hp @ 5% |
| MRL-40001B14 | - | MRL-40011B14 | - | 150Hp @ 3% | 300Hp @ 1.5% | 350-400Hp @ 1.5% |
| MRL-40002B14 | - | MRL-40012B14 | - | 150Hp @ 5% | 300Hp @ 3% | 350-400Hp @ 3% |
| MRL-40003B14 | - | MRL-40013B14 | - | - | 300Hp @ 5% | 350-400Hp @ 5% |
| MRL-50001 | - | MRL-50011 | - | 200Hp @ 3% | 350-400Hp @ 1.5% | 500Hp @ 1.5% |
| MRL-50002 | - | MRL-50012 | - | 200Hp @ 5% | 350-400Hp @ 3% | 500Hp @ 3% |
| MRL-50003 | - | MRL-50013 | - | - | 350-400Hp @ 5% | 500Hp @ 5% |
| MRL-60001 | - | MRL-60011 | - | - | 500Hp @ 1.5% | 600Hp @ 1.5% |
| MRL-60002 | - | MRL-60012 | - | - | 500Hp @ 3% | 600Hp @ 3% |
| MRL-60003 | - | MRL-60013 | - | - | 500Hp @ 5% | 600Hp @ 5% |
| MRL-75001 | - | MRL-75011 | - | - | 600Hp @ 1.5% | 700Hp @ 1.5% |
| MRL-75002 | - | MRL-75012 | - | - | 600Hp @ 3% | 700Hp @ 3% |
| MRL-75003 | - | MRL-75013 | - | - | 600Hp @ 5% | 700Hp @ 5% |
| MRL-85001 | - | MRL-85011 | - | - | 700Hp @ 1.5% | 800Hp @ 1.5% |
| MRL-85002 | - | MRL-85012 | - | - | 700Hp @ 3% | 800Hp @ 3% |
| MRL-85003 | - | MRL-85013 | - | - | 700Hp @ 5% | 800Hp @ 5% |
| MRL-100001 | - | MRL-100011 | - | - | 800Hp @ 1.5% | - |
| MRL-100002 | - | MRL-100012 | - | - | 800Hp @ 3% | - |
| MRL-100003 | - | MRL-100013 | - | - | 800Hp @ 5% | - |

## Line / Load Reactor Electrical Data

| Model Number | Watts Loss | Wire Range (AWG) | Terminal Torque (in / lbs) | Ind. mH | Fund Amps | Max Amps |
|---|---|---|---|---|---|---|
| **MRL-00201** | 8 | 22 14 | 4.5 | 12 | 2 | 3 |
| **MRL-00202** | 12 | 22 14 | 4.5 | 20 | 2 | 3 |
| **MRL-00203** | 16 | 22 14 | 4.5 | 32 | 2 | 3 |
| **MRL-00204** | 11 | 22 14 | 4.5 | 6 | 2 | 3 |
| **MRL-00401** | 15 | 22 14 | 4.5 | 3 | 4 | 6 |
| **MRL-00402** | 20 | 22 14 | 4.5 | 6.5 | 4 | 6 |
| **MRL-00403** | 20 | 22 14 | 4.5 | 9 | 4 | 6 |
| **MRL-00404** | 21 | 22 14 | 4.5 | 12 | 4 | 6 |
| **MRL-00801** | 20 | 22 14 | 4.5 | 1.5 | 8 | 12 |
| **MRL-00802** | 29 | 22 14 | 4.5 | 3 | 8 | 12 |
| **MRL-00803** | 26 | 22 14 | 4.5 | 5 | 8 | 12 |
| **MRL-00804** | 28 | 22 14 | 4.5 | 7.5 | 8 | 12 |
| **MRL-01201** | 26 | 22 5 | 16 | 1.25 | 12 | 18 |
| **MRL-01202** | 31 | 22 5 | 16 | 2.5 | 12 | 18 |
| **MRL-01203** | 41 | 22 5 | 16 | 4.2 | 12 | 18 |
| **MRL-01801** | 36 | 22 5 | 16 | 0.8 | 18 | 27 |
| **MRL-01802** | 43 | 22 5 | 16 | 1.5 | 18 | 27 |
| **MRL-01803** | 43 | 22 5 | 16 | 2.5 | 18 | 27 |
| **MRL-02501** | 48 | 22 5 | 16 | 0.5 | 25 | 37.5 |
| **MRL-02502** | 52 | 22 5 | 16 | 1.2 | 25 | 37.5 |
| **MRL-02503** | 61 | 22 5 | 16 | 1.8 | 25 | 37.5 |
| **MRL-03501** | 49 | 22 5 | 16 | 0.4 | 35 | 52.5 |
| **MRL-03502** | 54 | 22 5 | 16 | 0.8 | 35 | 52.5 |
| **MRL-03503** | 54 | 18 4 | 20 | 1.2 | 35 | 52.5 |
| **MRL-04501** | 54 | 18 4 | 20 | 0.3 | 45 | 67.5 |
| **MRL-04502** | 62 | 18 4 | 20 | 0.7 | 45 | 67.5 |
| **MRL-04503** | 65 | 18 4 | 20 | 1.2 | 45 | 67.5 |
| **MRL-05501** | 64 | 6 0 | 6-4(45) & 2-0(50) | 0.25 | 55 | 82.5 |
| **MRL-05502** | 67 | 6 0 | 6-4(45) & 2-0(50) | 0.5 | 55 | 82.5 |
| **MRL-05503** | 71 | 6 0 | 6-4(45) & 2-0(50) | 0.85 | 55 | 82.5 |
| **MRL-08001** | 82 | 6 0 | 6-4(45) & 2-0(50) | 0.2 | 80 | 120 |
| **MRL-08002** | 86 | 6 0 | 6-4(45) & 2-0(50) | 0.4 | 80 | 120 |
| **MRL-08003** | 96 | 6 0 | 6-4(45) & 2-0(50) | 0.7 | 80 | 120 |
| **MRL-10001** | 94 | 6 0 | 6-4(45) & 2-0(50) | 0.15 | 100 | 150 |
| **MRL-10002** | 84 | 6 0 | 6-4(45) & 2-0(50) | 0.3 | 100 | 150 |
| **MRL-10003** | 108 | 6 0 | 6-4(45) & 2-0(50) | 0.45 | 100 | 150 |
| **MRL-13001** | 108 | 2 0000 | 150 | 0.1 | 130 | 195 |
| **MRL-13002** | 180 | 2 0000 | 150 | 0.2 | 130 | 195 |
| **MRL-13003** | 128 | 2 0000 | 150 | 0.3 | 130 | 195 |
| **MRL-16001** | 116 | 2 0000 | 150 | 0.075 | 160 | 240 |
| **MRL-16002** | 149 | 2 0000 | 150 | 0.15 | 160 | 240 |
| **MRL-16003** | 138 | 2 0000 | 150 | 0.23 | 160 | 240 |
| **MRL-20001B14** | 124 | Copper Tab | Not Applicable | 0.055 | 200 | 300 |
| **MRL-20002B14** | 168 | Copper Tab | Not Applicable | 0.11 | 200 | 300 |
| **MRL-20003B14** | 146 | Copper Tab | Not Applicable | 0.185 | 200 | 300 |
| **MRL-25001B14** | 154 | Copper Tab | Not Applicable | 0.045 | 250 | 375 |
| **MRL-25002B14** | 231 | Copper Tab | Not Applicable | 0.09 | 250 | 375 |
| **MRL-25003B14** | 219 | Copper Tab | Not Applicable | 0.15 | 250 | 375 |
| **MRL-32001B14** | 224 | Copper Tab | Not Applicable | 0.04 | 320 | 480 |
| **MRL-32002B14** | 264 | Copper Tab | Not Applicable | 0.075 | 320 | 480 |
| **MRL-32003B14** | 351 | Copper Tab | Not Applicable | 0.125 | 320 | 480 |
| **MRL-40001B14** | 231 | Copper Tab | Not Applicable | 0.03 | 400 | 600 |
| **MRL-40002B14** | 333 | Copper Tab | Not Applicable | 0.06 | 400 | 600 |
| **MRL-40003B14** | 293 | Copper Tab | Not Applicable | 0.105 | 400 | 600 |
| **MRL-50001** | 266 | Copper Tab | Not Applicable | 0.025 | 500 | 750 |
| **MRL-50002** | 340 | Copper Tab | Not Applicable | 0.05 | 500 | 750 |
| **MRL-50003** | 422 | Copper Tab | Not Applicable | 0.085 | 500 | 750 |
| **MRL-60001** | 307 | Copper Tab | Not Applicable | 0.02 | 600 | 900 |
| **MRL-60002** | 414 | Copper Tab | Not Applicable | 0.04 | 600 | 900 |
| **MRL-60003** | 406 | Copper Tab | Not Applicable | 0.065 | 600 | 900 |
| **MRL-75001** | 427 | Copper Tab | Not Applicable | 0.015 | 750 | 1125 |
| **MRL-75002** | 630 | Copper Tab | Not Applicable | 0.029 | 750 | 1125 |
| **MRL-75003** | 552 | Copper Tab | Not Applicable | 0.048 | 750 | 1125 |
| **MRL-85001** | 798 | Copper tab | Not Applicable | 0.015 | 850 | 1063 |
| **MRL-85002** | 930 | Copper tab | Not Applicable | 0.027 | 850 | 1063 |
| **MRL-85003** | 1133 | Copper tab | Not Applicable | 0.042 | 850 | 1063 |
| **MRL-90001** | 860 | Copper tab | Not Applicable | 0.013 | 900 | 1125 |
| **MRL-90002** | 1020 | Copper tab | Not Applicable | 0.025 | 900 | 1125 |
| **MRL-90003** | 1365 | Copper tab | Not Applicable | 0.04 | 900 | 1125 |
| **MRL-100001** | 940 | Copper tab | Not Applicable | 0.011 | 1000 | 1250 |
| **MRL-100002** | 1090 | Copper tab | Not Applicable | 0.022 | 1000 | 1250 |
| **MRL-100003** | 1500 | Copper tab | Not Applicable | 0.038 | 1000 | 1250 |

For additional information visit http://www.mtecorp.com/lineload.html

## Sine Wave dV/dT Filters (2-8kHz Carrier Frequency)

| 460VAC | | | | | |
|---|---|---|---|---|---|
| Motor HP | Filter Rating Amps | Open | Stocked Item | NEMA 1* | Stocked Item |
| | | Model No. | | Model No. | |
| 1.5 | 9 | SWAP0009D | - | SWAGA0009D | - |
| 2 | | | | | |
| 3 | | | | | |
| 5 | | | | | |
| 7.5 | 12 | SWAP0012D | - | SWAGA0012D | - |
| 10 | 17 | SWAP0017D | - | SWAGA0017D | - |
| 15 | 22 | SWAP0022D | - | SWAGB0022D | - |
| 20 | 27 | SWAP0027D | - | SWAGB0027D | - |
| 25 | 35 | SWAP0035D | - | SWAGB0035D | - |
| 30 | 45 | SWAP0045D | - | SWAGB0045D | - |
| 40 | 55 | SWAP0055D | - | SWAGB0055D | - |
| 50 | 65 | SWAP0065D | - | SWAGB0065D | - |
| 60 | 80 | SWAP0080D | - | SWAGC0080D | - |
| 75 | 110 | SWAP0110D | - | SWAGC0110D | - |
| 100 | 130 | SWAP0130D | - | SWAGC0130D | - |
| 125 | 160 | SWAP0160D | - | SWAGC0160D | - |
| 150 | 200 | SWAP0200D | - | SWAGD0200D | - |
| 200 | 250 | SWAP0250D | - | SWAGD0250D | - |
| 250 | 305 | SWAP0305D | - | SWAGD0305D | - |
| 300 | 365 | SWAP0365D | - | SWAGD0365D | - |
| 350 | 415 | SWAP0415D | - | SWAGD0415D | - |
| 400 | 515 | SWAP0515D | - | SWAGD0515D | - |
| 450 | | | | | |
| 500 | 600 | SWAP0600D | - | SWAGE0600D | - |
| 600 | 720 | SWAP0720D | - | SWAGE0720D | - |

*** Note:** Some enclosures meet NEMA 2. For more information, visit www.mtecorp.com

## DC Chokes

| Model No. | 208V | 240V | 480V | 600V | Stocked Item |
|---|---|---|---|---|---|
| **DCA000204** | 1/4hp @ 5% | 1/4hp @ 5% | 1/2hp @ 3% &1/2-1hp@ 5% | 3/4-1hp @ 3&5% | - |
| **DCA000402** | 1/2hp @ 3% & 3/4-1hp@ 5% | 1/2hp @ 3% & 3/4-1hp@ 5% | 2hp @ 3% | | - |
| **DCA000403** | 1/2hp @ 5% | 1/2hp @ 5% | 1.5hp @ 3% | | - |
| **DCA000404** | | | 1.5hp @ 5% & 2hp @5% | 1.5hp & 2hp @ 3%& 5% | - |
| **DCA000902** | 1.5hp @ 3% | 1.5 & 2hp @ 3% | | | - |
| **DCA000903** | 1.5 & 2hp @ 5% | 1.5 & 2hp @ 5% | 3 & 5hp @ 3% | | - |
| **DCA000904** | | | 3 & 5hp @ 5% | 3 & 5hp @ 3 & 5% | - |
| **DCA001202** | 2hp @ 3% | 3hp @ 3% | | | - |
| **DCA001203** | 3hp @ 5% | 3hp @ 5% | | | - |
| **DCA001204** | | | | 7.5hp @ 3 & 5% | - |
| **DCA001802** | 3hp@3% & 5hp@5% | 5hp @ 3% | | | - |
| **DCA001803** | | 5hp @ 5% | 10hp @ 3% | 10hp @ 3% | - |
| **DCA001804** | | | 7.5hp @ 3% | 10hp @ 5% | - |
| **DCA001805** | | | 7.5hp @ 3 & 5% | | - |
| **DCA002503** | | | 15hp @ 3% | | - |
| **DCA002505** | | | 15hp @ 5% | 15hp @ 3 & 5% | - |
| **DCA003201** | 7.5hp @ 3% | 7.5hp @ 3% | | | - |
| **DCA003202** | | 7.5hp @ 5% | 20hp @ 3% | | - |
| **DCA003203** | 7.5hp @ 5% | | 20hp @ 5% | 20 & 25hp @ 3 & 5% | - |
| **DCA004002** | 10hp @ 3% | 10hp @ 3% | | | - |
| **DCA004003** | 10hp @ 5% | 10hp @ 5% | 25hp @ 3% | 30hp @ 3% | - |
| **DCA004004** | | | 25hp @ 5% | 30hp @ 5% | - |
| **DCA005001** | | 15hp @ 3% | | | - |
| **DCA005003** | 15hp @ 5% | | | 40hp @ 3% | - |
| **DCA005004** | | | 30hp @ 5% | 40hp @ 5% | - |
| **DCA006201** | 15hp @ 3% | | | | - |
| **DCA008002** | | 20hp @ 3% | | | - |
| **DCA008005** | | | 50hp @ 5% | 60hp @ 5% | - |
| **DCA009202** | | | 60hp @ 3% | | - |
| **DCA009203** | | | 60hp @ 5% | 75hp @ 3 & 5% | - |
| **DCA011002** | 30hp @ 5% | | | | - |
| **DCA011003** | | 30hp @ 5% | | | - |
| **DCA012502** | 40hp @ 5% | 40hp @ 3% | | | - |
| **DCA015002** | 50hp @ 5% | | 100hp @ 5% | | - |
| **DCA015004** | | | | | - |
| **DCA020002** | 60hp @ 5% | 60hp @ 5% | | | - |

## DC Choke Electrical Data

| Model No. | DC Amps | mH | Watts | Lug Size | Torque | Unit Weight (lbs) |
|---|---|---|---|---|---|---|
| **DCA000204** | 2 | 50 | 5 | 22-14 | 4.5 | 2 |
| **DCA000402** | 4 | 12 | 5 | 22-14 | 4.5 | 2 |
| **DCA000403** | 4 | 15 | 6 | 22-14 | 4.5 | 2 |
| **DCA000404** | 4 | 25 | 9 | 18-4 | 20 | 4 |
| **DCA000902** | 9 | 3.22 | 7 | 22-14 | 4.5 | 2 |
| **DCA000903** | 9 | 7.5 | 11 | 18-4 | 20 | 4 |
| **DCA000904** | 9 | 11.5 | 16 | 18-4 | 20 | 7 |
| **DCA001201** | 12 | 1 | 5 | 22-14 | 4.5 | 1 |
| **DCA001202** | 12 | 1 | 7 | 18-4 | 20 | 2 |
| **DCA001203** | 12 | 4 | 11 | 18-4 | 20 | 4 |
| **DCA001204** | 12 | 6 | 14 | 18-4 | 20 | 7 |
| **DCA001801** | 18 | 0.65 | 5 | 18-4 | 20 | 2 |
| **DCA001802** | 18 | 1.375 | 9 | 18-4 | 20 | 4 |
| **DCA001803** | 18 | 2.75 | 16 | 18-4 | 20 | 7 |
| **DCA001804** | 18 | 3.75 | 17 | 18-4 | 20 | 8 |
| **DCA001805** | 18 | 6 | 20 | 18-4 | 20 | 13 |
| **DCA002503** | 25 | 1.275 | 13 | 18-4 | 20 | 7 |
| **DCA002504** | 25 | 1.75 | 13 | 18-4 | 20 | 5 |
| **DCA002505** | 25 | 4 | 16 | 18-4 | 20 | 13 |
| **DCA003201** | 32 | 0.85 | 11 | 18-4 | 20 | 5 |
| **DCA003202** | 32 | 1.62 | 14 | 18-4 | 20 | 10 |
| **DCA003203** | 32 | 2.68 | 21 | 18-4 | 20 | 14 |
| **DCA004001** | 40 | 0.5 | 14 | 18-4 | 20 | 5 |
| **DCA004002** | 40 | 0.75 | 15 | 18-4 | 20 | 7 |
| **DCA004003** | 40 | 1 | 17 | 18-4 | 20 | 8 |
| **DCA004004** | 40 | 2 | 29 | 18-4 | 20 | 21 |
| **DCA005001** | 50 | 0.625 | 18 | 18-4 | 20 | 8 |
| **DCA005003** | 50 | 1.35 | 21 | 18-4 | 20 | 15 |
| **DCA005004** | 50 | 2 | 30 | 6-0 | 6-4(45) &2-0 | 25 |
| **DCA006201** | 62 | 0.32 | 17 | 6-0 | 6-4(45) &2-0 | 8 |
| **DCA006202** | 62 | 0.61 | 20 | 6-0 | 6-4(45) &2-0 | 14 |
| **DCA008002** | 80 | 0.4 | 25 | 6-0 | 6-4(45) & 2-0(50) | 14 |
| **DCA008005** | 80 | 1.25 | 25 | 6-0 | 6-4(45) & 2-0(50) | 35 |
| **DCA009201** | 92 | 0.2 | 19 | 6-0 | 6-4(45) & 2-0(50) | 10 |
| **DCA009202** | 92 | 0.6 | 34 | 6-0 | 6-4(45) & 2-0(50) | 23 |
| **DCA009203** | 92 | 1 | 48 | 6-0 | 6-4(45) & 2-0(50) | 32 |
| **DCA011002** | 110 | 0.3 | 38 | 6-0 | 6-4(45) & 2-0(50) | 22 |
| **DCA011003** | 110 | 0.45 | 45 | 6-0 | 6-4(45) & 2-0(50) | 22 |
| **DCA012502** | 125 | 0.22 | 27 | 6-0 | 6-4(45) & 2-0(50) | 23 |
| **DCA015002** | 150 | 0.22 | 36 | 2-0000 | 150 | 23 |
| **DCA015004** | 150 | 0.65 | 66 | 2-0000 | 150 | 52 |
| **DCA020002** | 200 | 0.21 | 50 | 2-0000 | 150 | 39 |

For additional information, visit http://www.mtecorp.com/dclink.html

## Matrix Harmonic Filters, 5% THID 480V, 60Hz, Variable Torque Loads

| Filter Max Load Amps | Motor HP | NEC Motor Amps | Filter Style | | |
|---|---|---|---|---|---|
| | | | Open Panel | Gen. Purpose NEMA 2 | Gen. Purpose NEMA 3R |
| | | | Model No. (*) | Model No. (*) | Model No. (*) |
| 6 | 3 | 4.8 | MDP0006D | MDG0006D | MDW0006C |
| 8 | 5 | 7.6 | MDP0008D | MDG0008D | MDW0008C |
| 11 | 7.5 | 11 | MDP0011D | MDG0011D | MDW0011C |
| 14 | 10 | 14 | MDP0014D | MDG0014D | MDW0014C |
| 21 | 15 | 21 | MDP0021D | MDG0021D | MDW0021C |
| 27 | 20 | 27 | MDP0027D | MDG0027D | MDW0027C |
| 34 | 25 | 34 | MDP0034D | MDG0034D | MDW0034C |
| 44 | 30 | 40 | MDP0044D | MDG0044D | MDW0044C |
| 52 | 40 | 52 | MDP0052D | MDG0052D | MDW0052C |
| 66 | 50 | 65 | MDP0066D | MDG0066D | MDW0066C |
| 83 | 60 | 77 | MDP0083D | MDG0083D | MDW0083C |
| 103 | 75 | 96 | MDP0103D | MDG0103D | MDW0103C |
| 128 | 100 | 124 | MDP0128D | MDG0128D | MDW0128C |
| 165 | 125 | 156 | MDP0165D | MDG0165D | MDW0165C |
| 208 | 150 | 180 | MDP0208D | MDG0208D | MDW0208C |
| 240 | 200 | 240 | MDP0240D | MDG0240D | MDW0240C |
| 320 | 250 | 302 | MDP0320D | MDG0320D | MDW0320C |
| 403 | 300 | 361 | MDP0403D | MDG0403D | MDW0403C |
| 482 | 400 | 477 | MDP0482D | MDG0482D | MDW0482C |
| 636 | 500 | 590 | MDP0636D | MDG0636D | MDW0636C |
| 786 | 600 | 708 | MDP0786D | MDG0786D | MDW0786C |

* Non-stock. For use with bypass systems contactor option 010 or 011 is additionally required. For additional information, visit http://www.mtecorp.com/matrix.html

## 3 Phase Circuit Breaker

| Amps | NEMA 1 Enclosed | NEMA 3R Enclosed |
|---|---|---|
| | Model No. (*) | Model No. (*) |
| 15A | T1N015TL1 | T1N015TL3 |
| 20A | T1N020TL1 | T1N020TL3 |
| 25A | T1N025TL1 | T1N025TL3 |
| 30A | T1N030TL1 | T1N030TL3 |
| 40A | T1N040TL1 | T1N040TL3 |
| 50A | T1N050TL1 | - |
| 60A | T1N060TL1 | T1N060TL3 |
| 70A | T1N070TL1 | T1N070TL3 |
| 80A | T1N080TL1 | T1N080TL3 |
| 90A | T1N090TL1 | T1N090TL3 |
| 100A | T1N100TL1 | T1N100TL3 |
| 125A | T3N125TL1 | T3N125TL3 |
| 150A | T3N150TL1 | T3N150TL3 |
| 175A | T3N175TL1 | T3N175TL3 |
| 200A | T3N200TL1 | T3N200TL3 |
| 225A | T3N225TL1 | T3N225TL3 |
| 250A | T4N250BL1 | T4N250BL3 |
| 400A | T5N400BL1 | T5N400BL3 |
| 600A | S6N600BL1 | S6N600BL3 |
| 800A | S6N800BL1 | S6N800BL3 |

* Non-stock. For additional information, visit http://www.abb-control.com/products/lv023-molded_casebreakers.htm

# Micro MAX™ AC Inverter Duty Motor

1000:1 Constant Torque (TENV) • 20:1 Constant Torque (TEFC)

Designed for direct replacement of PMDC or any other variable speed application where up to a 1000:1 constant torque speed range is required. Typical uses include: machine tools, conveyors, packaging machines, batching machines and printing equipment.

- Replaces 90 and 180 volt PMDC motors when used with AC variable frequency drives
- Constant torque operation from 0 to base speed (TENV ratings)
- Constant torque operation from 1/20 speed to base speed (TEFC ratings)
- Constant horsepower to twice base speed (RPM)
- Class H insulation with CR200 magnetic wire
- Continuous duty at 40°C ambient
- "Quick Connect" terminal board as noted
- Top mounted conduit box with pigtail leads (TEFC and 1.5Hp TENV)
- UL recognized and CSA certified
- Three year warranty

### C-Face with Rigid Base

| Hp | RPM | Volts | Encl. | Frame | Catalog No. | F.L.A. | Weight | Notes |
|---|---|---|---|---|---|---|---|---|
| 1/8 | 1800 | 230 | TENV | 56C | Y605 * | 1.0 | 18 | N, Q |
| 1/4 | 1800 | 230 | TENV | 56C | Y500 * | 1.0 | 18 | N, Q |
| 1/3 | 1800 | 230 | TENV | 56C | Y502 * | 1.2 | 18 | N, Q |
| 1/2 | 1800 | 230 | TENV | 56C | Y504 * | 1.8 | 20 | N, Q |
| | 1800 | 230/460 | TENV | 56C | Y360 * | 1.8/0.9 | 20 | N |
| | 1800 | 575 | TENV | 56C | Y361 * | 0.7 | 20 | N, Q |
| 3/4 | 1800 | 230 | TEFC | 56C | Y506 * | 2.8 | 23 | - |
| | 1800 | 230/460 | TEFC | 56C | Y362 * | 2.8/1.4 | 23 | - |
| | 1800 | 575 | TEFC | 56C | Y363 | 1.1 | 23 | - |
| 1 | 1800 | 230 | TEFC | 56C | Y508 * | 3.2 | 28 | - |
| | 1800 | 230/460 | TEFC | 56C | Y364 * | 3.2/1.6 | 28 | - |
| | 1800 | 575 | TEFC | 56C | Y365 * | 1.3 | 28 | - |
| 1 1/2 | 1800 | 230 | TENV | 145TC | Y522 * | 4.8 | 49 | N, 6 |
| | 1800 | 230/460 | TENV | 145TC | Y366 * | 4.8/2.4 | 49 | N, 6 |
| | 1800 | 575 | TENV | 145TC | Y367 * | 1.9 | 49 | N, 6 |
| 2 | 1800 | 230 | TEFC | 145TC | Y523 * | 5.8 | 50 | 6 |
| | 1800 | 230/460 | TEFC | 145TC | Y368 * | 5.8/2.9 | 50 | 6 |
| | 1800 | 575 | TEFC | 145TC | Y369 * | 2.3 | 50 | 6 |
| 3 | 1800 | 230 | TEFC | 182TC | Y998 | 8.4 | 70 | - |
| | 1800 | 230/460 | TEFC | 182TC | Y999 * | 8.4/4.2 | 70 | - |
| | 1800 | 575 | TEFC | 182TC | Y270 | 3.5 | 70 | - |
| 5 | 1800 | 230/460 | TEFC | 184TC | Y372 * | 13.4/6.7 | 88 | 6 |
| | 1800 | 575 | TEFC | 184TC | Y373 | 5.4 | 88 | 6 |
| 7 1/2 | 1800 | 230/460 | TEFC | 213TC | Y994 * | 21.4/10.7 | 125 | - |
| | 1800 | 575 | TEFC | 213TC | Y995 | 8.5 | 125 | - |
| 10 | 1800 | 230/460 | TEFC | 215TC | Y996 * | 28.0/14.0 | 135 | - |
| | 1800 | 575 | TEFC | 215TC | Y997 | 11.2 | 135 | - |

1. * Marathon Motors stock item.
2. For additional information visit www.marathonelectric.com/motors/search.asp

### C-Face Footless

| Hp | RPM | Volts | Encl. | Frame | Catalog No. | F.L.A. | Weight | Notes |
|---|---|---|---|---|---|---|---|---|
| 1/8 | 1800 | 230 | TENV | 56C | Y606 * | 1.0 | 17 | N, Q |
| 1/4 | 1800 | 230 | TENV | 56C | Y501 * | 1.0 | 17 | N, Q |
| 1/3 | 1800 | 230 | TENV | 56C | Y503 * | 1.2 | 17 | N, Q |
| 1/2 | 1800 | 230 | TENV | 56C | Y505 * | 1.8 | 19 | N, Q |
| | 1800 | 230/460 | TENV | 56C | Y374 * | 1.8/0.9 | 19 | N |
| | 1800 | 575 | TENV | 56C | Y375 * | 0.7 | 19 | N, Q |
| 3/4 | 1800 | 230 | TEFC | 56C | Y507 * | 2.8 | 23 | |
| | 1800 | 230/460 | TEFC | 56C | Y376 * | 2.8/1.4 | 23 | |
| | 1800 | 575 | TEFC | 56C | Y377 | 1.1 | 23 | |
| 1 | 1800 | 230 | TEFC | 56C | Y521 * | 3.2 | 27 | |
| | 1800 | 230/460 | TEFC | 56C | Y378 * | 3.2/1.6 | 27 | |
| | 1800 | 575 | TEFC | 56C | Y379 * | 1.3 | 27 | |

* Marathon Motors stock item.

**Notes:**

1. N: Totally Enclosed Non Ventilated; Q: "Quick Connect" terminal board; 6: Bolt-on, removable base for footless mounting option.
2. For additional information visit www.marathonelectric.com/motors/search.asp

# Black MAX™ Vector Duty

1000:1 Constant Torque

Designed for inverter or vector duty applications where up to a 1000:1 constant torque speed range is required. Typical uses include: material handling, machine tools, conveyors, crane & hoist, metal processing and other industrial machinery installed in dusty or dirty environments.

- Class F MAX GUARD insulation system
- Constant torque operation from 0 to base speed on vector drive
- Constant horsepower to twice base speed (RPM)
- Continuous duty at 40°C ambient
- Optimized for operation with IGBT inverter (NEMA Design A)
- Class F N/C thermostats
- Ball bearing
- Removable Base on some models as noted
- F1 standard, field reversible to F2 (except where noted)
- Encoder and brake provisions included on opposite drive end (maximum 10 lb-ft brake)
- UL recognized and CSA certified
- Three year warranty

### Totally Enclosed Non-Ventilated, C-Face with Rigid Base

| Hp | RPM | Volts | Frame | Catalog No. | F.L.A. | Weight | Notes |
|---|---|---|---|---|---|---|---|
| 1/4 | 1800 | 230/460 | 56C | Y592 * | 1.2/0.6 | 19 | N, S, 13 |
| 1/2 | 1800 | 230/460 | 56C | Y534 * | 1.6/0.8 | 28 | N, S, 6, 13 |
| | 1800 | 575 | 56C | Y555 * | 0.6 | 28 | N, S, 6, 13 |
| 1 | 1800 | 230/460 | 56C | Y535 * | 3.0/1.5 | 39 | N, S, 6, 13 |
| | 1800 | 575 | 56C | Y556 * | 1.2 | 40 | N, S, 6, 13 |
| | 1800 | 230/460 | 143TC | Y536 * | 3.0/1.5 | 43 | N, S, 6, 13 |
| | 1200 | 230/460 | 145TC | Y537 * | 3.8/1.9 | 49 | N, S, 6, 13 |
| 1 1/2 | 1800 | 230/460 | 145TC | Y538 * | 4.8/2.4 | 50 | N, S, 6, 13 |
| 2 | 1800 | 230/460 | 145TC | Y551 * | 6.0/3.0 | 70 | N |
| | 1800 | 575 | 145TC | Y557 * | 2.4 | 70 | N |
| | 1200 | 230/460 | 184TC | Y540 * | 6.6/3.3 | 88 | N, AL |
| 3 | 1800 | 230/460 | 182TC | Y541 * | 8.4/4.2 | 93 | N, AL |
| | 1800 | 575 | 182TC | Y558 * | 3.4 | 98 | N, AL |
| | 1200 | 230/460 | 213TC | Y542 * | 9.4/4.7 | 118 | N, AL |
| 5 | 1800 | 230/460 | 184TC | Y543 * | 14.0/7.0 | 103 | N, AL |
| | 1800 | 575 | 184TC | Y559 * | 5.4 | 103 | N, AL |
| | 1200 | 230/460 | 215TC | Y544 * | 15.4/7.7 | 128 | N, AL |
| 7 1/2 | 1800 | 230/460 | 213TC | Y545 * | 21.0/10.5 | 146 | N, AL |
| | 1800 | 575 | 213TC | Y560 * | 8.4 | 150 | N, AL |
| | 1200 | 230/460 | 254TC | Y546 * | 22.0/11.0 | 209 | N, AL |
| 10 | 1800 | 230/460 | 215TC | Y547 * | 27.0/13.5 | 159 | N, AL |
| | 1800 | 575 | 215TC | Y561 * | 10.8 | 159 | N, AL |
| | 1200 | 230/460 | 256TC | Y548 * | 28.0/14.0 | 275 | N, AL |
| 15 | 1800 | 230/460 | 254TC | Y549 * | 40.0/20.0 | 250 | N, AL, I |
| | 1800 | 575 | 254TC | Y562 * | 16.0 | 250 | N, AL, I |
| 20 | 1800 | 230/460 | 256TC | Y552 * | 50.0/25.0 | 320 | N, I |
| | 1800 | 575 | 256TC | Y563 * | 20.0 | 320 | N, I |
| 25 | 1800 | 230/460 | 284TC | Y553 * | 62.0/31.0 | 525 | N, I |
| | 1800 | 575 | 284TC | Y567 * | 24.8 | 525 | N, I |
| 30 | 1800 | 230/460 | 286TC | Y393 * | 80.0/40.0 | 575 | N, I |

* Marathon Motors stock item. Shaded areas are cast iron frames.

**Notes:**

1. AL: Aluminum Frame Construction; N: Totally Enclosed Non-Ventilated; I: Intermittent duty from 90-120Hz operation; S: Steel Frame Construction; 6: Bolt-on, removable base for footless mounting option; 13: F1 Mounting only, cannot modify to F2.
2. For additional information visit www.marathonelectric.com/motors/search.asp

### Black MAX™ Vector Duty: Encoders through Mod Center

| Brand | Model | PPR | Catalog No. | Notes |
|---|---|---|---|---|
| Avtron | HS25A | 1024 | A746* | Optical Hollow Shaft, MS connector |
| | | 2048 | A747* | |
| | HS35A | 1024 | A736* | Optical Hollow Shaft, MS connector |
| | | 2048 | A739* | |
| | HS35M | 1024 | A742* | Magnetic Hollow Shaft, EPIC connector |
| | | 2048 | A744 | |
| | M3 | 1024 | A753* | Optical Hollow Shaft, EPIC connector |
| | M56 | 1024 | A793* | Magnetic Modular Style, EPIC connector |
| Dynapar | HS35 | 1024 | A772* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | 2048 | A776* | |
| BEI | HS35 | 1024 | A779* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | 2048 | A780* | |

1. * Marathon Motors stock item.
2. For additional information visit www.marathonelectric.com/motors/search.asp

# Blue MAX™ 2000 Vector Duty

2000:1 Constant Torque

Designed for inverter or vector duty applications where up to a 2000:1 constant torque speed range is required. Typical uses include: material handling, machine tools, conveyors, crane & hoist, metal processing, test stands, pumps, compressors, textile processing and other industrial machinery installed in dusty or dirty environments where cast iron construction is required.

- Class H MAX GUARD insulation system
- Constant torque operation from 0 to base speed on vector drive, including TEFC (on V/Hz drives, TEFC motors are limited to 20:1 Constant Torque)
- Constant horsepower to twice base speed (143-254 frame); 1.5 times base (all others)
- Continuous duty at 40°C ambient
- Optimized for operation with IGBT inverter (NEMA Design A)
- C-Face foot mount through 100 Hp as noted
- Class F N/C thermostats
- Ball bearing (roller bearing available 360 frame and larger)
- Cast iron frame and brackets
- Patented “fracket” design (TEBC enclosure)
- “B” temperature rise on Blower-Cooled motors
- F1 standard, field reversible to F2
- Encoder and brake provisions included on opposite drive end
- UL recognized and CSA certified
- Three year warranty

**Totally Enclosed Rigid Base, and C-Face with Rigid Base**

| Hp | RPM | Volts | Encl. | Frame | Catalog No. | F.L.A. | Weight | Notes |
|---|---|---|---|---|---|---|---|---|
| **1** | 1800 | 230/460 | TENV | 143TC | Y525 * | 3.0/1.5 | 61 | NEMA Design B |
| **1 1/2** | 1800 | 230/460 | TENV | 145TC | Y590 * | 4.6/2.3 | 68 | |
| **2** | 1800 | 230/460 | TENV | 145TC | Y526 * | 6.0/3.0 | 70 | |
| **3** | 1800 | 230/460 | TENV | 182TC | Y527 * | 8.0/4.0 | 110 | |
| **5** | 1800 | 230/460 | TENV | 184TC | Y564 * | 13.4/6.7 | 117 | NEMA Design B |
| **7 1/2** | 1800 | 230/460 | TEFC | 213TC | Y595 * | 19.4/9.7 | 191 | |
| | 1800 | 230/460 | TENV | 213TC | Y565 * | 21.0/10.5 | 180 | |
| **10** | 1800 | 230/460 | TEFC | 215TC | Y596 * | 25.4/12.7 | 211 | |
| | 1800 | 230/460 | TENV | 215TC | Y566 * | 26.0/13.0 | 290 | |
| **15** | 1800 | 230/460 | TEFC | 254TC | Y597 * | 37.0/18.5 | 339 | |
| | 1800 | 230/460 | TENV | 254TC | Y509 * | 40.4/20.2 | 350 | |
| | 1200 | 230/460 | TEBC | 284TC | Y395 * | 40.0/20.0 | 480 | |
| **20** | 1800 | 230/460 | TEFC | 256TC | Y598 * | 52.0/26.0 | 375 | |
| | 1800 | 230/460 | TENV | 256TC | Y510 * | 50.0/25.0 | 380 | |
| | 1200 | 230/460 | TEBC | 286TC | Y582 | 52.4/26.2 | 500 | NEMA Design B |
| **25** | 1800 | 230/460 | TEFC | 284T | Y569 * | 63.0/31.5 | 492 | |
| | 1800 | 230/460 | TEBC | 284TC | Y511 * | 63.0/31.5 | 500 | |
| | 1200 | 230/460 | TEBC | 324TC | Y583 * | 67.0/33.5 | 620 | NEMA Design B |
| **30** | 1800 | 230/460 | TEFC | 286T | Y570 * | 77.0/38.5 | 594 | |
| | 1800 | 230/460 | TEBC | 286TC | Y512 * | 74.0/37.0 | 520 | |
| | 1200 | 230/460 | TEBC | 326TC | Y584 * | 82.0/41.0 | 686 | NEMA Design B |
| **40** | 1800 | 230/460 | TEFC | 324T | Y571 * | 100/50.0 | 540 | |
| | 1800 | 230/460 | TEBC | 324TC | Y513 * | 100/50.0 | 620 | |
| | 1200 | 230/460 | TEBC | 364TC | Y585 * | 104/52.0 | 1050 | |
| **50** | 1800 | 230/460 | TEFC | 326T | Y572 * | 121/60.5 | 540 | |
| | 1800 | 230/460 | TEBC | 326TC | Y514 * | 120/60.0 | 640 | |
| | 1200 | 230/460 | TEBC | 365TC | Y586 | 130/65.0 | 1100 | |

* Marathon Motors stock item.

**Notes:**

1. B: NEMA Design B.
2. For additional information visit www.marathonelectric.com/motors/search.asp

### Totally Enclosed Rigid Base, and C-Face with Rigid Base (continued)

| Hp | RPM | Volts | Encl. | Frame | Catalog No. | F.L.A. | Weight | Notes |
|---|---|---|---|---|---|---|---|---|
| **60** | 1800 | 230/460 | TEFC | 364T | Y573 * | 147/73.5 | 965 | |
| | 1800 | 230/460 | TEBC | 364TC | Y515 * | 147/73.5 | 1062 | |
| | 1200 | 230/460 | TEBC | 404TC | Y587 * | 142/71.0 | 1380 | |
| **75** | 1800 | 230/460 | TEFC | 365T | Y574 * | 184/92.0 | 1006 | |
| | 1800 | 230/460 | TEBC | 365TC | Y516 * | 180/90.0 | 1106 | |
| | 1200 | 230/460 | TEBC | 405TC | Y588 * | 180/90.0 | 1450 | NEMA Design B |
| **100** | 1800 | 230/460 | TEFC | 405T | Y575 * | 230/115 | 1308 | |
| | 1800 | 230/460 | TEBV | 405TC | Y517 * | 230/115 | 1429 | |
| | 1200 | 230/460 | TEBC | 444TC | Y589 * | 250/125 | 2150 | |
| **125** | 1800 | 460 | TEFC | 444T | Y576 * | 143 | 2062 | |
| | 1800 | 460 | TEBC | 444T | Y518 * | 138 | 2110 | NEMA Design B |
| **150** | 1800 | 460 | TEFC | 445T | Y577 * | 170 | 2246 | |
| | 1800 | 460 | TEBC | 445T | Y519 * | 170 | 2321 | |
| **200** | 1800 | 460 | TEFC | 445T | Y578 * | 230 | 2404 | |
| | 1800 | 460 | TEBC | 445T | Y520 * | 230 | 2457 | |
| **250** | 1800 | 460 | TEFC | 449T | Y579 | 295 | 2800 | |
| | 1800 | 460 | TEBC | 449T | Y531 * | 295 | 2880 | |
| **300** | 1800 | 460 | TEFC | 449T | Y580 | 330 | 2890 | 20:1 |
| | 1800 | 460 | TEBC | 449T | Y532 * | 327 | 2950 | |
| **350** | 1800 | 460 | TEBC | 449T | Y533 * | 385 | 3075 | |

* Marathon Motors stock item.
**Notes:**
1. B: NEMA Design B.
2. For additional information visit www.marathonelectric.com/motors/search.asp

### Blue MAX™ 2000 Vector Duty / Encoders Through Mod Center

| Encl. | Brand | Model | PPR | Catalog No. | Notes |
|---|---|---|---|---|---|
| **TENV** | Avtron | HS25A | 1024 | A746* | Optical Hollow Shaft, MS connector |
| | | | 2048 | A747* | |
| | | HS35A | 1024 | A736* | Optical Hollow Shaft, MS connector |
| | | | 2048 | A739* | |
| | | HS35M | 1024 | A742* | Magnetic Hollow Shaft, EPIC connector |
| | | | 2048 | A744 | |
| | | M3 | 1024 | A753* | Optical Hollow Shaft, EPIC connector |
| | | M56 | 1024 | A793* | Magnetic Modular Style, EPIC connector |
| | Dynapar | HS35 | 1024 | A772* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A776* | |
| | BEI | HS35 | 1024 | A779* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A780* | |
| **TEFC** | Avtron | HS35A | 1024 | A737* | Optical Hollow Shaft, MS connector |
| | | | 2048 | A740 | |
| | | HS35M | 1024 | A742* | Magnetic Hollow Shaft, EPIC connector |
| | | | 2048 | A744 | |
| | | M3 | 1024 | A754* | Optical Hollow Shaft, EPIC connector |
| | Dynapar | HS35 | 1024 | A774* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A777* | |
| | BEI | HS35 | 1024 | A783* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A784* | |
| **TEBC** | Avtron | HS35A | 1024 | A738* | Optical Hollow Shaft, MS connector |
| | | | 2048 | A741* | |
| | | HS35M | 1024 | A743* | Magnetic Hollow Shaft, EPIC connector |
| | | | 2048 | A745 | |
| | | M56 | 1024 | A794* | Magnetic Modular Style, EPIC connector |
| | Dynapar | HS35 | 1024 | A775* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A778* | |
| | BEI | HS35 | 1024 | A781* | Shaft mount, 5-26VDC, with 10 pin connector |
| | | | 2048 | A782* | |
| | - | - | - | A801* | Encoder Conduit box |

1. * Marathon Motors stock item.
2. For additional information visit www.marathonelectric.com/motors/search.asp