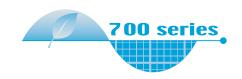
Product Information





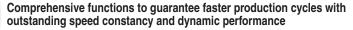
Highest level in your hand













Many key components with 10-year design guarantee a long service life



PLC inside as standard







Highest Level of Driving Performance



(1) Exhibit best performance of the general-purpose motor (real sensorless vector control)

High accuracy/fast response speed operation by the vector control can be performed with a general-purpose motor without encoder.

- Maximum of 200% high torque can be generated at an ultra low speed of 0.3Hz (Type 00023 to 00126).
- Speed Control

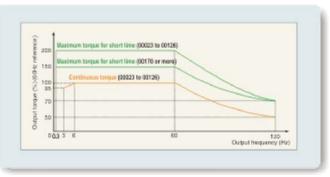
Speed control range 1:200 (0.3Hz to 60Hz driving only)

Speed response 120rad/s

■ Torque Control

Torque control range 1:20
Absolute torque accuracy ± 20%
Repeated torque accuracy ± 10%

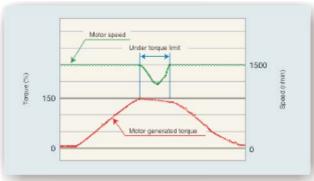
^{*} Since torque control can not be performed in the low speed regeneration region and at a low speed with light load, use the vector control with encoder.



Example of torque characteristic under real sensorless vector control

1. Torque limit function

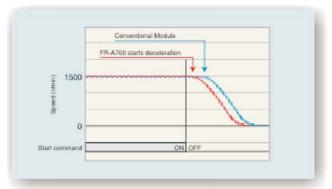
Torque limit function is effective to prevent machine from damage (Grinding machine tools etc.) against the sudden torque disturbance.



Example of torque limit characteristic

2. Input response time reduced

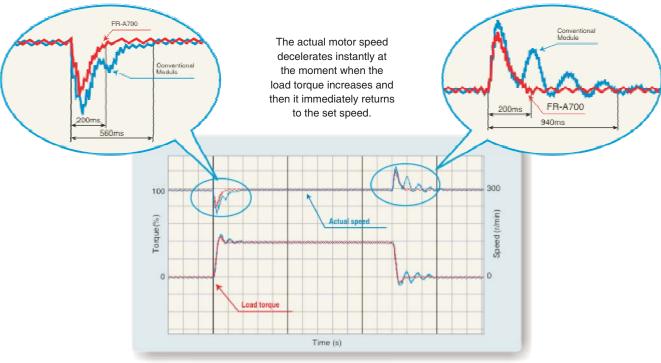
The delay to the input command has been minimized. The response time has been reduced to half as compared to the conventional model. It is suitable for cycle-operation applications.



Example of input command signal response characteristic

3. Quick response to fluctuating load

Torque response level to the sudden load fluctuation has been greatly improved as compared to the conventional model. The motor speed variation is minimized to maintain a constant speed. It is suitable for a sawmill machine, etc.



Example of actual speed variation when a load is instantaneously applied FR-A700 series under real sensorless vector control conventional series under advanced magnetic flux vector control

(2) Higher accuracy operation with encoder (vector control)

Vector control operation can be performed using a motor with encoder. Torque control/position control as well as fast response/high accuracy speed control (zero speed control, servo lock) can be realized with the inverter.

*1 A plug-in option for encoder feed back control (FR-A7AP) is necessary.

*2 Only a pulse train-code system is employed for pulse command system when performing position control with an inverter and the FR-A7AP. The maximum pulse input is 100kpps.

■ Speed control

Speed control range
Speed variation rate
Speed response

1:1500 (both driving/regeneration 3)

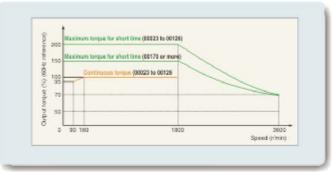
± 0.01% (100% means 3000r/min)

300rad/s (with model adaptive speed control)

*3 Regeneration unit (option) is necessary for regeneration

■ Torque control

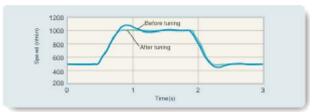
Torque control range 1:50
Absolute torque accuracy ± 10%⁴
Repeated torque accuracy ± 5%⁴



Example of torque characteristics under vector control

1. Easy gain tuning

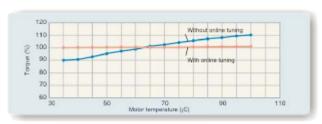
Since the load inertia of the motor is automatically estimated online to calculate the optimum speed control gain and position loop gain.



Comparison of the speed accuracy before and after the load inertia estimation

2. Online auto tuning

Online auto tune feature compensated for motor temperature. This operation is appropriate for applications such as a winder/printing machine (tension control) which is controlled by torque.



Example of motor temperature-torque characteristics

(3) V/F control and advanced magnetic flux vector control operations available

Since V/F control and advanced magnetic flux vector control operations are also available, you can replace the conventional model without anxiety with the inverter.



PLC as

standard

Complement: list of functions according to driving control method

| Control Method | Speed Control | Torque Control | Position Control | Speed Control Range | Speed Response | Applied Motor |
|-------------------------------|----------------------------------|----------------|------------------|-------------------------------------|----------------|--|
| V/F | 0 | × | × | 1:10 (6 to 60Hz : Driving) | 10 to 20rad/s | General-purpose motor (without encoder) |
| Advanced magnetic flux vector | 0 | × | × | 1:120 (0.5~60Hz : Driving) | 20 to 30rad/s | General-purpose motor (without encoder) |
| Real sensorless vector | 0 | 0 | × | 1:200 (0.3~60Hz : Driving) | 120rad/s | General-purpose motor (without encoder) |
| Vector | | | 0 | 1:1500 (0.04~60Hz Both | 000 | General-purpose motor (with encoder) |
| (FR-A7AP is necessary) | (zero speed control, servo lock) | O | <u></u> *5 | driving/regeneration) ^{*6} | 300rad/s | Dedicated motor |

^{*5} Only a pulse train+code method is employed for pulse command method when performing position control with an inverter and the FR-A7AP. The maximum pulse input is 100kpps.

Built in PLC function



The FR-A700 also has an integrated PLC function that gives the customer the ability to adapt the FR-A700's performance to his individual needs. Because of this, many small applications can now be completely

handled by the FR-A700 inverter without any other control device. Programming the PLC function is simple and easy when using Mitsubhishi's GX Developer programming software.

Improved Usability with Full of Useful Functions

octions Special functions

- More advanced auto tuning
- Enhanced PID function
- Power failure deceleration stop function/original operation continuation at instantaneous power-failure
- Regeneration avoidance function

- Built-in break transistor
 (Type 00023 to 00620 built-in brake resistor)
- Pulse train input
- Enhanced I/O function
- Multiple Overload Setting
- Traverse function

^{*4} Online auto tuning (with adaptive magnetic flux observer)

^{*6} Regeneration unit (option) is necessary for regeneration

4 Long Life Components and Life Check Function



(1) Further extended components life

- The life of a newly developed cooling fan has been extended to 10 years of design life*1. The life of the cooling fan is further extended with ON/OFF control of the cooling fan.
- Longevity of capacitor was achieved with the adoption of a design life of 10 years 112 (A capacitor with specification of 5000 hours at 105 °C ambient temperature is adapted.)
- *1 Ambient temperature : annual average 40°C (free from corrosive gas, flammable gas,
- Since the design life is a calculated value, it is not a guaranteed value.
- *2 Output current: equivalent to rating current of the Mitsubishi standard motor (4 poles).

Life indication of life components

| Components | Life Guideline of the FR-A700 | Guideline of JEMA ^{'3} |
|-----------------------------------|-------------------------------|---------------------------------|
| Cooling fan | 10 years | 2 to 3 years |
| Main circuit smoothing capacitor | 10 years | 5 years |
| Printed board smoothing capacitor | 10 years | 5 years |

^{*3} Excerpts from "Periodic check of the transistorized inverter" of JEMA (Japan Electrical Manufacturer's Association)

(2) State of the art longevity diagnostic method

- Degrees of deterioration of main circuit capacitor, control circuit capacitor or inrush current limit circuit can be monitored.
- Since a parts life alarm can be output by self-diagnosis, troubles can be avoided.
- *4 Any one of main circuit capacitor, control circuit capacitor, inrush current limit circuit and cooling fan reaches the output level, an alarm is output. For the main circuit capacitor, the capacitor capacity needs to be measured during A stop by setting parameter.

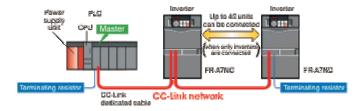


Network Connection as You Desired



(1) Compatible with the CC-Link communication (option)

The inverter can be connected to the Mitsubishi PLC (Q. QnA. A series, etc.) through the CC-Link. It is compatible with the CCLink



(3) RS-485 and USB connection

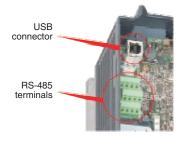
- The RS-485 terminals are equipped as standard in addition to the PU connector.
- You can make RS-485 communication with the operation panel or parameter unit connected to the PU connector.
- Since the inverter can be connected to the network with terminals, multi-drop connection is also easily done.
- Modbus-RTU (Binary) protocol has been added for communications in addition to the conventional Mitsubishi inverter protocol (computer link).
- As a USB connector (USB1.1B connector) is standard equipped, communication with a personnel computer can be made with a USB cable only.
- Using the RS-485 terminal or USB connector, you can make communication by the FR-Configurator (setup S/W).

(2) Compatible with SSCNET[[] (option) (available soon)

The inverter can be connected to Mitsubishi motion controller hrough the SSCNETIII. The SSCNETIII employs a high-speed synchronous serial communication system and is appropriate for the synchronous operation.

(SSCNET ·· Servo System Controller Network)







(4) Corresponds to major networks overseas

The inverter can be connected with networks such as Device-NET™, PROFIBUS-DP, LONWORKS, EtherNet (available soon), SSCNETIII and CANopen when communication options are used.

LONWORKS is a registered trademark of Echelon Corporation and DeviceNet is of ODVA Other company and product names herein are the trademarks of their



Free of Environmental Worries

noise easure

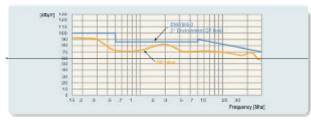
(1) Reduction of electromagnetic noise (built-in EMC filter)

Reduction of noise generated from the inverter was achieved with adoption of a new technology (low-noise of switching power, low noise of inverter element).

Because of the newly developed built-in noise filter (EMC filter), the inverter itself can comply with the EMC Directive (2nd Environment³). (To make the EMC filter of the inverter valid 1, set ON/OFF connector*2 to ON.)



- *1 Leakage current will increase when the EMC filter is selected.
- *2 Since the leakage current when using the EMC filter for the 200V class 0.4K and 0.75K is small, the filter is always valid (setting connector is not provided).
- *3 Refer to the EMC installation manual for compliance conditions



| | Capacitive Filter (Radio noise filter) | Zero-phase Reactor (Line noise filter) | DC Reactor |
|-----------------------|---|---|--------------------------|
| Type 01160 or less | Standard (built-in) | Standard (built-in) | Option (sell separately) |
| Type 01800 or more | Standard (built-in) | Option (sell separately) | Standard (provided) |

(2) Measures against harmonic leakage current

A compact AC reactor (FR-HAL) and a DC reactor (FR-HEL), which limit harmonics current flowing into the power supply and improve the power factor, are available as options. (For the 75K or more, a DC reactor is supplied as standard.)





A high power factor converter (FR-HC, MT-HC) for effective suppressions of power-supply harmonics (conversion coefficient: K5=0) can be connected.

(3) Equipped with inrush current suppression circuit

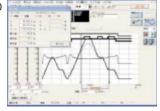
Because of the built-in inrush current limit circuit, the current at power on can be restricted.

Simple Operation and Easy Maintenance



(1) Easy maintenance with FR-Configurator (Option)

- Parameter management (parameter setting, file storage, printing) is easy.
- Maintenance and setup of the inverter can be done from a personal computer connected with USB.
- Mechanical resonance is easily avoided with machine analyzer function.
- Parameter setting after replacement of the FRA500 series can be made with a parameter automatic conversion function.





(2) Operation panel with the popular setting dial

- Possible to copy parameters with operation panel. Parameter setting values are stored in the operation panel and optional parameter unit (FR-PU07).
- Operation is easy with the setting dial.





PU/EXT operation mode example

- Operation panel is detachable and can be installed on the enclosure surface. (cable connector option is required)
- PU/EXT (operation mode) can be switched with a single touch.
- A dial/key operation lock function prevents operational errors.



(3) New type parameter unit FR-PU07 (option)

- An operation panel can be removed and a parameter unit can be connected.
- Setting such as direct input method with a numeric keypad, operation status indication, and help function are usable.
- Eight languages can be displayed.
- Parameter setting values of a maximum of three inverters can be stored.
- Since a battery pack type (available soon) is connectable, parameter setting and parameter copy can be performed without powering on the inverter.



(4) Easy replacement with the cooling fan cassette

- Cooling fans are provided on top of the inverter.
- Cooling fans can be replaced without disconnecting main circuit wires.



(5) Removable terminal block

A removable terminal block was adapted. (The terminal block of the FR-A700 series is compatible with that of the FR-A500 series. Note that some functions of the FR-A700 series are restricted when using the terminal block of the FR-A500 series. Note that the wiring cover is not compatible.)

Rating

| Series | | | FR-A7 | | | | | | | | | | | | | | |
|---------------|--|--|--|--|---|--|--|--|---|--|---|---|---|---|---|---|---|
| | | | 00023 | 00038 | | | | | | | | 00470 | | 00770 | | 01160 | |
| | Rated motor | 120% overload capacity | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | |
| | capacity (KW) *1 | 150% overload capacity 200% overload capacity | 0.75 0.4 | 1.5 0.75 | 2.2 1.5 | 3.7 2.2 | 5.5 3.7 | 7.5 5.5 | 11 | 15 | 18.5 15 | 22 18.5 | 30 22 | 37 30 | 45 37 | 55 45 | |
| | (KVV) | ' ' | 2.3 | 3.8 | 5.2 | 8.3 | 12.6 | 17 | 7.5 25 | 11 31 | 38 | 47 | 62 | 77 | 93 | 116 | |
| | Rated current *3 | 120% overload capacity 150% overload capacity | 2.3 | 3.8 | 5.2 4.8 | 8.3 7.6 | 11.5 | 16 | 23 | 29 | 35 | 47 | 6∠ 57 | 70 | 93 85 | 106 | |
| | riated current | 200% overload capacity | 1.5 | 2.5 | 4 | 6 | 9 | 12 | 17 | 23 | 31 | 38 | 44 | 57 | 71 | 86 | |
| | Output capacity | 120% overload capacity | 1.8 | 2.9 | 4 | 6.3 | 9.6 | 13 | 19.1 | 23.6 | 29 | 35.8 | 47.3 | 58.7 | 70.9 | 88.4 | |
| | (KVA) *2 | 150% overload capacity | 1.6 | 2.7 | 3.7 | 5.8 | 8.8 | 12.2 | 17.5 | 22.1 | 26.7 | 32.8 | 43.4 | 53.3 | 64.8 | 80.8 | |
| Output | | 200% overload capacity | 1.1 | 1.9 | 3 | 4.6 | 6.9 | 9.1 | 13 | 17.5 | 23.6 | 29 | 33.5 | 43.4 | 54.1 | 65.5 | |
| | Overload current | 120% overload capacity 150% overload capacity | 110% 0 | of rated o | current ca | apacity f | or 60 s; | 120% to | r3s^* | | | | | | | | |
| | rating | 200% overload capacity | | | current ca | | | | | | | | | | | | |
| | Voltage *5 | 20070 Oronoud Supusity | | | V to pow | | | | | | | | | | | | |
| | Frequency range | | 0.2 - 40 | | · to por | o. oapp | ., ronag | , . | | | | | | | | | |
| | Control method | | | | rol / high | carrier f | reauenc | v contro | ı | | | | | | | | |
| | | | | | m among | | | | | lux vec | or conti | rol, real s | sensorles | ss vector | control, | | |
| | | | and clo | se loop | vector co | ntrol) | | | | | | | | | | | |
| | Regenerative bra | • ' | | orque / 2 | | | | | | 20% t | orque c | ontinuou | IS *6 | 20% to | orque co | ntinuous | 3 |
| | Power supply volt | age | | | 30 - 480V | | 0Hz (-1 | 5% / +1 | 0%) | | | | | | | | |
| | Voltage range | | | | 50Hz/60H | Ηz | | | | | | | | | | | |
| Input | Power supply free | | | HZ (± 5 | , | 0 | 40 | 47 | 00 | 00 | 0.4 | 44 | 50 | 00 | 00 | 100 | |
| | Rated input capacity (KVA) *7 | 120% overload capacity 150% overload capacity | 2.5 2.1 | 4.5 4 | 5.5 4.8 | 9 8 | 12 11.5 | 17 16 | 20 20 | 28 27 | 34 32 | 41 37 | 52 47 | 66 60 | 80 73 | 100 91 | |
| | capacity (KVA) | 200% overload capacity | 1.5 | 2.5 | 4.5 | 5.5 | 9 | 12 | 17 | 20 | 28 | 34 | 41 | 52 | 66 | 80 | |
| | Cooling | | Self co | | | Fan c | | | | | | | | | | | |
| | Protective structu | re *9 | IP20 *8 | . 3 | | | | | | | | | | | IP 00 | | |
| Others | Dimension in mm | | | 150*260*140 220*260*170 220*300*190 250*400*190 325'550*195 435*550* | | | | | | 550*250 | | | | | | | |
| | Approximate mas | s (Kg) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 7.1 | 7.1 | 7.5 | 7.5 | 13 | 13 | 23 | 35 | 35 | |
| | | | | 10 | | | | | | | | | | | | | |
| | | | FR-A74 | +0 | | | | | | | | | | | | | |
| Series | | | FR-A74 01800 | 02160 | 02600 | 03250 | 03610 | 04320 | 04810 | 05470 | 06100 | 06830 | 07700 | 08660 | 09620 | 10940 | 12120 |
| Series | Rated motor | 120% overlod capacity | 01800 90 | 02160 110 | 132 | 160 | 185 | 220 | 250 | 280 | 315 | 355 | 400 | 450 | 500 | 550 | 630 |
| Series | Rated motor capacity (KW) *1 | 150% overlod capacity | 90 75 | 02160 110 90 | 132 110 | 160 132 | 185 160 | 220 185 | 250 220 | 280 250 | 315 280 | 355 315 | 400 355 | 450 400 | 500 450 | 550 500 | 630 560 |
| Series | capacity (KW) *1 | 150% overlod capacity 200% overlod capacity | 90 75 55 | 02160 110 90 75 | 132 110 90 | 160 132 110 | 185 160 132 | 220 185 160 | 250 220 185 | 280 250 220 | 315 280 250 | 355 315 280 | 400 355 315 | 450 400 355 | 500 450 400 | 550 500 450 | 630 560 500 |
| Series | | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity | 90 75 55 180 144 | 02160 110 90 75 216 180 | 132 110 90 260 216 | 160 132 110 325 260 | 185 160 132 361 325 | 220 185 160 432 361 | 250 220 185 481 432 | 280 250 220 547 481 | 315 280 250 610 547 | 355 315 280 683 610 | 400 355 315 770 683 | 450 400 355 866 770 | 500 450 400 962 866 | 550 500 450 1094 962 | 630 560 500 1212 1094 |
| Series | capacity (KW) *1 Rated current *3 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 | 02160 110 90 75 216 180 144 | 132 110 90 260 216 180 | 160 132 110 325 260 216 | 185 160 132 361 325 260 | 220 185 160 432 361 325 | 250 220 185 481 432 361 | 280 250 220 547 481 432 | 315 280 250 610 547 481 | 355 315 280 683 610 547 | 400 355 315 770 683 610 | 450 400 355 866 770 683 | 500 450 400 962 866 770 | 550 500 450 1094 962 866 | 630 560 500 1212 1094 962 |
| Series | capacity (KW) *1 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity | 90 75 55 180 144 | 02160 110 90 75 216 180 | 132 110 90 260 216 | 160 132 110 325 260 216 248 198 | 185 160 132 361 325 | 220 185 160 432 361 325 329 275 | 250 220 185 481 432 | 280 250 220 547 481 | 315 280 250 610 547 | 355 315 280 683 610 | 400 355 315 770 683 | 450 400 355 866 770 | 500 450 400 962 866 | 550 500 450 1094 962 | 630 560 500 1212 1094 962 924 834 |
| Series | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 | 02160 110 90 75 216 180 144 165 137 110 | 132 110 90 260 216 180 198 165 137 | 160 132 110 325 260 216 248 198 165 | 185 160 132 361 325 260 275 248 198 | 220 185 160 432 361 325 329 275 248 | 250 220 185 481 432 361 367 329 275 | 280 250 220 547 481 432 417 | 315 280 250 610 547 481 465 | 355 315 280 683 610 547 521 | 400 355 315 770 683 610 587 | 450 400 355 866 770 683 660 | 500 450 400 962 866 770 733 | 550 500 450 1094 962 866 834 | 630 560 500 1212 1094 962 924 |
| Series | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity | 90 75 55 180 144 110 137 110 100 | 02160 110 90 75 216 180 144 165 137 110 | 132 110 90 260 216 180 198 165 137 | 160 132 110 325 260 216 248 198 165 apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; | 220 185 160 432 361 325 329 275 248 120% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 | 280 250 220 547 481 432 417 367 | 315 280 250 610 547 481 465 417 | 355 315 280 683 610 547 521 465 | 400 355 315 770 683 610 587 521 | 450 400 355 866 770 683 660 587 | 500 450 400 962 866 770 733 660 | 550 500 450 1094 962 866 834 733 | 630 560 500 1212 1094 962 924 834 |
| Series Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 | 02160 110 90 75 216 180 144 165 137 110 of rated of rated of | 132 110 90 260 216 180 198 165 137 | 160 132 110 325 260 216 248 198 165 apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; | 220 185 160 432 361 325 329 275 248 120% fo | 250 220 185 481 432 361 367 329 275 or 3 s* ¹⁰ or 3 s* ¹¹ | 280 250 220 547 481 432 417 367 | 315 280 250 610 547 481 465 417 | 355 315 280 683 610 547 521 465 | 400 355 315 770 683 610 587 521 | 450 400 355 866 770 683 660 587 | 500 450 400 962 866 770 733 660 | 550 500 450 1094 962 866 834 733 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity | 90 75 55 180 144 110 137 110 100 110% 0 150% 0 | 02160 110 90 75 216 180 144 165 137 110 of rated of rated of | 132 110 90 260 216 180 198 165 137 current cacurrent cac | 160 132 110 325 260 216 248 198 165 apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; | 220 185 160 432 361 325 329 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s* ¹⁰ or 3 s* ¹¹ | 280 250 220 547 481 432 417 367 | 315 280 250 610 547 481 465 417 | 355 315 280 683 610 547 521 465 | 400 355 315 770 683 610 587 521 | 450 400 355 866 770 683 660 587 | 500 450 400 962 866 770 733 660 | 550 500 450 1094 962 866 834 733 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 110% 0 150% 0 | 02160 110 90 75 216 180 144 165 137 110 of rated of rated of a rat | 132 110 90 260 216 180 198 165 137 | 160 132 110 325 260 216 248 198 165 apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; | 220 185 160 432 361 325 329 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s* ¹⁰ or 3 s* ¹¹ | 280 250 220 547 481 432 417 367 | 315 280 250 610 547 481 465 417 | 355 315 280 683 610 547 521 465 | 400 355 315 770 683 610 587 521 | 450 400 355 866 770 683 660 587 | 500 450 400 962 866 770 733 660 | 550 500 450 1094 962 866 834 733 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 110% 0 120% 0 3 Phas 0.2 - 4(| 02160 110 90 75 216 180 144 165 137 110 of rated coff rated of ra | 132 110 90 260 216 180 198 165 137 current ca current ca current ca current ca | 160 132 110 325 260 216 248 198 165 apacity fapacity fapacity for supp | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 110% c 120% c 3 Phas 0.2 - 40 Soft PV (Select | 02160 110 90 75 216 180 144 165 137 110 of rated of rate | 132 110 90 260 216 180 198 165 137 current cacurrent cac | 160 132 110 325 260 216 248 198 165 apacity f apacity f yer supp | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 100 110% c 120% c 150% c 3 Phas 0.2 - 4(Seft PV (Selec | 110 90 75 216 180 144 165 137 110 of rated of rated of rated of a C , 0 00 Hz | 132 110 90 260 216 180 198 165 137 current courrent courr | 160 132 110 325 260 216 248 198 165 248 198 165 4pacity fi papacity fi ver supp | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 110% c 120% c 3 Phas 0.2 - 40 Soft PV (Select | 110 90 75 216 180 144 165 137 110 of rated of rated of rated of a C , 0 00 Hz | 132 110 90 260 216 180 198 165 137 current cacurrent cac | 160 132 110 325 260 216 248 198 165 248 198 165 4pacity fi papacity fi ver supp | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 55 180 144 110 137 110 100 110% 0 150% 0 3 Phas 0.2 - 4(Soft PV (Select and clo | 02160 110 90 75 216 180 144 165 137 110 of rated of rated | 132 110 90 260 216 180 198 165 137 current courrent courr | 160 132 110 325 260 216 248 198 165 apacity fapacity fapacity for supp carrier for V/f conntrol) | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 329 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 180 144 110 137 110 100 110% of 120% of 150% of 3 Phass 0.2 - 4(Soft PV (Select and 100 points) of 100 points of 100 poi | 02160 110 90 75 216 180 144 165 137 110 of rated of rated | 132 110 90 260 216 180 198 165 137 current ca current c | 160 132 110 325 260 216 248 198 165 apacity fapacity fapacity for suppring for the suppring | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 329 275 248 120% fo 150% fo 200% fo | 250 220 185 481 432 361 367 329 275 or 3 s*10 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 |
| | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative branch | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 200% overlod capacity 200% overlod capacity 200% overlod capacity 200% overlod capacity | 90 75 180 144 110 137 110 100 110% of 150% of 20% of 10% o | 02160 110 90 75 216 180 144 165 137 110 of rated of rated of rated of rated of see AC , 0 00 Hz VM contitable from see loop 10% to shase 38 28V at \$\frac{1}{2}\$ HZ (\pm 5) | 132 110 90 260 216 180 198 165 137 current ca current c | 160 132 110 325 260 216 248 198 165 apacity f apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; ly voltag | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo le | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 250 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 587 521 | 500 450 400 962 866 770 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free Rated input | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 180 144 110 137 110 100 110% of 150% of | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current cacurrent cac | 160 132 110 325 260 216 218 198 165 165 apacity frapacity frapacit | 185 160 132 361 325 260 275 248 198 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo je y contro ance ma | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity 120% overlod capacity 120% overlod capacity 150% overlod capacity 140% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity | 90 75 180 144 110 137 110 100 110% of 150% of 3 Phass 0.2 - 4(Soft PV (Select and clot) 20% forque/ Three p 323 - 5 50 / 60 37 110 | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current ca current ca v to pow rol / high m among vector co orque / co 30 - 480V 50H2/60H 5%) | 160 132 110 325 260 216 248 198 165 apacity f apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 120% fo 200% fo 200% fo e | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 flux vect | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free Rated input capacity (KVA) *7 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 120% overlod capacity 200% overlod capacity | 90 75 180 90 75 180 144 110 137 110 100 110% of 120% of 150% of 3 Phass 0.2 - 4(Soft PV (Select and clol 20% forque/ toontinuous Three p 323 - 5 50 / 60 37 110 100 | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current cacurrent cac | 160 132 110 325 260 216 218 198 165 165 apacity frapacity frapacit | 185 160 132 361 325 260 275 248 198 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 120% fo 150% fo 200% fo je y contro ance ma | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free Rated input capacity (KVA) *7 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 200% overlod capacity 120% overload capacity 120% overload capacity 200% overload capacity | 90 75 180 90 75 180 144 110 137 110 100 110% of 120% of 150% of 3 Phass 0.2 - 4(Soft PV (Select and 150% of | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current ca current ca v to pow rol / high m among vector co orque / co 30 - 480V 50H2/60H 5%) | 160 132 110 325 260 216 248 198 165 apacity f apacity f | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 120% fo 200% fo 200% fo e | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 flux vect | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 465 417 | 400 355 315 770 683 610 587 521 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 733 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 500 1212 1094 962 924 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free Rated input capacity (KVA) *7 | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 200% overlod capacity 150% overlod capacity 120% overload capacity 120% overload capacity 120% overload capacity 120% overload capacity | 90 75 180 90 75 180 144 110 137 110 100 110% of 120% of 150% of 3 Phass 0.2 - 4(Soft PV (Select and clol 20% forque/ toontinuous Three p 323 - 5 50 / 60 37 110 100 | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current ca current ca v to pow rol / high m among vector co orque / co 30 - 480V 50H2/60H 5%) | 160 132 110 325 260 216 248 198 165 248 198 165 198 198 198 198 198 198 198 198 198 198 | 185 160 132 361 325 260 275 248 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 275 200% fo 120% fo 120% fo 150% fo 200% fo 120% fo 200% fo 120% fo 200% fo 20 | 250 220 185 481 432 361 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 flux vect | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 sensorles 586 520 465 | 450 400 355 866 770 683 660 587 521 | 500 450 400 962 866 770 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 5500 1212 1094 962 834 733 |
| Output | capacity (KW) *1 Rated current *3 Output capacity (KVA) *2 Overload current Voltage *5 Frequency range Control method Regenerative bra Power supply vol Voltage range Power supply free Rated input capacity (KVA) *7 Cooling Protective structure | 150% overlod capacity 200% overlod capacity 120% overlod capacity 150% overlod capacity 150% overlod capacity 120% overlod capacity 120% overlod capacity 150% overlod capacity 120% overlod capacity 200% overlod capacity 120% overload capacity 150% overload capacity 200% overload capacity 200% overload capacity 200% overload capacity | 90 75 180 90 75 180 144 110 137 110 100 110% of 120% of 150% of 30 Phass 0.2 - 4(Soft PV (Select and 150 | 02160 110 90 75 216 180 144 165 137 110 of rated | 132 110 90 260 216 180 198 165 137 current casurrent cas | 160 132 110 325 260 216 248 198 165 248 198 165 198 198 198 198 198 198 198 198 198 198 | 185 160 132 361 325 260 275 248 198 198 or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; or 60 s; | 220 185 160 432 361 325 275 248 275 200% fo 120% fo 120% fo 150% fo 200% fo 120% fo 200% fo 120% fo 200% fo 20 | 250 220 185 481 432 367 329 275 or 3 s*11 or 3 s*11 or 3 s*11 | 280 250 220 547 481 432 417 367 329 flux vect | 315 280 250 610 547 481 465 417 367 | 355 315 280 683 610 547 521 465 417 | 400 355 315 770 683 610 587 521 465 sensorles 586 520 465 | 450 400 355 866 770 683 587 521 ss vector | 500 450 400 962 866 770 660 587 | 550 500 450 450 1094 962 866 834 733 660 | 630 560 5500 1212 1094 962 834 733 |

Remarks

- 1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
- 2 The rated output capacity indicated assumes that the output voltage is 440 V.
- 3 When operating the inverter 00023 to 01800 with a value larger than 3K Hz set in Pr. 72 PWM frequency selection, with 120% or 150% set, the rated output current is max. 85%. When operating the inverter of 02160 or more with a value larger than 2 KHz set in Pr. 72 PWM frequency selection, the rated output current is max. 85%.
- 4 The % value of the overload current rating indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperature under 100% load.
- 5 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage
- can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about $\overline{2}$ that of power supply.
- 6 With high duty brake resistor, the 00023 to 00250 & 00310 to 00620 will achieve the performance of 100% torque / 10%ED & 100% torque / 6% ED respectively.
- 7 The power supply capacities varies with the value of the power supply side inverter impendence (including those of the input reactor and cables).
- 8 When the hook of the inverter front cover is cut off for installation of plug-in option, the inverter changes to an open type (IP00).
- 9 FR-DU07: IP40 (except for the PU connector)
- 10 Max. ambient temperature 40 C Inverse time characteristics.
- 11 Max. ambient temperature 50 C Inverse time characteristics.

• Details of Factory Supplied DC Link Chokes

| Anadiantian (larrantan) | | Dimensions in mm w | | weight | Americantina (Immedian) | B0 . | Dimensions in mm | | | weight | |
|-------------------------|--------------|--------------------|-----|--------|-------------------------|------------------------|------------------|-----|-------------|--------|----|
| Application (Inverter) | DC reactor | W | Н | D | Kg | Application (Inverter) | DC reactor | W | Н | D | Kg |
| FR-A740-01800-IN | FR-HEL-H90K | 150 | 340 | 190 | 20 | FR-A740-06100-IN | FR-HEL-H315K | 210 | 495 | 250 | 42 |
| FR-A740-02160-IN | FR-HEL-H110K | 150 | 340 | 195 | 22 | FR-A740-06830-IN | FR-HEL-H355K | 210 | 495 | 250 | 46 |
| FR-A740-02600-IN | FR-HEL-H132K | 175 | 405 | 200 | 26 | FR-A740-07700-IN | FR-HEL-H400K | 235 | 500 ±10% | 250 | 50 |
| FR-A740-03250-IN | FR-HEL-H160K | 175 | 405 | 205 | 28 | FR-A740-08660-IN | FR-HEL-H450K | 240 | 500 ±10% | 270 | 57 |
| FR-A740-03610-IN | FR-HEL-H185K | 175 | 405 | 240 | 29 | FR-A740-09520-IN | FR-HEL-H500K | - | 345 | 455 | 67 |
| FR-A740-04320-IN | FR-HEL-H220K | 175 | 405 | 240 | 30 | FR-A740-10940-IN | FR-HEL-H560K | - | 360 | 460 | 85 |
| FR-A740-04810-IN | FR-HEL-H250K | 190 | 440 | 250 | 35 | FR-A740-12120-IN | FR-HEL-H630K | - | 360 | 460 | 95 |
| FR-A740-05470-IN | FR-HEL-H280K | 190 | 440 | 255 | 38 | | | | | | |

Brake resistor specifications 400V Class

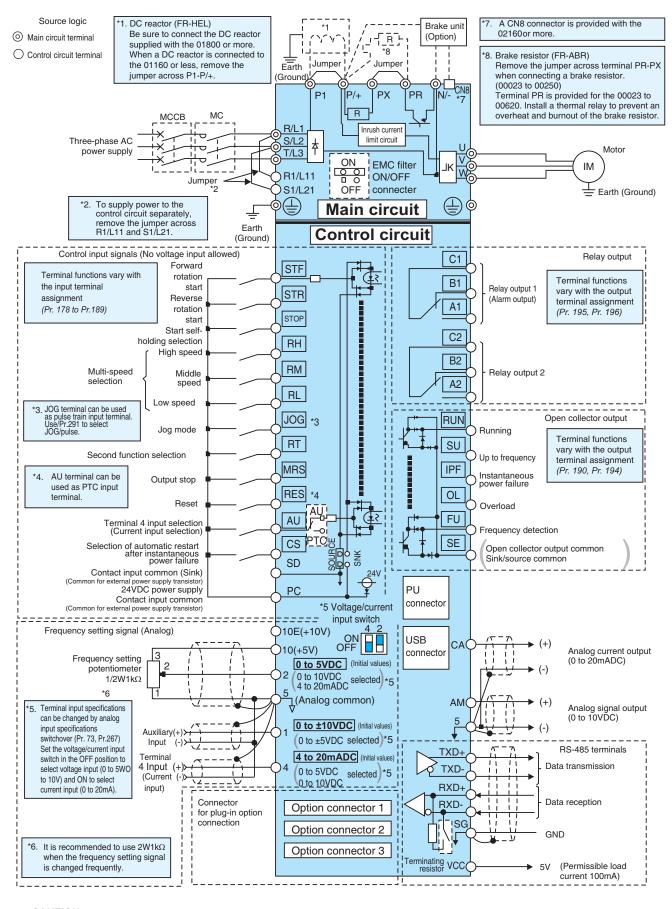
| Resistance | Power |
|------------|---------------------------------------|
| Ohm | W |
| 1200 | 45 |
| 700 | 75 |
| 350 | 115 |
| 250 | 120 |
| 150 | 155 |
| 110 | 185 |
| 75 | 340 |
| 52 | 1000 |
| 36 | 1500 |
| 26 | 2200 |
| | Ohm 1200 700 350 250 150 110 75 52 36 |

Common specifications FR-A700

| FR-A740 | | | Description |
|--|-------------------------------------|--|--|
| | 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* |
| | Frequency setting resolution | Analog input | 0.015 Hz / 0-50 Hz (terminal 2, 4:0-10 V / 12 bit) 0.03 Hz / 0-50 Hz (terminal 2, 4:0-5 V / 11 bit, 0-20mA / 11 bit, terminal 1: -10-+10V / 12 bit) 0.06 Hz / 0-50 Hz (terminal 1:0-±V / 11 bit) |
| | | Digital Input | 0.01 Hz |
| | Frequency accuracy | | ± 0.2 % of the maximum output frequency (temperature range 25° \pm 10°C) via analog input; ± 0.01 % of the set output frequency (via digital input) |
| Occident | Voltage / frequency characteristics | | Base frequency adjustable from 0 to 400 Hz; selection between constant torque, variable torque or optional flexible 5-point V/f characteristics |
| Control Specifi- cations | Starting torque | | $200\ \%\ 0.3$ Hz (00023 to 00126), $150\ \%\ 0.3$ Hz (00170 or more) (under real sensorless vector control or vector control) |
| | Torque boost | | Manual torque boost |
| | Acceleration / c | eceleration time | 0;0.1 to 3600s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected. |
| | Acceleration / de | eceleration characteristics | Linear or S-form course, user selectable |
| | DC injection bra | | Operating frequency (0-120 Hz), operating time (0-10 s) and operating voltage (0-30 %) can be set individually. The DC brake can also be activated via the digital input |
| | Stall prevention | • | Operation current level can be set (0 to 220 % adjustable), whether to use the function or not can be selected |
| | Motor protection Torque limit leve | | Electronic motor protection relay (rated current user adjustable) |
| | rorque infini leve | | Torque limit value can be set (0 to 400 % variable) Terminal 2, 4:0-5 V DC, 0-10 V DC, 0/4-20 mA |
| | Frequency setting values | Analog input | Terminal 1:0-±5 V DC, 0-±10V DC |
| | ŭ | 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 | | Available individually for forward rotation and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected. |
| | Input signals | Common | Any of 12 signals can be selected using parameters 178 to 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, star-time tuning start external input, torque bias selection, 1, 2", 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 |
| | | Pulse train input | 100 kpps |
| Control signals for operation | | Operating status | Any of 7 signals can be selected using parameter 190 to 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 MC3, orientation completion*i, 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*, reverse rotation output*, low speed output, torque detection, regenerative status output*, start-time tuning completion, in-position completion*i, minor failure output and alarm output. Open collector output (5 point), relay output (2 points) and alarm code of the inverter can be output (4 bit) from the open collector |
| | Output signals | When using the FR- A7AY, FR-A7AR option | In addition to the above operating modes parameters 313-319 (function selection for the additional 7 output terminals) can also be used to assign the following four signals: 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) |
| | | Analog output | You can select any signals using Pr. 54 CA and Pr.54 FM terminal function selection (pulse train output) and Pr. 158 AM terminal function selection (nanalog 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 command, and torque monitor. |
| D'andre | Control unit | Operating state | 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, cumlative 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*, output terminal option monitor*, option fitting status*, terminal assignment status*, torque command, torque current command, feed back pulse*, motor output |
| Display | (FR-PU07/ FR-DU07) | 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/trouble shooting with a help function*3. |
| | | | |
| | Ambient Tempe | rature | -10°C to +50°C (non-freezing) |
| | Ambient Tempe | | -10°C to +50°C (non-freezing) 90%RH maximum (non-condensing) |
| Environ- ment | | ty | ` - |

*1. 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/s² or less for the 160K or more.

Terminal Connection Diagram



CAUTION

- To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables.
- Be sure to earth (ground) the inverter and motor before use.
- This connection diagram assumes that the control circuit is source logic (initial setting). Refer to the instruction manual for the connection in the case of sink logic.



Terminal Assignment of Main Circuit & Signal Terminals

| Function | Terminal | Designation | Description |
|-------------------------|---------------------|---|--|
| | L1, L2, L3, | Mains supply connection | Mains power supply of the inverters (380-480 V AC, 50/60 Hz) |
| | P/+, PR | Brake resistor connection | An optional brake resistor (FR-ABR) can be connected across these terminals. The PR terminal is provided only for type 00023 - 00620. |
| | P/+, N/- | Brake unit connection | A brake unit (FR-BU and BU,MT-BU5), power regeneration common converter (FR-CV) or regeneration common converter (MT-RC) and high power factor converter (FR-HC, MT-HC) can be connected to these terminals. |
| Main circuit connection | P/+,P1 | DC reactor connection | For type 00023 - 01160 a DC reactor can be connected to these terminals. (For 01800 or above a DC reactor is supplied as standard) When the jumper is connected across terminals PR and PX (initial status), the built-in brake reactor circuit is valid. |
| | PR, PX | Built-in brake circuit connection | The PX terminal is provided only for type 00023 - 00250. |
| | U, V, W L11, L21 | Motor connection | Voltage output of the inverter (3-phase, 0 V up to power supply voltage, 0.5-400 Hz) To use external power for the control circuit connect the mains power to L11/L21(and remove jumpers L1 and L2) |
| | CN8 | Power supply for control circuit Ext. brake transistor control | Control connection for the MT-BU5 external brake module |
| | <u>+</u> | PE PE | Protective earth connection of inverter |
| | STF | Forward rotation start | The motor rotates forward, if a signal is applied to terminal STF |
| | STR | Reverse rotation start | The motor rotates reverse, if a signal is applied to terminal STR The start signals are self-rotatining, if a signal is applied to terminal STR |
| | STOP BH BM BI | Start self-retaining selection Multi-speed selection | The start signals are self-retaining, if a signal is applied to terminal STOP Preset of 15 different output frequencies according to the combination of the RH, RM and RL signals |
| | JOG | Jog mode selection | The JOG mode is selected, if a signal is applied to this terminal (factory setting). The start signals STF and STR determine the rotation direction. |
| Control | 000 | Pulse train input | The JOG terminal can be used as pulse train input terminal (parameter 291 setting needs to be changed) |
| connection (progra- | RT | Second parameter settings | A second set of parameter settings is selected, if a signal is applied to terminal RT. |
| mmable) | MRS | Output stop | The inverter lock stops the output frequency without regard to the delay time. |
| | RES | RESET input | An activated protective circuit is reset, if a signal is applied to the terminal RES (t > 0,1 s). |
| | AU | Current input selection | The 0/4-20mA signal on terminal 4 is enabled by a signal on the AU terminal. If you connect a PTC temperature sensor you must assign the PTC signal to the AU terminal and set the slide. |
| | ,,, | PTC input | If you connect a PTC temperature sensor you must assign the PTC signal to the AU terminal and set the slide switch on the control circuit board to the PTC position. |
| | cs | Automatic restart after instanta- neous power failure | The inverter restarts automatically after a power failure, if a signal is applied to the terminal CS |
| Common | SD | Reference potential (OV) for the PC terminal (24V) | When "sink" control logic is selected by setting the control signal jumper a specific control function is triggered when the corresponding control terminal is connected to the PC terminal. When "source" control logic is selected and you are using external 24V power you must connect the 0V of the external power supply to terminal SD. The SD terminal is isolated from the terminals 5 and SE with optocouplers. |
| | PC | 24 V DC output | Internal power supply 24 V DC/0, 1 A output |
| | 10 E | Voltage output for | Output voltage 10 V DC. Max. output current 10 mA Recommended potentiometer: 1 kΩ, 2 W linear |
| | 10 | potentiometer | Output voltage 5 V DC Max. output current 10 mA. Recommended potentiometer: $1k\Omega$, 2 W linear |
| Setting value | 2 | Input for frequency setting value signal | The setting value 0 to 5 V DC (or 0-10 V, 0/4-20mA) is applied to this terminal. You can switch between voltage and current setpoint values with parameter 73. The input resistance is $10k\Omega$ |
| specifi- cation | 5 | Frequency setting common and analog outputs | Terminal 5 provides the common reference potential (0V) for all analog set point values and for the analog output signals CA (current) and AM (voltage). The terminal is isolated from the digital circuit's reference potential (SD). This terminal should not be grounded |
| | 1 | Auxiliary input for frequency setting value signal 0-±5 (10) V DC | An additional voltage setting value signal of 0- \pm 5 (10) V DC can be applied to terminal 1. The voltage range is preset to 0- \pm 10 V DC. The input resistance is $10k\Omega$ |
| | 4 | Input for setting value signal | The setting value 0/4-20 mA or 0-10 V is applied to this terminal. You can switch between voltage and current setpoint values with parameter 267. The input resistance is 250Ω . The current setting value is enabled via terminal function AU. |
| | A1, B1, C1 | Potential free relay output 1 (Alarm) | The alarm is output via relay contacts. The block diagram shows the normal operation and voltage free status. If the protective function is activated, the relay pick up. The maximum contact load is 200 V AC/0.3 A or 30 V DC/0.3 A |
| | A2, B2, C2 | Potential free relay output 2 | Any of the available 42 output signals can be used as the output driver. The maximum contact load is 230V AC /0.3 A or 30 V DC / 0.3A. |
| | RUN | Signal output for motor operation | The output is switched low, if the inverter output frequency is equal to or higher than the starting frequency. The output is switched high, if no frequency is output or the DC brake is in operation. |
| | SU | Signal output for frequency setting value/current value comparison | The SU output supports a monitoring of frequency setting value and frequency current value. The output is switched low, once the frequency current value(output frequency of the inverter)approaches the frequency setting value(determined by the setting value signal) within a preset range of tolerance. |
| | IPF | Signal output for instantaneous power failure | The output is switched low for a temporary power failure within a range of 15ms≤-tiPF≤100ms or for under voltage. |
| Signal output (progra- | OL | Signal output for overload alarm | The OL is switched low, if the output current of the inverter exceeds the current limit preset in parameter 22 and the stall prevention is activated. If the output current of the inverter falls below the current limit preset in parameter 22, the signal at the OL output is switched high. |
| mmable) | FU | Signal output for monitoring output frequency | The output is switched low once the output frequency exceeds a value preset in parameter 42(or 43). Otherwise the FU output is switched high. |
| | SE | Reference potential for signal outputs | The potential that is switched via open collector outputs RUN, SU,OL,IPF and FU is connected to this terminal. |
| | CA | Analog signal output | |
| | AM | 0-20 mA DC Analog signal output 0-10 V DC (1mA) | One of 18 monitoring function can be selected, e.g. external frequency output. CA and AM output can be used simultaneously. The function are determined by parameters. |
| | - | PU connector | A parameter unit can be connected. Communications via RS485 I/O standard: RS485, Mulit-Drop operation, 4,800-38,400 Baud (overall length: 500m) |
| Interface | - | RS 484 terminal | Communications via RS485 |
| | | (via RS485 terminal) | I/O standard: RS485, Mulit-Drop operation, 300-38, 400 Baud (overall length: 500m) This LISB interface is used to connect the inverter to a personal computer(conforms to LISB1.1) |
| | - | USB connector | This USB interface is used to connect the inverter to a personal computer(conforms to USB1.1) |

Option List

| | | Name | | Туре | Applications, Specifications, etc. | Applicable Inverter |
|--------------------|---|--|----------------------|---|--|--|
| | Vector co | ontrol | | | Vector control with encoder can be performed. | |
| | Orientation/encoder | | FR-A7AP | The main spindle can be stopped at a fixed position (orientation) in combination with a pulse encoder. The motor speed is sent back and the speed is maintained constant. | | |
| | 16-bit digital input | | | FR-A7AX | This input interface sets the high frequency accuracy of the inverter using an external BCD or binary digital signal. BCD code 3 digits (maximum 9990) BCD code 4 digits (maximum 9999) Binary 12 bits (maximum FFFH) Binary 16 bits (maximum FFFFH) | |
| be | | | | | Output signals provided with the inverter as standard are selected to output from the open collector. | Shared among all |
| Plug-in Type | Digital or Extensio | utput n analog output | | FR-A7AY | This option adds 2 different signals that can be monitored at the terminals AM0 and AM1, such as the output frequency, output voltage and output current. 20mADC or 10VDC meter can be connected. | models |
| | Relay ou | itput | | FR-A7AR | Output any three output signals available with the inverter as standard from the relay contact terminals. | |
| | uo | CC-Link | | FR-A7NC | This option allows the inverter to be operated or monitored | |
| | nicati | LONWORKS | | FR-A7NL | or the parameter setting to be changed from a computer or PLC. | |
| | Communication | DeviceNet | | FR-A7ND | | |
| | Con | PROFIBUS-DP | | FR-A7NP | *For the FR-A7NC (CC-Link), the above operations can be done from the PLC only. | |
| | Paramet | er unit (8 langua | ges) | FR-PU01 | Interactive parameter unit with LCD display | |
| | Paramet | er unit connectio | on cable | FR-CB20 | Cable for connection of operation panel or parameter unit indicates a cable length. (1m, 3m, 5m) | Channel |
| | Operation connected | n panel connecti or | ion | FR-ADP | Connector to connect the operation panel (FR-DU07) and connection cable | Shared among all models |
| | Cable for encoder Mitsubishi vector control dedicated motor (SF-V5RU) | | | FR-V7CBL | Connection cable for the inverter and encoder for Mitsubishi vector control dedicated motor (SF-V5RU). indicates a cable length. (1m, 3m, 5m) | |
| þe | Heatsink protrusion attachment | | FR-A7CN01 to 11 | The inverter heatsink section can be protruded outside of the rear of the enclosure. | FR-A720-1.5K to 90K FR-A740-0.4K to 132K According to capacities | |
| e Share | | | FR-AAT24 | Attachment for replacing with the A700 series using the installation holes of the FR-A500 series. | FR-A740-11K, 15K | |
| Stand-alone Shared | Intercom | patibility attachm | nent | FR-A5AT | Attachment for replacing with the FR-A700 series using the installation holes of the FR-A100 <excellent> and FR-A200<excellent></excellent></excellent> | According to capacities |
| | AC react | tor | | FR-HAL | For harmonic suppression measures and improvement of inverter input power factor (total power factor approx. 88%) | According to capacities |
| | DC reac | tor | | FR-HEL | For harmonic suppression measures and improvement of inverter input power factor (total power factor approx. 93%) | Compatible with the 55K or less |
| | Line nois | se filter | | FR-BSF01 FR- BLF | For line noise reduction | Shared among al models |
| | High-dut | y brake resistor | | FR-ABR | For improvement of braking capability of the built-in brake of the inverter | Compatible with the 22K or less |
| | Brake ur Resistor | | | FR-BU2 | For increasing the braking capability of the inverter (for high-inertia load or negative load) | Connected as per |
| | | | mon | | Brake unit and resistor unit are used in combination | Connected as per Capacity |
| | Power regeneration common Converter Stand-alone reactor dedicated for the FR-CV | | FR-CV FR-CVL | Unit which can return motor-generated braking energy back to the power supply in common converter system | Compatible with the 55K or less | |
| hared | Power regeneration converter | | | | Energy saving type high performance brake unit which can regenerate the braking energy generated by the motor to the power supply. | Compatible with the 75K or more |
| Stand-alone Shared | High pov | ver factor conver | rter | FR-HC | The high power factor converter switches the converter section on/off to reshape an input current waveform into a sine wave greatly suppressing harmonics. (Used in | Compatible with the 55K or less |
| Stand | | a sine wave, greatly suppressing harmonics. (Used in combination with the standard accessory.) | | | Compatible with the 75K or more | |
| | Surge voltage suppression filter | | | FR-ASF | Filter for suppressing surge voltage on motor | Compatible with the 400V class 55K or less |
| | Sine way | re filter | Reactor Capacitor | MT- BSL (-HC) MT- BSC | Reduce the motor noise during inverter driving Use in combination with a reactor and a capacitor | Compatible with the 75K or more |
| | | | | | | |

Protective Functions

| | Function Name | Display |
|------------------------|---|-------------------|
| | Operation panel lock | HOLd |
| Error | Parameter write error | Er to Er 4 |
| Message *2 | Copy operation error | r E I to r E Y |
| | Error | Err. |
| | Stall prevention (overcurrent) | OL |
| | Stall prevention (overvoltage) | oL |
| | Regenerative brake prealarm | rЬ |
| Warnings | Electronic thermal relay function prealarm | ſΗ |
| *3 | PU stop | Ρ5 |
| | Maintenance signal output | nr |
| | Parameter copy | CP |
| | Speed limit display (output during speed limit) | SL |
| Minor Failure *4 | Fan fault | Fn |
| | Overcurrent shutoff during acceleration | E.0C1 |
| | Overcurrent shutoff during constant speed | S.002 |
| | Overcurrent shut-off during deceleration or stop | E.D.C.3 |
| | Regenerative overvoltage shut-off during acceleration | E.Ou 1 |
| | Regenerative overvoltage shut-off during constant speed | E.Ou2 |
| | Regenerative overvoltage shut- off during deceleration or stop | E.O u 3 |
| | Inverter overload shut-off (Electronic thermal relay Function) *1 | 8.ГНГ |
| | Motor overload shut-off (Electronic thermal relay Function) *1 | 8,ГНП |
| Major failures | Fin overheat | 8.F1 n |
| *5 | Instantaneous power failure protection | EJ PF |
| | Undervoltage protection | E.UuF |
| | Input phase failure | ELLF |
| | Stall prevention | E.DL Г |
| | Brake transistor alarm detection | €. 6€ |
| | Output side earth (ground) fault overcurrent protection | E. GF |
| | Output phase failure protection | E. LF |
| | External thermal relay operation *6 | 8.0НГ |
| | PTC thermistor operation | <i>Е.РГ</i> С |
| | Option alarm | E.0PF |
| | Communication option alarm | E.DP3 |

| | Function Name | Display |
|-------------------------|--|---------------------|
| | Option alarm | E. 1 to E. 3 |
| | Parameter storage device alarm | E. PE |
| | PU disconnection | <i>Е.Р</i> ИЕ |
| | Retry count excess | 8,-81 |
| | Parameter storage device alarm | 8,282 |
| | CPU error | E. 67 E. 77E.CPU |
| | Operation panel power supply short circuit RS-485 terminals power supply short circuit | 8.07.8 |
| | 24VDC power output short Circuit | 8,224 |
| | Output current detection value excess | 063.3 |
| Major failures *5 | Inrush resistor overheat | EJ 0H |
| | Communication alarm (inverter) | €.5€ r |
| | Analog input error | E.RI E |
| | Overspeed occurrence *7 | <i>E.</i> 05 |
| | Speed deviation excess detection *7 | £.05 <i>a</i> |
| | Open cable detection *7 | E.E.C.F |
| | Position error large *7 | E. 08 |
| | Brake sequence error | E.NЬ I ™ E.NЬ П |
| | Encoder phase error *7 | E.E.P |
| | Internal circuit error | ε. 13 |
| | USB error | E.US6 |
| | Opposite rotation deceleration alarm | ε. 11 |

- *1. Resetting the inverter initializes the internal thermal integrated data of the electronic thermal relay function.
- *2. The error message shows an operational error. The inverter output is not shut off.
- *3. Warnings are messages given before major failures occur. The inverter output is not shut off.
- *4. Minor failure warns the operator of failures with output signals. The inverter output is not shut off.
- *5. When major failures occur, the protective functions are activated to shut off the inverter output and output the alarms.
- *6. The external thermal operates only when the OH signal is set in Pr.178 to Pr.189 (input terminal function selection).
- * 7. Appears when the FR-A7AP (option) is fitted.

For Information of Mitsubishi F. A. Products

MESSUNG SYSTEMS PVT. LTD.

15, Electronic Sadan - 3, MI.I.D.C. BHOSARI, PUNE - 411 026. INDIA TEL : +91(020) 2712 3130, 2712 8927, 2711 9615 FAX : +91(020) 2712 8108 email : marketing@mspl.messung.com WEBSITE : www.messung.com

MESSUNG AREA OFFICES

| PUNE | MUMBAI | NEW DELHI |
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| TEL:+91(020) 25820447 | TEL:+91(022)26674308 / | TEL:+91(011)29216128 |
| 25820448 | 66949564 | 29226129 |
| FAX:+91(020) 25820450 | FAX:+91(022)26674309 | FAX:+91(011)29226130 |
| HYDERABAD | BANGALORE | BARODA |
| TEL:+91(040)27722519 / | TEL:+91(080)41732564 | TEL:+91(0265)2314669 / |
| 27720308 | 41732592 | 2358137 |
| FAX:+91(040)27722519 | FAX:+91(080)41320758 | FAX:+91(0265)23333307 |

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GURGAON TEL:+91(124)4267466 / 4267467 FAX:+91(124)4267466

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