

FRENIC-HVAC Inverter

General Specifications



1. Standard Specifications

1-1. Three-phase 230 V series (1 to 125 HP)

| <u> </u> | 0 125 HP) | Items | | Specifications | | | | | | | | | | | | | | | |
|-------------|----------------------|---------------------------------|--------------------------|---|-------------|----------|----------|-----------|------------|---------|---------|----------|------------|------------|------------|------------|------------|-----------------------|------------|
| | EDN AD1 | | | 001 | 000 | 002 | 005 | 007 | 010 | 015 | | | | 1 045 | 1 | | | 1 400 | 1 405 |
| Type *8 | | ■-2U : HVAC | | 001 | 002 | 003 | 005 | 007 | 010 | 015 | 020 | 025 | 030 *11 | 040 *11 | 050 *11 | 060 *11 | 075 *11 | 100 *11 | 125 *11 |
| | al applied | Three phase | AC208V motor | 1 | 2 | 3 | 5 | 7. 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 125 |
| | (Rated t) [HP] *1 | input | AC230V motor | | | | | | | | | | | | | | | | |
| outpu | t) [HP] · | Single phase | AC208V motor | - | 1/2 | 3/4 | 1.5 | 2 | 3 | 5 | 5 | 7. 5 | 10 | 10 | 15 | 20 | 30 | 30 | 40 |
| | | input | AC230V motor | - | 1/2 | 1 | 2 | 3 | 3 | 5 | 7. 5 | 10 | 10 | 15 | 20 | 25 | 30 | 30 | 50 |
| | Three phase | Rated capacit | ty [kVA] *2 | 1. 9 | 3. 1 | 4. 3 | 7. 1 | 10 | 12 | 18 | 23 | 29 | 35 | 45 | 58 | 71 | 85 | 112 | 137 |
| ngu | | Rated current | | 5 | 8 | 11 | 18 | 27 | 31.8 | 46. 2 | 59.4 | 74. 8 | 88 | 115 | 146 | 180 | 215 | 283 | 346 |
| ratings | Single phase | Rated capaci | ty [kVA] *2 | 0. 7 | 1. 2 | 1.6 | 2. 7 | 4. 1 | 4. 9 | 7. 1 | 9. 2 | 11 | 13 | 17 | 22 | 27 | 37 | 40 | 52 |
| | | Rated current | t [A] | 1. 9 | 3. 1 | 4. 2 | 7. 0 | 10.5 | 12. 4 | 18. 0 | 23. 1 | 29. 1 | 34. 3 | 44. 8 | 56. 9 | 70. 2 | 95 | 102 | 131 |
| Output | Rated voltage | e [V] *3 | | Three-phase, 200 to 240 V (with AVR function) Three-phase, 200 to 230 V (with AVR function) | | | | | | | | | | n) | | | | | |
| of I | Overload capa | | | 110% - 1 min (Overload capability interval : IEC 61800-2 compliant) | | | | | | | | | | | | | | | |
| | Rated frequer | | | 50, 60 | | | | | | | | | | | | | | | |
| | | Main power su | | Three- | -phase, | 200 to | 240 V, | 50/60 | Hz | | | | | | | 220 V, | | | |
| | | | age, frequency | | | | | | | | | | | | | 230 V, | | | |
| | | Rated current | | 2. 8 | 5. 3 | 7. 5 | 12. 9 | 18. 0 | 24. 2 | 36. 0 | 48. 6 | 60.0 | 71.5 | 96. 9 | 121 | 145 | 178 | 246 | 291 |
| | | | er supply capacity [kVA] | 1. 2 | 2. 2 | 3. 0 | 5. 2 | 7. 2 | 10 | 15 | 20 | 24 | 29 | 39 | 49 | 58 | 71 | 98 | 116 |
| | Single phase | Single | e-phase | , 200 t | o 240 \ | /, 50/60 |) Hz | | | | | | | o 220 \ | | | | | |
| i i | | | age, frequency | | | | | | | | | | Ü | • | | | /, 60 Hz | | |
| 20 | | Rated current | | - | 5. 3 | 7. 5 | 12. 9 | 18. 0 | 24. 2 | 36. 0 | 48. 6 | 60.0 | 71.5 | | 121 | 145 | 178 | 246 | 291 |
| Input | | | er supply capacity [kVA] | - | 1.3 | 1.8 | 3. 0 | 4. 2 | 5.6 | 8. 3 | 12 | 14 | 17 | 23 | 28 | 34 | 41 | 57 | 67 |
| | - | ntrol power s | | Single-phase 200 to 240 V, 50/60 Hz Single-phase 200 to 230 V, 50/60 Hz | | | | | | | | | | | | | | | |
| | | age, frequenc | | _ | | | | | | | | | 0. 1 | | 000 1 | 000 1/ | FO 11 | | |
| | | in power supp | • | - Single-phase 200 to 220 V, 50 Hz Single-phase 200 to 230 V, 60 Hz | | | | | | | | | | | | | | | |
| 1 4 | Phases, volta | age, frequency quency variat | y ** | | | | | | | | | | | | | | | | |
| | | quency variat | ions | Voltage: +10 to -15% (Interphase voltage unbalance : 2% or less) *5, Frequency: +5 to -5% 20 | | | | | | | | | | | | | | | |
| ing A | Torque [%] *7 | | | | | | | | | | | | | | | | U to 15 | | |
| <u> </u> | DC injection | braking | | | | | | | | | | 30.0s, | | | 1:0 to | 60% | | | |
| | | N 61800-3:200 | 4) *10 | | | | | | | | | nd Env. | (Immur | nity) | | | C3/ 2nd | | |
| DC rea | actor (DCR) * | 10 | | Built- | -in (IE | C/EN 61 | 000-3-2 | 2 *9, IEC | C/EN 610 | 000-3-1 | 2) | | | | | | | d accesso 61000-3- | |
| Power | factor | Displacement | P. F. (cos φ) | >0.98 | 3 | | | | | | | | | | | | | | |
| (at ra | ated load) | True P.F. | | ≧0.90 |) | | | | | | | | | | | | | | |
| Effic | iency (at rat | ted load) | | | | 97% | | | | | | | | 98 | 8% | | | | |
| Applic | cable (safety | y) standards | | UL5080 | C, C22. | 2 No. 14 | , IEC/E | N 61800 |)-5-1 : 20 | 007, SE | MI F47- | 0706 (un | der app | olicati | on) | | | | |
| Enclos | losure IEC/EN 60529 | | | | IP55 | | | | | | | | | | | | IP00 | | |
| | UL 50 | | | | PE 1/ U | L TYPE1 | 2 (under | applio | cation) | | | | | | | | UL open | type | |
| | oling method | | | | Fan cooling | | | | | | | | | | | | | | |
| Weight | t/Mass [kg] | IP21 | | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 23 | 23 | 50 | 50 | 70 | 70 | - | | |
| | | IP55 | | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 23 | 23 | 50 | 50 | 70 | 70 | | | |
| | | IP00 | | - | | | | | | | | | | - | | | 42 | 43 | 62 |
| | | | | | | | | | | | | | | | | | | | |

- *1) US 4-pole standard induction motor
- $\star 2$) Rated capacity is calculated by assuming the output rated voltage as 230 V.
- *3) Output voltage cannot exceed the power supply voltage. At single-phase input use, the output voltage may be lower than three-phase input.

 *4) The auxiliary power input is used as an AC power input when combining the unit to DC power supply such as high power factor PWM converter with power regenerative function. (Generally not to be used.)
- *5) Voltage unbalance [%] = (Max. voltage [V] Min. voltage [V])/Three-phase average voltage [V] x 67 (See IEC61800-3.) If this value is 2 to 3%, use an optional AC reactor (ACR).
- *6) The value is calculated on assumption that the inverter is connected with a power supply 230V, 50Hz and Rsce=120.
- *7) Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)
- *8) The underline (___) replaces an numeric letter depending on the drive capacity.
- The box (\blacksquare) replaces an alphabetic letter depending on the enclosure. M (IP21), L (IP55) or S(IP00) *9) It is applicable when the power supply is supplied from 3-phase 200V series transformer which is through 3-phase 400V series transformer.
- *10) EMC filters and DCR does not conform to each corresponding standards when single phase input use.
- *11) COMMING SOON : The capacity from 30HP to 125HP of 230V series.

1-2. Three-phase 460 V series (1 to 75 HP)

| Tense Specifications Specification | <u>.u.</u> | TO /5 HP) | | Specifications | | | | | | | | | | | | | |
|---|------------|----------------|--------------------------|---|---------------------------------------|-----------|--------|----------|---------|----------|---------|--------|--------------|------------------------------------|-------|----------|-------|
| Section Color Co | | | | | | | | | | • | | | | | | | |
| Mountain Single phase | Type *8 | FRNAR1 | ■-4U : HVAC | 001 | 002 | 003 | 005 | 007 | 010 | 015 | 020 | 025 | 030 | 040 | 050 | | |
| Innex phase Rated capacity (kVA) 2 1.9 3.2 4.3 7.1 10 14 19 25 31 35 47 59 72 89 | moto | r (Rated | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| Single phase Rated current [A] 2.5 | outp | ut) [HP] *1 | | - | 1/2 | 1 | 2 | 3 | 3 | 5 | 7.5 | 10 | 10 | 15 | 20 | 25 | 30 |
| Single phase Rated current [A] 2.5 | | Three phase | Rated capacity [kVA] *2 | 1.9 | 3. 2 | 4.3 | 7. 1 | 10 | 14 | 19 | 25 | 31 | 35 | 47 | 59 | 72 | 89 |
| Rated current [A] | ngs | input | Rated current [A] | 2. 5 | 4. 1 | 5.5 | 9. 0 | 13.5 | | 24. 5 | 32 | | 45 | 60 | | | |
| Rated current [A] | i z | | | - | 1.1 | 1.6 | 2. 7 | 4.1 | | 7. 5 | 9.8 | 12 | | 18 | 23 | | 34 |
| Rated frequency [Hz] | ~ | input | Rated current [A] | | | | | | 7. 2 | 9. 5 | 12.4 | 15. 2 | 17.5 | 23. 4 | 29. 2 | 35. 4 | 43. 6 |
| Rated frequency [Hz] | but | Rated voltage | e [V] *3 | | | | | | | | | | | | | | |
| Rated frequency [Hz] | JT | Overload capa | ability | 110% - 1 min | (Overload capat | oility i | nterva | I : IEC | 61800- | 2 compl | iant) | | | | | | |
| Input | _ | | | | | | | | | | | | | | | | |
| Single phase Main power supply capacity (kVA) | | | | Three-phase, | 380 to 480 V, 5 | 50/60 Hz | ! | | | | | | | | | | |
| Required power supply capacity (kVA) 1.2 2.2 3.1 5.2 7.2 10 15 20 24 29 39 49 58 71 | | | Rated current [A] *6 | 1.4 | 2. 7 | 3.8 | 6. 5 | 9.0 | 12. 1 | 18. 0 | 24. 3 | 30.0 | 35.8 | 48. 5 | 60. 4 | 72. 3 | 88. 7 |
| Phases voltage frequency Rated current [A] **6 Required power supply capacity [kVA] - 1.3 1.8 3.0 4.2 5.6 8.3 12 14 17 23 28 34 41 | | | | 1.2 | 2. 2 | 3.1 | 5. 2 | 7. 2 | 10 | 15 | 20 | 24 | 29 | 39 | 49 | 58 | 71 |
| Required power supply capacity [kVA] | ings | | | Single-phase, | 380 to 480 V, | 50/60 I | z | • | | | • | | | | | | |
| Required power supply capacity [kVA] | rat | | | - | 2. 7 | 3.8 | 6. 5 | 9.0 | 12. 1 | 18. 0 | 24. 3 | 30.0 | 35. 8 | 48. 5 | 60. 4 | 72. 3 | 88. 7 |
| Phases, voltage, frequency Auxiliary main power supply : Phases, voltage, frequency Phases, voltage, unbalance Phases, voltage, voltag | | | | - | 1. 3 | 1.8 | 3. 0 | | | | | | | | 28 | 34 | 41 |
| Auxiliary main power supply: Phases, voltage, frequency *4 Voltage, frequency variations Voltage: +10 to −15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to −5% Torque [%] *7 Do injection braking EMC filter (IEC/EN 61800-3:2004) *9 Built-in (IEC/EN 61000-3-2, IEC/EN 61000-3-12) Power factor (DCR) *9 Fifticiency (at rated load) Applicable (safety) standards UL508c, C22.2 No. 14, IEC/EN 61800-5-1:2007, SEMI F47-0706 Enclosure IEC/EN 60529 UL TYPE 1/ UL TYPE 1/ UL TYPE 12 (under application) Cooling method Weight/Mass (kg) IP21 Notage: +10 to −15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to −5% Single-phase 380 to 440 V, 50 Hz Singl | Inp | | | Single-phase | 380 to 480 V, 5 | 0/60 Hz | | | | | | | | | | | |
| Phases, voltage, frequency **4 Voltage, frequency **4 Voltage, frequency variations Voltage: +10 to −15% (Interphase voltage unbalance : 2% or less) **5, Frequency: +5 to −5% | | | | | | | | | | | | | | | | | |
| Voltage: frequency variations Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5% Torque [%] *7 20 10 to 15 Do injection braking Starting frequency: 0. 0 to 60. OHz. Braking time: 0. 0 to 30. 0s, Braking level: 0 to 60% EMC filter (IEC/EN 61800-3:2004) *6 EMC standards compliance: Category C2 (emission) / 2nd Env. (Immunity) DC reactor (DCR) *9 Built-in (IEC/EN 61000-3-2, IEC/EN 61000-3-12) Power factor (at rated load) Prue P.F. ≥0.98 Efficiency (at rated load) 95% 96% 97% 98% Applicable (safety) standards UL508C, C22.2 No. 14, IEC/EN 61800-5-1:2007, SEMI F47-0706 Enclosure IEC/EN 60529 IP21/ IP55 UL 50 UL TYPE I/ UL TYPE 12 (under application) Cooling method Fan cooling Weight/Mass [kg] IP21 10 10 10 10 10 18 18 1 | | | | Single-phase 380 to 440 V, 50 H Single-phase 380 to 480 V, 60 H | | | | | | | | | | to 440 V. 50 Hz to 480 V. 60 Hz | | | |
| Torque [%] *** 20 | | | | Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5 Frequency: +5 to -5% | | | | | | | | | | | | | |
| EMC filter (IEC/EN 61800-3:2004) *9 | ak- | Torque [%] *7 | | 1010480 | 20 10% (111201) | | 20 |) | . 2/0 | 01 100 | , , , | roquom | .,. <u>.</u> | | | 10 to 15 | |
| DC reactor (DCR) 0 0 0 0 0 0 0 0 0 | я | DC injection | braking | Starting freq | uency:0.0 to 60 |). OHz, E | raking | time:0 | 0 to 3 | 0. 0s, E | raking | level: |) to 60 | 1% | | | |
| DC reactor (DCR) 0 0 0 0 0 0 0 0 0 | FMC | filter (IEC/FI | V 61800-3:2004) *9 | EMC standards | compliance : 0 | Category | C2 (er | mission) |) / 2nd | Env. (| Immunit | y) | | | | | |
| Power factor (at rated load) Displacement P.F. (cos φ) >0.98 | | | | | | | | | | | | | | | | | |
| Efficiency (at rated load) 95% 96% 97% 98% | | r factor | Displacement P.F. (cosφ) | >0.98 | | | | | | | | | | | | | |
| Applicable (safety) standards UL508C, C22.2 No. 14, IEC/EN 61800-5-1:2007, SEMI F47-0706 Enclosure IEC/EN 60529 IP21/ IP55 UL 50 UL TYPE 1/ UL TYPE 12 (under application) Cooling method Fan cooling Weight/Mass [kg] IP21 10 10 10 10 10 10 18 18 18 23 23 50 50 | (at | rated load) | True P.F. | ≧0.90 | | | | | | | | | | | | | |
| Enclosure | Effi | ciency (at ra | ted load) | 95% | 96% | | | 9 | 7% | | | | | | | 98% | |
| UL 50 | App I | icable (safety | y) standards | UL508C, C22.2 | No. 14, IEC/EN | 61800-5 | -1:200 | 7, SEMI | F47-07 | 06 | | | | | | | |
| Cooling method Fan cooling Weight/Mass [kg] IP21 10 10 10 10 10 18 18 18 23 23 50 50 | Encl | osure | IEC/EN 60529 | IP21/ IP55 | · · · · · · · · · · · · · · · · · · · | | | | | | | | | | | | |
| Weight/Mass [kg] IP21 | | | UL 50 | UL TYPE 1/ UL TYPE 12(under application) | | | | | | | | | | | | | |
| Weight/Mass [kg] IP21 | Cool | ing method | | Fan cooling | | | | | | | | | | | | | |
| TDEE 10 10 10 10 10 10 10 10 10 10 10 TO 50 | | | IP21 | 10 | 10 | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 18 | 23 | 23 | 50 | 50 |
| ן ווין ווין ווין ווין ווין ווין ווין וו | | | IP55 | 10 | 10 | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 18 | 23 | 23 | 50 | 50 |

(100 to 1000 HP)

| |) LO 1000 H | Items | Specifications | | | | | | | | | | | | |
|--------------|-----------------------------|--------------------------------------|---|-------------------------|----------|---------|-----------|---------|----------|---------------------|---------|---------|---------|--------|------|
| ø | FRN AR1 | ■-4U : HVAC | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 450 | 500 | 600 | 800 | 900 | 1000 |
| Type *8 | | | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 | *10 |
| moto | r (Rated | Three phase AC460V motor input | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 450 | 500 | 600 | 800 | 900 | 1000 |
| outp | ut) [HP] *1 | Single phase input | 40 | 50 | 60 | 75 | 75 | 100 | 125 | 150 | 200 | 200 | 300 | 350 | 450 |
| | Three phase | Rated capacity [kVA] *2 | 119 | 140 | 167 | 201 | 242 | 300 | 330 | 414 | 517 | 589 | 764 | 932 | 1091 |
| ratings | | Rated current [A] | 150 | 176 | 210 | 253 | 304 | 377 | 415 | 520 | 650 | 740 | 960 | 1170 | 1370 |
| === | Single phase | Rated capacity [kVA] *2 | 46 | 54 | 65 | 78 | 94 | 117 | 128 | 160 | 201 | 229 | 297 | 363 | 425 |
| 7 | | Rated current [A] | 58. 5 | 68. 6 | 81.9 | 98. 6 | 118 | 147 | 161 | 202 | 253 | 288 | 374 | 456 | 534 |
| Output | Rated voltage | e [V] *3 | Three-phase, | 380 to 480 V (w | ith AV | funct | on) | • | | • | | | • | | |
| Lt, | Overload cap | | 110% - 1 min (Overload capability interval : IEC 61800-2 compliant) | | | | | | | | | | | | |
| O | Rated freque | ncy [Hz] | 50, 60Hz | 50, 60Hz | | | | | | | | | | | |
| | Three phase | Main power supply : | | 380 to 440 V, 5 | | | | | | | | | | | |
| | input | Phases, voltage, frequency | Three-phase, | 380 to 480 V, 6 | 60 Hz | | | | | | | | | | |
| | | Rated current [A] *6 | 119 | 141 | 201 | 238 | 286 | 357 | 390 | 500 | 628 | 705 | 881 | 1115 | 1256 |
| | | Required power supply capacity [kVA] | 95 | 113 | 161 | 190 | 228 | 285 | 311 | 399 | 501 | 562 | 702 | 889 | 1001 |
| gs | | Main power supply : | | 380 to 440 V, | | | | | | | | | | | |
| ratings | input | Phases, voltage, frequency | Single-phase, | 380 to 480 V, | 60 Hz | | | | | | | | | | |
| r | | Rated current [A] *6 | 119 | 141 | 201 | 238 | 286 | 357 | 390 | 500 | 628 | 705 | 881 | 1115 | 1256 |
| Input | | Required power supply capacity [kVA] | 55 | 65 | 93 | 110 | 132 | 165 | 180 | 230 | 289 | 325 | 406 | 513 | 578 |
| Ę | | ntrol power suuply : | Single-phase | 380 to 480 V, 5 | 60/60 Hz | : | - | | | - | | - | - | | |
| | | age, frequency | | | | | | | | | | | | | |
| | Auxiliary ma | in power supply : | | 380 to 440 V, 5 | | | | | | | | | | | |
| | | age, frequency *4 | Single-phase 380 to 480 V, 60 Hz | | | | | | | | | | | | |
| | | quency variations | | to -15% (Interp | hase vo | ltage i | unba l an | ce : 2% | or les | s) * ⁵ , | Frequen | cy: +5 | to -5% | | |
| Brak- ing | Torque [%] *7 | | 10 to 15 | | | | | | | | | | | | |
| ā | DC injection | braking | Starting freq | uency:0.0 to 60 | | | | | | | | | | | |
| | | N 61800-3:2004) *9 | C2/ 2nd. | | | | | | | | (emissi | on) / 2 | nd Env. | (Immun | ity) |
| DC r | eactor (DCR) * | 9 | Built-in (IEC IEC/EN 61000- | /EN 61000-3-2, 3-12) | Stand | ard acc | essory | (IEC/EN | l 61000- | -3-12) | | | | | |
| Powe | r factor | Displacement P.F. (cosφ) | >0.98 | | | | | | | | | | | | |
| (at | rated load) | True P.F. | ≧0.90 | | | | | | | | | | | | |
| Effi | ciency (at ra | ted load) | 98% | | | | | | | | | | | | |
| App I | icable (safet | | UL508C, C22.2 | No. 14, IEC/EN | 61800-5 | 5-1:200 | 7, SEMI | F47-07 | 06 | | | | | | |
| Enc I | osure IEC/EN 60529 | | IP21/ IP55 IP00 | | | | | | | | | | | | |
| | | UL 50 | UL TYPE 1/ UL TYPE 1 | 2 (under application) | UL op | en type | | | | | | | | | |
| | oling method | | Fan cooling | | | | | | | | | | | | |
| Weig | ight/Mass [kg] IP21 IP55 | IP21 | 70 | 70 | - | | | | | | | | | | |
| | | | 70 | 70 | | | | | | | | | | | |
| | | IP00 | - | | 62 | 64 | 94 | 98 | 129 | 140 | 245 | 245 | 330 | 530 | 530 |

- *1) US 4-pole standard induction motor. *2) Rated capacity is calculated by assuming the output rated voltage as 460 V.
- **2) Nated capacity is calculated by assuming the output rated voltage as 400 V.
 **3) Output voltage cannot exceed the power supply voltage. At single-phase input use, the output voltage may be lower than three-phase input.
 **4) The auxiliary power input is used as an AC power input when combining the unit to DC power supply such as high power factor PWM converter with power regenerative function. (Generally not to be used.)
 **5) Voltage unbalance [%] = (Max. voltage [V] Min. voltage [V])/Three-phase average voltage [V] x 67 (See IEC61800-3.)
- If this value is 2 to 3%, use an optional AC reactor (ACR).

 *6) The value is calculated on assumption that the inverter is connected with a power supply 460V, 50Hz and Rsce=120.

 *7) Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)

- *8) The uderline (__) replaces an numeric letter depending on the drive capacity.
 The box (■) replaces an alphabetic letter depending on the enclosure. M (1P21), L (1P55) or S (1P00)
 *9) EMC filters and DCR does not conform to each corresponding standards when single phase input use.
- *10) COMMING SOON : The capacity from 60HP to 1000HP of 460V series.

1-3. Three-phase 575 V series

| (1 - | to 30 HP) | | | | | | | | | | | |
|--------------|-------------------------|---|---|--------------|-------------|------------|-------------|-------------|--------------|-------------|------------|------------|
| | | Items | Specifications | | | | | | | | | |
| Type *8 | FRNAR1 | ■-5U : HVAC | 001 *10 | 002 *10 | 003 *10 | 005 *10 | 007 *10 | 010 *10 | 015 *10 | 020 *10 | 025 *10 | 030 *10 |
| | nal applied r (Rated | Three phase AC460V motor input | 1 | 2 | 3 | 5 | 7. 5 | 10 | 15 | 20 | 25 | 30 |
| outp | ut) [HP] *1 | Single phase input | = | 1/2 | 3/4 | 1. 5 | 2 | 3 | 5 | 5 | 7. 5 | 10 |
| | Three phase | Rated capacity [kVA] *2 | 1.6 | 2. 7 | 3.8 | 6. 1 | 9. 2 | 11 | 16 | 21 | 26 | 31 |
| ratings | | Rated current [A] | 1. 7 | 2. 8 | 3. 9 | 6. 2 | 9.3 | 12 | 17 | 22 | 27 | 32 |
| Ξ | Single phase | Rated capacity [kVA] *2 | - | 0. 9 | 1.4 | 2. 3 | 3. 5 | 4. 5 | 6. 5 | 8. 4 | 10 | 12 |
| 20 | input | Rated current [A] | - | 1.0 | 1.5 | 2. 4 | 3.6 | 4. 6 | 6. 6 | 8. 5 | 10. 5 | 12. 4 |
| Output | Rated voltage | e [V] *3 | Three-phas | se, 575 to 6 | 00 V (with | AVR funct | ion) | • | • | • | • | • |
| ΕŢ | Overload cap | ability | 110% - 1 r | min (Overloa | ad capabili | ty interva | I : IEC 618 | 300-2 compl | iant) | | | |
| | Rated freque | ncy [Hz] | 50, 60Hz | | | | | | | | | |
| | | Main power supply : Phases, voltage, frequency | Three-phas | se, 575 to 6 | 500 V, 50/6 | 0 Hz | | | | | | |
| | | Rated current [A] *6 | 1. 2 | 2. 1 | 3. 0 | 5. 2 | 7. 2 | 9. 7 | 14. 4 | 19. 5 | 24. 0 | 28. 6 |
| | | Required power supply capacity [kVA] | 1. 2 | 2. 1 | 3. 0 | 5. 2 | 7. 2 | 10 | 15 | 20 | 24 | 29 |
| S | | Main power supply : | Single-pha | ase, 575 to | 600 V, 50/ | 60 Hz | | | | | | |
| nput ratings | input | Phases, voltage, frequency | | | | | | | | | | |
| rat | | Rated current [A] *6 | - | 2. 1 | 3. 0 | 5. 2 | 7. 2 | 9. 7 | 14. 4 | 19. 5 | 24. 0 | 28. 6 |
| Ħ | | Required power supply capacity [kVA] | - | 1.3 | 1.8 | 3. 0 | 4. 2 | 5. 6 | 8. 3 | 12 | 14 | 17 |
| ם | Auxiliary co | ntrol power supply : | Single-pha | ase 575 to 6 | 00 V, 50/6 | 0 Hz | | • | | • | | |
| | Phases, volta | age, frequency | | | | | | | | | | |
| | Auxiliary ma | in power supply : | - | | | | | | | | | |
| | Phases, volta | age, frequency *4 | | | | | | | | | | |
| | Voltage, fre | quency variations | Voltage: +10 to -15% (Interphase voltage unbalance : 2% or less) *5, Frequency: +5 to -5% | | | | | | | | | |
| ak- ng | Torque [%] *7 | | 20 | | | | | | | | | |
| Б | DC injection | braking | Starting | frequency:0. | 0 to 60.0H | z, Braking | time:0.0 t | to 30.0s, E | Braking leve | el:0 to 60% | | |
| EMC | filter (IEC/E | N 61800-3:2004) *9 | EMC standa | ards complia | nce : Cate | gory C3 (e | mission) / | 2nd Env. (| (Immunity) | | | |
| | eactor (DCR) * | | Built-in | (IEC/EN 6100 | 00-3-2, IEC | /EN 61000- | 3-12) | | | | | |
| | | Displacement P.F. $(\cos \phi)$ | >0.98 | | | | | | | | | |
| (at | rated load) | True P.F. | ≧0.90 | | | | | | | | | |
| Effi | ciency (at ra | ted load) | 95% | 96% | | | 9 | 7% | | | 9 | 8% |
| Appl | icable (safet | y) standards(under application) | UL508C, C22.2 No.14, IEC/EN 61800-5-1:2007, SEMI F47-0706 | | | | | | | | | |
| Encl | osure | IEC/EN 60529 | IP21/ IP5 | 5 | | | | | | | | |
| | | UL 50(under application) | UL TYPE 1/ UL TYPE 12 | | | | | | | | | |
| Cool | ing method | | Fan cooling | | | | | | | | | |
| Weig | | IP21 | 10 | 10 | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 18 |
| 1 | | IP55 | 10 | 10 | 10 | 10 | 10 | 10 | 18 | 18 | 18 | 18 |

(40 to 300 HP)

| Ť | • | Items | Specifications | | | | | | | | | | | |
|--------------|--|---|---|---|-------------|------------|-------------|------------|---------------------------|-------------|-------------|------------|--|--|
| Type | FRNAR1 | ■-5U : HVAC | 040 *10 | 050 *10 | 060 *10 | 075 *10 | 100 *10 | 125 *10 | 150 *10 | 200 *10 | 250 *10 | 300 *10 | | |
| moto | Nominal applied motor (Rated output) [HP] *1 Three phase input AC460V motor 40 50 60 75 100 125 150 200 single phase 10 15 20 25 30 40 50 75 | | | | | | | | | 250 | 300 | | | |
| outp | ut) [HP] *I | Single phase input | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 100 | | |
| | Three phase | Rated capacity [kVA] *2 | 40 | 51 | 62 | 76 | 103 | 124 | 145 | 210 | 260 | 287 | | |
| ratings | input | Rated current [A] | 41 | 52 | 63 | 77 | 104 | 125 | 146 | 211 | 262 | 289 | | |
| Ξ | Single phase | Rated capacity [kVA] *2 | 15 | 20 | 24 | 29 | 40 | 48 | 56 | 81 | 101 | 111 | | |
| 70 | input | Rated current [A] | 15. 9 | 20. 2 | 24. 5 | 30.0 | 40. 5 | 48. 7 | 56. 9 | 82. 2 | 102 | 112 | | |
| Output | Rated voltag | e [V] *3 | Three-pha | Three-phase, 575 to 600 V (with AVR function) | | | | | | | | | | |
| I, | Overload cap | ability | 110% - 1 min (Overload capability interval : IEC 61800-2 compliant) | | | | | | | | | | | |
| 0 | Rated freque | ncy [Hz] | 50, 60Hz | | | | | | | | | | | |
| | Three phase input | Main power supply : Phases, voltage, frequency | Three-pha | se, 575 to 6 | 600 V, 50/6 | 0 Hz | | | | | | | | |
| | | Rated current [A] *6 | 38. 8 | 48. 3 | 57. 9 | 71.0 | 94. 7 | 113 | 140 | 199 | 249 | 272 | | |
| | | Required power supply capacity [kVA] | 39 | 49 | 58 | 71 | 95 | 113 | 140 | 199 | 248 | 271 | | |
| ratings | | Main power supply : Phases, voltage, frequency | Single-ph | ase, 575 to | 600 V, 50/ | 60 Hz | | • | | | | | | |
| r a | | Rated current [A] *6 | 38. 8 | 48. 3 | 57. 9 | 71.0 | 94. 7 | 113 | 140 | 199 | 249 | 272 | | |
| Input | | Required power supply capacity [kVA] | 23 | 28 | 34 | 41 | 55 | 65 | 81 | 115 | 144 | 157 | | |
| Ę | Auxiliary co | ntrol power supply : | Single-ph: | ase 575 to 6 | 600 V, 50/6 | 0 Hz | | | | | | - | | |
| | Phases, volt | age, frequency | | | | | | | | | | | | |
| | Auxiliary ma | in power supply : | - | | Single-ph | ase, 575 t | o 600 V, 50 |)/60 Hz | | | | | | |
| | | age, frequency *4 | | | | | | | | | | | | |
| | Voltage, fre | quency variations | Voltage: | +10 to -15% | (Interphas | e voltage | unbalance : | 2% or les | s) * ⁵ , Frequ | uency: +5 t | o -5% | | | |
| Brak- ing | Torque [%] *7 | | 10 to 15 | | | | | | | | | | | |
| В. | DC injection | braking | Starting | frequency:0. | 0 to 60.0H | z, Braking | time:0.0 t | o 30.0s, E | Braking leve | el:0 to 60% | | | | |
| EMC | filter (IEC/E | N 61800-3:2004) *9 | EMC stand | ards complia | ance : Cate | gory C3 (e | mission) / | 2nd Env. (| (Immunity) | | | | | |
| | eactor (DCR) * | | Built-in | (IEC/EN 6100 | 00-3-2, IEC | /EN 61000- | 3-12) | | Standard | accessory | (IEC/EN 610 | 000-3-12) | | |
| | r factor | Displacement P.F. $(\cos \phi)$ | >0.98 | | | | | | • | | | | | |
| (at | rated load) | True P.F. | ≧0.90 | | | | | | | | | | | |
| Effi | ciency (at ra | ted load) | 98% | | | | | | | | | | | |
| Appl | icable (safet | y) standards(under application) | UL508C, C | 22. 2 No. 14, | IEC/EN 618 | 00-5-1:200 | 7, SEMI F47 | '-0706 | | | | | | |
| Encl | osure | IEC/EN 60529 | IP21/ IP5 | 5 | | | | | IP00 | | | | | |
| | | UL 50(under application) | UL TYPE 1. | / UL TYPE 12 | 2 | | | | UL open t | уре | | | | |
| Cool | poling method | | | Fan cooling | | | | | | | | | | |
| | | IP21 | 23 | 23 | 50 | 50 | 70 | 70 | - | | | | | |
| | | IP55 | 23 | 23 | 50 | 50 | 70 | 70 | † | | | | | |
| | | IP00 | _ | • | • | | | | 62 | 94 | 98 | 129 | | |
| | | <u> </u> | | | | | | | | | | | | |

- *1) US 4-pole standard induction motor.
- *2) Rated capacity is calculated by assuming the output rated voltage as 575 V.
- *3) Output voltage cannot exceed the power supply voltage. At single-phase input use, the output voltage may be lower than three-phase input.
- *4) The auxiliary power input is used as an AC power input when combining the unit to DC power supply such as high power factor PWM converter with power regenerative function. (Generally not to be used.)
 *5) Voltage unbalance [%] = (Max. voltage [V] Min. voltage [V])/Three-phase average voltage [V] x 67 (See IEC61800-3.)
- If this value is 2 to 3%, use an optional AC reactor (ACR).
- *6) The value is calculated on assumption that the inverter is connected with a power supply 575V, 50Hz and Rsce=120.
 *7) Average braking torque for the motor running alone. (It varies with the efficiency of the motor.)
- *8) The underline (___) replaces an numeric letter depending on the drive capacity.
- The box (\blacksquare) replaces an alphabetic letter depending on the enclosure. M (IP21), L (IP55) or S (IP00)
- *9) EMC filters and DCR does not conform to each corresponding standards when single phase input use.
 *10) COMMING SOON: The capacity from 1HP to 300HP of 575V series.

2. Common specifications

| <u> </u> | COMI | non specificatio | | Dama ulc- |
|----------|---------------|---------------------------------|--|----------------------------------|
| | | Items Maximum frequency | Specifications 1 • 25 to 120 Hz | Remarks |
| | | Base frequency | • 25 to 120 Hz | |
| | | Starting frequency | • 0.1 to 60.0 Hz variable setting | |
| | | Carrier frequency | 230V series: | |
| | | | • 0.75 to 16 kHz variable setting (1 HP to 25 HP) | |
| | | | • 0.75 to 10 kHz variable setting (30 HP to 100 HP) *4 | |
| | | | • 0.75 to 6 kHz variable setting (125 HP) *4 | |
| | | | | |
| | nge | | 460V series: | |
| | Setting range | | • 0.75 to 16 kHz variable setting (1 HP to 50 HP) | |
| | ing | | \cdot 0.75 to 10 kHz variable setting (60 HP to 125 HP) *4 | |
| ± | ett | | • 0.75 to 6 kHz variable setting (150 HP to 900 HP) *4 | |
| Output | Š | | • 0.75 to 4 kHz variable setting (1000 HP) *4 | |
| ō | | | 575V series: | |
| | | | • 0.75 to 16 kHz variable setting (1 HP to 50 HP) *4 | |
| | | | • 0.75 to 10 kHz variable setting (60 HP to 125 HP) *4 | |
| | | | \cdot 0.75 to 6 kHz variable setting (150 HP to 300 HP) *4 | |
| | | | NOTE: Frequency drops automatically to protect the inverter depending on | |
| | | | environmental temperature and output current. | |
| | 0 | | (This auto drop function can be canceled.) | |
| | | ut frequency racy(Stability) | • Analog setting : $\pm 0.2\%$ of max. frequency (at 25 \pm 10 °C) • Digital setting : $\pm 0.01\%$ of max. frequency (at -10 to +50 °C) | |
| | | ing resolution | • Analog setting : ±0.01% of max. Frequency (at =10 to +30 C) • Analog setting : 1/3000 of max. frequency (1/1500 with [V2] input) | |
| 1 | | 1 000 14 11 1011 | Digital setting: 0.01 Hz (99.99 Hz or less), 0.1Hz (100.0 to 120 Hz) | |
| | | | Link setting : 1/20000 of max. frequency or 0.01 Hz (fixed) | |
| | Cont | rol method | · V/f control | |
| | | | • Dynamic torque vector control | |
| | | | •V/f control, the slip compensation is available. | |
| | | age/frequency | 230V Base frequency and max. output frequency can be set to 80 to 240 V in common. | |
| | cnara | acteristic | series • The AVR control ON/OFF can be selected. | |
| | | | • Non-linear V/f setting (2 points) : Free voltage (0 to 240 V) and frequency (0 to 120 Hz) can be set. | |
| | | | 460V • Base frequency and max. output frequency can be set to 160 to 500 V in common. | |
| | | | series • The AVR control ON/OFF can be selected. | |
| | | | • Non-linear V/f setting (2 points) : Free voltage (0 to 500 V) and | |
| | | | frequency (0 to 120 Hz) can be set. | |
| | | | 575V Base frequency and max. output frequency can be set to 200 to 600 V in common. | |
| | | | series The AVR control ON/OFF can be selected. | |
| | | | • Non-linear V/f setting (2 points): Free voltage (0 to 600 V) and | |
| | T | | frequency (0 to 120 Hz) can be set. | |
| | lorq | ue boost | • Auto torque boost • Manual torque boost: Desired torque boost (0.0 to 20.0%) can be set. | |
| | | | Select application load with function code. | |
| | | | (Constant torque load or variable torque load) | |
| | Star | ting torque | • 100% or higher/set frequency : 1.0 Hz | |
| | | | Base frequency 50 Hz, Slip compensation and auto torque boost operation | |
| | Star | t/stop operation | •Keypad : Start and stop with FWD, REV and STOP keys. | |
| | | | •External signals (digital inputs) : Forward (Reverse) rotation, stop command | |
| _ | | | (capable of 3-wire operation), coast-to-stop command, | |
| Control | | | external alarm, alarm reset, etc. | |
| Cor | | | Link operation : Operation through RS-485 or field bus (option) communications. | |
| | | | • Switching operation command : Remote/Local switching, link switching. | |
| 1 | Frea | uency setting | • Keypad : Can be set with "UP" and "DOWN" keys. | |
| 1 | | | • External Volume : Can be Set with external potentiometer (1 to $5k\Omega$ 1/2W). | "+1 to +5 VDC" |
| | | | • Analog input : 0 to ± 10 VDC (± 5 VDC)/0 to $\pm 100\%$ (Terminals [12] and [V2]) | can be adjusted |
| | | | 0 to +10 VDC (+5 VDC)/0 to +100% (Terminals [12] and [V2]) | with bias and analog input gain. |
| | | | +4 to +20 mADC/0 to 100% (Terminal [C1]) | analog input gain. |
| | | | 0 to +20 mADC/0 to 100% (Terminal [C1]) | |
| | | | • UP/DOWN operation : Frequency can be increased or decreased | |
| | | | while the digital input signal is ON. | |
| | | | Multi-frequency Selectable from 16 steps (step 0 to 15). Link operation Frequency can be set via RS-485 (Standard accessory). | |
| | | | • Switching frequency setting : Frequency setting can be switched (2 settings) | |
| | | | by external signal (digital input). | |
| 1 | | | Remote/local switching, link switching. | |
| | | | • Auxiliary frequency setting : Terminal [12], [C1] or [V2] input can be selected | |
| 1 | | | respectively as an additional input. | |
| 1 | | | • Inverse operation : The setting "O to +10 VDC/O to 100%" can be switched to | |
| 1 | | | "+10 to 0 VDC/0 to 100%" by external command. | |
| | | | The setting "+4 to +20 mADC/0 to 100%" can be switched to | |
| 1 | | | "+20 to +4 mADC/0 to 100%" by external command. The setting "0 to +20 mADC/0 to 100%" can be switched to | |
| 1 | | | The setting "O to +20 mADC/O to 100%" can be switched to "+20 to 0 mADC/O to 100%" by external command. | |
| 1 | | | Programmed PATTERN operation: Maximum 7 stages can be set. | |
| Щ_ | <u> </u> | | 1100 Grammod 1711 Edit Operation - maximum / stages out to set. | l . |

2. Common specifications

| Common specification Items | Specifications | Remarks |
|--|---|---------|
| Acceleration/ deceleration time | • Setting range : 0.00 to 3600 s | |
| decereration time | • Switch : The four types of accel./decel. time can be set or selected individually. | |
| | (switchable during operation) • Acceleration/deceleration pattern : Linear accel./decel., S-shape accel./decel. (weak, strong), | |
| | curvilinear accel./decel. | |
| | (accel./decel. max. capacity of constant output) | |
| | • Deceleration mode (coast-to-stop) : Coast-to-stop at the operation command OFF. | |
| F 1: 1 | • Forcible stop decel. time : Deceleration stop by the forcible stop (STOP). | |
| Frequency limiter (Upper limit and lower | •Both upper and lower limit frequencies can be variably set in hertz. □ •It is possible to choose the operation done from continuous operation at | |
| limit frequencies) | lower limit frequency or operation stop when the set frequency drops below the lower limit. | |
| Bias frequency | • Bias of set reference frequency and PID command can be independently set. | |
| | (setting range : 0 to ±100%) | |
| Analog input | •Gain : Setting in the range from 0 to 200%. | |
| | • Off-set: Setting in the range from -5.0 to +5.0%. | |
| Jump frequency | • Filter : Setting in the range from 0.00s to 5.00s. • Actuation points (3 points) and their common jump widths (0 to 30 Hz) can be set. | |
| Julip Trequency | • Resonance points can be detected automatically and be set the jump frequency automatically. | |
| Auto-restart after | • Trip at power failure : The inverter trips immediately after power failure. | |
| momentary power failure | •Trip at power recovery : Coast-to-stop at power failure and trip at power recovery. | |
| | • Continuous operation : Operation is continued using the load inertia energy. | |
| | • Start at the frequency selected before momentary stop: Coast-to-stop at power failure | |
| | and start after power recovery at the frequency selected before momentary stop. | |
| | • Start at starting frequency : Coast-to-stop at power failure and start at the starting frequency after power recovery. | |
| Current limit | Limiting the current by hardware to prevent overcurrent trip due to sharp load change | |
| by hardware | or momentary power failure which cannot be controlled by software current limit. | |
| | (This function can be cancelled.) | |
| Operation by | • With commercial power switching command, the inverter outputs 50Hz/60 Hz (SW50, SW60). | |
| commercial power supply | • The inverter has the commercial power supply switching sequence. | |
| Slip compensation Torque limiter | Compensates for decrease in speed according to the load. Switchable between 1st or 2nd torque limit values. | |
| Current control | • Automatically reduces the frequency so that the output current becomes lower than | |
| (software current limit) | the preset operation level. | |
| PID control | • PID adjuster for process control | |
| | • Switchable between forward and reverse operations | |
| | ·Slow flowrate function (pressurized operation available before slow flowrate) | |
| | Automatic update for slow flowrate frequency PID command | |
| | PID command : Keypad panel, analog input (from terminals [12],[C1],[V2]), RS-485 communications | |
| | • PID feedback value : Analog input (from terminals [12], [C1], [V2]) | |
| | ·Alarm output (absolute value alarm, deviation alarm) | |
| | • PV level detection | |
| | • Scaling for PV value | |
| | • PV value conversion/calculation of analog input | |
| | • PID output limiter | |
| | • Integration reset/hold • Antireset windup | |
| | • PID auto tuning | |
| Auto search for idling | • Estimates the speed of the motor running under no load and starts the motor without stopping it. | |
| motor speed | (Motor electric constant needs tuning : Offline tuning) | |
| Automatic deceleration | • If the DC link voltage or calculated torque exceeds the automatic deceleration level | |
| | during deceleration, the inverter automatically prolongs the deceleration time | |
| | to avoid overvoltage trip. (It is possible to select forcible deceleration actuated with | |
| | more than three times longer deceleration.) | |
| | • If the calculated torque exceeds automatic deceleration level during constant speed operation, | |
| | the inverter avoids overvoltage trip by increasing the frequency. | |
| | • Automatic deceleration level can be set. | |
| Deceleration characteristic | • The motor loss is increased during deceleration to reduce the regenerative energy | |
| (improving braking | in the inverter to avoid overvoltage trip. | |
| ability) | | |
| Automatic energy | •The output voltage is controlled to minimize the total sum of the motor loss and | |
| saving operation | inverter loss at a constant speed. | |
| Overload prevention | · If the ambient temperature or IGBT joint temperature increases due to overload, | |
| control | the inverter lowers the output frequency to avoid overload. | |
| Voltage Shortage Avoidance Operation | •The continuous operation is available reducing output frequency during low voltage. | |
| Input Phase Loss | • Selectable from trip or continuous low power operation. | |
| Protection Avoidance | Constitution trip of contentace for porter operation. | |
| Operation | | |
| Off-line tuning | •Rotary type and non-rotary type are available for tuning the motor constant. | |
| Cooling fan | • Detects inverter internal temperature of the inverter and stops the cooling fan when the temperature is low. | |
| ON/OFF control | | |

2. Common specifications

| | Items | Specifications | Remarks |
|---------|----------------------------------|---|----------------------------------|
| | Universal DI | • The status of external digital signal connected with the universal digital input terminal | |
| | Universal DO | is transferred to the host controller. Digital command signal from the host controller is output to the | |
| | om versar bo | universal digital output terminal. | |
| | Universal AO | • The analog command signal from the host controller is output to the analog output terminal. | |
| | Rotation direction | • Preventing reverse rotation | |
| | control | • Preventing forward rotation | |
| | Preventing condensation in motor | When the inverter is stopped, current is automatically supplied to the motor to keep the motor warm and avoid condensation. | |
| | Customized logic | • Available in 14 steps with the functions of 2-input, 1-output, logical calculation, | |
| | interface | and timer function. | |
| | Pump control | • Cascade control (FIXED:1+8 pcs, FLOATING:4 pcs (with option)) | |
| | | Periodic motor switching | |
| | | • Promptly connection/disconnection for auxiliary motor | |
| | | - Control of maximum starts per hour - Dry pump detection | |
| | | • End of curve detection | |
| | | • Filter clogging prevention | |
| | | • Anti jam | |
| - | | · Check valve protection | |
| Control | | - Boost function - Wet-bulb temperature presumption control | |
| Col | Fire mode | • Continues operation without alarm by retry. | |
| | Pattern operation | • Pattern operation is available by inverter itself. | |
| | Real time clock (RTC) | ·Date, hour and alarm information with date and hour can be displayed, and timer operation | Time can be |
| | | can be used with RTC. | maintained with battery (option) |
| | | • Daylight saving time auxiliary function. | bactery (option) |
| | Timer operation | • Set 4-timers for one week. | |
| | Password function | • Prevent improperly operation and/or data undisplayed available. (two level setting.) | |
| | Mutual operation | • Connectable between inverters with RTU communications. (maximum 3 pcs.) | |
| | External PID control | • PID processor for process control / On / Off controller (3 channels) | |
| | | Normal operation / inverse operation | |
| | | PID command: Keypad, analog input (terminals [12], [C1] and [V2]), RS-485 PID feedback value (terminals [12], [C1] and [V2]) | |
| | | • Alarm output (absolute value alarm, deviation alarm) | |
| | | • PID feedback error detection | |
| | | • Sensor input amount scaling | |
| | | • Sensor input amount conversion / calculation | |
| | | PID output limiter | |
| | | • Integration reset / hold • Anti-reset wind-up function | |
| | Run/stop | Speed monitor (set frequency, output frequency, motor speed, load shaft speed, line speed, | |
| | | and speed indication with percent), | |
| | | Output current [A], output voltage [V], calculated torque [%], input power [kW], | |
| | | PID reference value, PID feedback value, PID output, load [%], motor output [kW], | |
| | | analog input monitor, integral power consumption [kWh], integral power consumption [MWh], | |
| | It | effective current value for each phase [A] | |
| | Inverter life warning | Life judgment of the main circuit capacitor, electrolytic capacitor on printed circuit board, and cooling fan. | |
| | | Life warning information can be output to an external device. | |
| | | • Ambient temperature : IP21 40°C, IP55 30°C, Load rate : inverter rated current 100% | |
| | Cumulative running | • Displays the inverter cumulative running hours, integrated power, | |
| | hours | cumulative motor running hours, and the number of operation start times. | |
| | | •Outputs the warning when the maintenance time or the number of start times has | |
| lay | | exceeded the preset value. | |
| Display | | Displays the cumulative energy for unit of months, weeks, days and hours | |
| | Light-alarm | and running hours (with RTC). • WARN. LED is lit and light-alarm factor is displayed. | |
| | Trip mode | Displays the cause of trip. | |
| | Running or trip mode | • Trip history : Saves and displays the cause of the last ten trips (with a code). | + |
| | • | • Detail data recorded : Saves and displays the detail data recorded on occurrence of | |
| | | the last four trips. | |
| | | • Saves and displays the date, hour and minute with RTC. | |
| | LED display | • LED for light-alarm or alarm occurrence. | |
| | Guidance function | Needed information can be displayed by pushing "HELP" key. | 1 |
| | Multi language | - Corresponded to Japanese, English, German, French, Spanish, Italian, Chinese, Russian, Greek, Turkish, Polish, Gzech, Swedish, Portuguese, Dutch, Malay, Vietnamese, Thai and Indonesian. | |
| | | (Sequential correspond to User Customized Language.) | |
| | Battery level display | Battery level can be displayed when the battery (option) is connected. | + |
| | LCD back-light | • Set lighting time for LCD back-light during key operation only or unlit. | _ |

| Overcurrent protection | • The inverter is stopped for protection against overcurrent. | OC1 |
|---|---|---|
| Short-circuit | The inverter is stopped for protection against overcurrent caused by | 002 |
| protection | a short circuit in the output circuit. | 0 C 3 |
| Ground fault | • The inverter is stopped for protection against overcurrent caused by | |
| protection | a grounding fault in the output circuit. | |
| Overvoltage | (230V series: 25 HP or less, 460V series: 50 HP or less, 575V series: 50 HP or less *4) | O U 1 |
| protection | • An excessive voltage (230V series: 400 VDC, 460V series: 800 VDC, 575V series: 1000 VDC *4) in the DC link circuitis detected and the inverter is stopped. | 007 |
| | If an excessive voltage is applied unintended, the protection can not be guaranteed. | 003 |
| | The an executive vertage to apprive anniconade, the proceeding can not be guaranteed. | |
| Undervoltage | • The voltage drop (230V series: 200 VDC, 460V series: 400 VDC, 575V series: 600 VDC *4) | L U |
| protection | in the DC link circuit is detected to stop the inverter. | |
| | However, the alarm will not be issued when the re-starting after instantaneous stop is selected. | |
| Input phase loss | • The input phase loss is detected to protect or shut off the inverter. | Lin |
| Output phase loss | When the load to be connected is small, a phase loss would not be detected. Detects breaks in inverter output wiring at the start of running and | OPL |
| detection | during running and stop the inverter output. | |
| Overheat protection | • Stop the inverter output detecting excess cooling fin temperature | OH 1 |
| · | in case of a cooling fan fault or overload. | |
| | · Stop the inverter output detecting inner temperature of the inverter unit | O H 3 |
| | for a cooling fan fault or overload. | |
| | • Stop the inverter output detecting the cooling fan failure. | |
| Overland protection | • Stop the inverter output detecting the charging circuit fault. | 01.11 |
| Overload protection | Stop the inverter output detecting a switching element temperature calculated with cooling fin temperature and the output current. | OLU |
| External alarm input | With the digital input signal (THR), the inverter is stopped with an alarm. | OH 2 |
| Electronic thermal | • The inverter is stopped with an electronic thermal function set to protect the motor. | 0 L 1 |
| | Protects the general-purpose motor and inverter motor over all frequency range. | |
| ot: | (The level and thermal time constant (0.5 to 75.0 min) can be set.) | |
| PTC thermistor | • PTC thermistor input stops the inverter to protect the motor. | OH4 |
| | Connect a PTC thermistor between terminal [C1] and [11] and set the switch | |
| Overload early | on control print board and the function code. | |
| Overload early warning | Warning signal (OL) is output at the predetermined level before stopping the inverter with electronic thermal function. | _ |
| Memory error | • Data is checked upon power-on and data writing to detect any fault in the memory and | E r 1 |
| | stop the inverter if any. | - ' ' |
| Keypad panel | • The keypad panel detects a communication fault between the keypad panel and | E r 2 |
| communications error | the inverter main body during the run command from the keypad panel available and | |
| | to stop the inverter. | |
| CPU error | • Stop the inverter detecting a CPU error or LSI error caused by noise. | E r 3 |
| Option communications error | When each option is used, a fault of communication with the inverter main body is detected to stop the inverter. | E r 4 |
| Option error | • When each option is used, the option detects a fault to stop the inverter. | E r 5 |
| Operation error | 1 1 | |
| | • SIOP key priority: | E r 6 |
| | "STOP" key priority: Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor | |
| | | |
| | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. | |
| | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: | |
| | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: If the running command is being input when switching the running command method | |
| | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. | |
| Tuning error | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". | Er6 |
| Tuning error | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. | |
| RS-485 communications | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. • Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". • Stop the inverter output when tuning failure, interruption or any fault | Er6 |
| | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of | Er6 |
| RS-485 communications error (port1) | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. | Er7 Er8 |
| RS-485 communications error (port1) | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed | Er6 |
| RS-485 communications error (port1) Data save error upon undervoltage | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. | Er7 Er8 |
| RS-485 communications error (port1) | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between | Er7 Er8 |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. | Er7 Er8 |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of | Er7 Er8 |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. | Er7 Er8 ErF |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. | Er 7 Er 8 Er F Er P |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. Stop the inverter detecting a analog wire break detection (enable / disable selectable). | Erf ErF ErP ErH Err Cof |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection PID feedback | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. | Erf ErF ErP ErH Err Cof |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. Stop the inverter detecting a analog wire break detection (enable / disable selectable). | Erf ErF ErP ErH Err Cof |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection PID feedback | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. Stop the inverter detecting a analog wire break detection (enable / disable selectable). | Erf ErF ErP ErH Err Cof |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection PID feedback | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. Stop the inverter detecting a analog wire break detection (enable / disable selectable). | Erf ErF ErP ErH Err Cof |
| RS-485 communications error (port1) Data save error upon undervoltage RS-485 communications error (port2) Hardware error Simulation error Current input wire break detection PID feedback | Pressing the "STOP" key on the keypad will forcibly decelerate, stop the motor and display "Er6" even if the running command through signal input or communication is selected. Start check: If the running command is being input when switching the running command method from power-on, alarm reset or the linked operation, the operation starts suddenly. This function prohibits running and displays "Er6". Stop the inverter output when tuning failure, interruption or any fault as a result of tuning is detected during tuning for motor constant. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the keypad panel is used to configure the network. When the undervoltage protection occurred, an alarm is displayed if the data is not properly saved. Stop the inverter output detecting the communication error between the inverter main unit and a mate when the RS-485 connection port of the [DX+], [DX-] are used to configure the network. Stop the inverter detecting a LSI error on the power printed circuit board caused by noise. Simulated alarm is output by the keypad panel operation. Stop the inverter detecting a analog wire break detection (enable / disable selectable). | Erf ErF ErP ErH Err CoF PV1 PV2 PVA PVb |

2 Common specifications

| Items | Specifications | Remarks |
|------------------------------------|--|---------|
| Anti jam protection | Display the error detecting the starting failure due to overcurrent. | rLo |
| Filter clogging prevention | Display the error detecting the overload during PID control. | FoL |
| Enable circuit failure | Diagnos the enable circuit condition and stop the inverter output detecting the circuit failure. | ECF |
| detection | - Diagnos the enable circuit condition and stop the inverter output detecting the circuit failure. | |
| Ground fault protection | • Detects the zero-phase current in the output power, protects the inverter from overcurrent | E F |
| | caused by a ground fault in the output circuit, and stops the inverter. | |
| | For inverters of: | |
| | 230V series of 30HP or above, 460V series of 60HP or above and 575V series of 60HP or above. *4 | |
| Fuse blown | Detects a break of the main circuit fuse in the inverter and stops the inverter. | FUS |
| | For inverters of: | |
| Charger aircuit arror | 230V series of 125HP, 460V series of 150HP or above and 575V series of 150HP or above. ** Detects a charger circuit error and stops the inverter. | PbF |
| Charger circuit error | For inverters of: | |
| | 230V series of 30HP or above, 460V series of 60HP or above and 575V series of 60HP or above. *4 | |
| DC fan locked | Failure of the air circulation DC fan inside the inverter. | FAL |
| | For inverters of: | = |
| | 230V series of 75HP or above (IP00), 30HP or above (IP21) and 7.5HP or above (IP55) *4 | |
| | 460V series of 150HP or above (IP00), 60HP or above (IP21) and 15HP or above (IP55) *4 | |
| | 575V series of 150HP or above (IP00), 60HP or above (IP21) and 15HP or above (IP55) *4 | |
| Alarm relay output | •The inverter outputs a relay contact signal when the inverter issues an alarm and | |
| (for any fault) | stops the inverter output. | |
| | • The alarm stop state is reset by pressing the "RESET" key or by the digital input signal (RST). | |
| Light-alarm (warning) | Light- alarm is displayed when registered alarm or warning as light-alarm is occurred. | |
| | (continuous running) | |
| | Covered alarm : | |
| | External alarm (OH2), Inverter overheat (OH3), Motor overheat (OH4), | |
| | Motor overload (OL1), Keypad panel communication error (Er2), | |
| | Optional communication error (Er4), | |
| | Option error (Er5), RS-485 communication error (port 1) (Er8), | |
| | RS-485 communication error (port 2) (ErP), DC fan lock detected, | |
| | Overload early warning (for motor), Heatsink overheat early warning, | |
| | Life early warning (DC link bus capacitor, electrolytic capacitor on printed circuit board, | |
| | cooling fan), | |
| | Reference command loss detected, PID warning output, Low torque detected, | |
| | Thermistor detection (PTC), | |
| | Machine life (cumulative motor run time error), Machine life (number of startups error) | |
| | Current Input Wire Break Detection PID feedback error detection | |
| Stall prevention | Low battery warning Date&time information lost Mutual operation slave alarm | |
| Stail prevention | - Operates when the inverter output goes beyond the instantaneous overcurrent limiting level, and avoids tripping, during acceleration and constant speed operation. | |
| Retry function | • When the motor is tripped and stopped, this function automatically resets the tripping | |
| Noti y Tanocion | state and restarts operation. (Retry times, waiting time for reset, corresponding trip | |
| | for retry and retry available time can be set.) | |
| | It can be confirmed by communication the times of the restarting. | |
| Surge protection | • The inverter is protected against surge voltage intruding between | |
| | the main circuit power line and ground. | |
| Command loss detected | • A loss (breaking, etc.) of the frequency command is detected to output an alarm and | |
| | the operation is continued at the preset frequency (set at a ratio to the frequency | |
| | before detection). | |
| Momentary power failure protection | If restart upon momentary power failure is selected, the inverter restarts | |
| Atmosphere | upon recovery of the voltage within the set time. Free from dusts, direct sunlight, corrosive or flammable gases, oil mist, vapor or water drops. | |
| A CHILO SPITET & | (Pollution degree 2 (IEC60664-1)). Indoor use only. | |
| | The atmosphere can contain a small amount of salt. (0.01 mg/cm2 or less per year) | |
| | The inverter must not be subjected to sudden changes in temperature | |
| | that will cause condensation to form. | |
| Ambient temperature | IP21 ·-10 to +50°C (+50 to +60°C : correspond with deleting) | |
| | -10 to +40°C : installed side-by-side without clearance | |
| | (230V series: 25 HP or less, 460V series: 50 HP or less, 575V series: 50 HP or less *4) | |
| | IP55 | |
| | -10 to +30°C : installed side-by-side without clearance | |
| | (230V series: 25 HP or less, 460V series: 50 HP or less, 575V series: 50 HP or less *4) | |
| Ambiont bumiditu | IPO0 •-10 to +50°C | |
| Ambient humidity Altitude | - 5 to 95 %RH (without condensation) - 1,000m or lower | |
| Vibration | 230V series: 60 HP or less, 460V series: 125 HP or less, 575V series: 125 HP or less *4 | |
| TINI GETOII | 230V series: 60 HP or less, 460V series: 125 HP or less, 5/5V series: 125 HP or less = 3mm : 2 to less than 9 Hz | |
| | 10m/s ² : 9 to less than 200Hz | |
| | TOTAL OF THE TOTAL COURTS | |
| | 230V series: 75 to 100 HP *4 230V series: 125 HP, 460V series: 150 to 1000 HP, | |
| | 3mm : 2 to less than 9 Hz 575V series: 150 to 300 HP*4 | |
| | 9.8m/s^2 : 9 to less than 20Hz 3mm : 2 to less than 9 Hz | |
| | $2m/s^2$: 20 to less than 55Hz $2m/s^2$: 9 to less than 55Hz | |
| | 1m/s^2 : 55 to less than 200Hz 1m/s^2 : 55 to less than 200Hz | |
| Ctores temperature | ·-25 to +70°C | |
| Storage temperature | | |

- *2 Alarm (ECF) is occurred when one of the inputs of EN1 or EN2 are OFF (If it exceeds 50 ms, it will be as disagreement.). Power supply reboot only to reset this alarm.
- Apply by wire to turn off enable command and stop the inverter output with feedback signal assigned DECF signal of inverter to safety switch. COMMING SOON: The capacity from 30HP to 125HP of 230V series, 60HP to 1000HP of 460V series and 1HP to 300HP of 575V series. *3

| | <u>erminal func</u> | ctions | | |
|------------------------|---------------------|--|--|---|
| Classifi- cation | Symbol | Name | Functions | Remarks |
| | L1/R, L2/S L3/T | Main circuit power inputs | Connect three-phase input power lines. | |
| rmina | R0, T0 | Auxiliary power input for the control circuit | Connect single-phase input power lines. | |
| Main circuit terminals | R1, T1 | Auxiliary power input for main circuit | Connect single-phase input power lines. | 230V series: 30 HP or more *3 460V series: 60 HP or more *3 575V series: 60 HP or more *3 |
| . C | U, V, W | Inverter outputs | Connect a three-phase motor. | 575V Series: 60 np or more |
| lair | P(+), N(-) | DC link bus | Terminal for DC bus link system. | |
| - | ⊕ G | Grounding for inverter | Grounding terminals for the inverter. | |
| | [13] | Power supply for | Power supply for frequency command potentiometer. | Variable resistor : 1 to 5 kΩ |
| | 5403 | the potentiometer | The potentiometer of 1/2 W rating or more might be connected. | DC10V, DC10mA max. |
| | [12] | Analog setting voltage input | - External input voltage to be used as a frequency command. 0 to +10 VDC/0 to 100% (0 to +5 VDC/0 to 100%) 0 to ±10 VDC/0 to ±100% (0 to ±5 VDC/0 to ±100%) | Input impedance : $22k\Omega$ Maximum input : ± 15 VDC |
| | | (Inverse operation) | • +10 to 0 VDC/0 to 100% | " Gain : 200% |
| | | (PID control) | Used as PID command value or PID feedback signal. | Offset : ±5% |
| | | (Auxiliary frequency | •Used as additional auxiliary setting to various frequency settings. | Bias : ±100% |
| | | setting) | | Setting filter : 5 s |
| | | (Accel./decel. time ratio setting) | ·Used as ratio setting for acceleration or deceleration time ratio. | |
| | | (Upper/lower freq. setting) | •Used as frequency setting for upper or lower frequency setting. | |
| | [01] | (Analog input monitor) | (Display coefficient valid) | Louis invadence (0500 |
| | [C1] | Analog setting current input | • External input current to be used as a frequency command. 4 to 20 mADC/0 to 100%, 0 to 20 mADC/0 to 100% | Input impedance : 250Ω Maximum input : 30 mADC |
| | | (Inverse operation) | 4 to 20 mADC/O to 100%, O to 20 mADC/O to 100% | maximum input . 30 mapo |
| | | (PID control) | • Used as PID command value or PID feedback signal. | |
| | | (PTC thermistor) | • PTC thermistor connection to protect the motor. | Offset : ±5% |
| rt | | (Auxiliary frequency | | Bias : ±100% |
| Analog input | | setting) (Accel./decel. time | | Setting filter : 5 s |
| Ana | | ratio setting) (Upper/lower_freq. | •Used as frequency setting for upper or lower frequency setting. | |
| | | setting) (Analog input monitor) | • Enables peripheral analog signals to be displayed on the keypad panel. | |
| | [VO] | A 1 112 | (Display coefficient valid) | |
| | [V2] | Analog setting voltage input | • External input voltage to be used as a frequency command. | Input impedance : 22kΩ |
| | | | 0 to +10 VDC/0 to 100% (0 to +5 VDC/0 to 100%) 0 to ±10 VDC/0 to ±100% (0 to ±5 VDC/0 to ±100%) | Maximum input : ±15 VDC |
| | | (Inverse operation) | +10 to 0 VDC/0 to 100% | |
| | | | Used as PID command value or PID feedback signal. | 0ffset : ±5% |
| | | (Auxiliary frequency | ·Used as additional auxiliary setting to various frequency settings. | Bias : ±100% |
| | | setting) | | Setting filter : 5 s |
| | | (Accel./decel. time ratio setting) | | n |
| | | (Upper/lower freq. setting) | •Used as frequency setting for upper or lower frequency setting. | |
| | | (Analog input monitor) | Enables peripheral analog signals to be displayed on the keypad panel. (Display coefficient valid) | |
| | [11] | Analog common | Common terminals for frequency command signals. | These terminals are electrically |
| | (2 terminals) | | ([12], [13], [C1], [V2], [FM1], [FM2]) | isolated from terminals [CM]s and [CMY]. |
| | [X1] | Digital input1 | • The following functions can be assigned to terminals [X1] to [X7], | Operation current at ON |
| | [X2] | Digital input2 | [FWD] and [REV]. | Source current : 2.5 to 5 mA |
| | [X3] [X4] | Digital input3 | <pre><common functions=""></common></pre> | Voltage level : 2 V or less |
| | [X5] | Digital input4 Digital input5 | • SINK/SOURCE is changeable by using the internal slide switch. • These function codes may also switch the logic system between normal | Operation current at OFF |
| | [X6] | Digital input6 | and/or negative to define how the inverter logic interprets either | Allowable leakage current : |
| | [X7] | Digital input7 | ON or OFF status of each terminal. | 0.5 may or less |
| | [FWD] | Run forward | | Voltage level : 22 to 27 V |
| | [REV] | Run reverse | The state of the one of the state of the sta | |
| ب | | Select multi-frequency | The combination of the ON/OFF states of digital input signals (SS1) (SS2) (SS4) and (SS8) provides 16 different frequency choices | |
| ndu | (SS4) | | (SS1), (SS2), (SS4) and (SS8) provides 16 different frequency choices. | |
| _ | (\$\$8) | | | |
| Digital input | L | Select ACC/DEC time (2 steps) | The combination of the ON/OFF states of (RT1) and (RT2) provides | ф |
| ΙO | (RT2) | Select ACC/DEC time (4 steps) | four choices of acceleration/deceleration settings. | |
| | (HI V) | (4 steps) Enable | Used as a self-hold signal for 3-wire inverter operation. | |
| | (IILU) | 3-wire operation | Turning the (HLD) ON self-holds the (FWD) or (REV) command: turning it OFF releases the self-holding. | |
| | (ВХ) | Coast to a stop | Turning the (BX) ON immediately shuts down the inverter output so that the motor coasts to a stop without issuing any alarms. | |
| | (RST) | Reset alarm | Turning the (RST) ON clears the alarm state. | Signal of 0.1 s or more |
| | | Enable external | Turning the (THR) OFF immediately shuts down the inverter output | |
| | | alarm trip | so that the motor coasts to a stop, issuing "OH2" if (ALM) is enabled. | |
| | | | | |

| | erminal fund | | | |
|---------------------|--------------|--|--|--|
| Classifi- cation | Symbol | Name | Functions | Remarks |
| ပ | (Hz2/Hz1) | Select frequency | Turning the (Hz2/Hz1) ON selects Frequency command 2. | |
| | /DODDIV) | command2/1 Enable DC braking | Turning the (DODN) OH astimates DC healing | The second in the second secon |
| | , , | | Turning the (DCBRK) ON activates DC braking. The (TL2/TL1) switches between torque limiters 1 and 2. | The negative logic system never applies to those terminals. |
| | | level2/1 | , | |
| | | Switch to commercial power (50 Hz) | Turning the (SW50) OFF switches to commercial power (50 Hz). | The negative logic system never applies to those terminals. |
| | | Switch to commercial power (60 Hz) | Turning the (SW60) OFF switches to commercial power (60 Hz). | |
| | (UP) | UP (Increase output frequency) | While the (UP) is ON, the output frequency increases. | |
| | (DOWN) | DOWN (Decrease output frequency) | While the (DOWN) is ON, the output frequency decreases. | |
| | (WE-KP) | Enable data change with keypad | Only when the (WE-KP) is ON, function code data can be changed via the keypad panel. | |
| | (Hz/PID) | Cancel PID control | Turning the (Hz/PID) ON disables the PID control so that the inverter | |
| | | | runs the motor with a reference frequency specified by any of the multi-frequency, keypad panel, analog input, etc. | |
| | (IVS) | Switch normal/inverse operation | The (IVS) switches the output frequency control between normal (proportional to the input value) and inverse in PID process control | |
| | | | and manual frequency command. Turning the (IVS) ON selects the inverse operation. | |
| | (IL) | Interlock | In a configuration where a magnetic contactor (MC) is inserted between | |
| | | | the inverter and motor, connecting the auxiliary contact to this terminal enables the input of the (IL) when a power failure occurs, | |
| | (1.5) | Enable communications | activating the momentary power failure detection function. Turning the (LE) ON gives priority to commands received via | |
| | (LE) | link via RS-485 or field bus (option) | the RS-485 communications link or the field bus option. | |
| | (U-DI) | Universal DI | Using the (U-DI) enables the inverter to monitor arbitrary digital | |
| | | | input signals sent from the peripheral equipment, transmitting the signal status to the host controller. | |
| put | (STM) | Enable auto search for idling motor speed at starting | The (STM) enables auto search for idling motor speed at the start of operation. | |
| Digital input | (STOP) | Force to stop | Turning the (STOP) OFF causes the motor to decelerate to a stop forcedly in accordance with the specified deceleration time. | |
| Digit | (PID-RST) | Reset PID integral and differential components | Turning the (PID-RST) ON resets PID integral and differential components. | |
| | (PID-HLD) | Hold PID integral component | Turning this terminal command ON holds the integral components of the PID processor. | |
| | (LOC) | Select local (keypad) operation | Turning the (LOC) ON gives priority to run/frequency commands entered from the keypad panel. | |
| | | Enable to run | Turning the (RE) ON enables motor running. | |
| | (DWP) | Protect motor from dew condensation | Turning the (DWP) ON supplies a DC current to the motor on halt, in order to generate heat, preventing dew condensation. | The negative logic system never applies to those terminals. |
| | (ISW50) | Enable integrated sequence to switch to commercial power (50 Hz) | Turning the (ISW50) OFF switches inverter operation to commercial-power operation in accordance with the inverter internal switching sequence (50 Hz). | The negative logic system never applies to those terminals. |
| | (ISW60) | Enable integrated | Turning the (ISW50) OFF switches inverter operation to commercial-power | |
| | | sequence to switch to commercial power (60 Hz) | operation in accordance with the inverter internal switching sequence (60 Hz). | |
| | | Periodic motor switching time clear | Turning the (MCLR) ON clears periodic switching time of pump control. | |
| | | UP/DOWN frequency reset Count the run time of | Turning the (STZ) ON clears the frequency of UP/DOWN control. Turning the (CRUN-M1) ON accumulates the run time of motor 1 | |
| | (OKUN-WI) | commercial power-driven motor1 | in commercial-power operation. (independent of run/stop and motor selected) | |
| | (CLC) | Cancel customizable logic | Turning the (CLC) ON enables customizable logic. | |
| | (CLTC) | Clear customizable logic timers | Turning the (CLTC) ON clears all the timer/counter for customizable logic. | |
| | (FR2/FR1) | Switch the run | Turning the (FR2/FR1) ON switches the run command to (FWD2) or (REV2). | |
| | (FWD2) | Run forward command2 | Turning the (FWD2) ON runs the motor in the forward direction: | The negative logic system never applies to those terminals. |
| | (REV2) | Run reverse command2 | turning it OFF decelerates it to a stop. (second run command) Turning the (REV2) ON runs the motor in the reverse direction: | APP. 100 CO CHOSC COMMINICATS. |
| | (FWD) | Run forward | turning it OFF decelerates it to a stop. (second run command) Turning the (FWD) ON runs the motor in the forward direction: | These terminal commands can be assigned only to terminals [FWD] and |
| | (REV) | Run reverse | turning it OFF decelerates it to a stop. Turning the (REV) ON runs the motor in the reverse direction; turning it OFF decelerates it to a stop. | [REV]. The negative logic system never applies to those terminals. |
| | | | | |

| <u>3. T</u> | erminal fund | | | |
|---------------------|---------------|---|--|---|
| Classifi- cation | Symbol | Name | Functions | Remarks |
| <u> </u> | (FMS) | Fire mode | Turning the (FMS) ON switches the mode of the inverter to fire mode. | The negative logic system never applies to those terminals. |
| | (PID2/1) | PID channel switching | Turning the (PID2/1) ON switches PID control 2. | |
| | | Boost command | Turning the (BST) ON cancels PID control and starts boost operation. | |
| | | Flow switch | Turning the (FS) ON means there is a flow and OFF is no flow. | |
| | (FRC) | Filter clogging reverse rotation | Turning the (FRC) ON cancels PID control and starts the reverse | |
| | /POLIO | | rotation for removing filter clogging. | |
| | , , | Pump control switching Mutual operation : | Turning the (PCHG) ON switches the driven pumps. Turning the (MENO) ON allows to operate master motor for mutual operation. | |
| | (MENU) | Master motor | Turning the (MENO) on allows to operate master motor for mutual operation. | |
| | (MEN1) | Pump control motor1 | Turning the (MEN1) ON allows to operate pump control motor1. | |
| | (MEN2) | Pump control motor2 | Turning the (MEN2) ON allows to operate pump control motor2. | |
| | | Pump control motor3 | Turning the (MEN3) ON allows to operate pump control motor3. | |
| | | Pump control motor4 | Turning the (MEN4) ON allows to operate pump control motor4. | |
| | | Pump control motor5 | Turning the (MEN5) ON allows to operate pump control motor5. | |
| | | Pump control motor6 | Turning the (MEN6) ON allows to operate pump control motor6. | |
| | | Pump control motor7 Pump control motor8 | Turning the (MEN7) ON allows to operate pump control motor7. | |
| | L | Timer cancel | Turning the (MEN8) ON allows to operate pump control motor8. Turning the (TMC) ON disables timer operation. | |
| | | Timer1 enable | Turning the (TM1) ON enables the setting of timer1. | |
| | | Timer2 enable | Turning the (TM2) ON enables the setting of timer2. | |
| | L | Timer3 enable | Turning the (TM3) ON enables the setting of timer3. | |
| | L | Timer4 enable | Turning the (TM4) ON enables the setting of timer4. | |
| | (PID-SS1) | Multistage PID | The combination of the ON/OFF states of digital input signals (PID-SS1) | |
| | (PID-SS2) | | and (PID-SS2) provides 4 stages of PID control command can be selected. | |
| | | Multistage | The combination of the ON/OFF states of digital input signals (EPID-SS1) | |
| ., | (EPID-SS2) | external PID | and (EPID-SS2) provides 4 stages of external PID control command | |
| | /EDID1 (M) | | can be selected. | |
| | (EPID1-ON) | PID control1 On | Turning the (EPID-ON) ON enables the external PID control and OFF disables it. | |
| | (EPID2-ON) | | urr disables it. | |
| | (EPID3-ON) | PID control2 On | | |
| | (EF IDS-ON) | PID control3 On | | |
| ц | (%/EPID1) | External PID control1 cancel | Turning the (%/EPID) ON cancels the external PID control. | Operate with selected command such as multi-frequency/keypad panel/ |
| Digital input | (%/EPID2) | External PID control2 cancel | | analog input etc. when external |
| tal | (%/EPID3) | | | PID is cancelled. |
| | (10) El 100) | PID control3 cancel | | |
| ۵ | | External PID1 normal/ | Operation mode of external PID control-output signal can be switched | |
| | | inverse operation switching | between normal/inverse operation. Turning the (EPID-IVS) ON selects inverse operation. | |
| | (EPID2-IVS) | External PID2 normal/ inverse operation | | |
| | | switching | | |
| | (FPID3-IVS) | External PID3 normal/ | | |
| | ,, | inverse operation switching | | |
| | (EPID1-RST) | External PID1 integral/ | Turning the (EPID-RST) ON clears differential value and | |
| | (EDINO_DOT) | differential reset External PID2 integral/ | integral value of external PID. | |
| | (EF IDZ-KOI) | differential reset | | |
| | (EPID3-RST) | External PID3 integral/ differential reset | | |
| | (EPID1-HLD) | External PID1 Integral hold | Turning the (EPID-HLD) ON holds integral of external PID. | |
| | (EPID2-HLD) | External PID2 | | |
| | (EPID3-HLD) | integral hold External PID3 | | |
| | FENA? | integral hold | | |
| | [EN1] | Enable input1 | • Turning off the circuit between terminals [EN1] and [PLC] or | |
| | [EN2] | Enable input2 | terminals [EN2] and [PLC] stops the inverter's output transistor. (Safe Torque Off : STO) | |
| | | | • These terminals are exclusively used for the source mode input and | |
| | | | cannot be switched to the sink mode. | |
| | | | ·If either one of these input terminals is kept OFF, the inverter | |
| | | | interprets it as a discrepancy, causing an alarm "ecf". This alarm state | |
| | | | can be cleared only by turning the inverter power off and on clears | |
| | [DI C] | DIC cianal namar | this alarm. | 1-24 V (22 +0 27 V) May 200 |
| | [PLC] | PLC signal power | Connects to the power supply of PLC output signals. This terminal also serves as 24 V power supply. | +24 V (22 to 27 V), Max. 200 mA |
| | [CM] | Digital input common | Common terminals for digital input signals. | This terminal is electrically |
| | (2 terminals) | | | isolated from terminals [CM]s and [11]s. |

| Special flower programment of the following in pasts, the selected are will be issued. The minimum and the selection and we also wis the legic system became mared and the selection of the selection and the selection and the selection of the selection and the sele | | <u>erminal fur</u> | | | |
|--|--------------------|--------------------|---|--|--|
| The provision content | lassifi- cation | Symbol | Name | Functions | Remarks |
| Procedure of the Common and Com | ၁ | [V1] | Transistor output1 | Dut of the following cignals, the calested one will be issued | Maximum voltage at OFF : 27 VDC |
| Column C | | | | | • |
| papic labels to SIM and SUMBLE. The extraining is required. This signal is 00 men the inventor in conting with the starting fragmony. Growth of the conting is required. The property of lights. The property of lights. The property of lights. The property of lights. The property of lights with the starting fragmony of lights. The property of lights with the starting of the fragmony of lights and the property article signal to 87. The property of lights with the starting of the lights of the starting of the lights of the property of lights | | | ' | | _ |
| State Stat | | [Y4] | Transistor output4 | status of each terminal. | Maximum current at ON : 50 mADC |
| See Secretary common The single 1.00 Alone the investor in revenues with the starting frequency (speech of | | | | Applicable to SINK and SOURCE. (No switching is required.) | |
| PRO Frequency Topical Bett Speak Its processed when Trequency proced requires at soft-value. | | /DIII | 1) Inverter running | This signal is ON when the inverter is running with the starting | (at 5UmA) |
| Fig. Progressy (proced) Fig. Progressy (proced) Fig. Secretary (proced) Fig. S | | (NOI | in this cer running | | |
| Institute Inst | | (FAF | Frequency (speed) | ON-signal is generated when frequency/speed reaches at set-value. | |
| OFFICE Comment Comme | | | arrival signal | , , , | |
| Control Cont | | /EN1 | Teroguenov (opend) | | |
| U.U. Bindervoltage detected (Inverter stopped) (Inverter stopped | | (FD) | | | |
| Commerce accordance | | | | | |
| (IDE) Investor context Initiality (IPP) Anto restarting after recommentary power failure (IDE) Anto restarting after recommentary power failure (IDE) Anto restarting after recommentary power failure (IDE) Motor overload early surmine (IDE) (IDE) Investor coady to run (IDE) (I | | (Ll | | | |
| Time Ling Corp. (IPPA duto restarting after momentary power failures (ID Note overland | | /101 | | · | |
| Accordance of the control of the con | | (101 | · · | | |
| Col. Moster overload | | (IPF | Auto-restarting after | | |
| Section Sect | | | momentary power failure | its output due to a momentary power failure until the restart is completed. | |
| GBD | | (OL | * I | , | |
| Simple S | | | variy warning | | |
| content between commercial power and inverter output from 80 on content of power line to inverter output from 80 on content of power line to inverter output from 80 on content output from 80 on | | (RD) |) Inverter ready to run | | |
| power line to inverter output (SMS2-7) (SMS2-1) (SMS2 | | (SW88 | , | This controls the magnetic contactor located at the commercial power | |
| Commercial power This to inverter output | | | | | |
| (SISE2-2) Saitch motor drive source between commercial powers of the commercial power of the commercia | | | and inverter output | power line to inverter output. | |
| Simple Secondary risks Simple S | | | | | |
| commercial power and inverter output Grosscondary side) (SMS2-1) Switch notor drive source bitteen commercial power line to inverter output. For primary side in the inverter output. (For primary side) TAOS slect AX Tarainal function (for MC on primary side) TOUS Shifted to pattern operation stage. Multiple (100 mg) telling the shift of the stage. (TO) Pattern operation stage. Multiple (100 mg) telling the shift of the stage. (STI) Pattern operation stage. Multiple (100 mg) telling the shift of the stage. (STI) Pattern operation stage. Multiple (100 mg) telling the shift of the stage. (STI) Pattern operation stage. In the commercial power line to riverter output. (STI) Pattern operation stage. In the commercial interest output in the commercial stages (100 mg). (STI) Pattern operation stage. In the commercial interest output in the commercial operation stage. In the commercial interest output in the | | (SW52-2 |) Switch motor drive | This controls the magnetic contactor located at the inverter output | |
| Commercial process of the control | | | | | |
| This controls the magnetic contactor located at the inverter input side concercial power and inverter output (for primary side), for switching the motor drive source from the commercial power and inverter output (for primary side) | | | and inverter output | commercial power line to inverter output. | |
| Source between Commercial power and inverter output Gorinary side), for switching the motor drive source from the commercial power and inverter output Gor primary side) | | | (For secondary side) | | |
| Commercial power and inverter output (For primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the magnetic contactor located at the inverter primary side) This signal controls the side of the side | | (SW52-1 | * I | This controls the magnetic contactor located at the inverter input side | |
| and inverter output (AX) Salect AX terminal function (For MC on input side (primary side) (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For MC on input side (primary side). (AX) Salect AX terminal function (For AX input (DO MC on Signal (LOD MS), telling, the sales. (AX) Salect AX terminal function (For AX input (DO MC on Signal (LOD MS), telling, the completion of all stages. (BY) Salect AX terminal function (For AX input (DO MC on Signal (LOD MS), telling, the completion of all stages. (BY) Salect AX terminal function (For AX input (DO MC on Signal (LOD MS)), telling, the completion of all stages. (BY) Salect AX terminal function (For AX input (DO MC on Signal (LOD MS)), telling, the completion of all stages. (BY) Salect AX terminal function (For AX input (BY)), telling, the completion of all stages. (BY) Salect AX terminal function (BY) Signal (LOD MS), telling, the completion of all stages. (BY) Salect AX terminal function (BY) Signal (LOD MS), telling, the completion of all stages. (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (LOD AX input (BY)) (BY) Salect AX terminal function (BY) Signal (BY) | 4 | | | | |
| Comparison Com | tpu | | and inverter output | power line to inverter output. | |
| Comparison Com | no . | | (For primary side) | | |
| Comparison Com | stor | (A) | | | |
| Comparison Com | insi | | | input side (primary side). | |
| Operation stage ON signal (100 ms), telling the shift of the stage. (To Pattern operation by Don completion of all stages (1 to 7) in pattern operation, the inverter oxigle completed issues a one-shot, ON, signal (100 ms), telling the completion of all stages. (SIGI) Pattern operation with the combination of SIGI, SIG2 and SIG4, the inverter outputs the current stage number, 2. (SIGIA) Pattern operation stage number, 4. (IDL2) Inverter output Invision of SIGI, SIG2 and SIG4, the inverter outputs the current limiter, torque limiter, or anti-regenerative control (automatic deceleration) continues for 20 ms or more. (FAN) Cooling fan in operation This signal comes ON when auto-resetting is in progress. (U-D0) Universal D0 This signal comes ON when auto-resetting is in progress. (U-D0) Universal D1 This output signal comes ON when auto-resetting is in progress. (U-D0) Universal D1 This output is a heat sink overheat early warning before an overheat trip actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 IP to 60 IP) / IP55 (7.5 IP to 60 IPP) 43 IPDO (150 IP to 125 IPP) PS5 (15 IP to 125 IPP) 43 PDO (150 IP to 125 IPP) PS5 (15 IP to 125 IPP) 43 INDO (150 IP to 120 IPP) PS5 (15 IP to 125 IPP) 43 INDO (150 IPP to 120 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 125 IPP) 43 IPDO (150 IPP to 125 IPP) PS5 (15 IPP to 12 | Tra | (TU |) Shifted to pattern | When the stage is shifted in pattern operation, the inverter issues a one-shot | |
| Composition | | | operation stage | ON signal (100 ms), telling the shift of the stage. | |
| (SIGI) Pattern operation stage, number 1. (SIGE) Pattern operation stage, number 2. (SIGE) Pattern operation stage, number 4. (IOL2) Inverter output training with delay continues (or 20 ms or more. (IAN) Cooling fan training with delay continues (or 20 ms or more. (IAN) Cooling fan training with delay training with signal comes ON when the inverter activating the current limiter, continues for 20 ms or more. (IAN) Auto-resetting This output signal comes ON when auto-resetting is in progress. (II-DO) Universal DO This signal comes ON when auto-resetting is in progress. (II-DO) Universal DO This signal comes ON when auto-resetting is in progress. (II-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This Signal comes ON when auto-resetting is in progress. (III-DO) Universal DO This DO ON Phy | | (10 | | | |
| Size Pattern operation stage number 2 Size Pattern operation stage number 4 | | (STG1 | · • · · · · · · · · · · · · · · · · · · | | |
| (ST64) Pattern operation stage number 4 (1012) Inverter output limiting with delay torque limiter, or anti-regenerative control (automatic deceleration) continues for 20 ms or more. (FAN) Cooling fan in operation (TRY) Auto-resetting This output signal comes ON when auto-resetting is in progress. (U-DO) Universal DO This signal commands a peripheral apparatus according to signal sent from the host controller. (OH) Heat sink overheat early warning This outputs the ON/OFF state of the cooling fan sink overheat early warning actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ some provided in the cooling fan service lifetime alarm or it is also used to detect an internal air circulation fan failure. (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime oriteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 31 | | (STG2 | | operating stage. | |
| stage number. 4 (1012) Inverter output This signal comes ON when the inverter activating the current limiter, torque limiter, or anti-regenerative control (automatic deceleration) continues for 20 ms or more. (FAN) Cooling fan in operation This signal outputs the ON/OFF state of the cooling fan. in operation This output signal comes ON when auto-resetting is in progress. (U-DO) Universal DO This signal commands a peripheral apparatus according to signal sent from the host controller. (OH) Heat sink overheat early warning This outputs a heat sink overheat early warning before an overheat trip actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime oriteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 300 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime oriteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) 43 1400 (150 HP to 1000 HP) 45 250V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP) / IP00 (150 HP to 1000 HP) | | /CTC/ | | | |
| CFAND Cooling fan CFAND CF | | (3144 | | | |
| continues for 20 ms or more. (FAN) Cooling fan in operation (IRY) Auto-resetting This signal comes ON when auto-resetting is in progress. (U-DD) Universal DO This signal comes ON when auto-resetting is in progress. (UH) Heat sink overheat from the host controller. (OH) Heat sink overheat early warning the signal sent from the host controller. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 125 HP)/ IP55 (7.5 HP to 60 HP)/ 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 1P00 (150 HP to 1000 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 1P00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 230V series: IP21 (30 HP to 300 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ | | (IOL2 | | | |
| This signal outputs the ON/OFF state of the cooling fan. | | | Thin chig with dordy | | |
| (U-DO) Universal DO This signal commes ON when auto-resetting is in progress. (U-DO) Universal DO This signal commands a peripheral apparatus according to signal sent from the host controller. (OH) Heat sink overheat early warning (OH) Heat sink overheat early warning before an overheat trip actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 125 HP) / IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP) / IP55 (15 HP to 125 HP)/ For series: IP21 (60 HP to 125 HP) / IP55 (15 HP to 125 HP)/ IP00 (150 HP to 300 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP) / IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP) 460V series: IP21 (30 HP to 125 HP) / IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (75 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (75 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (75 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (75 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP55 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP00 (7.5 HP to 125 HP)/ IP00 (750 HP to 125 HP) / IP00 (7.5 | | (FAI | | | |
| (U-DD) Universal DO This signal commands a peripheral apparatus according to signal sent from the host controller. (OH) Heat sink overheat early warning This outputs a heat sink overheat early warning before an overheat trip actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP)/ 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 300 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP)/ 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ \$3 \$43 | | /TD) | | At the second se | |
| Comparison of the host controller. This outputs a heat sink overheat early warning before an overheat trip actually happens. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ *3 | | I | | | |
| early warning | | (0 00 | on vor our bo | | |
| It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | (Oh | | This outputs a heat sink overheat early warning before an overheat trip | |
| Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | | early warning | | |
| 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | | | | |
| 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 300 HP) (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP) 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 3 *3 *3 *3 *3 *4 *4 *5 *6 *6 *7 *7 *8 *8 *8 *8 *8 *8 *8 *8 | | | | 1 | *3 |
| IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 | | | | | |
| S75V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 | | | | | *3 |
| (LIFE) Lifetime alarm This outputs a service lifetime alarm according to the internal lifetime criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ IP00 (75 HP to 125 HP) 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ 3 *3 | | | | | *3 |
| criteria. It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | | | IP00 (150 HP to 300 HP) | |
| It is also used to detect an internal air circulation fan failure. Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | (LIFE | Lifetime alarm | 1 ' | |
| Applicable capacity: 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | | | | |
| 230V series: IP21 (30 HP to 60 HP)/ IP55 (7.5 HP to 60 HP)/ | | | | | |
| 460V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 *3 *3 *3 | | | | | *3 |
| IP00 (150 HP to 1000 HP) 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 | | | | | *3 |
| 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ *3 | | | | | T************************************* |
| IP00 (150 HP to 300 HP) | | | | 575V series: IP21 (60 HP to 125 HP)/ IP55 (15 HP to 125 HP)/ | *3 |
| | | ļ | | IP00 (150 HP to 300 HP) | |

| | | Inal Tund | | F.m.+!-m- | I Damanila I |
|---------------------|---------------------------------|-----------------|--------------------------------------|---|--|
| Classifi- cation | | Symbol | Name | Functions | Remarks |
| tio | | | | | |
| l as | | | | | |
| ပ | | (DEE OEE) | Reference loss | This signal sames ON when an analog fraguency command is missed | |
| | | (NEF UFF) | detected | This signal comes ON when an analog frequency command is missed | |
| | | /51.B16\ | | due to wire breaks. | |
| | | (RUN2) | Inverter output on | This signal is ON when the inverter is running with the starting | |
| | | | | frequency or higher or when the DC braking is activated. | |
| | | (OLP) | Overload prevention | This output signal comes ON when the overload prevention control | |
| | | | control | is activated. | |
| | | (ID) | Current detected | This signal comes ON when the output current of the inverter has exceeded | |
| | | | | the detection level for the time longer than the specified timer period. | |
| | | (PID-ALM) | PID alarm | This outputs an absolute-value alarm and E396alarm when | |
| | | | | the PID control is enabled. | |
| | | (PID-CTL) | Under PID control | This signal comes ON when the PID control is enabled. | |
| | | (PID-STP) | Motor stopped due to | This signal is ON when the inverter is in a stopped state by the slow | |
| | | | slow flowrate under | flowrate stopping function under the PID control. | |
| | | | PID control | (The inverter is stopped even if a run command is entered.) | |
| | | (IJ-TI) | Low output torque | This signal comes ON when the torque value has been below the preset | |
| | | (0 12) | detected | detection level for the time longer than the specified timer period. | |
| | | (FRIIN) | Running forward | ON-signal is generated at forward rotation. | |
| | | | Running reverse | ON-signal is generated at reverse rotation | |
| | | | In remote operation | This signal comes ON when the inverter is in the remote mode. | |
| | . | | Motor overheat | This signal comes ON when the motor overheat is detected by the PTC | |
| | | (IMM) | detected by thermistor | I | |
| | | / N OLIO | - | After the social outsting | |
| | | (MUHU) | learly warning | After the periodic switching conditions are met, the early warning signal | |
| | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | comes ON for preset time. | |
| | | (MLIM) | Pump control-output | This signal comes ON when pump control is in the maximum operating | |
| | | | limit signal | condition. | |
| | | (C10FF) | Terminal [C1] | When Input current to C1 terminal become less than 2 mA, this is | |
| | | | wire break | interpreted as wire brake and then ON signal is generated. | |
| | | (FARFDT) | Frequency arrival/ | This signal comes ON when both (FAR) and (FDT) are ON. | |
| 井 | | | detected | | |
| ıtp | | (AUX_L) | Auxiliary motor drive | In pump control, when pumps are switched, drive signal of an auxiliary | |
| ٥ | | | signal | motor is output for suppressing the PV variation. | |
| tor | | | | To compensate for a lack when pump control is in the maximum operating | |
| | | | | condition, drive signal of an auxiliary motor is output. | |
| Transistor output | | (MNT) | Maintenance timer | Alarm/warning signal is generated when time passes or start-up exceeds | |
| Ļ | | | | over the preset value. | |
| | | (L-ALM) | Light alarm | When Alarm or warning, which is set as "light alarm", is generated, | |
| | | | | inverter indicates "Light alarm" on the display, continuous running and | |
| | | | | generates this light alarm signal. | |
| | | (ALM) | Alarm output | This is an alarm relay output as a transistor output. | |
| | | | (for any alarm) | | |
| | | (DECF) | Enable circuit | This output signal comes ON when the inverter detects a failure of | |
| | | \- / | failure detected | the Enable circuit. | |
| | ļ | (ENOFF) | Enable input OFF | This output signal comes ON when the terminal [EN1] or [EN2] input | |
| | Ī | / | | is turned OFF (opened). | |
| | ļ | (CI 01) | Customizable logic | These are customizable logic output signals as transistor output signals. | |
| | Ī | | output signal1 | | |
| | ļ | | Customizable logic | | |
| | Ī | | output signal2 | | |
| | | | Customizable logic | | |
| | Ī | | output signal3 | | |
| | | | Customizable logic | | |
| | | (ULU4) | output signal4 | | |
| | | (OL OF) | | | |
| | Ī | (GLU5) | Customizable logic output signal5 | | |
| | | /01.00\ | | | |
| | Ī | (CLU6) | Customizable logic output signal6 | | |
| | | | | | |
| | | (CL07) | Customizable logic | | |
| | | | output signal7 | | |
| | | | Timer in operation | This signal comes ON when one of the timer 1 to timer 4 is in operation. | |
| | L | (TMD1) | Timer1 in operation | This signal comes ON when timer1 is in operation. | |
| | L | | Timer2 in operation | This signal comes ON when timer2 is in operation. | |
| | L | | Timer3 in operation | This signal comes ON when timer3 is in operation. | |
| L | | (TMD4) | Timer4 in operation | This signal comes ON when timer4 is in operation. | <u> </u> |
| | | _ | | | |

| I | Symbol | Name | Functions | Remarks |
|----------------|--|--------------------------|---|-------------------------------|
| cation | , | | | |
| sat | | | | |
| 5 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |
| | (M1_I) | Motor1 inverter driven | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | | placed between pump control motor1 and inverter output. | |
| | (M1_L) | Motor1 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply driven | placed between pump control motor1 and commercial power supply. | |
| | (M2_I) | Motor2 inverter driven | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | | placed between pump control motor2 and inverter output. | |
| | (M2_L) | Motor2 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply driven | placed between pump control motor2 and commercial power supply. | |
| | (M3_I) | Motor3 inverter driven | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | | placed between pump control motor3 and inverter output. | |
| | | Motor3 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply driven | placed between pump control motor3 and commercial power supply. | |
| | (M4_I) | Motor4 inverter driven | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | | placed between pump control motor4 and inverter output. | |
|) IIIII | | Motor4 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply driven | placed between pump control motor4 and commercial power supply. | |
| h | (M5_L) | Motor5 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply drive | placed between pump control motor5 and commercial power supply. | |
|) | (M6_L) | Motor6 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply drive | placed between pump control motor6 and commercial power supply. | |
| , ,,,,, | (M7 L) | Motor7 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | | power supply drive | placed between pump control motor7 and commercial power supply. | |
| h | (M8 L) | Motor8 commercial | Signal is output to operate open/close the magnetic contactor (MC) | |
| | _ | power supply drive | placed between pump control motor8 and commercial power supply. | |
| # | (M-RUN) | Mutual operation | One of inverters is operating by mutual operation. | |
| output | | Mutual operation alarm | One of inverters is in alarm by mutual operation. | |
| | | PID2 enable | This signal comes ON when PID2 is in enabled state. | |
| tor | | PID1 alarm | Absolute value alarm/deviation alarm of PID control is output. | |
| . <u>s</u> | | PID2 alarm | historials ratio artifully deviation artifully solution to satisfact. | |
| ransistor | | PID1 feedback error | This signal comes ON when there is PV signal errors in PID control. | |
| Ĕ | | PID2 feedback error | THIS SIGNAL COMES ON WHICH CHOICE IS IN SIGNAL CITOLS IN TID CONCLOT. | |
| ļ | | | This signal comes ON when external PID is in enabled state. | |
| | | External PID2 in control | THIS SIGNAL COMES ON WHEN EXCELLED IN THE CHARLES SCALE. | |
| | | External PID3 in control | | |
| | | | Dutant of outawal DID postwal is NVOTE duty on le signal | |
| | | External PID1 output | Output of external PID control is ON/OFF duty cycle signal. | |
| | | External PID2 output | | |
| | | External PID3 output | This signal cases (Mushan eyt and DID casted by | |
| | | External PID1 in | This signal comes ON when external PID control is in operation. | |
| | | External PID2 in | | |
| | | External PID3 in | | |
| | | External PID1 alarm | Absolute value alarm/deviation alarm of external PID control is output. | |
| | | External PID2 alarm | | |
| | | External PID3 alarm | | |
| ["" | (EPV1-0FF) | External PID1 | This signal comes ON when there is PV signal errors | |
| <u> </u> | | feedback error | in external PID control. | |
| | (EPV2-0FF) | External PID2 | | |
| ļ | | feedback error | | |
| | (EPV3-OFF) | External PID3 | | |
| | | feedback error | | |
| (| PLC) | Transistor output | Power supply for transistor output load. (24 VDC, 200 mADC max.) | Use short-circuit terminals |
| | | power | (NOTE : Shared by the digital input [PLC] terminal.) | between [CM]s and [CMY]. |
| [| CMY] | Transistor output | Common terminal for transistor output signal terminals. | This terminal is electrically |
| | | common | | isolated from terminals [CM]s |
| | | | | and [11]s. |

| | Symbol | Name | Functions | Remarks |
|---------------|---|--|---|---|
| cation | | | | |
| | [Y5A], [Y5C] | General purpose relay output | As a general-purpose relay output, the same functions as [Y1] to [Y4] can be assigned. The logic value is switchable between [Y5A] and [Y5C] are "excited" and "non-excited." | Contact rating : 250 VAC, 0.3 A, cos φ=0.3 48 VDC, 0.5A |
| Relay output | [30A], [30B], [30C] | Alarm relay output (for any error) | This outputs a non-voltage contact signal (1c) when the inverter is stopped with the protective function. As a general-purpose relay output, the same functions as [Y1] to [Y4] can be assigned. The logic value is switchable between [30A] and [30C] are "excited" and "non-excited." | Contact rating : 250 VAC, 0.3 A, cos φ=0.3 48 VDC, 0.5A |
| Analog output | [FM1], [FM2] | Analog monitor | The output can be either analog DC voltage (0 to 10 V) or analog DC current (4 to 20 mA/0 to 20 mA). Any one of the following items can be output with the selected analog form. • Output frequency (with slip compensation/without slip compensation) • Output current • Output voltage • Output torque • Load factor • Input power • PID feedback amount • DC link bus voltage • Universal AO • Motor output • Analog output test • PID command • PID output • PID deviation • Customizable logic output signal • Inverter cooling fin temperature • Reference frequency * When the terminal is outputting 0 to 10 VDC, it is capable of driving up to two meters with 10kΩ impedance. * When the terminal is outputting current, it is capable of connecting a maximum of 500Ω to the meter. | Adjustable gain range : 0% to 300% |
| | [11] | Analog common | | |
| | RJ-45 connector for the keypad panel | RS-485 communications port1 | Out of the following protocols, the desired one can be selected. • Modbus RTU • Fuji general-purpose inverter protocol • FRENIC Loader protocol (SX) *1 • Metasys N2 *2 • BACnet *2 | With power supply to the keypad panel. |
| Communication | [DX+], [DX-], [SD] | RS-485 communications port2 (Terminal control PCB) | Out of the following protocols, the desired one can be selected. • Modbus RTU • Fuji general-purpose inverter protocol • FRENIC Loader protocol (SX) *1 • Metasys N2 *2 • BACnet *2 | Mounted on control PCB. |
| | CN11 | Connector for battery | Possible to connect Inverter Supporting PC Loader *1 Connect battery (option). | |
| tery | | | , (-p, | |

^{*1} Unavailable for concurrent use.

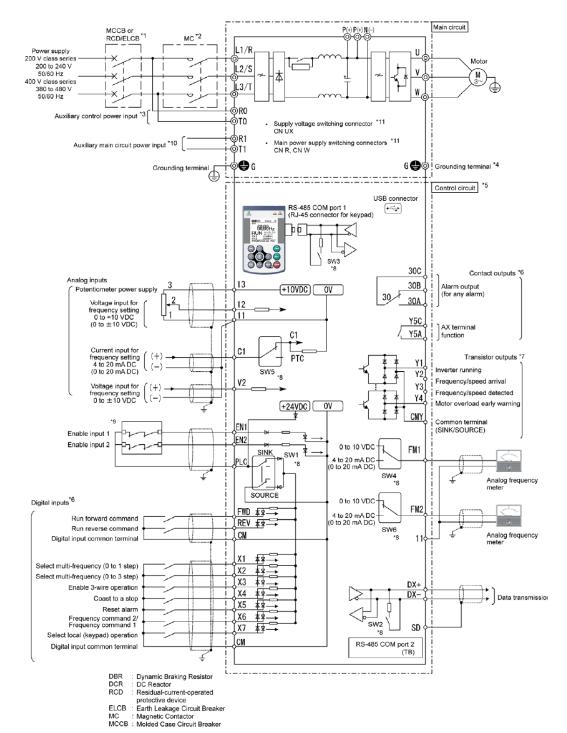
^{*2} Unavailable for concurrent use.

^{*3} COMMING SOON: The capacity from 30HP to 125HP of 230V series, 60HP to 1000HP of 460V series and 1HP to 300HP of 575V series.

4A. FRENIC-HVAC Multi-Purpose Keypad



4B. Basic wiring diagram (Operation by external signal inputs)



Note *1:

Install a recommended molded-case circuit-breaker (MCCB) or a ground fault circuit interrupter (GFCI) (with an overcurrent protection function) in the primary circuit of the inverter to protect wiring. At this time, ensure that the circuit breaker capacity is equivalent to or lower than the recommended capacity.

Note *2:

Install a magnetic contactor (MC) recommended for each inverter to separate the inverter form the power supply, apart from the MCCB or GFCI, when necessary. Connect a surge suppressor in parallel when installing a coil such as the MC or solenoid near the inverter.

Note *3:

To retain an alarm output signal *ALM* issued on inverter's programmable output terminals by the protective function or to keep the keypad alive even if the main power has shut down, connect these terminals to the power supply lines. Even without power supply to these terminals, the inverter can run.

Note *4:

A grounding terminal for a motor; use this terminal if needed..

Note *5:

For the control signal wires, use shielded or twisted wires. Ground shielded wires. To prevent malfunction due to noise, keep the control circuit wiring away from the main circuit wiring as far as possible (recommended: 10cm or more), and never set them in the same wire duct. When crossing the control circuit wiring with the main circuit wiring, set them at right angles. once *6:

The connection diagram shows factory default functions assigned to digital input terminals (X1) to (X7), (FWD) and (REV), transistor output terminals (Y1) to (Y4), and relay contact output terminals (Y5A/C) and (30A/B/C).

Note *7:

Terminal (Y1) to (Y4) (transistor outputs) support both SINK and SOURCE modes. Note *8:

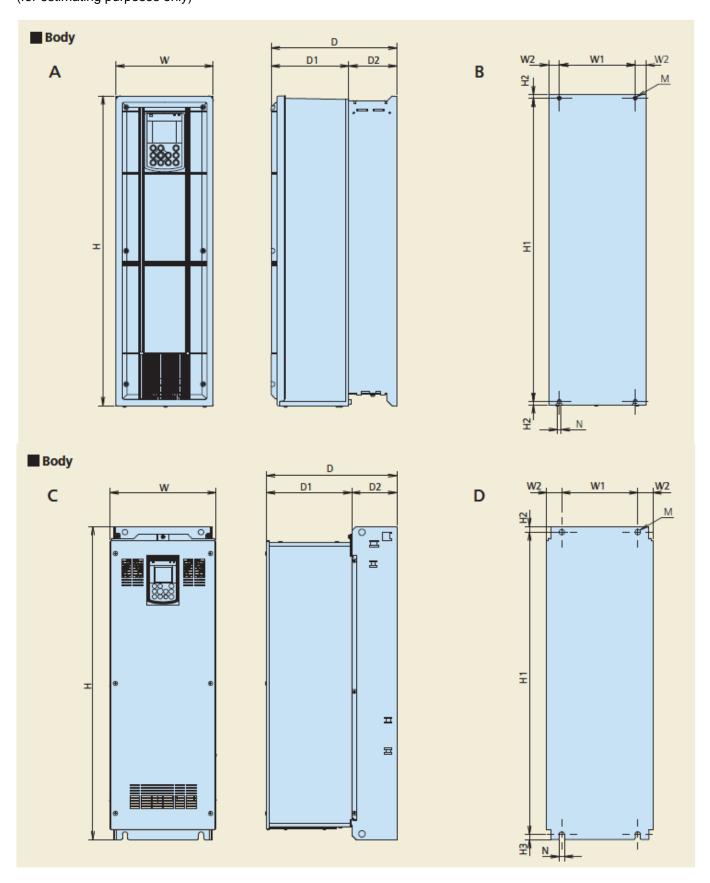
Slide switches on the control printed circuit board (control PCB). Use these switches to customize the inverter operations. For details refer to the User's or Instruction Manuals description of "Setting up the slide switches".

Standard FRENIC-HVAC Model Number Outline Dimensions:

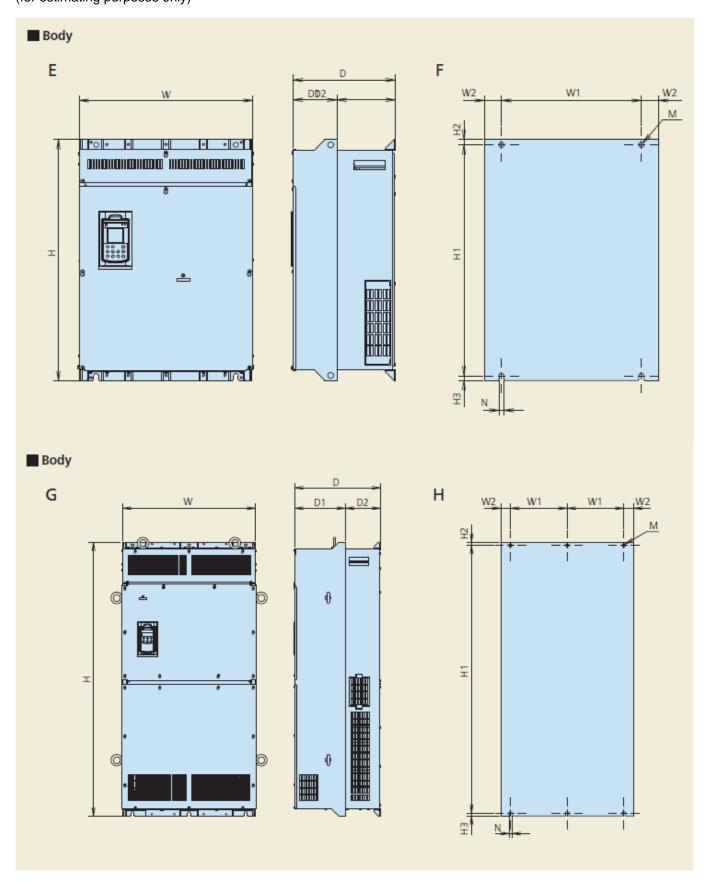
| 230V | | | | | | | | | | | | | | | | |
|---------|-----------------|----------------|---------|-----------------|---------------|-----------------|---------------|---------------|---------|---------------|---------------|--------|-----------------|---------|----------------------|--------|
| Rated | Nominal applied | Type | | Outside | dimens | ions [mi | n(inch)] | | | Mo | unting | dimen | sions [n | nm(incl | <u>1)]</u> | |
| voltage | motor (HP) | D | Dwg.no. | W | Н | D | D1 | D2 | Dwg.no. | W1 | W2 | H1 | H2 | H3 | М | N |
| | 1 | FRN001AR1□-2U | | | | | | | | | | | | | | |
| | 2 | FRN002AR1□-2U | | 150 | 465 | 262 | 162 | 100 | | 115 | 17.5 | 451 | 7 | | | |
| | 3 | FRN003AR1□-2U | | (5.91) | (18.3) | (10.3) | (6.38) | (3.94) | | (4.53) | (0.69) | (17.8) | (0.28) | | | |
| | 5 | FRN005AR1 □-2U | | | | | | | | | | | | | 2× φ 8 | 8 |
| | 7.5 | FRN007AR1□-2U | A | 203 | 585 | 262 | 162 | 100 | В | 158 | 22.5 | 571 | 7 | - | $(\phi 0.31)$ | |
| | 10 | FRN010AR1□-2U | | (7.99) | (23) | | (6.38) | (3.94) | | | | (22.5) | (0.28) | | (ψ 0.51) | (0.51) |
| | 15 | FRN015AR1□-2U | | | | | (0.36) | (3.54) | | (0.22) | (0.03) | (22.3) | (0.26) | | | |
| | 20 | FRN020AR1□-2U | | 203 | 645 | 262 | 162 | 100 | | 158 | 22.5 | 631 | 7 | | | |
| 3-phase | 25 | FRN025AR1 □-2U | | (7.99) | (25.4) | (10.3) | (6.38) | (3.94) | | (6.22) | (0.89) | (24.8) | (0.28) | | | |
| 230V | 30 | FRN030AR1 □-2U | С | 265 | 736 | 284 | 184.5 | 99.5 | | 180 | | 716 | 12 | 8 | 2x φ 10 | 10 |
| | 40 | FRN040AR1 □-2U | | (10.4) | (29) | (11.2) | (7.26) | (3.92) | D | (7.09) | 42.5 | (28.2) | (0.47) | (0.31) | $(\phi 0.39)$ | (0.39) |
| | 50 | FRN050AR1 □-2U | | 300 | 885 | 367.9 | 240.8 | 127.1 | ן י | 215 | (1.67) | 855 | 15.5 | 14.5 | 2x φ 15 | 15 |
| | 60 | FRN060AR1 □-2U | | (11.8) | (34.8) | (14.5) | (9.48) | (5) | | (8.46) | | (33.7) | (0.61) | (0.57) | $(\phi 0.59)$ | (0.59) |
| | 75 | FRN075AR1 □-2U | | 361.2 | 740 | 276.3 | 115 | 155 | | 355 | 275 | | 690 | | $2x \phi 10$ | 10 |
| | 100 | FRN100AR1□-2U | | (14.2) | (29.1) | (10.9) | (4.53) | (6.1) | | (14) | (10.8) | 720 | (27.2) | | $(\phi 0.39)$ | (0.39) |
| | 125 | FRN125AR1□-2U | K | 535.8 (21.1) | 750 (29.5) | 291.3 (11.5) | 145 (5.71) | 140 (5.51) | К | 530 (20.9) | 430 (16.9) | (28.4) | 688.7 (27.1) | _ | 2x φ 15 (φ 0.59) | |

| 460V | | | | | | | | | | | | | | | | |
|---------|-----------------|----------------|-------------------------------|--------|--------|--------|--------|--------|---------|--------|----------|---------|--------|--------|---------------|--------|
| Rated | Nominal applied | Туре | Outside dimensions [mm(inch)] | | | | | Mo | ounting | dimen | sions [n | nm(incl | ch)] | | | |
| voltage | motor (HP) | туре | Dwg.no. | W | Н | D | D1 | D2 | Dwg.no. | W1 | W2 | H1 | H2 | Н3 | М | N |
| | 1 | FRN001AR1□-4U | | | | | | | | | | | | | | |
| | 2 | FRN002AR1□-4U | | | | | | | | | | | | | | |
| | 3 | FRN003AR1□-4U | | 150 | 465 | 262 | 162 | 100 | | 115 | 17.5 | 451 | 7 | | | |
| | 5 | FRN005AR1□-4U | | (5.91) | (18.3) | (10.3) | (6.38) | (3.94) | | (4.53) | (0.69) | (17.8) | (0.28) | | | |
| | 7.5 | FRN007AR1□-4U | | | | | | | | | | | | | | |
| | 10 | FRN010AR1□-4U | Α | | | | | | В | | | | | _ | 2x φ 8 | 8 |
| | | FRN015AR1□-4U | | | | | | | | | | | | | $(\phi 0.31)$ | (0.31) |
| | 20 | FRN020AR1□-4U | | 203 | 585 | 262 | 162 | 100 | | 158 | 22.5 | 571 | 7 | | | |
| | 25 | FRN025AR1□-4U | | (7.99) | (23) | (10.3) | (6.38) | (3.94) | | (6.22) | (0.89) | (22.5) | (0.28) | | | |
| | 30 | FRN030AR1□-4U | | | | | | | | | | | | | | |
| | | FRN040AR1□-4U | | 203 | 645 | 262 | 162 | 100 | | 158 | 22.5 | 631 | 7 | | | |
| | | FRN050AR1□-4U | | (7.99) | (25.4) | | (6.38) | (3.94) | | (6.22) | (0.89) | (24.8) | (0.28) | | | |
| | 60 | FRN060AR1□-4U | C | 265 | 736 | 284 | 184.5 | 99.5 | D | 180 | | 716 | 12 | 8 | $2x \phi 10$ | |
| 3-phase | | FRN075AR1□-4U | | (10.4) | (29) | (11.2) | (7.26) | (3.92) | | (7.09) | | (28.2) | | | $(\phi 0.39)$ | |
| 460V | 100 | FRN100AR1□-4U | | 300 | 885 | 367.9 | 240.8 | 127.1 | | 215 | (1.67) | | 15.5 | | $2x \phi 15$ | |
| | 125 | FRN125AR1□-4U | | (11.8) | (34.8) | | (9.48) | (5) | | (8.46) | | (33.7) | (0.61) | (0.57) | $(\phi 0.59)$ | (0.59) |
| | 150 | FRN150AR1□-4U | | | 740 | 315 | 135 | | | | | 710 | | | | |
| | 200 | FRN200AR1□-4U | Е | 530 | (29.1) | | (5.31) | 180 | F | 430 | 50 | (28) | 15.5 | | $2x \phi 15$ | |
| | 250 | FRN250AR1□-4U | _ | (20.9) | 1000 | 360 | 180 | (7.09) | | (16.9) | (1.97) | | (0.61) | (0.57) | $(\phi 0.59)$ | (0.59) |
| | | FRN300AR1□-4U | | | (39.4) | | (7.09) | | | | | (38.2) | | | | |
| | | FRN350AR1□-4U | | | 1000 | 360 | 180 | | | | | 970 | | | | |
| | 450 | FRN450AR1□-4U | G | 680 | (39.4) | (14.2) | (7.09) | 180 | н | 290 | 50 | (38.2) | 15.5 | | $3x \phi 15$ | |
| | 500 | FRN500AR1□-4U |] " | (26.8) | 1400 | 440 | 260 | (7.09) | l '' | (11.4) | (1.97) | 1370 | (0.61) | (0.57) | $(\phi 0.59)$ | (0.59) |
| | 600 | FRN600AR1□-4U | | | (55.1) | | (10.2) | | | | | (53.9) | | | | |
| | 800 | FRN800AR1□-4U | | 880 | 1400 | 440 | 260 | 180 | | 260 | 50 | 1370 | | | | |
| | | | ī | | (55.1) | | (10.2) | (7.09) | J | | | (53.9) | | | $4x \phi 15$ | |
| | | FRN900AR1□-4U | • | 1000 | 1550 | 500 | 313.2 | 186.8 | l | 300 | 49.5 | 1520 | (0.61) | (0.57) | $(\phi 0.59)$ | (0.59) |
| | 1000 | FRN1000AR1□-4U | | (39.4) | (61) | (19.7) | (12.3) | (7.35) | | (11.8) | (1.95) | (59.8) | | | | |

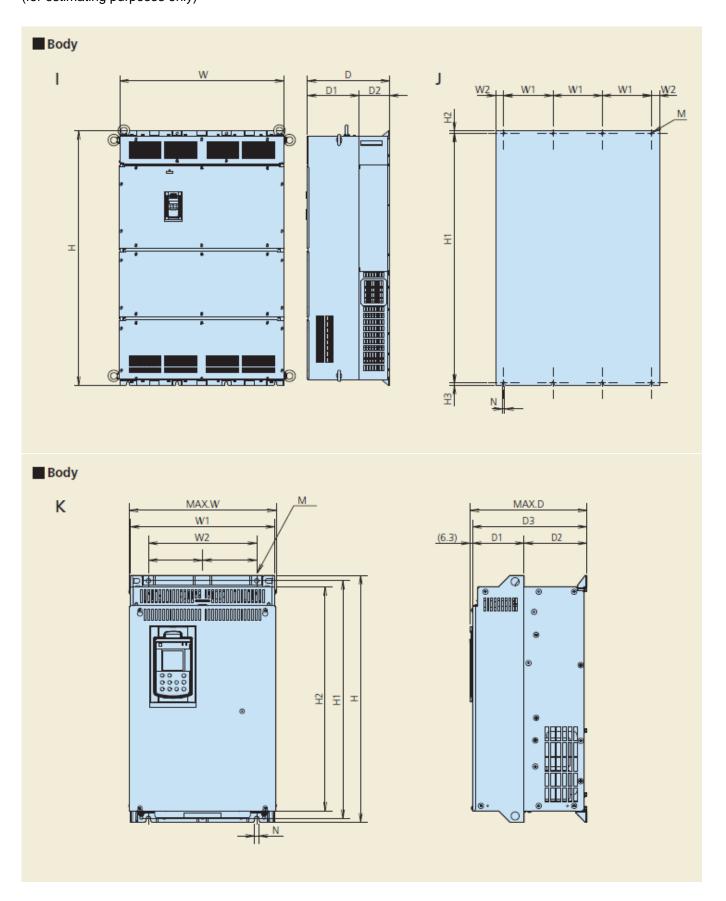
FRENIC-HVAC: Outline Drawings - Reference Model Number Outline Dimension Tables (for estimating purposes only)



FRENIC-HVAC: Outline Drawings - Reference Model Number Outline Dimension Tables (for estimating purposes only)



FRENIC-HVAC: Outline Drawings - Reference Model Number Outline Dimension Tables (for estimating purposes only)



FRENIC-HVAC Multi-function Keypad

