YASKAWA

YASKAWA AC Drive GA700

Crane Software

Control Specifications

Software No. VSAA0578x

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

Table of Contents

| 1. | General Specifications | 1 |
|----|---|----|
| 2. | Electrical Specifications | 1 |
| 3. | Connection Diagram | 2 |
| 4. | Parameter Differences with Standard GA700 | 3 |
| 5. | Test Run | 43 |
| 6. | Description of Added Functions | 44 |
| 7. | Drive Faults | 62 |
| | | |
| / | Appendix 1. Parameter Calculations | 64 |
| / | Appendix 2. Checklist | 68 |
| / | Appendix 3. Tuning Procedures | 70 |
| / | Appendix 4. Flux Compensation | 71 |

PAGE

1. General Specifications

The document cover the Crane Custom GA700 AC Drive, and supplements the technical manual for the standard GA700 SIEP $C710617\square$.

- ① For instructions on how to use the operator keypad and perform Auto-Tuning, refer the technical manual for the standard GA700 drive (SIEP C710617□).
- ② Sequence error SE1 to SE4 concern errors and faults specific to Crane Custom Software. If sequence error SE1 through SE4 occur, refer to section 6.1.5 and Appendix 1 to calculate the correct values needed to set parameters S1-01 through S1-15, and the proper external sequence required.
- 2. Electrical Specifications

2.1 Design

GA700 (standard AC drive)

- 2.2 Compatible Option Cards
- (1) Frequency I/O Options (using port CN5-A) DI-A3 AI-A3 SI-P3(PROFIBUS-DP) SI-C3(CC-Link) SI-N3(DeviceNet) SI-S3(CANopen) SI-T3(MECHATROLINK-Ⅱ) SI-EM3(Modbus TCP/IP) SI-EN3(EtherNet/IP) SI-ET3(MECHATROLINK-Ⅲ) SI-EP3(PROFINET)
- (2) Monitor Output Options (using ports CN5-A, B, C) AO-A3 DO-A3
- (3) Speed Control Option Cards (using ports CN5-B, C) PG-B3 PG-X3
- (4) Speed Control Option Cards (using ports CN5-C) PG-RT3
- 2.3 Custom Model(1) Software No.
 - Software number for the crane customized GA700 is VSAA0578 .
 - (2) Type

400 V class: 0.4 to 315 kW

(3)Model

CIPR-GA70xxxxxxxxxxxx

3. Connection Diagram



4. Parameter Differences with Standard GA700

4.1 List of Parameter Changes

4.1.1 Functions

The following functions differ in the crane version of GA700:

| New Functions | Functions Removed | Functions Changed |
|---------------------------------|--------------------------------|---|
| Brake sequence and brake signal | PM Control | Changed what happens when an external BB command |
| observation function | LOCAL/REMOTE key | is entered during run. See section 6.9. |
| Run command tuning | 3 –wire operation | The input signal for "During DC Braking" (Initial |
| Impact Stop Function | PID Control | Excitation) was changed to prevent triggering UV1, UV2 detection. |
| Swift Lift | Speed Search Function | Defaults and setting ranges changed for certain parameters. |
| Overload Detection Function | Energy Saving | See the parameter table in section 4.2. |
| Travel Limit Function | Torque Control | |
| | Momentary Power Loss Ride-Thru | |
| | Fault Restart Function | |
| | Speed limit detection | |
| | Frequency lower limit | |
| | Magnetic field weakening | |
| | High Slip Braking | |
| | Virtual MFIO selection | |
| | DWEZ Support | |
| | MFDI Selection 2 | |
| | MFDO Selection 2 | |
| | | |

4.1.2 Parameter

The following parameter groups have been changed for the crane version of GA700.

| Parameter Group | Standard AC Drive | Crane Custom AC Drive | Changes |
|-----------------|---------------------------|-----------------------|--------------------------------------|
| A1 | Environment Setting | \leftarrow | A1-01, 02, 03: Setting range changed |
| b1 | Run Mode Selection | \leftarrow | b1-07, 08: deleted |
| b3 | Speed Search | Not available | Speed Search deleted |
| b5 | PID Control | Not available | PID Control deleted |
| b6 | Dwell Function | Not available | Dwell function deleted |
| b8 | Energy Saving Control | Not available | Energy Saving Control deleted |
| C4 | Torque Compensation | \leftarrow | C4-03, 04, 05: Deleted |
| d5 | Torque Reference | Not available | Torque reference deleted |
| H1 | Sequence Input | \leftarrow | H1-05 to H1-08: Defaults changed |
| H2 | Sequence Output | \leftarrow | H2-01,02: Default changed |
| H6 | Pulse I/O | \leftarrow | H6-01: Setting range changed |
| L3 | Stall Prevention Function | \leftarrow | L3-04: Default changed |
| L5 | Fault Restart | Not available | Fault Restart deleted |
| L6 | Overtorque Detection | Not available | Overtorque detection deleted |
| L8 | Hardware Protection | \leftarrow | L8-07: Default changed |
| o2 | LOCAL/REMOTE key | \leftarrow | Parameter o2-01 deleted |
| S1 | Not available | Brake Sequence | Brake Sequence Added |
| S2 | Not available | Run Cmd Tuning | Run Cmd Tuning Added |
| S3 | Not available | Impact Stop function | Impact Stop function added |
| S4 | Not available | Swift Lift Function | Swift Lift function added |
| S5 | Not available | Overload Detection | Overload detection added |
| S6 | Not available | Overtorque Detection | Overtorque detection added |
| U2 | Fault History | \leftarrow | U2-21, 22: Added |
| U4 | Monitors | \leftarrow | U4-15: Added |

4.1.3 Multi-Function Input, Output Function

TerminalM3-M4 Function

TerminalM5-M6 Function

H2-02

H2-03

| Parameter No. | Name | Standard AC Drive | Crane Custom AC Drive |
|---------------|------------------------|----------------------------------|----------------------------------|
| H1-01 | Terminal S1 Function | 40(Forward RUN (2-Wire)) | 40(Forward RUN (2-Wire)) |
| H1-02 | Terminal S2 Function | 41(Reverse RUN (2-Wire)) | 41(Reverse RUN (2-Wire)) |
| H1-03 | Terminal S3 Function | 24 (External fault) | 24 (External fault) |
| H1-04 | Terminal S4 Function | 14 (Fault reset) | 14 (Fault reset) |
| H1-05 | Terminal S5 Function | 3 (Multi-step speed reference 1) | 0 (Brake release check) |
| H1-06 | Terminal S6 Function | 4 (Multi-step speed reference 2) | 3 (Multi-step speed reference 1) |
| H1-07 | Terminal S7 Function | 6 (Jog Command Selection) | 4 (Multi-step speed reference 2) |
| H1-08 | Terminal S8 Function | 8 (External baseblock: N.O.) | 9 (External baseblock: N.C.) |
| | | | |
| Parameter No. | Name | Standard AC Drive | Crane Custom AC Drive |
| H2-01 | TerminalM1-M2 Function | 0 (During run) | 21 (Brake release command) |

I/O sequences and analog input selections were also changed along with the addition of new functions and the removal of other functions.

1 (Zero speed)

2 (Frequency agree)

1 (Zero speed)

2 (Frequency agree)

4.2 Parameter Description

4.2.1 Parameter Table

| Parameter Group | Group Name | Function No. | Function Name |
|--------------------|----------------------|-----------------|--|
| | Initialization | A1 | Environment Settings |
| А | Parameters | A2 | User Parameter Settings |
| | | b1 | Operation Mode Selection |
| | | b2 | DC Injection Braking and Short Circuit Braking |
| b | Application | b4 | Timer Function |
| 0 | rippirourion | b7 | Droop Control |
| | | b9 | Zero Servo |
| | | C1 | Accel & Decel Time |
| | | C2 | S-Curve Charactersitic |
| | | C3 | Slin Compensation |
| С | Tuning | C4 | Torque Compensation |
| | | C5 | Auto Sneed Regulator (ASR) |
| | | C5 | Duty & Carrier Frequency |
| | | | Eracuanay Beference |
| | | d2 | Deference Limite |
| | | d2 | Lymp Erspansy |
| d | Reference Settings | <u>d3</u> | Frequency |
| | 0 | 4 | Field Westering / Equities |
| | | 00 | Field weakening / Forcing |
| | | d7 | Offset Frequency |
| | | E1 | V/f Charactersitics |
| F | Motor Parameters | E2 | Motor Parameter |
| E | Motor Farameters | E3 | Motor 2 V/f Charactersitics |
| | | E4 | Motor 2 Parameters |
| | | F1 | PG Option Setup (Encoder) |
| | | F2 | Analog Input Option |
| | | F3 | Digital Input Option |
| F | Options | F4 | Analog Output Option |
| | L | F5 | Digital Output Option |
| | | F6 | Communication Options |
| | | F7 | Ethernet Options |
| | | H1 | Digital Inputs |
| | - | H2 | Digital Outputs |
| | | H3 | Analog Inputs |
| Н | Terminal Functions | H4 | Analog Outputs |
| | | H5 | Modbus Communication |
| | | H6 | Pulse Train Input/Output |
| | | L1 | Motor Protection |
| | | 12 | Power Loss Ride Through |
| | | 13 | Stall Pravantion |
| т | Protection Functions | LJ LA | Sneed Detection |
| L | Trotection Functions | L4 17 | Torque Limit |
| | | 1.8 | Drive Protection |
| | | 1.0 | Drive Protection 2 |
| | | L9 n1 | Hunting Dravention |
| | | n2 | Auto Erro Reculator (AER) |
| | | n2 | Auto Fier (Overenzite Droking |
| n | Special Adjustment | 113 | A de Orien Leon Vester Trus |
| | | n4 | Adv Open Loop Vector Tune |
| | | nS | Feed Forward Control |
| | | no | Unline Luning |
| | | 01 | Keypad Display |
| | Keypad-Related | 02 | Keypad Operation |
| 0 | Settings | 03 | Copy Keypad Function |
| | J | 04 | Maintenance Monitors |
| | | 05 | Log Function |
| | | <u>S1</u> | Brake Sequence |
| | | S2 | Run Cmd Tuning |
| S | Crane Parameters | S3 | Impact Stop |
| 5 | cruite i arunneters | S4 | Light-load Acceleration |
| | | S5 | Overload Detection |
| | | S6 | Overtorque Detection |

Table 4.2.1 Parameter Groups

| | | | | | Table 4 | .2.2 Parameter Table (1) Gray shading indicates a difference l | between th | e crane (| GA700 ai | nd the sta | undard G | GA 700. |
|-------------------|---------------------|---|------------------|------------------|---------|--|--------------------------|-----------|----------------------------|------------------|----------|--------------------|
| | No. | Parameter Name | Setting Range | Setting Units | Default | Description | Changes during Run | V/f | Access L V/f with PG | evel (*3) OLV | CLV | MEMOBUS Address |
| | A1-00 | Language Selection | 0,1 | 1 | 1 *2 | 0: English 1: Japanese | Yes | A | A | A | A | 100H |
| | A1-01 | Access Level Selection | 0 to 3 | 1 | 2 | 0 : Operation Only 1 : User Parameters 2 : Advanced Level 3 : Expert Level | Yes | A | A | A | A | 101H |
| neters | A1-02 | Control Method Selection | 0 to 3 | 1 | 2 *2 | 0 : V/f Control 1 : V/f Control with Encoder 2 : Open Loop Vector 3 : Closed Loop Vector | No | S | S | S | S | 102H |
| ion Paran | A1-03 | Intitalize Parameters | 0000 to 2220 | 1 | 0000 | 1110 : User Initialization 2220 : 2-Wire Initialization | No | A | А | A | A | 103H |
| Initializat | A1-04 | Password 1 | 0000 to 9999 | 1 | 0000 | | No | A | A | A | A | 104H |
| | A1-05 | Password 2 | 0000 to 9999 | 1 | 0000 | | No | A | A | A | A | 105H |
| | A1-11 | Firmware Update Lock | 0,1 | 1 | 0 | | No | Е | Е | E | Е | 111DH |
| | A1-12 | Bluetooth ID | 0000 to 9999 | 1 | 0000 | | No | A | A | A | A | 1564H |
| Parameter Setting | A2-01 A2-32 | User Parameter 1 (thru 32) | _ | _ | _ | | No | A | A | A | A | 106H to 125H |
| User | A2-33 | User Parameter Auto Selection | 0,1 | 1 | 1 | | No | А | Α | A | А | 126H |
| D | b1-01 | Frequency Reference Selection 1 | 0 to 4 | 1 | 0 | 0:Keypad 1: Control circuit terminals 2: MEMOBUS 3: Option card 4 : Pulse Train Input | No | S | S | S | S | 180H |
| | b1-02 | Run Command Selection 1 | 0 to 3 | 1 | 1 | 0: Keypad 1: Control circuit terminals 2: MEMOBUS 3: Option card | No | S | S | S | S | 181H |
| | b1-03 | Stopping Method Selection | 0 to 3 | 1 | 0 | 0: Ramp to stop 1: Coast to stop 2: DC Injection Braking (DB) 3: Coast to stop with timer | No | S | S | S | S | 182H |
| | b1-04 | Reverse Operation Selection | 0,1 | 1 | 0 | 0: Reverse possible 1: Reverse prohibited | No | A | A | A | A | 183H |
| | b1-05 | Operation Selection for Setting of E1-09 or less | 0 to 3 | 1 | 0 | 0: Operates according to frequency reference 1: Output shuts off 2: Operate according to E1-09 3: Zero Speed operation | No | No | No | No | A | 184H |
| c | b1-06 | Read Sequence Input Twice | 0,1 | 1 | 1 | 0 : Single Scan 1 : Double Scan | No | A | A | A | A | 185H |
| Applicatior | b1-14 | Phase Order Selection | 0,1 | 1 | 0 | 0: Standard 1: Switch phases | No | A | A | A | A | 1C3H |
| | b1-15 | Frequency Reference Selection 2 | 0 to 4 | 1 | 0 | 0:Keypad 1: Control circuit terminals 2: MEMOBUS 3: Option card 4 : Pulse Train Input | No | A | A | A | A | 1C4H |
| | b1-16 | Run Command Selection 2 | 0 to 3 | 1 | 1 | 0: Keypad 1: Control circuit terminals 2: MEMOBUS 3: Option card | No | A | A | A | A | 1C5H |
| | b1-17 | Run Command at Power Up | 0,1 | 1 | 0 | 0: Prohibited 1: Run command allowed at power up | No | A | A | A | A | 1C6H |
| | b1-21 | CLV Start Selection | 0,1 | 1 | 0 | 0 : Reject RUN if b2-01 <u1-05<e1-09 1 : Accept RUN Command at Any Speed</u1-05<e1-09 | No | No | No | No | E | 748H |
| | b1-23 | Selection REV Parameters | 0,1 | 1 | 0 | 0 : Disabled 1 : Enabled | No | A | A | A | No | B1DH |
| | b1-35 | Digital Input Deadband Time | 0.0 to 100.0 | 0.1ms | 0.0 | | No | E | E | E | E | 1117H |

*2: This value is not reset when the drive is initialized. Specifications for Japan have A1-00 = 1 and A1-02 = 2 as a default.

Access levels: S, A, x
 S: "Setup Mode" parameters can be monitored and edited. A: "Advanced Mode" (A1-01=2) parameters can be monitored and edited. No: Parameter not available at this Access Level.

| | | | | | Table 4 | .2.2 Parameter Table (2) | | | | | | |
|--------------|-------|--------------------------------------|------------------|------------------|-----------|--|--------------------------|-----|----------------------------|-------------------|-----|--------------------|
| | No. | Parameter Name | Setting Range | Setting Units | Default | Description | Changes during Run | V/f | Access L V/f with PG | _evel (*3) OLV | CLV | MEMOBUS Address |
| | b2-01 | Zero Speed Level | 0.0 to 10.0 | 0.1 Hz | 0.5 | | No | A | А | A | A | 189H |
| king | b2-02 | DC Injection Braking Current | 0 to 100 | 1% | 50 | Sets the DC Injection Braking current as a percentage of the drive rated current. | No | A | А | A | No | 18AH |
| ection Bra | b2-03 | DC Injection Braking Time at Start | 0.00 to 10.00 | 0.01 s | 0.00 | | No | A | A | A | A | 18BH |
| DC Inje | b2-04 | DC Injection Braking Time at Stop | 0.00 to 10.00 | 0.01 s | 0.00 * | *Default setting depends on the control mode set to A1-02 (refer to the appendix). | No | A | A | A | A | 18CH |
| | b2-08 | Magnetic Flux Compensation Volume | 0 to 1000 | 1% | 0 | Set as a percentage of the no-load current value. | No | No | No | А | No | 190H |
| | b4-03 | Terminal M1-M2 ON-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B30H |
| | b4-04 | Terminal M1-M2 OFF-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B31H |
| unction | b4-05 | Terminal M3-M4 ON-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B32H |
| Timer Fi | b4-06 | Terminal M3-M4 OFF-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B33H |
| | b4-07 | Terminal M5-M6 ON-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B34H |
| | b4-08 | Terminal M5-M6 OFF-Delay Time | 0 to 65000 | 1ms | 0 | | No | E | E | E | E | B35H |
| roop Control | b7-01 | Droop Control Gain | 0.0 to 100.0 | 0.1% | 0.0 | | Yes | No | No | No | A | 1CAH |
| | b7-02 | Droop Control Delay Time | 0.03 to 2.00 | 0.01 s | 0.05 | | Yes | No | No | No | A | 1CBH |
| Dro | b7-03 | Droop Control Limit Selection | 0,1 | 1 | 1 | 0: Disabled 1: Enabled | No | No | No | No | A | 17EH |
| Servo | b9-01 | Zero Servo Gain | 0 to 100 | 1 | 5 | | No | No | No | No | A | 1DAH |
| Zero (| b9-02 | Zero Servo Completion Width | 0 to 16383 | 1 | 10 | | No | No | No | No | A | 1DBH |
| | C1-01 | Accel Time 1 | | | 2.0 | | Yes | S | S | S | S | 200H |
| | C1-02 | Decel Time 1 | | | 3.0 | | Yes | S | S | S | S | 201H |
| | C1-03 | Accel Time 2 | | | | | Yes | А | А | А | A | 202H |
| e | C1-04 | Decel Time 2 | | | | *The acceleration/deceleration setting range will | Yes | Α | А | А | А | 203H |
| tion Tim | C1-05 | Accel Time 3 | 0.0 to 6000.0 | 0.1 s | 10.0 | vary based on the units selected in C1-10. If C1-10 is set to zero, then the setting range for the | Yes | А | А | А | A | 204H |
| ecelerat | C1-06 | Decel Time 3 | | | 10.0 | Accel/decel time will be 0.00 to 600.00 s | Yes | A | A | А | A | 205H |
| tion / D | C1-07 | Accel Time 4 | | | | | Yes | A | A | A | A | 206H |
| ccelerat | C1-08 | Decel Time 4 | | | | | Yes | А | A | А | A | 207H |
| A | C1-09 | Emergency stop Time | | | 2.0 | | Yes | A | A | A | A | 208H |
| 1 | C1-10 | Accel/Decel Time Units | 0,1 | 1 | 1 | 0: 0.01 s units 1: 0.1 s units | No | A | A | А | A | 209H |
| | C1-11 | Accel/Decel Time Switching Frequency | 0.0 to 590.0 | 0.1 Hz | 0.0 * | *Default setting depends on the control mode set to A1-02 (refer to the appendix). | No | A | A | A | A | 20AH |
| 1 | C1-14 | Accel/Decel Rate Frequency | 0.0 to | 0.1 Hz | 0.0 | | Yes | А | А | A | А | 264H |

 Table 4.2.2 Parameter Table (2)

Table 4.2.2 Parameter Table (3)

| | | | Catting Catting Changes Access Leve | | _evel (*3) | vel (*3) | | | | | | |
|-----------|-------|--|-------------------------------------|---------|------------|---|---------------|-----|----------------|-----|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| stics | C2-01 | S-Curve Characteristic Time at Acceleration Start | 0.00 to 10.00 | 0.01s | 0.20* | *Default setting depends on the control mode set to A1-02 (refer to the appendix). | No | А | А | А | А | 20BH |
| aracteris | C2-02 | S-Curve Characteristic Time at Acceleration End | 0.00 to 10.00 | 0.01s | 0.20 | | No | А | А | А | А | 20CH |
| rve Chá | C2-03 | S-Curve Characteristic Time at Deceleration Start | 0.00 to 10.00 | 0.01s | 0.20 | | No | А | А | А | А | 20DH |
| S Cu | C2-04 | S-Curve Characteristic Time at Deceleration End | 0.00 to 10.00 | 0.01s | 0.00 | | No | A | А | A | A | 20EH |
| | C3-01 | Slip Compensation Gain | 0.0 to 2.5 | 0.1 | 1.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | A | No | A | A | 20FH |
| | C3-02 | Slip Compensation Primary Delay Time | 0 to 10000 | 1 ms | 200 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | A | No | A | No | 210H |
| | C3-03 | Slip Compensation Limit | 0 to 250 | 1% | 200 | | No | A | No | A | No | 211H |
| | C3-04 | Slip Compensation Selection During Regeneration | 0 to 2 | 1 | 0 | Sets the slip compensation function during regenerative operation. 0 : Disabled 1 : Enabled Above 6Hz 2 : Enabled | No | A | No | A | No | 212H |
| ч | C3-05 | Output Voltage Limit Operation Selection | 0,1 | 1 | 0 | Determines if the motor magnetic flux is automatically decreased when output voltage saturation occurs. 0: Disabled 1: Enabled | No | No | No | A | A | 213H |
| ensatio | C3-16 | Vout Modulation Limit Start Level | 70.0 to 90.0 | 0.1% | 90.0 | | No | No | No | Е | Е | 261H |
| o Comp | C3-17 | Vout Modulation Limit Max Level | 85.0 to100.0 | 0.1% | 100.0 | | No | No | No | Е | Е | 262H |
| Sli | C3-18 | Output Voltage Limit Level | 50.0 to 100.0 | 0.1% | 90.0 | | No | No | No | Е | Е | 263H |
| | C3-21 | Motor 2 Slip Compensation Gain | 0.0 to 2.5 | 0.1 | 1.0 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | A | No | A | A | 33EH |
| | C3-22 | Motor 2 Slip Compensation Primary Delay Time Constant | 0 to 10000 | 1 ms | 200 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | A | No | A | No | 241H |
| | C3-23 | Motor 2 Slip Compensation Limit | 0 to 250 | 1% | 200 | | No | A | No | A | No | 242H |
| | C3-24 | Motor 2 Slip Compensation Selection During Regeneration | 0 to 2 | 1 | 0 | Sets the slip compensation during regenerative operation function for motor 2. 0 : Disabled 1 : Enabled Above 6Hz 2 : Enabled | No | A | No | A | No | 243H |
| | C3-28 | Adaptive Slip Control Mode | 0,1 | 1 | 0 | Sets the slip compensation function mode. 0:Normal 1:Advanced | No | No | No | No | Е | 1B5BH |
| | C4-01 | Torque Compensation Gain | 0.00 to 2.50 | 0.01 | 1.00* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | A | А | А | No | 215H |
| | C4-02 | Torque Compensation Primary Delay Time Constant | 0 to 60000 | 1 ms | 20* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | A | A | A | No | 216H |
| | C4-06 | Torque Compensation Primary Delay Time Constant 2 | 0 to 10000 | 1 ms | 150 | | No | No | No | A | No | 21AH |
| sation | C4-07 | Motor 2 Torque Compensation Gain | 0.00 to 2.50 | 0.01 | 1.00 | *Default activities is determined by the central mode | Yes | A | A | A | No | 341H |
| ompens | C4-08 | M2 Torque Comp Delay Time | 60000 | 1 ms | 20 * | set in E3-01 (refer to the appendix) | Yes | A | A | A | No | 1110H |
| due C(| C4-13 | Torque Comp Delay Time Select 1 | 60000 | 1ms | * | set in A1-02 (refer to the appendix) | No | A | A | A | No | 1115H |
| Tor | C4-14 | M2 Torque Comp Delay Time Sel 1 | 60000 | 1ms | * | set in E3-01 (refer to the appendix) | No | A | А | А | No | 1116H |
| | C4-19 | Torque Ripple Suppress Min Freq | 10.0 | 0.1Hz | 0.1Hz | | No | E | E | E | E | B8DH |
| | C4-20 | Voltage Compensation Adjust 1 | 0 to 200 | 1 | 120 | | No | E | E | E | E | BCBH |
| | C4-21 | Current Control Gain | 0.50 to | 0.01 | 1 00 | | No | No | No | No | F | 15834 |
| | 04-20 | | 2.50 | 0.01 | 1.00 | | 110 | 140 | NU | NU | L . | 100011 |

Table 4.2.2 Parameter Table (4)

| | | | | | | | Changes | | Access | evel (*3) | | |
|--------------|-------|--|-------------------------|------------------|---------------|---|---------------|-----|----------------|-----------|-----|--------------------|
| | No. | Parameter Name | Setting Range | Setting Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | MEMOBUS Address |
| | C5-01 | ASR Proportional Gain 1 (P) | 0.00 to 300.00 ** | 0.01 | 20.00 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | No | А | No | А | 21BH |
| | C5-02 | ASR Integral Time 1 (I) | 0.000 to 60.000 | 0.001 s | 0.500 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | No | A | No | A | 21CH |
| | C5-03 | ASR Proportional Gain 2 (P) | 0.00 to 300.00 | 0.01 | 20.00 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | No | A | No | A | 21DH |
| | C5-04 | ASR Integral Time 2 (I) | 0.000 to 60.000 | 0.001 s | 0.500 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | Yes | No | А | No | А | 21EH |
| | C5-05 | ASR Limit | 0.0 to 20.0 | 0.1% | 5.0* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | A | No | No | 21FH |
| | C5-06 | ASR Primary Delay Time Constant | 0.000 to 0.500 | 0.001 s | 0.004* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | No | No | А | 220H |
| | C5-07 | ASR Gain Switch Frequency | 0.0 to 400.0 | 0.1 Hz | 0.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | No | No | A | 221H |
| | C5-08 | ASR Integral Limit | 0 to 400 | 1% | 400 | | No | No | No | No | A | 222H |
| | C5-12 | Integral Operation during Accel/Decel | 0,1 | 1 | 0 | Disabled. Integral functions are enabled only during constant speed. Enabled. Integral functions are always enabled, during accel/decel and during constant speed. | No | No | А | No | No | 386H |
| | C5-17 | Motor Inertia | 0.0001 to 6.0000 | 0.0001 | 0.0015 *** | ***Setting range and default setting are determined by drive capacity (refer to the appendix) | No | No | No | No | E | 276H |
| | C5-18 | Motor Inertia Ratio | 0.0 to 6000.0 | 0.1 | 1.0 | | No | No | No | No | E | 277H |
| ed Regulator | C5-21 | Motor 2 ASR Proportional Gain 1 (P) | 0.00 to 300.00 | 0.01 | 20.00 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | No | А | No | A | 356H |
| | C5-22 | Motor 2 ASR Integral Time 1 (I) | 0.000 to 60.000 | 0.001 s | 0.500 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | No | A | No | A | 357H |
| matic Spe | C5-23 | Motor 2 ASR Proportional Gain 2 (P) | 0.00 to 300.00 | 0.01 | 20.00 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | No | А | No | A | 358H |
| Auto | C5-24 | Motor 2 ASR Integral Time 2 (I) | 0.000 to 60.000 | 0.001 s | 0.500 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | Yes | No | А | No | A | 359H |
| | C5-25 | Motor 2 ASR Limit | 0.0 to 20.0 | 0.1% | 5.0 | | No | No | А | No | No | 35AH |
| | C5-26 | Motor 2 ASR Primary Delay Time Constant | 0.000 to 0.500 | 0.001 s | 0.004 | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | No | No | No | No | A | 35BH |
| | C5-27 | Motor 2 ASR Gain Switch Frequency | 0.0 to 400.0 | 0.1 Hz | 0.0 | | No | No | No | No | А | 35CH |
| | C5-28 | Motor 2 ASR Integral Limit | 0 to 400 | 1% | 400 | | No | No | No | No | A | 35DH |
| | C5-29 | Speed Control Response | 0,1 | 1 | 0 | Sets the level of speed control responsiveness. Usually it is not necessary to change this setting. 0 : Standard 1 : High Performance 1 | No | E | E | E | E | B18H |
| | C5-32 | Integral Operation during Accel/Decel for Motor 2 | 0,1 | 1 | 0 | Disabled. Integral functions for motor 2 are enabled only during constant speed. Enabled. Integral functions are always enabled for motor 2, during accel/decel and during constant speed. | No | No | A | No | No | 361H |
| | C5-37 | Motor 2 Inertia | 0.0001 to 6.000 | 0.0001 | 0.0015 *** | ***Setting range and default setting are determined by drive capacity (refer to the appendix) | No | No | No | No | E | 278H |
| | C5-38 | Motor 2 Load Inertia Ratio | 0.0 to 6000.0 | 0.1 | 1.0 | | No | No | No | No | Е | 279H |
| | C5-50 | Notch Filter Frequency | 0,2 to 100 | 1Hz | 0 | | No | No | No | No | E | B14H |
| | C5-51 | Notch Filter Bandwidth | 0.5 to 5.0 | 0.1 | 1.0 | | No | No | No | No | Е | B15H |

Table 4.2.2 Parameter Table (5)

| | | | Sotting | Setting | | | Changes Access Level (*3) | | Access L | _evel (*3) | | |
|-----------------|-------|---|-----------------------------|---------|------------|--|---------------------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | C6-02 | Carrier Frequency Selection | 1 to F | 1 | 1 *** | | No | S | S | S | S | 224H |
| equency | C6-03 | Carrier Frequency Upper Limit | 1.0 to 15.0 ** *** | 0.1 kHz | 2.0 *** | The carrier frequency is set as follows: 1: 2.0kHz 2: 5.0kHz 3: 8.0kHz 4: 10.0kHz 5: 12.5kHz 6: 15.0kHz | No | A | A | A | A | 225H |
| Carrier Fre | C6-04 | Carrier Frequency Lower Limit | 1.0 to 15.0 ** *** | 0.1 kHz | 2.0 *** | F: Random ** Possible only when C6-02 = 0F. ***Both setting range and default/facotry settings will vary based on drive capacity. | No | A | A | No | No | 226H |
| | C6-05 | Carrier Frequency Proportional Gain | 00 to 99 ** | 00 | 00 | | No | A | A | No | No | 227H |
| | d1-01 | Frequency Reference 1 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | S | S | S | S | 280H |
| | d1-02 | Frequency Reference 2 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | S | S | S | S | 281H |
| | d1-03 | Frequency Reference 3 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | S | S | S | S | 282H |
| erence | d1-04 | Frequency Reference 4 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | S | S | S | S | 283H |
| ncy Ref | d1-05 | Frequency Reference 5 | 0.00 to 590.00 | 0.01 Hz | 0.00 | The setting units and setting range will vary based on parameters E1-04 and o1-03. | Yes | А | Α | А | Α | 284H |
| Frequei | d1-06 | Frequency Reference 6 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | А | Α | А | Α | 285H |
| | d1-07 | Frequency Reference 7 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | А | А | А | A | 286H |
| | d1-08 | Frequency Reference 8 | 0.00 to 590.00 | 0.01 Hz | 0.00 | | Yes | А | Α | А | Α | 287H |
| | d1-17 | Jog Frequency Reference | 0.00 to 590.00 | 0.01 Hz | 6.00 | | Yes | S | S | S | S | 292H |
| imit | d2-01 | Frequency Reference Upper Limit Value | 0.0 to 110.0 | 0.1% | 100.0 | | No | A | A | A | A | 289H |
| uency L | d2-02 | Frequency Reference Lower Limit Value | 0.0 to 110.0 | 0.1% | 0.0 | | No | A | А | А | А | 28AH |
| Freq | d2-03 | Master Speed Reference Lower Limit Value | 0.0 to 110.0 | 0.1% | 0.0 | | No | А | A | A | A | 293H |
| / | d3-01 | Jump Frequency 1 | 0.00 to 590.00 | 0.1 Hz | 0.0* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | А | А | А | Α | 294H |
| duency | d3-02 | Jump Frequency 2 | 0.00 to 590.00 | 0.1 Hz | 0.0* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | А | А | А | A | 295H |
| ump Fr | d3-03 | Jump Frequency 3 | 0.00 to 590.00 | 0.1 Hz | 0.0* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | A | 296H |
| ſ | d3-04 | Jump Frequency Width | 0.0 to 20.0 | 0.1 Hz | 1.0* | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | A | 297H |
| ence | d4-01 | Frequency Reference Hold Function Selection | 0,1 | 1 | 0 | 0: Hold Frequency Reference not saved. 1: Hold Frequency Reference saved. | No | А | А | А | А | 298H |
| Sequ | d4-10 | Up/Down Lower Limit Selection | 0,1 | 1 | 0 | | No | А | А | А | А | 2B6H |
| ning Forcing | d6-03 | Field Forcing Selection | 0,1 | 1 | 0 | Sets the field forcing function. 0 : Disabled 1 : Enabled | No | No | No | A | A | 2A2H |
| Field Weakening | d6-06 | Field Forcing Limit | 100 to 400 | 1% | 400% | | No | No | No | A | A | 2A5H |

Table 4.2.2 Parameter Table (6)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3). | | MEMOBUS |
|-------------|-------|--|-----------------------|-------------|--------------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Addres |
| lcy | d7-01 | Offset Frequency 1 | -100.0 to 100.0 | 0.1% | 0.0 | | Yes | A | A | A | A | 2B2H |
| set Frequer | d7-02 | Offset Frequency 2 | -100.0 to 100.0 | 0.1% | 0.0 | | Yes | A | A | A | A | 2B3H |
| ЭЩО | d7-03 | Offset Frequency 3 | -100.0 to 100.0 | 0.1% | 0.0 | | Yes | A | A | A | A | 2B4H |
| | E1-01 | Input Voltage Setting | 310 to 510 | 1vac | 400 | | No | S | S | S | S | 300H |
| | E1-03 | V/f Pattern Selection | 0 to FF | 1 | F | 0~E: Select from 15 preset fixed patterns. F : Random Pattern w/Output Voltage Limit FF : Random Pattern w/Output Voltage Limit | No | S | S | S | No | 302H |
| | E1-04 | Max Output Frequency (Fmax) | 40.0 to 590.0 | 0.1 Hz | 60.0 * | | No | S | S | S | S | 303H |
| | E1-05 | Max Voltage (Vmax) | 0.0 to 510.0 | 0.1 Vac | 400.0 * | | No | S | S | S | S | 304H |
| | E1-06 | Base Frequency (Fa) | 0.0 to 590.0 | 0.1 Hz | 60.0 * | | No | S | S | S | S | 305H |
| s | E1-07 | Mid Output Frequency (Fb) | 0.0 to 590.0 | 0.1 Hz | 3.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | No | 306H |
| acteristi | E1-08 | Mid Output Frequency Voltage (Vc) | 0.0 to 510.0 | 0.1 Vac | 22.0 * | | No | A | А | А | No | 307H |
| //f Chara | E1-09 | Minimum Output Frequency (Fmin) | 0.0 to 590.0 | 0.1 Hz | 0.5 * | | No | S | S | S | S | 308H |
| > | E1-10 | Minimum Output Frequency Voltage (Vmin) | 0.0 to 510.0 | 0.1 Vac | 4.0 * | | No | A | А | А | No | 309H |
| | E1-11 | Mid Output Frequency 2 | 0.0 to 400.0 | 0.1 Hz | 0.0 ** | | No | E | E | Е | E | 30AH |
| | E1-12 | Mid Output Frequency Voltage 2 | 0.0 to 510.0 | 0.1 Vac | 0.0 ** | **Setting ignored is E1-11 and E1-12 equal zero. | No | E | E | Е | E | 30BH |
| | E1-13 | Base Voltage (Vbase) | 0.0 to 510.0 | 0.1 Vac | 0.0 *** | ***If set to 0.0, then the base voltage will equal the maximum voltage. | No | E | E | Е | E | 30CH |
| | E1-14 | Middle Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1 Vac | 0.0 *** | ***If set to 0.0, then the base voltage will equal the maximum voltage. | No | A | А | А | No | 34CH |
| | E1-15 | Minimum Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1 Vac | 0.0 *** | ***If set to 0.0, then the base voltage will equal the maximum voltage. | No | А | A | А | No | 34DH |
| | E2-01 | Motor Rated Current | *** | 0.1 A * | 1.00 ** | Note: If drive capacity is 7.5kW or less, then set in units of 0.01A. | No | S | S | S | S | 30EH |
| | E2-02 | Motor Rated Slip | 0.000 to 20.000 | 0.001 Hz | 2.900 ** | Default setting is determined by the Control Mode (refer to attached table). 10% to 200% of the drive's reted surrent con- | No | А | А | А | А | 30FH |
| | E2-03 | Motor No-Load Current | 0.00 to | 0.01A | 0.60 ** | ****The setting range for E2-03 is just below the range for E2-01. | No | A | A | A | A | 310H |
| | E2-04 | Number of Motor Poles | 2 to 120 | 2pole | 4 | | No | А | А | A | А | 311H |
| ers | E2-05 | Motor Resistance Between Lines | 0.000 to 65.000 | 0.001Ω | 38.198 ** | *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | A | A | 312H |
| arame | E2-06 | Motor Leakage Inductance | 0.0 to 60.0 | 0.1% | 18.2 ** | *Default setting is determined by drive capacity (refer to the appendix) | No | А | А | А | А | 313H |
| Motor I | E2-07 | Motor Iron Core Saturation Co-Efficient | 0.00 to 0.50 | 0.01 | 0.50 | | No | No | No | A | A | 314H |
| | E2-08 | Motor Iron Core Saturation Co-Efficient 2 | 0.00 to 0.75 | 0.01 | 0.75 | | No | No | No | A | A | 315H |
| | E2-09 | Motor Mechanical Loss | 0.0 to 10.0 | 0.1% | 0.0 | | No | No | No | E | E | 316H |
| | E2-10 | Motor Iron Loss for Torque Compensation | 0 to 65535 | 1w | 14 ** | *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | No | No | 317H |
| | E2-11 | Motor Rated Power | 0.00 to 650.00 | 0.01 Kw | 0.40 ** | | No | S | S | S | S | 318H |

Table 4.2.2 Parameter Table (7)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3). | | MEMOBUS |
|---------|-------|---|--------------------|-------------|--------------|--|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Addres |
| | E3-01 | Motor 2 Control Method | 0 to 3 | 1 | 2 | 0: V/f Control 1: V/f Control with PG 2: Open Loop Vector Control 3: Closed Loop Vector Control | No | A | A | A | A | 319H |
| | E3-04 | Motor 2 Max Output Frequency | 40.0 to 590.0 | 0.1 Hz | 60.0 * | | No | A | A | A | A | 31AH |
| | E3-05 | Motor 2 Max Voltage | 0.0 to 510.0 | 0.1 Vac | 400.0 * | | No | А | А | А | А | 31BH |
| | E3-06 | Motor 2 Base Frequency | 0.0 to 590.0 | 0.1 Hz | 60.0 * | | No | А | А | А | А | 31CH |
| ristics | E3-07 | Motor 2 Mid Output Freq. | 0.0 to 590.0 | 0.1 Hz | 3.0 * | | No | А | А | A | No | 31DH |
| haracte | E3-08 | Motor 2 Mid Output Freq. Voltage | 0.0 to 510.0 | 0.1 Vac | 22.0 * | | No | A | A | А | No | 31EH |
| 2 V/f C | E3-09 | Motor 2 Min. Output Freq. | 0.0 to 590.0 | 0.1 Hz | 0.5 * | | No | A | A | А | А | 31FH |
| Motor | E3-10 | Motor 2 Min. Output Freq. Voltage | 0.0 to 510.0 | 0.1 Vac | 4.0 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | No | А | А | А | No | 320H |
| | E3-11 | Motor 2 Mid Output Frequency 2 | 0.0 to 590.0 | 0.1 Hz | 0.0 ** | | No | E | Е | E | E | 345H |
| | E3-12 | Motor 2 Mid Output Frequency Voltage 2 | 0.0 to 510.0 | 0.1 Vac | 0.0 ** | | No | Е | Е | Е | Е | 346H |
| | E3-13 | Motor 2 Base Voltage | 0.0 to 510.0 | 0.1vac | 0.0 *** | | No | Е | Е | Е | Е | 347H |
| | E3-14 | Motor 2 Middle Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1vac | 0.0 *** | | No | А | А | А | No | 114EH |
| | E3-15 | Motor 2 Minimum Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1vac | 0.0 *** | | No | A | А | А | No | 114FH |
| | E4-01 | Motor 2 Rated Current | *** | 0.1a * | 1.00 ** | - | No | A | A | A | A | 321H |
| | E4-02 | Motor 2 Rated Slip | 0.000 to 20.000 | 0.001 Hz | 2.900 ** | | No | А | А | A | А | 322H |
| | E4-03 | Motor 2 Rated No-Load Current | 0.00 to | 0.01A | 0.60 ** | | No | A | A | A | A | 323H |
| | E4-04 | Motor 2 Motor Poles | 2 to 48 | 2pole | 4 | | No | А | А | A | А | 324H |
| neters | E4-05 | Motor 2 Line-to-Line Resistance | 0.000 to 65.000 | 0.001Ω | 38.198 ** | units of 0.01 A. ** Default setting is determined by the control | No | A | A | А | А | 325H |
| 2 Paran | E4-06 | Motor 2 Leakage Inductance | 0.0 to 60.0 | 0.1% | 18.2 ** | mode (refer to the appendix). *** 10% to 200% of the drive's rated current can be | No | A | А | А | А | 326H |
| Motor: | E4-07 | Motor 2 Motor Iron-Core Saturation Coefficient 1 | 0.00 to 0.50 | 0.01 | 0.50 | set. ****The setting range for E4-03 is just below the | No | No | No | А | А | 343H |
| | E4-08 | Motor 2 Motor Iron-Core Saturation Coefficient 2 | 0.00 to 0.75 | 0.01 | 0.75 | range for E4-01 | No | No | No | А | А | 344H |
| | E4-09 | Motor 2 Mechanical Loss | 0.0 to 10.0 | 0.1% | 0.0 | | No | No | No | Е | Е | 33FH |
| | E4-10 | Motor 2 Iron Loss | 0 to 65535 | 1w | 14 ** | | No | А | A | No | No | 340H |
| | E4-11 | Motor 2 Rated Capacity | 0.00 to 650.00 | 0.01 Kw | 0.40 ** | | No | А | А | A | А | 327H |
| | F1-01 | PG Pulses | 1 to 60000 | 1 | 600 | | No | No | S | No | S | 380H |
| _ | F1-02 | Operation Selection at PG Open Circuit (PGo) | 0 to 4 | 1 | 1 | 0: Ramp to stop 2: Emergency stop 1: Coast to stop 3: Continue running 4 : No Alarm Display | No | No | A | No | A | 381H |
| Contro | F1-03 | Operation Selection at Overspeed (oS) | 0 to 3 | 1 | 1 | 0: Ramp to stop 2: Emergency stop 1: Coast to stop 3: Continue running | No | No | А | No | А | 382H |
| Speed | F1-04 | Operation Selection at Deviation | 0 to 3 | 1 | 3 | 0: Ramp to stop 1: Coast to stop 3: Continue running | No | No | A | No | A | 383H |
| PG Sp | F1-05 | PG 1 Rotation Selection | 0,1 | 1 | 0* | 0: Phase A leads with forward run command. 1: Phase B leads with forward run command. *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | A | No | A | 384H |
| | F1-06 | PG 1 Division Rate | 1 to 132 | 1 | 1 | | No | No | A | No | A | 385H |

*4: Default setting is determined by drive capacity (requires that a multi-function input is set to enable motor 2).

Table 4.2.2 Parameter Table (8)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3) | | MEMOBUS |
|--------|-------|---|-----------------------|----------|----------|---|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Addres |
| | F1-08 | Overspeed Detection Level | 0 to 120 | 1% | 115 | | No | No | А | No | А | 387H |
| | F1-09 | Overspeed Detection Delay Time | 0.0 to 2.0 | 0.1 s | 0.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | А | No | A | 388H |
| | F1-10 | Excessive Speed Deviation Detection Level | 0 to 50 | 1% | 10 | | No | No | А | No | A | 389H |
| | F1-11 | Excessive Speed Deviation Detection Delay Time | 0.0 to 10.0 | 0.1 s | 0.5 | | No | No | А | No | A | 38AH |
| | F1-12 | Number of PG 1 Gear Teeth 1 | 0 to 1000 | 1 | 0 | | No | No | А | No | No | 38BH |
| | F1-13 | Number of PG 1 Gear Teeth 2 | 0 to 1000 | 1 | 0 | | No | No | А | No | No | 38CH |
| | F1-14 | PG Open-Circuit Detection Time | 0.0 to 10.0 | 0.1 s | 2.0 | | No | No | А | No | А | 38DH |
| ontrol | F1-20 | PG 1 Disconnect Detection | 0,1 | 1 | 1 | 0: Disabled 1: Enabled | No | No | А | No | А | 3B4H |
| peed C | F1-21 | PG 1 Signal Selection | 0,1 | 1 | 0 | 0: A pulse detection 1: AB pulse detection | No | No | A | No | No | 3BCH |
| PG Spe | F1-30 | PG Card Option Port for Motor 2 Selection | 0,1 | 1 | 1 | 0: CN5-C 1: CN5-B | No | No | А | No | A | 3AAH |
| | F1-31 | PG 2 Pulses Per Revolution | 1 to 60000 | 1 | 600 | | No | No | А | No | А | 3B0H |
| | F1-32 | PG 2 Rotation Selection | 0,1 | 1 | 0 | 0: Pulse A leads 1: Pulse B leads | No | No | A | No | A | 3B1H |
| | F1-33 | PG 2 Gear Teeth 1 | 0 to 1000 | 1 | 0 | | No | No | А | No | No | 3B2H |
| | F1-34 | PG 2 Gear Teeth 2 | 0 to 1000 | 1 | 0 | | No | No | А | No | No | 3B3H |
| | F1-35 | PG2 Division Rate for Pulse Monitor | 1 to 132 | 1 | 1 | | No | No | А | No | A | 3BEH |
| | F1-36 | PG2 Option Card Disconnect Detection | 0,1 | 1 | 1 | 0: Disabled 1: Enabled | No | No | А | No | A | 3B5H |
| | F1-37 | PG 2 Signal Selection | 0,1 | 1 | 0 | 0: A pulse detection 1: AB pulse detection | No | No | А | No | No | 3BDH |
| | F2-01 | Analog Command Option Card Operation Selection | 0,1 | 1 | 0 | 0: Separate inputs 1: Combine inputs | No | А | А | А | А | 38FH |
| AI | F2-02 | Analog Input Option Card Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | A | A | A | A | 368H |
| | F2-03 | Analog Input Option Card Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | A | A | A | 369H |

Table 4.2.2 Parameter Table (9)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3) | | MEMORUS |
|--------|-------|-------------------------------------|-----------------------|---------|---------|---|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | F3-01 | Digital Input Option Card Selection | 0 to 8 | 1 | 0 | 0: BCD 1% 4: BCD 0.1 Hz 1: BCD 0.1% 5: BCD 0.0 1Hz 2: BCD 0.01% 6: BCD (5-digit) 0.01 Hz 3: BCD 1 Hz 7: Binary 8 : Multi-Function Digital Input | No | A | A | A | A | 390H |
| | F3-03 | DI-A3 Data Bit Size | 0 to 2 | 1 | 2 | 0: 8 bit 1: 12 bit 2: 16 bit | No | A | A | A | A | 3B9H |
| | F3-10 | Terminal D0 Function Selection | 1 to 1FF | 1 | F | | No | Е | Е | Е | Е | BE3H |
| | F3-11 | Terminal D1 Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BE4H |
| | F3-12 | Terminal D2 Function Selection | 1 to 1FF | 1 | F | | No | E | E | Е | Е | BE5H |
| | F3-13 | Terminal D3 Function Selection | 1 to 1FF | 1 | F | | No | E | E | Е | Е | BE6H |
| | F3-14 | Terminal D4 Function Selection | 1 to 1FF | 1 | F | | No | Е | Е | E | Е | BE7H |
| | F3-15 | Terminal D5 Function Selection | 1 to 1FF | 1 | F | | No | Е | E | Е | Е | BE8H |
| D | F3-16 | Terminal D6 Function Selection | 1 to 1FF | 1 | F | | No | Е | E | E | Е | BE9H |
| | F3-17 | Terminal D7 Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BEAH |
| | F3-18 | Terminal D8 Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BEBH |
| | F3-19 | Terminal D9 Function Selection | 1 to 1FF | 1 | F | | No | Е | E | Е | Е | BECH |
| | F3-20 | Terminal DA Function Selection | 1 to 1FF | 1 | F | | No | Е | E | Е | Е | BEDH |
| | F3-21 | Terminal DB Function Selection | 1 to 1FF | 1 | F | | No | E | E | Е | Е | BEEH |
| | F3-22 | Terminal DC Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BEFH |
| | F3-23 | Terminal DD Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BF0H |
| | F3-24 | Terminal DE Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BF1H |
| | F3-25 | Terminal DF Function Selection | 1 to 1FF | 1 | F | | No | E | E | E | Е | BF2H |
| | F4-01 | Terminal V1 Monitor Selection | 000 to 999 ** | 101 | 102 | **Setting range is determined by the control mode set in A1-02. | No | A | A | A | A | 391H |
| | F4-02 | Terminal V1 Monitor Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | А | А | А | А | 392H |
| S | F4-03 | Terminal V2 Monitor Selection | 000 to 999 ** | 101 | 103 | **Setting range is determined by the control mode set in A1-02. | No | A | A | A | A | 393H |
| Output | F4-04 | Terminal V2 Monitor Gain | -999.9 to 999.9 | 0.1% | 50.0 | | Yes | А | А | А | А | 394H |
| Analog | F4-05 | Terminal V1 Monitor Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | A | A | A | 395H |
| | F4-06 | Terminal V2 Monitor Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | А | А | А | А | 396H |
| | F4-07 | Terminal V1 Signal Level | 0,1 | 0 | 0 | 0: 0 to 10 Vdc 1: -10 to +10 Vdc | No | А | А | А | А | 397H |
| | F4-08 | Terminal V2 Signal Level | 0,1 | 0 | 0 | 0: 0 to 10 Vdc 1: -10 to +10 Vdc | No | А | А | А | А | 398H |

Table 4.2.2 Parameter Table (10)

| | | | Setting | Setting | | | Changes | | Access L | _evel (*3) | | MEMOBUS |
|---------------|---------------------------|--|-------------------|---------|---------|--|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | F5-01 | Terminal M1-M2 Output Selection | | 1 | 0 | | No | А | А | А | A | 399H |
| | F5-02 | Terminal M3-M4 Output Selection | | 1 | 1 | | No | А | А | А | A | 39AH |
| | F5-03 | Terminal P1-PC Output Selection | | 1 | 2 | | No | А | А | А | A | 39BH |
| | F5-04 | Terminal P2-PC Output Selection | 0 to | 1 | 4 | **Selects the function assigned to the multi-function | No | А | А | А | A | 39CH |
| utputs | F5-05 | Terminal P3-PC Output Selection | 1FF ** | 1 | 6 | output terminals. | No | A | A | A | A | 30DH |
| Digital O | F5-06 | Terminal P4-PC Output Selection | | 1 | 37 | | No | A | А | А | A | 39EH |
| | F5-07 | Terminal P5-PC Output Selection | | 1 | F | | No | A | А | А | A | 39FH |
| | F5-08 | Terminal P6-PC Output Selection | | 1 | F | | No | A | А | А | A | 3A0H |
| | F5-09 | DO-A3 Output Mode Selection | 0 to 2 | 1 | 0 | 0: Output terminals are each assigned separate output functions. 1: Binary code output 2: Use output terminal functions selected by parameters F5-01 through F5-08. | No | A | A | A | A | 3A1H |
| | F6-01 | Communications Error Operation Selection | 0 to 5 | 1 | 1 | 0: Ramp to stop 1: Coast to stop 2: Fast Stop (Use C1-09) 3: Alarm Only 4 : Alarm (Run at d1-04) 5 : Alarm - Ramp Stop | No | A | А | А | A | 3A2H |
| | F6-02 | Selection of External Fault from Communication Option Board | 0,1 | 1 | 0 | 0: Always detected 1: Detection during run only | No | A | А | A | A | 3A3H |
| ettings | F6-03 | Stopping Method for External Fault from Communication Option Board | 0 to 3 | 1 | 1 | 0: Ramp to stop 1: Coast to stop 2: Fast Stop (Use C1-09) 3: Alarm Only | No | A | А | A | A | 3A4H |
| ion Card Se | F6-04 | Trace Sampling from Communications Option Board | 0.0 to 5.0 | 0.1 s | 2.0 | | No | A | A | A | A | 3A5H |
| unication Opt | F6-06 | Torque Reference/Torque Limit Selection from Communications Option | 0,1 | 1 | 0 | Disabled. Torque reference/limit from option board disabled. Enabled. Torque reference/limit from option board enabled. | No | No | No | A | A | 3A7H |
| Commi | F6-07 | NetRef/ComRef Selection | 0,1 | 1 | 0 | 0: Multi-step reference disabled (same as F7) 1: Multi-step reference enabled (same as V7) | No | A | A | A | A | 3A8H |
| | F6-08 | Reset Communication Parameters | 0,1 | 1 | 0 | 0: Communication-related parameters are not reset when the drive is initialized using A1-03. 1: Reset all communication-related parameters when the drive is initialized using A1-03. | No | A | A | A | A | 36AH |
| | F6-10 through F7-xx | Refer to the technical manual included w | ith the option of | ard | | <u> </u> | | | | | | |
| | H1-01 | Terminal S1 Function Selection | | 1 | 40 | | No | А | A | A | Α | 438H |
| | H1-02 | Terminal S2 Function Selection | | 1 | 41 | | No | A | А | А | A | 439H |
| | H1-03 | Terminal S3 Function Selection | | 1 | 24 | | No | А | А | А | A | 400H |
| | H1-04 | Terminal S4 Function Selection | | 1 | 14 | | No | А | А | А | A | 401H |
| uts | H1-05 | Terminal S5 Function Selection | | 1 | 0 | | No | А | А | А | A | 402H |
| jital Inp | H1-06 | Terminal S6 Function Selection | 0 to 1FF | 1 | 3 | | No | А | А | А | A | 403H |
| Dić | H1-07 | Terminal S7 Function Selection | | 1 | 4 | | No | А | Α | Α | A | 404H |
| | H1-08 | Terminal S8 Function Selection | | 1 | 9 | | No | A | A | А | A | 405H |
| | H1-40 | Mbus Reg 15C0h bit0 Input Func | | 1 | F | | No | А | А | А | А | B54H |
| | H1-40 | Mbus Reg 15C0h bit1 Input Func | | 1 | F | | No | А | А | А | А | B55H |
| | H1-42 | Mbus Reg 15C0h Bit2 Input Func | | 1 | F | | No | А | А | А | А | B56H |

Table 4.2.2 Parameter Table (11)

| No. | Na | Descentes Marca | Setting | Setting | Defeut | Description | Changes | | Access L | evel (*3) | | MEMOBUS |
|---------|-------|---|-----------------|---------|---------|---|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | H2-01 | Terminal M1-M2 Function Selection (contact relay switch) | | 1 | 21 | | No | А | А | А | А | 40BH |
| | H2-02 | Terminal M3-M4 Function Selection (contact relay switch) | 00 to 1FF | 1 | 0 | **Setting range is determined by the control mode set in A1-02. | No | А | А | А | А | 40CH |
| | H2-03 | Terminal M5-M6 Function Selection (contact relay switch) | | 1 | 2 | | No | А | А | A | А | 40DH |
| | H2-06 | Estimated Power Pulse Output Unit Selection | 0 to 4 | 1 | 0 | 0: 0.1 kW units 3: 100 kW units 1: 1 kW units 4: 1000 kW units 2: 10 kW units | No | A | A | A | A | 437H |
| | H2-07 | Modbus Register 1 Address Select | 0001 - 1FFF | 1 | 0001 | | No | А | А | A | А | B3AH |
| | H2-08 | Modbus Register 1 Bit Select | 0000 - FFFF | 1 | 0000 | | No | А | А | A | А | B3BH |
| | H2-09 | Modbus Register 2 Address Select | 0001 - 1FFF | 1 | 0001 | | No | А | A | A | A | B3CH |
| | H2-10 | Modbus Register 2 Bit Select | 0000 - FFFF | 1 | 0000 | | No | А | А | А | А | B3DH |
| | H2-20 | Comparator 1 Monitor Selection | 000 - 999 | 1 | 102 | | No | А | А | А | А | 1540H |
| | H2-21 | Comparator 1 Lower Limit | 0.0 - 300.0 | 0.1% | 0.0 | | No | А | А | А | А | 1541H |
| | H2-22 | Comparator 1 Upper Limit | 0.0 - 300.0 | 0.1% | 0.0 | | No | А | А | А | А | 1542H |
| | H2-23 | Comparator 1 Hysteresis | 0.0 - 10.0 | 0.1% | 0.0 | | No | А | А | А | А | 1543H |
| | H2-24 | Comparator 1 On-Delay Time | 0.0 - 600.0 | 0.1s | 0.0 | | No | А | А | А | А | 1544H |
| | H2-25 | Comparator 1 Off-Delay Time | 0.0 - 600.0 | 0.1s | 0.0 | | No | A | А | А | А | 1545H |
| " | H2-26 | Comparator 2 Monitor Selection | 000 - 999 | 1 | 103 | | No | A | А | А | А | 1546H |
| Outputs | H2-27 | Comparator 2 Lower Limit | 0.0 - 300.0 | 0.1% | 0.0 | | No | А | A | А | А | 1547H |
| Digital | H2-28 | Comparator 2 Upper Limit | 0.0 - 300.0 | 0.1% | 0.0 | | No | A | A | A | А | 1548H |
| | H2-29 | Comparator 2 Hysteresis | 0.0 - 10.0 | 0.1% | 0.0 | | No | A | A | A | А | 1549H |
| | H2-30 | Comparator 2 On-Delay Time | 0.0 - 600.0 | 0.1s | 0.0 | | No | А | A | А | А | 154AH |
| | H2-31 | Comparator 2 Off-Delay Time | 0.0 - 600.0 | 0.1s | 0.0 | | No | А | А | А | А | 154BH |
| | H2-32 | Comparator 1 Filter Time | 0.0 - 10.0 | 0.1s | 0.0 | | No | А | А | А | А | 159AH |
| | H2-33 | Comparator1 Protection Selection | 0 to 4 | 1 | 4 | 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Digital Output Only | No | A | A | A | A | 159BH |
| | H2-34 | Comparator 2 Filter Time | 0.0 - 10.0 | 0.1s | 0.0 | | No | А | A | A | А | 159CH |
| | H2-35 | Comparator2 Protection Selection | 0 to 4 | 1 | 4 | 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Digital Output Only | No | A | A | A | A | 159DH |
| | H2-36 | Comparator 1 Ineffective Time | 0.0 - 1000.0 | 0.1s | 0.0 | | No | А | А | А | А | 159EH |
| | H2-37 | Comparator 2 Ineffective Time | 0.0 - 1000.0 | 0.1s | 0.0 | | No | A | A | A | A | 159FH |
| | H2-40 | Mbus Reg 15E0h bit0 Output Func | 0 to 1FF | 1 | F | | No | A | A | A | А | B58H |
| | H2-41 | Mbus Reg 15E0h bit1 Output Func | 0 to 1FF | 1 | F | | No | А | A | A | А | B59H |
| | H2-42 | Mbus Reg 15E0h bit2 Output Func | 0 to 1FF | 1 | F | | No | A | A | A | A | B5AH |

Table 4.2.2 Parameter Table (12)

| | | | Sotting | Sotting | | | Changes | | Access I | _evel (*3) | | MEMORUS |
|-------------|-------|---|-----------------------|-----------|---------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | H3-01 | Terminal A1 Signal Level Selection | 0 to 3 | 1 | 0 | 0: 0 to +10 Vdc 1: -10 V to +10 Vdc 2 : 4 to 20 mA 3 : 0 to 20 mA | No | A | A | A | A | 410H |
| | H3-02 | Terminal A1 Function Selection | 0 to 41 | 1 | 0 | **Setting range is determined by the control mode set in A1-02 | Yes | А | А | А | А | 411H |
| | H3-03 | Terminal A1 Input Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | A | A | A | A | 411H |
| | H3-04 | Terminal A1 Input Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | A | A | A | 412H |
| | H3-05 | Terminal A3 Signal Level Selection | 0 to 3 | 1 | 0 | 0: 0 to +10 Vdc 1: -10 V to +10 Vdc 2 : 4 to 20 mA 3 : 0 to 20 mA | No | A | A | A | A | 413H |
| | H3-06 | Terminal A3 Function Selection | 0 to 41 | 1 | 2 | **Setting range is determined by the control mode set in A1-02 | No | A | A | A | A | 414H |
| | H3-07 | Terminal A3 Input Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | A | A | A | A | 415H |
| | H3-08 | Terminal A3 Input Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | А | A | A | 416H |
| | H3-09 | Terminal A2 Signal Level Selection | 0 to 3 | 1 | 2 | 0: 0 to +10 Vdc 1: -10 V to +10 Vdc 2 : 4 to 20 mA 3 : 0 to 20 mA | No | A | A | A | A | 417H |
| uts | H3-10 | Terminal A2 Function Selection | 0 to 41 | 1 | 0 | **Setting range is determined by the control mode set in A1-02 | No | А | А | А | А | 418H |
| Analog Inpu | H3-11 | Terminal A2 Input Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | A | A | A | A | 419H |
| 4 | H3-12 | Terminal A2 Input Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | A | A | A | 41AH |
| | H3-13 | Analog Input Filter Time Constant | 0.00 to 2.00 | 0.01 s | 0.03 | | No | Α | А | А | A | 41BH |
| | H3-14 | Analog Input Terminal Enable Selection | 1 to 7 | 1 | 7 | Determines which of the analog input terminals will be enabled when H1-□□= C. 1: Terminal A1 only 2: Terminal A2 only 3: Terminals A1 and A2 only 4: Terminals A1 and A2 6: Terminals A1 and A3 6: Terminals A2 and A3 7: All terminals enabled | No | A | A | A | A | 41CH |
| | H3-16 | Terminal A1 Tuning Offset | -500 to 500 | 1 | 0 | | No | A | А | А | А | 2F0H |
| | H3-17 | Terminal A2 Tuning Offset | -500 to 500 | 1 | 0 | | No | А | А | А | А | 2F1H |
| | H3-18 | Terminal A3 Tuning Offset | -500 to 500 | 1 | 0 | | No | A | А | A | А | 2F2H |
| | H3-40 | Mbus Reg 15C1h Input Function | 4 to 2F | 1 | F | | No | A | А | A | A | B5CH |
| | H3-41 | Mbus Reg 15C2h Input Function | 4 to 2F | 1 | F | | No | A | A | A | A | B5FH |
| | H3-42 | Mbus Reg 15C3h Input Function | 4 to 2F | 1 | F | | No | A | A | A | A | B62H |
| | H3-43 | Mbus Reg Inputs FilterTime Const | 0.00 to 2.00 | 0.01s | 0.00 | | No | A | А | А | A | 117FH |

Table 4.2.2 Parameter Table (13)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3) | | MEMOBUS |
|-----------|-------|---|-----------------------|----------|---------|--|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | H4-01 | Terminal FM Analog Output Select | 000 to 999 ** | 1 | 102 | **Setting range is determined by the control mode set in A1-02 | No | A | A | A | A | 41DH |
| | H4-02 | Terminal FM Analog Output Gain | -999.9 to 999.9 | 0.1% | 100.0 | | Yes | S | S | S | S | 41EH |
| | H4-03 | Terminal FM Analog Output Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | А | A | A | 41FH |
| uts | H4-04 | Terminal AM Analog Output Select | 000 to 999 ** | 1 | 103 | **Setting range is determined by the control mode set in A1-02 | No | A | A | A | A | 420H |
| alog Outp | H4-05 | Terminal AM Analog Output Gain | -999.9 to 999.9 | 0.1% | 50.0 | | Yes | S | S | S | S | 421H |
| Ar | H4-06 | Terminal AM Analog Output Bias | -999.9 to 999.9 | 0.1% | 0.0 | | Yes | A | A | A | A | 422H |
| | H4-07 | Terminal FM Signal Level Select | 0 to 2 | 1 | 0 | 0: 0 to +10 Vdc 1: -10 Vdc to +10 Vdc 2 : 4 to 20 mA | No | A | A | A | A | 423H |
| | H4-08 | Terminal AM Signal Level Select | 0 to 2 | 1 | 0 | 0: 0 to +10 Vdc 1: -10 Vdc to +10 Vdc 2 : 4 to 20 mA | No | A | A | A | A | 424H |
| | H4-20 | Analog Power Monitor 100% Level | 0.00 to 650.00 | 0.01kW | 0.00 | | No | А | A | А | А | B53H |
| | H5-01 | Node Address | 0 to FF | 1 | 1f | | No | A | А | А | А | 425H |
| | H5-02 | Communication Speed Selection | 0 to 8 | 1 | 3 | 0: 1200 bps 5: 38400 bps 1: 2400 bps 6: 57600 bps 2: 4800 bps 7: 76800 bps 3: 9600 bps 8: 115200 bps 4: 19200 bps | No | A | A | A | A | 426H |
| | H5-03 | Communication Parity Selection | 0 to 2 | 1 | 0 | 0: Parity disabled 2: Even Parity 1: Odd parity | No | A | А | А | А | 427H |
| | H5-04 | Stopping Method After Communication Error (CE) | 0 to 3 | 1 | 1 | 0: Ramp to stop 2: Emergency stop 1: Coast to stop 3: Continue running | No | А | А | А | А | 428H |
| | H5-05 | Communication Error Detection Selection | 0,1 | 1 | 1 | 0: Disabled 1: Enabled. If communication is lost for more than two seconds, a CE fault will occur. | No | A | A | A | A | 429H |
| | H5-06 | Drive Transmit Wait Time | 0 to 65 | 1 ms | 5 | | No | A | A | А | A | 42AH |
| | H5-07 | RTS Control Selection | 0,1 | 1 | 1 | 0: Disabled. RTS is always on. 1: Enabled. RTS turns on only when sending. | No | А | А | А | А | 42BH |
| S Comm | H5-09 | Communication Error Detection Time | 0.0 to 10.0 | 0.1 s | 2.0 | | No | А | А | А | А | 435H |
| MOBUS | H5-10 | Unit Selection for MEMOBUS/Modbus Register 0025H | 0,1 | 1 | 0 | 0: 0.1 V units 1: 1 V units | No | А | А | А | А | 436H |
| ME | H5-11 | Communications ENTER Function Selection | 0,1 | 1 | 0 | Drive requires an Enter command before accepting any changes to parameter settings. Parameter changes are activated immediately without the Enter command (same as V7). | No | A | A | A | A | 43CH |
| | H5-17 | ENTER command response @CPU BUSY | 0,1 | 1 | 0 | 0 : Ignore Command(No ROM/RAM Write) 1 : Write to RAM Only | No | Е | E | Е | Е | 11A1H |
| | H5-18 | Motor Speed Filter over Comms | 0 to 100 | 1ms | 0 | | No | А | А | А | А | 11A2H |
| | H5-20 | Communication Parameters Reload | 0,1 | 1 | 0 | 0 : Reload at Next Power Cycle 1 : Reload Now | No | А | A | А | А | B57H |
| | H5-25 | Function 5A Register 1 Selection | 0000 to FFFF | 1 | 0044 | | Yes | А | А | А | А | 1589H |
| | H5-26 | Function 5A Register 2 Selection | 0000 to FFFF | 1 | 0045 | | Yes | А | А | А | А | 158AH |
| | H5-27 | Function 5A Register 3 Selection | 0000 to FFFF | 1 | 0042 | | Yes | А | А | А | А | 158BH |
| | H5-28 | Function 5A Register 4 Selection | 0000 to FFFF | 1 | 0049 | | Yes | А | А | А | А | 158CH |

Table 4.2.2 Parameter Table (14)

| | | | Sotting | Setting | | | Changes | | Access I | _evel (*3) | | MEMORUS |
|--------------|-------|---|--|-----------|---------|--|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | H6-01 | Pulse Train Input Function Selection | 0 | 0 | 0 | 0: Frequency reference | No | A | А | A | А | 42CH |
| | H6-02 | Pulse Train Input Scaling | 1000 to 32000 | 1 Hz | 1440 | | Yes | A | A | A | A | 42DH |
| | H6-03 | Pulse Train Input Gain | 0.0 to 1000.0 | 0.1% | 100.0 | | Yes | А | А | А | А | 42EH |
| Train I/O | H6-04 | Pulse Train Input Bias | -100.0 to 100.0 | 0.1% | 0.0 | | Yes | A | A | A | A | 42FH |
| Pulse . | H6-05 | Pulse Train Input Filter Time | 0.00 to 2.00 | 0.01 s | 0.10 | | Yes | А | А | А | А | 430H |
| | H6-06 | Pulse Train Monitor Selection | * | 102 | 102 | *Pulse monitor used to regulated speed | Yes | А | А | A | A | 431H |
| | H6-07 | Pulse Train Monitor Scaling | 0 to 32000 | 1 Hz | 1440 | | Yes | A | A | A | А | 432H |
| | H6-08 | Pulse Train Input Minimum Frequency | 0.1 to 1000 | 0.1 Hz | 0.5 | | No | A | A | A | A | 43FH |
| | L1-01 | Motor Protection Function Selection | 0 to 6 | 1 | 1 | 0: Disabled 1: General purpose motor (standard fan cooled) 2: Drive dedicated motor with a speed range of 1:10 3: Vector motor with a speed range of 1:100 6: Standard motor (50 Hz) *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | S | S | S | S | 480H |
| | L1-02 | Motor Protection Operation Time | 0.1 to 5.0 | 0.1min | 1.0 | | No | А | А | Α | А | 481H |
| | L1-03 | Motor Overheat Alarm Operation Selection (PTC input) | 0 to 3 | 1 | 3 | 0: Ramp to stop 1: Coast to stop 2: Emergency stop (decelerate to stop using the deceleration time in C1-09) 3: Alarm only (oH3 will flash) | No | A | A | A | A | 482H |
| tion | L1-04 | Motor Overheat Operation Selection | 0 to 2 | 1 | 1 | 0: Ramp to stop 1: Coast to stop 2: Emergency stop (decelerate to stop using the deceleration time in C1-09) | No | A | A | A | A | 483H |
| Aotor Protec | L1-05 | Motor Temperature Input Filter Time Constant | 0.00 to 10.00 | 0.01 s | 0.20 | | No | A | A | A | A | 484H |
| N | L1-08 | oL1 Current Level | 0.0 A or 10% to 150% of the drive rated current | 0.1A | 0.0 | | No | A | A | A | A | 1103H |
| | L1-09 | oL1 Current Level for Motor 2 | 0.0 A or 10% to 150% of the drive rated current | 0.1A | 0.0 | 0. Fashini | No | A | A | A | A | 1104H |
| | L1-13 | Selection | 0,1 | 1 | 1 | U: Enabled 1: Disabled | No | А | А | А | А | 46DH |

Table 4.2.2 Parameter Table (15)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3) | | MEMORUS |
|------------------|-------|--|-----------------------|------------|-----------|---|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Addres |
| r Loss | L2-03 | Minimum Baseblock Time | 0.1 to 5.0 | 0.1s | 0.2* | *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | A | No | 487H |
| Powe | L2-05 | DC Bus Undervoltage Detection Level | 300 to 420 | 1 V | 380 | | No | A | A | A | No | 489H |
| | L3-01 | Stall Prevention Selection during Acceleration | 0 to 3 | 1 | 1 | 0: Disabled 1: Enabled 2 : Intelligent (Ignore Decel Ramp) 3 : Current Limit Acceleration | No | A | A | A | No | 48FH |
| | L3-02 | Stall Prevention Level during Acceleration | 0 to 150 | 1% | 150 | | No | А | А | А | No | 490H |
| | L3-03 | Stall Prevention Limit during | 0 to 100 | 1% | 50 | | No | A | A | A | No | 491H |
| | L3-04 | Stall Prevention Selection during Deceleration | 0 to 5 *5 | 1 | 0 | 0: Disabled 1: Enabled 2: Optimal 3: Stall Prevention Function with braking resistor 4: Overexcitation Deceleration 1 5: Overxcitation Deceleration 2 | No | S | S | S | S | 492H |
| | L3-05 | Stall Prevention Selection during Run | 0 to 2 | 1 | 1 | 0: Disabled 1: Enabled (decel time C1-02) 2: Enabled (decel time C1-04) | No | A | A | No | No | 493H |
| | L3-06 | Stall Prevention Level during | 30 to 150 | 1% | 150 | | No | А | А | No | No | 494H |
| | L3-17 | Target DC Bus Voltage for Overvoltage Suppression and Stall Prevention | 300 to 800 | 1v | 750 | | No | A | A | A | A | 462H |
| | L3-20 | DC Bus Voltage Tuning Gain | 0.00 to 5.00 | 0.01 | 0.30 | | No | E | E | E | E | 465H |
| Stall Prevention | L3-21 | Accel/Decel Rate Calculation Gain | 0.00 to 10.00 | 0.01 | 1.00 | | No | Е | E | E | E | 466H |
| Stall F | L3-23 | Automatic Reduction Selection for Stall Prevention during Run | 0,1 | 1 | 0 | O: Sets the Stall Prevention level set in L3-06 that is used throughout the entire frequency range. 1: Automatic Stall Prevention level reduction in the constant output range | No | A | A | No | No | 4FDH |
| | L3-24 | Motor Acceleration Time for Inertia Calculations | 0.001 to 10.000 | 0.001 s | 0.178 | | No | Е | E | E | E | 46EH |
| | L3-25 | Load Inertia Ratio | 1.0 to 1000.0 | 0.1 | 1.0 | | No | Е | E | E | Е | 46FH |
| | L3-26 | Additional DC Bus Capacitors | 0 to 65000 | 1µf | 0 | | No | E | E | E | Е | 455H |
| | L3-27 | Stall Prevention Detection Time | 0 to 5000 | 1 ms | 50 | | No | A | A | No | No | 456H |
| | L3-35 | Speed Agree Width for Auto Decel | 0.00 to 1.00 | 0.01Hz | 0.00 | | No | E | E | E | E | 747H |
| | L3-36 | Current Suppression Gain@Accel | 0.0 to 100.0 | 0.1 | 20.0 * | *Default setting is determined by the control mode set in A1-02 | No | А | А | А | No | 11D0H |
| | L3-37 | Current Limit P Gain @ Accel | 0 to 100 | 1ms | 5 | | No | Е | E | E | No | 11D1H |
| | L3-38 | Current Limit I Time @ Accel | 0.0 to 100.0 | 0.1 | 10.0 | | No | Е | Е | E | No | 11D2H |
| | L3-39 | Current Limit Filter Time @Accel | 1.0 to 1000.0 | 1.0ms | 100.0 | | No | А | А | А | No | 11D3H |
| | L3-40 | SCurrent Limit Filter Time @Accel | 0,1 | 1 | 0 | | No | A | A | А | No | 11D4H |
| | L4-01 | Speed Agree Detection Level | 0.0 to 590.0 | 0.1 Hz | 0.0 | | No | A | A | А | А | 499H |
| | L4-02 | Speed Agree Detection Width | 0.0 to 20.0 | 0.1 Hz | 2.0 | | No | А | А | А | А | 49AH |
| tection | L4-03 | Speed Agree Detection Level (+/) | -590.0 to 590.0 | 0.1 Hz | 0.0 | | No | A | A | A | A | 49BH |
| ncy Det | L4-04 | Speed Agree Detection Width $(+/-)$ | 0.0 to 20.0 | 0.1 Hz | 2.0 | | No | А | А | А | А | 49CH |
| Freque | L4-05 | Frequency Reference Loss Detection Selection | 0,1 | 1 | 0 | 0: Enabled 1: Disabled | No | А | А | А | А | 49DH |
| | L4-06 | Frequency Reference at Reference Loss | 0.0 to 100.0 | 0.1% | 80.0 | | No | A | A | A | A | 4C2H |
| | L4-07 | Speed Agreement Detection Selection | 0,1 | 1 | 0 | 0: Disabled during baseblock 1: Enabled during baseblock | No | A | A | A | A | 470H |

*5: When using Closed Loop Vector (A1-02 = 3), set L3-04 to 3 (for use with a braking resistor).

Table 4.2.2 Parameter Table (16)

| | | | Setting | Setting | | | Changes | | Access L | evel (*3). | 1 | MEMOBUS |
|------------------|-------|--|----------------|-----------|-----------|--|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | L7-01 | Forward Torque Limit | 0 to 300 | 1% | 200 | | Yes | No | No | А | А | 4A7H |
| | L7-02 | Reverse Torque Limit | 0 to 300 | 1% | 200 | | Yes | No | No | A | A | 4A8H |
| | L7-03 | Forward Regenerative Torque Limit | 0 to 300 | 1% | 200 | | Yes | No | No | А | A | 4A9H |
| ue Limi | L7-04 | Reverse Regenerative Torque Limit | 0 to 300 | 1% | 200 | | Yes | No | No | А | A | 4AAH |
| Torc | L7-06 | Torque Limit Integral Time Constant | 5 to 10000 | 1 ms | 200 | | No | No | No | A | No | 4ACH |
| | L7-07 | Torque Limit Control Method Selection during Accel/Decel | 0,1 | 1 | 0 | 0: Proportional control (changes to integral control at constant speed). 1: Integral control. | No | No | No | A | No | 4C9H |
| | L7-16 | Torque Limit Control at Start | 0,1 | 1 | 1 | 0: Disabled 1: Enabled | No | No | No | A | A | 44DH |
| | L8-01 | Internal Dynamic Braking Resistor Protection Selection (ERF type) | 0,1 | 1 | 0 | 0: Disabled 1: Enabled | No | А | А | А | А | 4ADH |
| | L8-02 | Overheat Alarm Level | 50 to 150 | 1°C | 100 * | *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | А | А | 4AEH |
| | L8-03 | Overheat Pre-Alarm Operation Selection | 0 to 4 | 1 | 3 | 0: Ramp to stop 2: Emergency stop 1: Coast to stop 3: Continue running 4 : Operate at Reduced Speed (L8-19) | No | A | A | A | A | 4AFH |
| | L8-05 | Input Phase Protection Selection | 0,1 | 1 | 0 | 0: Disabled 1: Enabled | No | А | A | А | Α | 4B1H |
| | L8-07 | Output Phase Protection Selection | 0 to 2 | 1 | 1 | 0: Disabled 1: Enabled (triggered by a single phase loss) 2: Enabled (triggered when two phases are lost) | No | A | A | A | A | 4B3H |
| | L8-08 | Output Phase Detection Level | 0.0 to 20.0 | 0.1% | 5.0 | | No | А | A | А | А | 4B4H |
| | L8-09 | Ground Protection Selection | 0,1 | 1 | 1* | 0: Disabled 1: Enabled *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | A | A | 4B5H |
| | L8-10 | Heatsink Cooling Fan Operation Selection | 0 to 2 | 1 | 0 | 0 : During Run, w/ L8-11 Off-Delay 1 : Always On 2 : On when Drive Temp Reaches | No | A | А | A | A | 4B6H |
| u | L8-11 | Heatsink Cooling Fan Off Delay Time | 0 to 300 | 1 s | 60 | | No | A | A | A | A | 4B7H |
| rotectic | L8-12 | Ambient Temperature Setting | -10 to 50 | 1°C | 40 | | No | A | А | А | A | 4B8H |
| dware F | L8-15 | oL2 Characteristics Selection at Low Speeds | 0,1 | 1 | 1 | 0 : Disabled (No Additional Derate) 1 : Enabled (Reduced oL2 Level) | No | А | A | А | А | 4BBH |
| Har | L8-18 | Software Current Limit | 0,1 | 1 | 0 | 0: Disabled (gain = 0) 1: Enabled | No | А | A | А | Α | 4BEH |
| | L8-19 | Frequency Reduction Rate during Overheat Pre-Alarm | 0.1 to 0.9 | 0.1 | 0.8 | | No | A | A | A | A | 4BFH |
| | L8-35 | Installation Method Selection | 0 to 3 | 1 | 2* | 0 : IP20/UL Open Type/Ex Heatsink 1 : Side-by-Side Mounting 2 : IP20/UL Type 1 3 : Finless *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | A | A | 4ECH |
| | L8-38 | Carrier Frequency Reduction Selection | 0 to 2 | 1 | 2 * | 0: Disabled 1: Enabled below 6 Hz 2: Enabled for the entire speed range *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | A | A | 4EFH |
| | L8-39 | Reduced carrier frequency | 1.0 to 15.0 | 0.1kHz | 2.0* | *Default setting is determined by drive capacity (refer to the appendix) | No | А | А | А | А | 4F0H |
| | L8-40 | Carrier Frequency Reduction Off Delay Time | 0.00 to 2.00 | 0.01 s | 0.50 * | *Default setting is determined by the control mode set in A1-02 | No | A | Α | A | A | 4F1H |
| | L8-41 | Current Alarm Selection | 0,1 | 1 | 1 | 0: Disabled (no ouptut) 1: Enabled | No | A | А | A | A | 4F2H |
| | L8-55 | Internal Braking Transistor Protection | 0,1 | 1 | 1 | 0: Disabled 1: Enabled | No | A | A | A | А | 45FH |
| Driverotection 2 | L9-16 | FAn1 Detect Time | 0.0 to 30.0 | 0.1s | 4.0 | | No | A | A | A | A | 11DCH |

Table 4.2.2 Parameter Table (17)

| | | | Setting | Setting | | | Changes | | Access L | .evel (*3) | | MEMORUS |
|----------------|-------|--|-------------------|---------|-----------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | n1-01 | Hunting Prevention Function Selection | 0 to 2 | 1 | 1* | 0 : Disabled 1 : Enabled (Normal) 2 : Enabled (High Carrier Frequency) *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | No | No | 580H |
| | n1-02 | Hunting Prevention Gain | 0.00 to 2.50 | 0.01 | 1.00 | | No | Е | E | No | No | 581H |
| | n1-03 | Hunting Prevention Time Constant | 0 to 500 | 1 ms | 10* | *Default setting is determined by drive capacity (refer to the appendix) | No | E | E | No | No | 582H |
| | n1-05 | Hunting Prevention Gain While in Reverse | 0.00 to 2.50 | 0.01 | 0.00 | | No | E | E | No | No | 582H |
| tion | n1-08 | Current Detection Method | 0,1 | 1 | 0 | 0 : 2-Phases 1 : 3-Phases | No | E | E | E | E | 1105H |
| ng Preven | n1-13 | DC Bus Stabilization Control | 0,1 | 1 | 0 | 0 : Disabled 1 : Enabled | No | E | E | No | No | 1B59H |
| Hunti | n1-14 | DC Bus Stabilization Time | 50.0 to 500.0 | 0.1ms | 100.0 | | No | E | E | No | No | 1B5AH |
| | n1-15 | PWM Voltage Offset Calibration | 0 to 2 | 1 | 1* | 0 : No Calibration 1 : One Time Calibrate at Next Start 2 : Calibrate Every Time at Start *Default setting is determined by the control mode set in A1-02 | No | E | E | E | E | BF8H |
| | n1-16 | Hunting Prevention High Fc Gain | 0.00 to 2.50 | 0.01 | 0.50* | *Default setting is determined by drive capacity (refer to the appendix) | No | A | A | No | No | BFBH |
| | n1-17 | Hunting Prevent High Fc Filter | 0 to 1000 | 1ms | 500 | | No | E | E | No | No | BFCH |
| | n1-20 | Voltage Calibration Duration | 10 to 500 | 1ms | 50 | | No | E | E | E | E | 1588H |
| | n2-01 | Speed Feedback Detection Suppression (AFR) Gain | 0.00 to 10.00 | 0.01 | 1.00 * | *Default setting is determined by drive capacity (refer to the appendix) | No | No | No | A | No | 584H |
| ack Detection | n2-02 | Speed Feedback Detection Suppression (AFR) Time Constant | 0 to 2000 | 1 ms | 50 | | No | No | No | A | No | 585H |
| Speed Feedb | n2-03 | Speed Feedback Detection Suppression (AFR) Time Constant 2 | 0 to 2000 | 1 ms | 750 | | No | No | No | A | No | 586H |
| | n2-06 | Automatic Freq Regulator Gain(R) | 0 .00 to 10.00 | 1.00 | 1.00 | | No | No | No | A | No | 1567H |
| | n3-13 | Overexcitation Gain | 1.00 to 1.40 | 0.01 | 1.10 | | No | A | A | A | A | 531H |
| Deceleration | n3-14 | High Frequency Injection during Overexcitation Deceleration | 0,1 | 1 | 0 | 0: Disabled 1: Enabled | No | E | E | E | No | 532H |
| Dverexcitatior | n3-21 | High-Slip Suppression Current Level | 0 to 150 | 1% | 100 | | No | A | A | A | A | 579H |
| C | n3-23 | Overexcitation Operation Selection | 0 to 2 | 1 | 0 | 0: Enabled in both directions 1: Enabled only when rotating forward 2: Enabled only when in reverse | No | A | A | A | A | 57BH |
| tor Tune | n4-65 | Flux Estimate Response@High Freq | 0.50 to 3.00 | 0.01 | 1.00 | | No | No | No | No | A | 1B85H |
| n Loop Vec | n4-66 | Flux Estimate Response @Low Freq | 0.50 to 3.00 | 0.01 | 1.50 | | No | No | No | No | A | 1B86H |
| Adv Ope | n4-67 | Estimate GainSwitchover Freq | 0.00 to E1-04 | 0.01Hz | 6.00 | | No | No | No | No | A | 1B87H |

Table 4.2.2 Parameter Table (18)

| | | | 0 | 0 | | | Changes | | Access L | .evel (*3) | | |
|---------------|-------|---|---------------------|------------|------------|---|---------------|-----|----------------|------------|-----|--------------------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | MEMOBUS Address |
| | n5-01 | Feed Forward Control Selection | 0,1 | 1 | 0 | 0: Disabled 1: Enabled | No | No | No | No | A | 5B0H |
| ard Control | n5-02 | Motor Accel Time | 0.001 to 10.000 | 0.001 s | 0.178 * | *Default setting is determined by drive capacity | No | No | No | No | A | 5B1H |
| Feed Forw | n5-03 | Feed Forward Control Proportional Gain | 0.00 to 100.00 | 0.01 | 1.00 | | No | No | No | No | A | 5B2H |
| | n5-04 | Speed Response Frequency | 0.00 to 500.00 | 0.01 | 50.00* | *Default setting is determined by the control mode set in A1-02 | Yes | No | No | No | E | 5B3H |
| | n6-01 | Online Tuning Selection | 0 to 2 | 1 | 0 | 0: Disabled 1: Line-to-line resistance tuning 2: Voltage correction. | No | No | No | A | No | 570H |
| Online Tuninç | n6-05 | Online Tuning Gain | 0.1 to 50.0 | 0.1 | 1.0 | | No | No | No | E | No | 5C7H |
| 0 | n6-11 | Online Resistance Tuning | 0.000 to 1.000 | 0.001 | 0.000 | | No | No | No | No | E | 1B56H |
| | o1-01 | Drive Mode Unit Monitor Selection | 104 to 999 ** | 101 | 106 | *Default setting is determined by the control mode set in A1-02 | Yes | A | A | A | A | 500H |
| | o1-02 | User Monitor Selection after Power Up | 1 to 5 | 1 | 1 | 1: Frequency reference (U1-01) 2: Direction 3: Output frequency (U1-02) 4: Output current (U1-03) 5: User-selected monitor (set by o1-01) | Yes | A | A | A | A | 501H |
| | o1-03 | Frequency Display Unit Selection | 0 to 3 | 1 | 0 | 0: 0.01 Hz units 2: r/min units 1: 0.01% units 3: User-selected units | No | А | А | А | А | 502H |
| | o1-04 | V/f Pattern Display Unit | 0,1 | 1 | 0 | 0: Hz 1: r/min | No | No | No | No | A | 503H |
| | o1-05 | LCD Contrast Adjustment | 0 to 10 | 1 | 5 | | Yes | A | А | А | А | 504H |
| | o1-10 | User-Set Display Units Maximum Value | 1 to 60000 | 1 | 6000 | | No | А | А | А | А | 520H |
| r Display | o1-11 | User-Set Display Units Decimal Display | 0 to 3 | 1 | 2 | | No | А | А | А | А | 521H |
| Operato | o1-24 | Custom Monitor 1 | 0, 101 to 999 | 1 | 101 | | Yes | А | А | А | A | 11ADH |
| | o1-25 | Custom Monitor 2 | 0, 101 to 999 | 1 | 102 | | Yes | A | A | A | A | 11AEH |
| | o1-26 | Custom Monitor 3 | 0, 101 to 999 | 1 | 103 | | Yes | A | A | A | A | 11AFH |
| | o1-27 | Custom Monitor 4 | 0, 101 to 999 | 1 | 0 | | Yes | A | A | A | A | 11B0H |
| | o1-28 | Custom Monitor 5 | 0, 101 to 999 | 1 | 0 | | Yes | A | A | A | A | 11B1H |
| | o1-29 | Custom Monitor 6 | 0, 101 to 999 | 1 | 0 | | Yes | A | А | А | А | 11B2H |
| | o1-30 | Custom Monitor 7 | 0, 101 to 999 | 1 | 0 | | Yes | A | А | А | А | 11B3H |
| | o1-31 | Custom Monitor 8 | 0, 101 to 999 | 1 | 0 | | Yes | A | А | А | А | 11B4H |

Table 4.2.2 Parameter Table (19)

| | No | | Sotting | Sotting | | | Changes | | Access L | evel (*3). | | MEMORUS |
|------------|-------|----------------------------------|-------------------|---------|---------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | o1-32 | Custom Monitor 9 | 0, 101 to 999 | 1 | 0 | | Yes | А | A | А | A | 11B5H |
| | o1-33 | Custom Monitor 10 | 0, 101 to 999 | 1 | 0 | | Yes | A | A | А | A | 11B6H |
| | o1-34 | Custom Monitor 11 | 0, 101 to 999 | 1 | 0 | | Yes | А | A | А | А | 11B7H |
| | o1-35 | Custom Monitor 12 | 0, 101 to 999 | 1 | 0 | | Yes | А | A | А | А | 11B8H |
| | o1-36 | LCD Backlight Brightness | 1 to 5 | 1 | 3 | | Yes | A | A | А | А | 11B9H |
| | o1-37 | LCD Backlight ON/OFF Selection | 0,1 | 1 | 1 | 0 : OFF 1 : ON | Yes | A | A | А | А | 11BAH |
| | o1-38 | LCD Backlight Off-Delay | 10 to 300 | 1s | 60 | | Yes | A | A | А | А | 11BBH |
| | o1-39 | Show Initial Setup Screen | 0,1 | 1 | 1 | 0 : No 1 : Yes | Yes | А | A | А | А | 11BCH |
| | o1-40 | Home Screen Display Selection | 0 to 3 | 1 | 0 | 0 : Custom Monitor 1 : Bar Graph Display 2 : Analog Gauge Display 3 : Trend Plot Display | Yes | A | A | A | A | 11BDH |
| | o1-41 | 1st Monitor Area Selection | 0 to 2 | 1 | 0 | 0 : +/- Area (- o1-42 ~ o1-42) 1 : + Area (0 ~ o1-42) 2 : - Area (- o1-42 ~ 0) | Yes | A | A | A | A | 11C1H |
| r Display | o1-42 | 1st Monitor Area Setting | 0.0 to 100.0 | 1.0% | 100.0 | | Yes | А | А | А | A | 11C2H |
| Operator [| o1-43 | 2nd Monitor Area Selection | 0 to 2 | 1 | 0 | 0 : +/- Area (- 01-44 ~ 01-44) 1 : + Area (0 ~ 01-44) 2 : - Area (- 01-44 ~ 0) | Yes | A | A | A | A | 11C3H |
| | o1-44 | 2nd Monitor Area Setting | 0.0 to 100.0 | 1.0% | 100.0 | | Yes | А | A | А | А | 11C4H |
| | o1-45 | 3rd Monitor Area Selection | 0 to 2 | 1 | 0 | 0:+/-Area(-o1-46 ~ o1-46) 1:+Area(0~o1-46) 2:-Area(-o1-46~0) | Yes | A | A | A | A | 11C5H |
| | o1-46 | 3rd Monitor Area Setting | 0.0 to 100.0 | 1.0% | 100.0 | | Yes | А | А | А | А | 11C6H |
| | o1-47 | Trend Plot 1 Scale Minimum Value | -300.0 to 99.9 | 1.0% | -100.0 | | Yes | А | А | А | A | 11C7H |
| | o1-48 | Trend Plot 1 Scale Maximum Value | -99.9 to 300.0 | 1.0% | 100.0 | | Yes | А | А | А | А | 11C8H |
| | o1-49 | Trend Plot 2 Scale Minimum Value | -300.0 to 99.9 | 1.0% | -100.0 | | Yes | А | А | А | A | 11C9H |
| | o1-50 | Trend Plot 2 Scale Maximum Value | -99.9 to 300.0 | 1.0% | 100.0 | | Yes | A | А | A | А | 11CAH |
| | o1-51 | Trend Plot Time Scale Setting | 1 to 3600 | 1s | 300s | | Yes | A | A | А | A | 11CBH |
| | o1-55 | Analog Gauge Area Selection | 0,1 | 1 | 1 | 0 : +/- Area (- o1-56 ~ o1-56) 1 : + Area (0 ~ o1-56) | Yes | A | A | А | A | 11EEH |
| | o1-56 | Analog Gauge Area Setting | 0.0 to 100.0 | 1.0% | 100.0 | | Yes | A | A | A | A | 11EFH |

Table 4.2.2 Parameter Table (20)

| | | | Setting | Setting | | | Changes | | Access L | .evel (*3) | | MEMORUS |
|--------------|-------|--|---------|---------|---------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | o2-02 | STOP Key Function Selection | 0,1 | 1 | 1 | 0: Disabled. STOP key is disabled in REMOTE operation. 1: Enabled. STOP key is always enabled. | No | A | A | A | A | 506H |
| | o2-03 | User Parameter Default Value | 0 to 2 | 1 | 0 | No change. Set defaults. Saves parameter settings as default values for a User Initialization. Clear all. Clears the default settings that have been saved for a User Initialization. | No | А | A | A | A | 507H |
| | o2-04 | Drive Model Selection | 0 to FF | 1 | 92 * | Enter the drive model. Setting required only if installing a new control board. | No | A | А | A | A | 508H |
| unctions | o2-05 | Frequency Reference Setting Method Selection | 0,1 | 1 | 0 | 0: ENTER key must be pressed to enter a frequency reference. 1: ENTER key is not required. The frequency reference can be adjusted using the up and down arrow keys only. | No | A | A | A | A | 509H |
| tor Keypad F | o2-06 | Operation Selection when Digital Operator is Disconnected | 0,1 | 1 | 0 | 0: The drive continues operating if the digital operator is disconnected.1: A fault is triggered (oPr) and the motor coasts to stop. | No | A | А | A | А | 50AH |
| ital Opera | o2-07 | Motor Direction at Power Up when Using Operator | 0,1 | 1 | 0 | 0: Forward 1: Reverse | No | A | А | A | A | 527H |
| Dig | o2-23 | External 24V Powerloss Detection | 0,1 | 1 | 0 | 0 : Disabled 1 : Enabled | No | A | A | A | A | 11F8H |
| | o2-24 | LED Light Function Selection | 0 to 2 | 1 | 0 | 0 : Enable Status Ring & Keypad LED 1 : LED Status Ring Disable 2 : Keypad LED Light Disable | No | A | A | A | A | 11FEH |
| | o2-26 | Alarm display at ext. 24V power | 0,1 | 1 | 0 | 0 : Disabled 1 : Enabled | No | A | A | A | A | 1563H |
| | o2-27 | bCE Detection Selection | 0 to 4 | 1 | 3 | 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use <i>C1-09</i>) 3 : Alarm Only 4 : No Alarm Display | No | A | A | A | A | 1565H |
| | o3-01 | Copy Function Selection | 0 to 3 | 1 | 0 | 0: No action 1: Read parameters from the drive, saving them onto the digital operator. 2: Copy parameters from the digital operator, writing them to the drive. 3: Verify parameter settings on the drive to check if they match the data saved on the operator. | No | A | A | A | A | 515H |
| | o3-02 | Copy Allowed Selection | 0,1 | 1 | 0 | 0: Read operation prohibited 1: Read operation allowed | No | A | A | A | A | 516H |
| opy Function | o3-04 | Select Backup/Restore Location | 0 to 3 | 1 | 0 | 0 : Memory Location 1 1 : Memory Location 2 2 : Memory Location 3 3 : Memory Location 4 | No | A | A | A | A | B3EH |
| 0 | o3-05 | Select Items to Backup/ Restore | 0 | 1 | 0 | 0 : Standard Parameters | No | A | A | A | A | BDAH |
| | o3-06 | Auto Parameter Backup Selection | 0,1 | 1 | 1 | 0 : Disabled 1 : Enabled | No | A | A | A | A | BDEH |
| | o3-07 | Auto Parameter Backup Interval | 0 to 3 | 1 | 1 | 0 : Every 10 minutes 1 : Every 30 minutes 2 : Every 60 minutes 3 : Every 12 hours | No | A | A | A | A | BDFH |

Table 4.2.2 Parameter Table (21)

| | | | Setting | Setting | | | Changes | | Access L | .evel (*3) | | MEMOBUS |
|-------------|-------|--|-------------------|---------|---------|---|---------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during | V/f | V/f with PG | OLV | CLV | Address |
| | o4-01 | Cumulative Operation Time Setting | 0 to 9999 | 10h | 0 | | No | A | A | A | A | 50BH |
| | o4-02 | Cumulative Operation Time Selection | 0,1 | 1 | 0 | 0: Logs power-on time 1: Logs operation time when the drive output is active (output operation time). | No | A | A | A | A | 50CH |
| | o4-03 | Cooling Fan Operation Time Setting | 0 to 9999 | 1h | 0 | | No | A | A | A | A | 50EH |
| | o4-05 | Capacitor Maintenance Setting | 0 to 150 | 1% | 0 | | No | A | A | A | A | 51DH |
| 0 | o4-07 | DC Bus Pre-charge Relay Maintenance Setting | 0 to 150 | 1% | 0 | | No | A | A | A | A | 523H |
| laintenance | o4-09 | IGBT Maintenance Setting | 0 to 150 | 1% | 0 | | No | A | A | A | A | 525H |
| M | o4-11 | U2,U3 Initialize Selection | 0,1 | 1 | 0 | 0 : Disabled 1 : Enabled | No | A | A | A | A | 510H |
| | o4-12 | kWh Monitor Initialization | 0,1 | 1 | 0 | 0 : No Reset 1 : Reset | No | A | A | A | A | 512H |
| | o4-13 | Number of Run Commands Counter Initialization | 0,1 | 1 | 0 | 0 : No Reset 1 : Reset | No | A | A | A | A | 528H |
| | o4-22 | Time Format | 0 to 2 | 1 | 0 | 0 : 24 Hour Clock 1 : 12 Hour Clock 2 : 12 Hour JP Clock | Yes | A | A | A | A | 154FH |
| | o4-23 | Date Format | 0 to 2 | 1 | 0 | 0 : YYYY/MW/DD 1 : DD/MM/YYYY 2 : MM/DD/YYYY | Yes | A | A | A | A | 1550H |
| | o4-24 | bAT Detection Selection | 0 to 2 | 1 | 0 | 0 : Disable 1 : Enable (Alarm Detected) 2 : Enable (Fault Detected) | Yes | A | A | A | A | 310FH |
| | o5-01 | Log Start/Stop Selection | 0,1 | 1 | 0 | 0 : OFF 1 : ON | Yes | A | A | A | A | 1551H |
| | o5-02 | Log Sampling Interval | 100 to 60000 | 1ms | 1000 | | Yes | A | A | A | A | 1552H |
| | o5-03 | Log Monitor Data 1 | 000,101 to 999 | 1 | 101 | | Yes | A | A | A | A | 1553H |
| | o5-04 | Log Monitor Data 2 | 000,101 to 999 | 1 | 102 | | Yes | A | A | A | A | 1554H |
| | o5-05 | Log Monitor Data 3 | 000,101 to 999 | 1 | 103 | | Yes | A | A | A | A | 1555H |
| unction | o5-06 | Log Monitor Data 4 | 000,101 to 999 | 1 | 107 | | Yes | A | A | A | A | 1556H |
| Log F | o5-07 | Log Monitor Data 5 | 000,101 to 999 | 1 | 108 | | Yes | A | A | A | A | 1557H |
| | o5-08 | Log Monitor Data 6 | 000,101 to 999 | 1 | 000 | | Yes | A | A | A | A | 1558H |
| | o5-09 | Log Monitor Data 7 | 000,101 to 999 | 1 | 000 | | Yes | A | A | A | A | 1559H |
| | o5-10 | Log Monitor Data 8 | 000,101 to 999 | 1 | 000 | | Yes | A | A | A | A | 155AH |
| | o5-11 | Log Monitor Data 9 | 000,101 to 999 | 1 | 000 | | Yes | A | A | A | A | 155BH |
| | o5-12 | Log Monitor Data 10 | 000,101 to 999 | 1 | 000 | | Yes | A | A | A | A | 155CH |

Table 4.2.2 Parameter Table (22)

| | Na | Deremeter Neme | Setting | Setting | Default | Description | Changes | | Access I | _evel (*3) | | MEMOBUS |
|----------|-------|-----------------------------------|------------------|-----------|-----------|---|---------|-----|----------------|------------|-----|---------|
| | INO. | Parameter Name | Range | Units | Derault | Description | Run | V/f | v/r with PG | OLV | CLV | Address |
| | S1-01 | Brake Release Frequency (FWD) | 0.0 to 20.0 | 0.1 Hz | 2.0 | *6 | No | А | А | А | А | 680H |
| | S1-02 | Brake Release Frequency (REV) | 0.0 to 20.0 | 0.1 Hz | 2.0 | *6 | No | А | А | А | А | 681H |
| | S1-03 | Brake Delay Frequency | 0.0 to 400.0 | 0.1 Hz | 3.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | А | A | 682H |
| | S1-04 | Brake Delay Time | 0.00 to 10.00 | 0.01 s | 0.30 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | А | А | А | A | 683H |
| | S1-05 | Brake Release Current (FWD) | 0 to 200 | 1% | 50 | | No | A | A | А | А | 684H |
| | S1-06 | Brake Release Current (REV) | 0 to 200 | 1% | 30 | | No | A | A | А | А | 685H |
| | S1-07 | Brake Release Torque (FWD) | 0 to 200 | 1% | 100 | | No | No | No | А | А | 686H |
| | S1-08 | Brake Release Torque (REV) | 0 to 200 | 1% | 0 | | No | No | No | А | А | 687H |
| | S1-09 | Torque Compensation (FWD) | -200 to 200 | 1% | 50 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | No | No | A | A | 688H |
| | S1-10 | Torque Compensation (REV) | -200 to 200 | 1% | 0 | | No | No | No | A | A | 689H |
| Sequence | S1-11 | Torque Compensation Delay Time | 0 to 200 | 1 msec | 50 | | No | No | No | A | A | 68AH |
| Brake (| S1-12 | Brake Hold Frequency (FWD) | 0.0 to 20.0 | 0.1 Hz | 3.0 | *6 | No | A | A | A | A | 68BH |
| | S1-13 | Brake Hold Frequency (REV) | 0.0 to 20.0 | 0.1 Hz | 3.0 | *6 | No | A | A | A | A | 68CH |
| | S1-14 | Slip Prevention Frequency | 0.0 to 20.0 | 0.1 Hz | 3.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | A | 68DH |
| | S1-15 | Slip Prevention Time | 0.00 to 10.00 | 0.01 s | 0.30 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | A | 68EH |
| | S1-16 | Sequence Fault SE1 Detection Time | 0.00 to 2.00 | 0.01 s | 0.30 | | No | A | A | А | А | 68FH |
| | S1-17 | Sequence Fault SE2 Detection Time | 0.00 to 2.00 | 0.01 s | 1.00 | | No | A | A | A | A | 690H |
| | S1-18 | Sequence Fault SE3 Detection Time | 0.00 to 2.00 | 0.01 s | 0.50 | | No | A | A | A | A | 691H |
| | S1-19 | Sequence Fault SE4 Detection Time | 0.00 to 2.00 | 0.01 s | 0.50 | | No | А | А | А | А | 692H |
| | S1-20 | Operation in Reverse | 0,1 | 1 | 0 | 0: Normal motoring operations 1: Regen operation in reverse | No | No | No | А | No | 693H |
| | S1-22 | DB Phase Fix | 0,1 | 1 | 0 | 0: Dsiabled 1: Enabled | No | А | А | A | А | 6BFH |
| | S1-23 | Motor2 Brake Release Freq(FWD) | 0.0 to 20.0 | 0.1Hz | 2.0 | | No | А | А | А | А | 6C4H |
| | S1-24 | Motor2 Brake Release Freq(REV) | 0.0 to 20.0 | 0.1Hz | 2.0 | | No | А | А | А | А | 6C5H |
| | S1-25 | Motor2 Brake Delay Frequency | 0.0 to 400.0 | 0.1Hz | 3.0 * | *Default setting is determined by the control modeset in E3-01 (refer to the appendix) | No | A | A | A | A | 6C6H |

*6: If the frequency reference is reduced just below S1-01, S1-02, S1-12, or S1-13 with no Stop command entered (while both FWD and REV commands are closed), then the drive will continue to run, using the forward frequency reference of either S1-01 or S1-12, whichever is larger. The reverse frequency command will be either S1-02 or S1-13, whichever of the two is larger.

Table 4.2.2 Parameter Table (23)

| | | Setting Setting Changes Access Le | | evel (*3) | | MEMORIE | | | | | | |
|-----------|-------|--|------------------|-----------|-----------|---|---------------|-----|----------------|-----|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | S1-26 | Motor2 Brake Delay Time | 0.00 to 10.00 | 0.01s | 0.30 * | *Default setting is determined by the control mode set in E3-01 (refer to the appendix) | No | А | A | A | A | 6C7H |
| | S1-27 | M2 Brake Release Current (FWD) | 0 to 200 | 1% | 50 | | No | A | A | A | A | 6C8H |
| | S1-28 | M2 Brake Release Current (REV) | 0 to 200 | 1% | 30 | | No | А | A | А | A | 6C9H |
| | S1-29 | M2 Brake Release Torque (FWD) | 0 to 200 | 1% | 100 | | No | No | No | A | A | 6CAH |
| | S1-30 | M2 Brake Release Torque (REV) | 0 to 200 | 1% | 0 | | No | No | No | A | A | 6CBH |
| | S1-31 | Motor2 Torque Compensation(FWD) | -200 to 200 | 1% | 50* | *Default setting is determined by the control modeset in E3-01 (refer to the appendix) | No | No | No | A | A | 6CCH |
| | S1-32 | Motor 2 Torque Compensation(REV) | -200 to 200 | 1% | 0 | | No | No | No | А | А | 6CDH |
| | S1-33 | M2 Torq Compensation Delay Time | 0 to 200 | 1ms | 50 | | No | No | No | A | A | 6CEH |
| JCe | S1-34 | Motor2 Brake Hold Freq (FWD) | 0.0 to 20.0 | 0.1Hz | 3.0 | | No | A | A | А | A | 6CFH |
| ke Sequer | S1-35 | Motor2 Brake Hold Freq (REV) | 0.0 to 20.0 | 0.1Hz | 3.0 | | No | А | A | A | A | 6D0H |
| Bra | S1-36 | Motor2 Slip Prevention Frequency | 0.0 to 20.0 | 0.1Hz | 3.0* | *Default setting is determined by the control modeset in E3-01 (refer to the appendix) | No | A | A | A | A | 6D1H |
| | S1-37 | Motor2 Slip Prevention Time | 0.00 to 10.00 | 0.01s | 0.30* | *Default setting is determined by the control modeset in E3-01 (refer to the appendix) | No | A | A | A | A | 6D2H |
| | S1-38 | M2 Seq Fault SE1 Detect Time | 0.00 to 2.00 | 0.01s | 0.30 | | No | A | A | A | A | 6D3H |
| | S1-39 | M2 Seq Fault SE2 Detect Time | 0.00 to 2.00 | 0.01s | 1.00 | | No | A | A | A | A | 6D4H |
| | S1-40 | M2 Seq Fault SE3 Detect Time | 0.00 to 2.00 | 0.01s | 0.50 | | No | A | A | A | A | 6D5H |
| | S1-41 | M2 Seq Fault SE4 Detect Time | 0.00 to 2.00 | 0.01s | 0.50 | | No | A | A | A | A | 6D6H |
| | S1-42 | Motor2 Operation in Reverse | 0,1 | 1 | 0 | | No | No | No | A | No | 6D7H |
| | S1-54 | Brake Sequence Selection | 0,1 | 1 | 1 | 0 : Disabled 1 : Enabled | No | A | А | A | A | 6FDH |
| | S1-55 | Motor 2 Brake Sequence Selection | 0,1 | 1 | 1 | 0 : Disabled 1 : Enabled | No | А | А | А | А | 6FEH |
| ning | S2-01 | Run Command Minimum On Time (FWD) | 0.00 to 10.00 | 0.01 s | 0.00 | | No | A | A | A | A | 694H |
| Cmd Tu | S2-02 | Run Command Minimum On Time (REV) | 0.00 to 10.00 | 0.01 s | 0.00 | | No | A | А | A | А | 695H |
| Run | S2-03 | Run Command Delay Tmer(Reverse Forward) | 0.00 to 10.00 | 0.01 s | 0.00 | Possible with motor 1 only | No | А | А | А | No | 696H |
| Stop | S3-01 | Impact Stop Creep Frequency | 0.0 to 20.0 | 0.1 Hz | 3.0 * | *Default setting is determined by the control mode set in A1-02 (refer to the appendix) | No | A | A | A | A | 697H |
| Impact | S3-02 | Impact Stop Creep Frequency | 0.0 to 20.0 | 0.1 s | 10.0 | | No | A | A | A | A | 698H |

Table 4.2.2 Parameter Table (24)

| | | | Setting | Setting | | | Changes | | Access I | _evel (*3) | - | MEMORUS |
|-----------|-------|--|------------------|----------|---------|---|---------------|-----|----------------|------------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| d | S3-03 | Impact Stop Detection Torque (FWD) | 0 to 200 | 1% | 100 | | No | А | А | А | А | 699H |
| ipact Sto | S3-04 | Impact Stop Detection Torque (REV) | 0 to 200 | 1% | 100 | | No | A | A | A | A | 69AH |
| μ | S3-05 | Impact Stop Detection Time | 0.0 to 2.0 | 0.1 s | 0.3 | | No | Α | А | А | А | 69BH |
| | S4-01 | Swift Lift Control Selection | 0 to 2 | 1 | 0 | 0: Swift Lift Control disabled. 1: Swift Liftt Control 1 enabled. 2: Swift Lift Control 2 enabled. | No | A | A | A | A | 69CH |
| | S4-02 | Swift Lift 1 Max. Frequency (FWD) | 40.0 to 200.0 | 0.1 Hz | 60.0 | | No | A | А | А | A | 69DH |
| | S4-03 | Swift Lift 1 Max. Frequency (REV) | 40.0 to 200.0 | 0.1 Hz | 60.0 | | No | A | A | A | A | 69EH |
| | S4-04 | Swift Lift 1 Detection Torque (FWD) | 0 to 200 | 1% | 50 | | No | A | А | A | А | 69FH |
| | S4-05 | Swift Lift 1 Detection Torque (REV) | 0 to 200 | 1% | 50 | | No | A | A | A | A | 6A0H |
| | S4-06 | Swift Lift 1 Detection Frequency | 25.0 to 60.0 | 0.1 Hz | 60.0 | | No | A | A | A | A | 6A1H |
| | S4-07 | Swift Lift 1 Detection Time | 0.0 to 10.0 | 0.1 s | 1.0 | | No | A | А | А | А | 6A2H |
| | S4-08 | Swift Lift 2 Activation Frequency | 0 to 200 | 1 Hz | 50 | | No | No | No | А | А | 6A3H |
| | S4-09 | Swift Lift 2 Motoring Limit Start Level | 0 to 200 | 1% | 50 | Set as a percentage of the motor rated output | No | No | No | А | А | 6A4H |
| | S4-10 | Swift Lift 2 Motoring Hold Level | 0 to 200 | 1% | 100 | Set as a percentage of the motor rated output | No | No | No | A | A | 6A5H |
| Lift | S4-11 | Swift Lift 2 Regen Limit Start Level | 0 to 200 | 1% | 10 | Set as a percentage of the motor rated output | No | No | No | A | A | 6A6H |
| Swift | S4-12 | Swift Lift 2 Regen Hold Level | 0 to 200 | 1% | 100 | Set as a percentage of the motor rated output | No | No | No | А | А | 6A7H |
| | S4-13 | Swift Lift 2 Limit Timer | 0.1 to 10.0 | 0.1 s | 1.0 | | No | No | No | А | А | 6A8H |
| | S4-14 | Swift Lift 2 Fault Operation Selection | 0 to 4 | 1 | 2 | 0: Ramp to stop 2: Emergency stop 1: Coast to stop 3: Acceleration Prohibited 4 : Frequency deceleration | No | No | No | A | A | 6A9H |
| | S4-15 | Swift Lift 2 Fault Detection Level | 0 to 200 | 1% | 150 | Set as a percentage of the motor rated output. | No | No | No | A | A | 6AAH |
| | S4-16 | Swift Lift 2 Fault Detection Time | 0.0 to 10.0 | 0.1 s | 0.1 | | No | No | No | А | А | 6ABH |
| | S4-17 | Swift Lift 2 Accel Time Gain | 1.0 to 10.0 | 0.1 | 2.0 | When Swift Lift 2 is enabled, the actual acceleration time becomes a combination of the gain set in this parameter and the acceleration time. | No | No | No | A | A | 6ACH |
| | S4-18 | Swift Lift 2 Operation Selection during Regeneration | 0, 1 | 1 | 0 | 0: Disabled 1: Enabled | No | No | No | А | А | 6ADH |
| | S4-19 | Swift Lift 1 Torque Bias (FWD) | -50.0 to 50.0 | 0.1% | 0.0 | | No | А | А | А | А | 6AEH |
| | S4-20 | Swift Lift 1 Torque Bias (REV) | -50.0 to 50.0 | 0.1% | 0.0 | | No | A | A | A | А | 6AFH |
| | S4-21 | Swift Lift 2 Deceleration Width for oL6 | 0.0 to 10.0 | 0.1 Hz | 0.0 | | No | No | No | A | А | 6BDH |
| | S4-22 | Swift Lift 2 Freq Upper Limit Select | 0, 1 | 1 | 0 | 0: Disabled 1: Enabled | No | No | No | No | А | 6C2H |

Table 4.2.2 Parameter Table (25)

| | | | Setting | Setting | | t Description du | | | Access L | evel (*3) | | MEMOBUS |
|----------------|-------|---|----------------|----------|---------|--|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| | S5-01 | Overload Detection Operation Selection 1 | 0 to 6 | 1 | 0 | Disabled. Detection only during Speed Agree, acceleration prohibited (continue running). Alarm only. Detection while running, acceleration prohibited (continue running). Alarm only. Detection only during Speed Agree. Decelerate to stop at Fast Stop time (C1-09). Alarm only. Detection during run. Decelerate to stop at Fast Stop time (C1-09). Alarm only. Detection only during Speed Agree. Interrupt output current. Fault. Detection during run. Interrupt output current. Fault. | No | A | A | A | A | 6B0H |
| u | S5-02 | Overload Detection Torque 1 | 0 to 300 | 1% | 150 | | No | А | А | А | А | 6B1H |
| Detectic | S5-03 | Overload Detection Time 1 | 0.0 to 10.0 | 0.1 s | 0.1 | | No | А | А | А | А | 6B2H |
| Overload E | S5-04 | Overload Detection Operation Selection 2 | 0 to 6 | 1 | 0 | Disabled. Detection only during Speed Agree, acceleration prohibited (continue running). Alarm only. Detection while running, acceleration prohibited (continue running). Alarm only. Detection only during Speed Agree. Decelerate to stop at Fast Stop time (C1-09). Alarm only. Detection during run. Decelerate to stop at Fast Stop time (C1-09). Alarm only. Detection only during Speed Agree. Interrupt output current. Fault. Detection during run. Interrupt output current. Fault. | No | A | A | A | A | 6B3H |
| | S5-05 | Overload Detection Torque 2 | 0 to 300 | 1% | 150 | | No | А | А | А | А | 6B4H |
| | S5-06 | Overload Detection Time 2 | 0.0 to 10.0 | 0.1 s | 0.1 | | No | А | А | А | А | 6B5H |
| | S6-01 | Overtorque Detection Operation Selection 1 | 0 to 6 | 1 | 0 | Disabled. Detection only during Speed Agree, acceleration prohibited (continue running). Alarm only. Detection while running, acceleration prohibited (continue running). Alarm only. Detection only during Speed Agree. Interrupt output current. Serious error. Detection during run. Interrupt output current. Fault. Detection only during Speed Agree (continue running), but maintain multi-function digital output until stopped. Alarm only. Detection during run, but maintain Multi-Function Digital output until stopped. Alarm only. | No | A | A | A | A | 6B6H |
| | S6-02 | Overtorque Detection Level 1 | 0 to 300 | 1% | 150 | In V/f Control, this parameter is set a percentge of the motor rated current. | No | А | А | А | А | 6B7H |
| ection | S6-03 | Overtorque Detection Time 1 | 0.0 to 10.0 | 0.1 s | 0.1 | | No | A | A | A | A | 6B8H |
| Overtorque Dei | S6-04 | Overtorque Detection Operation Selection 2 | 0 to 6 | 1 | 0 | Disabled. Detection only during Speed Agree, acceleration prohibited (continue running). Alarm only. Detection while running, acceleration prohibited (continue running). Alarm only. Detection only during Speed Agree. Interrupt output current. Serious error. Detection during run. Interrupt output current. Fault. Detection only during Speed Agree (continue running), but maintain multi-function digital output until stopped. Alarm only. Detection during run, but maintain multi-function digital output until stopped. Alarm only. | No | A | A | A | A | 6B9H |
| | S6-05 | Overtorque Detection Level 2 | 0 to 300 | 1% | 150 | Set as a percentage fo the motor rated current when using V/f Control. | No | А | А | А | А | 6BAH |
| | S6-06 | Overtorque Detection Time 2 | 0.0 to 10.0 | 0.1 s | 0.1 | | No | А | А | А | А | 6BBH |
| | S6-09 | Torque Detection Filter Time | 0 to 1000 | 1ms | 0 | | No | А | А | А | А | 1A93H |

Table 4.2.2 Parameter Table (26)

| | | Parameter Name | Setting | Setting | Default | Default Description | Changes | | Access L | evel (*3) | | MEMOBUS |
|-----------------------|-------|------------------------------------|------------------------|-------------|-----------------|--|---------------|-----|----------------|-----------|-----|---------|
| | No. | Parameter Name | Range | Units | Default | Description | during Run | V/f | V/f with PG | OLV | CLV | Address |
| Tuning mode Selection | T0-00 | Tuning Mode Selection | 0,1 | 1 | 0 | 0 : Motor Parameter Tuning 1 : Control Tuning | No | Yes | Yes | Yes | Yes | 1197H |
| | T1-00 | Motor Selection 1/2 | 1,2 | 1 | 1 | 1: Select motor 1 for Auto-Tuning 2: Select motor 2 for Auto-Tuning Note that this parameter appears only when motor 2 has been selected using the other parameter settings. | No | Yes | Yes | Yes | Yes | 700H |
| | T1-01 | Tuning Mode Selection | 0 to 2 | 1 | 0 | 0: Rotational Auto-Tuning (A1-02 = 2 or 3) 1: Stationary Auto-Tuning (A1-02 = 2 or 3) 2: Terminal resistance only, (stationary) | No | Yes | Yes | Yes | Yes | 701H |
| | T1-02 | Motor Rated Power | 0.00 to 650.00 | 0.01 kW | 0.40 * ** | *When T1-01 equals "2", then T1-02 and T1-04 are also set. T1-01 can only be set to "2" in V/f Control. *Default setting is determined by drive capacity (refer to the appendix) | No | Yes | Yes | Yes | Yes | 702H |
| | T1-03 | Motor Rated Voltage | 0.0 to 510.0 | 0.1 Vac | 400.0 | | No | No | No | Yes | Yes | 703H |
| uto-Tuning | T1-04 | Motor Rated Current | *** | 0.01 A | 1.00 ** | **Default setting is determined by drive capacity (refer to the appendix) ***Can be set from 10% to 200% of the drive rated current. | No | Yes | Yes | Yes | Yes | 704H |
| otor A | T1-05 | Motor Base Frequency | 0.0 to 590.0 | 0.1 Hz | 60.0 | | No | No | No | Yes | Yes | 705H |
| tion M | T1-06 | Number of Motor Poles | 2 to 120 | 2 | 4 | | No | No | No | Yes | Yes | 706H |
| Induc | T1-07 | Motor Base Speed | 0 to 35400 | 2 r/min | 1750 | | No | No | No | Yes | Yes | 707H |
| | T1-08 | PG Number of Pulses Per Revolution | 0 to 60000 | 1 PPR | 600 | | No | No | No | No | Yes | 708H |
| | T1-09 | Motor No-Load Current | ** | 1 A | *** | **Setting range is determined by the values set to T1-01 through T1-04. ***The default setting is for a Yaskawa standard motor according to the values entered in T1-01 through T1-04. | No | No | No | Yes | Yes | 70AH |
| | T1-10 | Motor Rated Slip | 0.000 to 20.000 | 0.001 Hz | **** | ****Default value is for a Yaskawa standard motor for the rated power entered to T1-02. | No | Yes | Yes | No | No | 70BH |
| | T1-12 | Test Mode Selection | 0,1 | 1 | 0 | 0 : No 1 : Yes | No | No | No | Yes | Yes | BDBH |
| | T1-13 | No-load voltage | 0.0 to 510.0 | 0.1V | T1-03 × 0.9 | | No | No | No | Yes | Yes | BDCH |
| Ē | T3-00 | Control Loop Tuning Selection | 0 to 2 | 1 | 0 | 0 : Inertia Tuning 1 : ASR (Speed Regulator) 2 : Deceleration Rate Tuning | No | Yes | Yes | Yes | Yes | 1198H |
| a Tuning | T3-01 | Test Signal Frequency | 0.1 to 20.0 | 0.1 Hz | 3.0 | | No | No | No | No | Yes | 760H |
| d Inertis | T3-02 | Test Signal Amplitude | 0.1 to 10.0 | 0.1 | 0.5 | | No | No | No | No | Yes | 761H |
| ASR an | T3-03 | Motor Inertia | 0.0001 to 6.0000 | 0.0001 | 0.0015 | | No | No | No | No | Yes | 762H |
| | T3-04 | System Response Frequency | 0.1 to 50.0 | 0.1 Hz | 10.0 | | No | No | No | No | Yes | 763H |

4.2.3 Monitor Table

| | | | | | | | Parame | ter Acces | s Level | |
|-----------------|-------|------------------------|---------------|---|--------------------------------|-----|----------|-----------|---------|--------------------|
| | No. | Parameter Name | Min. Units | Description | Analog Monitor Output Level | V/f | V/f w/PG | OLV | CLV | MEMOBUS Address |
| | U1-01 | Frequency Reference | 0.01 Hz | Units displayed are determined by the setting of parameter o1-03. | 10 V / Max output frequency | А | A | A | А | 40H |
| | U1-02 | Output Frequency | 0.01 Hz | Units displayed are determined by the setting of parameter o1-03. | 10 V / Max output frequency | A | Α | А | А | 41H |
| | U1-03 | Output Current | 0.1 A | Minimum unit is 0.01A for 7.5kW or less. | 10 V / Drive rated current | А | A | А | А | 42H |
| | U1-04 | Control Method | - | 0 : V/f Control 1 : V/f Control with Encoder 2 : Open Loop Vector 3 : Closed Loop Vector | - | A | A | A | A | 43H |
| | U1-05 | Motor Speed | 0.01 Hz | Display units are determined by o1-03. | 10 V / Max output frequency | × | A | А | А | 44H |
| | U1-06 | Output Voltage Ref | 0.1 Vac | | 10 V / 400 V | Α | Α | А | А | 45H |
| | U1-07 | DC Bus Voltage | 1 Vdc | | 10 V / 800 V | Α | Α | Α | А | 46H |
| | U1-08 | Output Power | 0.1 kW | | 10 V / Drive capacity (kW) | А | Α | A | А | 47H |
| | U1-09 | Torque Reference | 0.1% | | 10 V / Motor rated torque | × | × | А | А | 48H |
| status Monitors | U1-10 | Input Terminal Status | - | bit 0 : Terminal S1 (MFDI 1) bit 1 : Terminal S2 (MFDI 2) bit 2 : Terminal S3 (MFDI 3) bit 3 : Terminal S4 (MFDI 4) bit 4 : Terminal S5 (MFDI 5) bit 5 : Terminal S7 (MFDI 7) bit 7 : Terminal S8 (MFDI 8) | - | A | A | A | A | 49H |
| 0 | U1-11 | Output Terminal Status | - | bit 0 : Terminals M1-M2 bit 1 : Terminals M3-M4 bit 2 : Terminals M5-M6 bit 3 : Not used (normal value of 0) bit 4 : Not used (normal value of 0) bit 5 : Not used (normal value of 0) bit 6 : Not used (normal value of 0) bit 7 : Fault relay MA/MB-MC | - | A | A | A | A | 4AH |
| | U1-12 | Drive Status | - | bit 0 : During run bit 1 : During zero-speed bit 2 : During reverse bit 3 : During fault reset signal input bit 4 : During speed agreement bit 5 : Drive ready bit 6 : During minor fault detection bit 7 : During fault detection | - | A | A | A | A | 4BH |
| | U1-13 | Terminal A1 Level | 0.1% | | 10 V / 100% | Α | Α | Α | Α | 4EH |
| | U1-14 | Terminal A2 Level | 0.1% | | 10 V / 100% | Α | Α | А | А | 4FH |
| | U1-15 | Terminal A3 Level | 0.1% | | 10 V / 100% | Α | Α | А | А | 50H |
| | U1-16 | SFS Output Frequency | 0.01 Hz | Display units are determined by o1-03. | 10 V / Max output frequency | А | A | А | A | 53H |
| | U1-17 | DI-A3 Input Status | - | | - | Α | Α | Α | А | 58H |
| | U1-18 | oPE Fault Parameter | - | | - | Α | Α | Α | А | 61H |

Table 4.2.3 Monitor Table (1)

Table 4.2.3 Monitor Table (2)

| | | | Min | | Analog Monitor | | Parame | ter Acces | s Level | |
|--------|--------|---------------------------------------|---------|---|----------------|--------|----------|-----------|---------|---------|
| | No. | Parameter Name | Units | Description | Output Level | V/f | V/f w/PG | OLV | CLV | MEMOBUS |
| nitors | U1-19 | MEMOBUS/Modbus Error Code | - | bit 0 : CRC Error bit 1 : Data Length Error bit 2 : Not used (normal value of 0). bit 3 : Parity Error bit 4 : Overrun Error bit 5 : Framing Error bit 6 : Timed Out bit 7 : Not used (normal value of 0). | - | A | A | A | A | 66H |
| Mol | 111-21 | AI-A3 Term V1 Level | 0.1% | | 10 V / 100% | Δ | Δ | Δ | Δ | 77H |
| atus | 111 22 | | 0.1% | | 10 V / 100% | Δ | Δ | Δ | Δ | 724 |
| Sta | 111 22 | | 0.1% | | 10 V / 100% | Δ | Δ | Δ | Δ | |
| | 01-23 | Input Bulao Monitor | 0.1% | | Dop. op. 46.02 | ^ | A | ^ | ۸ ۸ | |
| | 01-24 | | 1 112 | | Dep. on Ho-02 | A | A | A | A | |
| | 01-25 | Software Number Flash | - | | - | A | A | A | A | 4DH |
| | 01-26 | | - | | - | A | A | A | A F | 5BH |
| | 01-91 | Output Voltage | 0.1V | | 10 V / 400 V | E | E | E | E | 154EH |
| | U2-01 | Current Fault | - | | - | A | A | A | A | 80H |
| | U2-02 | Previous Fault | - | | - | A | A | A | A | 81H |
| | U2-03 | Freq Reference@Fault | 0.01 Hz | | - | A | A | A | A | 82H |
| | U2-04 | Output Freq @ Fault | 0.01 Hz | | - | A | A | A | A | 83H |
| | U2-05 | Output Current@Fault | 0.1 A | | - | A | A | Α | А | 84H |
| | U2-06 | Motor Speed @ Fault | 0.01 Hz | | - | × | A | Α | А | 85H |
| | U2-07 | Output Voltage@Fault | 0.1 V | | - | Α | A | Α | А | 86H |
| | U2-08 | DC Bus Voltage@Fault | 1 Vdc | | - | Α | Α | Α | А | 87H |
| ≥ | U2-09 | Output Power @ Fault | 0.1 kW | | - | Α | A | А | А | 88H |
| listo | U2-10 | Torque Ref @ Fault | 0.1% | | - | × | × | Α | А | 89H |
| rt – | U2-11 | Input Terminal Status @ Fault | - | Displays data in the same was as U1-10. | - | Α | Α | Α | А | 8AH |
| Fau | U2-12 | Output Terminal Status @ Fault | - | Displays data in the same was as U1-11. | - | Α | Α | Α | Α | 8BH |
| | U2-13 | Operation Status @ Fault | - | Displays data in the same was as U1-12. | - | Α | Α | Α | Α | 8CH |
| | U2-14 | Elapsed Time @ Fault | 1h | | - | Α | Α | Α | А | 8DH |
| | U2-15 | SFS Output @ Fault | 0.01 Hz | | - | Α | Α | А | А | 7E0H |
| | U2-16 | a-Axis Current@Fault | 0.10% | | - | Α | А | Α | Α | 7E1H |
| | 112-17 | d-Axis Current@Fault | 0.10% | | _ | x | × | Α | А | 7E2H |
| | 112-20 | Heatsink Temp @Fault | 1°C | | - | Α | Α | Α | А | 8FH |
| | 112-21 | Peak Hold Current at Previous Fault | 014 | | _ | A | A | A | A | 7E6H |
| | 112-22 | Peak Hold Frequency at Previous Fault | 0.1 A | | | Δ | Δ | Δ | Δ | 7E7H |
| | 112 01 | 1 eak hold hequency at hevious haut | 0.01112 | | _ | Λ Λ | Λ | ^ | Λ | |
| | 03-01 | | - | | - | A | A | | ~ | 9011 |
| | 03-02 | 2nd MostRecent Fault | - | | - | A | A | A | A | 91H |
| | U3-03 | 3rd MostRecent Fault | - | | - | A | A | A | A | 92H |
| | U3-04 | 4th MostRecent Fault | - | | - | A | A | A | A | 93H |
| | U3-05 | 5th MostRecent Fault | - | | - | A | A | Α | Α | 804H |
| | U3-06 | 6th MostRecent Fault | - | | - | Α | Α | Α | А | 805H |
| | U3-07 | 7th MostRecent Fault | - | | - | Α | A | A | А | 806H |
| | U3-08 | 8th MostRecent Fault | - | | - | Α | Α | А | А | 807H |
| - | U3-09 | 9th MostRecent Fault | - | | - | Α | А | Α | А | 808H |
| stor | 113-10 | 10th MostRecentFault | _ | | _ | Α | Α | Α | А | 809H |
| lt Hi | 113 11 | | 1h | | | Δ | Δ | Δ | Δ | 0/H |
| Fau | 00-11 | | 1h | | - | ^ | ^ | | ^ | 0511 |
| | 03-12 | | 111 | | - | A • | A | A | A _ | 900 |
| | 03-13 | Elapsed I ime@3rdFault | in 4 | | - | A | A | A | A | 96H |
| | U3-14 | ElapsedTime@4thFault | 1h | | - | A | A | A | A | 97H |
| | U3-15 | ElapsedTime@5thFault | 1h | | - | A | A | Α | Α | 80EH |
| | U3-16 | ElapsedTime@6thFault | 1h | | - | Α | Α | Α | Α | 80FH |
| | U3-17 | ElapsedTime@7thFault | 1h | | | Α | Α | Α | Α | 810H |
| | U3-18 | ElapsedTime@8thFault | 1h | | - | А | А | А | А | 811H |
| | U3-19 | ElapsedTime@9thFault | 1h | | - | Α | Α | А | А | 812H |
| | U3-20 | ElapsedTime@10 Fault | 1h | | - | Α | А | А | А | 813H |
| | | | | | | | | | | |

| | | Dec. 1 N | Min. | | Analog Monitor | | Parame | ter Acces | ss Level | |
|-------|----------|--------------------------------|----------|--------------------------|---------------------------|-------|---|-----------|---|-----------|
| | N0. | Parameter Name | Units | Description | Output Level | V/f | V/f w/PG | OLV | CLV | MEMOBUS |
| | 11/ 01 | | 1h | | 10 V/· 00000 b | Δ | Δ | Δ | Δ | And And A |
| | 114.00 | Num of Dun Commondo | - سناد 1 | | 10 1/2 65525 4 | ^ | ~ | ~ | ~ | 7511 |
| | 04-02 | | i time | | 10 V: 00000 L | A | A | A | A | / DH |
| | 04-03 | | 10 | | 10 V: 99999 N | A _ | A | A | A | 0/H |
| | U4-04 | | 1% | | 10 V: 100% | A | A | A | A | /EH |
| | U4-05 | CapacitorMaintenance | 1% | | 10 V: 100% | A | A | A | A | 7CH |
| | U4-06 | PreChargeRelayMainte | 1% | | 10 V: 100% | A | A | A | A | 7D6H |
| | U4-07 | IGBT Maintenance | 1% | | 10 V: 100% | A | A | A | A | 7D7H |
| | U4-08 | Heatsink Temperature | 1°C | | 10 V / 100°C | А | A | A | A | 68H |
| | U4-09 | LED Check | - | | - | Α | A | A | A | 5EH |
| | U4-10 | kWh, Lower 4 Digits | 1 kWh | | - | Α | Α | Α | Α | 5CH |
| | U4-11 | kWh, Upper 5 Digits | 1 MWh | | - | Α | Α | А | Α | 5DH |
| e | U4-13 | Peak Hold Current | 0.1 A | | - | А | Α | А | Α | 7CFH |
| nan | U4-14 | Peak Hold Output Frequency | 0.01 Hz | | - | Α | Α | А | Α | 7D0H |
| ainte | U4-15 | Torque Reference Monitor | 0.1% | | 10 V / Motor rated | А | Α | А | Α | 7FEH |
| Ma | U4-16 | Motor oL1 Level | 1% | | 10 V / 100% | A | А | А | А | 7D8H |
| | U4-18 | Reference Source | - | | - | Α | А | А | А | 7DAH |
| | | | | | 10 V [.] Maximum | | | | | |
| | U4-19 | Modbus FreqRef (dec) | 0.01% | | frequency | А | Α | A | A | 7DBH |
| | | | | | 10 V: Maximum | | | | | |
| | U4-20 | Option Freq Ref(dec) | - | | frequency | А | Α | А | A | 7DCH |
| | 114-21 | Run Command Source | - | | - | Δ | Δ | Δ | Δ | 7004 |
| | 114.22 | Modbus CmdData (box) | | | | Δ | Δ | Δ | Δ | |
| | 04-22 | Option CmdData (Nex) | - | | - | ^ | ^ | Λ | ۸ ۸ | |
| | 04-23 | Number of Dune (Lew) | - | | - | A | A | A | A | |
| | U4-24 | | - | | - | A | A | A | A | 1581H |
| | 04-25 | Number of Runs(High) | - | | - | A | A | A | A | 1582H |
| | U4-52 | Torque Ret from Comm | 0.1% | | 10 V: 100% | × | × | A | A | 1592H |
| | U6-01 | lg Secondary Current | 0.1% | | 10 V / Motor rated | А | Α | А | А | 51H |
| | | | 0.1.70 | | secondary current | | | | | • |
| | 116-02 | Id ExcitationCurrent | 0.1% | | 10 V / Motor rated | × | × | А | А | 52H |
| | 00.02 | | 0.170 | | secondary current | | | | | 0211 |
| | 116-03 | ASR Input | 0.01% | | 10 V / Max output | x | Δ | × | Δ | 54H |
| | 00 00 | | 0.0170 | | frequency | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | 0411 |
| | 116.04 | | 0.01% | | 10 V / Max output | × | Δ | × | Δ | 554 |
| | 00-04 | | 0.0176 | | frequency | | ~ | | ~ | 5511 |
| | U6-05 | OutputVoltageRef: Vq | 0.1 V | | 10 V / 400 Vrms | × | × | Α | Α | 59H |
| | U6-06 | OutputVoltageRef: Vd | 0.1 V | | 10 V / 400 Vrms | × | × | А | Α | 5AH |
| | U6-07 | q-Axis ACR Output | 0.1% | | 10 V / 400 Vrms | × | × | Е | E | 5FH |
| | U6-08 | d-Axis ACR Output | 0.1% | | 10 V / 400 Vrms | × | × | E | E | 60H |
| | U6-18 | Speed Detection PG1 Counter | 1pulse | | 10 V / 65536 | Α | Α | А | Α | 7CDH |
| | U6-19 | Speed Detection PG2 Counter | 1pulse | | 10 V / 65536 | А | Α | А | Α | 7E5H |
| | U6-20 | Frequency Reference Bias Value | 0.1% | | 10 V / Max frequency | Α | Α | А | А | 7D4H |
| | U6-21 | | 0.1% | | 10 V / Max frequency | A | A | A | A | 7D5H |
| | 2021 | | 0.170 | | 10 V / No of nulses | | <u> </u> | | | . 5011 |
| ş | U6-22 | Zero Servo Pulse Movement | 1pulse | | ner revolution | × | × | × | A | 62H |
| nitor | | | | | 10 V / Motor rated | | | | | |
| Mo | U6-25 | ASR Output Level | 0.01% | | secondary current | × | × | × | E | 6BH |
| ntrol | | | | | 10 V / Motor rated | | | | | |
| ē | U6-26 | Feed Fwd Cont Output | 0.01% | | secondary current | × | × | × | E | 6CH |
| | | | | | 10 V / Motor rated | | | | | |
| | U6-27 | FeedFwd Estimate Spd | 0.01% | | secondary current | × | × | × | E | 6DH |
| | 116-31 | TorqueDetect Monitor | 0.1% | | | ۵ | Δ | Δ | Δ | 701 |
| | 116-36 | | v.1/0 | | 10 1.100% | F | F | F | F | 720U |
| | 116.27 | | - | | - | E | | E | F | 72411 |
| | 116 10 | | - | | - | | | | | 70511 |
| | U0-40 | | - | • 1/6 80: 1ct actat | - | E | | E | | 12EH |
| | 116-80 | | | • U6-81: 2nd octet | | | | | | 7B0H to |
| | to U6-83 | Option IP Address 1 to 4 | - | • U6-82: 3rd octet | - | А | Α | A | A | 7B3H |
| | | | | U6-83: 4th octet | | | | | | 12011 |
| | | | | • U6-84: 1st octet | | | | | | |
| | U6-84 to | Online Subnets 1 to 4 | _ | • U6-85: 2nd octet | _ | Α | Δ | А | Α | 7B4H to |
| | U6-87 | | | • U6-86: 3rd octet | | | | | | 7B7H |
| | | | | | | | | | | 70011 |
| | | | | • U6-88: 1st octet | | | | | | 7B8H, |
| | 00-00 to | Online Gateways 1 to 4 | - | • U6-90: 3rd octet | - | А | А | А | Α | 750U |
| | 00-31 | | | <i>U</i> 6-91: 4th octet | | | | | | 7E1U |
| | | | | | | | 1 | | | /FIH |
Table 4.2.3 Monitor Table (4)

| | | | Min. | | Analog Monitor | Parameter Access Level | | | | | |
|----------|-------|----------------|-------|------------------------------|----------------|------------------------|----------|-----|-----|--------------------|--|
| | NO. | Parameter Name | Units | Description | Output Level | V/f | V/f w/PG | OLV | CLV | MEMOBUS Address | |
| Monitors | U6-92 | Online Speed | - | 10: 10 Mbps 100: 100 Mbps | - | A | A | A | A | 7F2H | |
| | U6-93 | Online Duplex | - | | - | А | А | А | А | 7F3H | |
| ontro | U6-98 | First Fault | - | | - | А | А | А | А | 7F8H | |
| 0 | U6-99 | Current Fault | - | | - | А | A | A | А | 7F9H | |

Gray shading indicates a difference between the crane GA700 and the standardGA700.

| Sotting | Multi Eunction Input Terminal Eunctions | Multi Eurotion Output Terminal Eurotions | (1) Multi Eurotion Analog Input Torminal Eurotions |
|---------|---|--|---|
| Value | (H1-01 to H1-08) | (H2-01 to H2-03) | (H3-02, H3-06,H3-10) |
| 00 | Brake release check | During run | Frequency bias |
| 01 | - | Zero speed | Frequency gain |
| 02 | External reference 1/2 selection | Speed agree 1 | Auxiliary frequency reference 1 |
| 03 | Multi-step speed reference 1 | User-set speed agree 1 | Auxiliary frequency reference 2 |
| 04 | Multi-step speed reference 2 | Frequency detection 1 | Output voltage bias |
| 05 | Multi-step speed reference 3 | Frequency detection 2 | Accel/decel time gain |
| 06 | Jog frequency selection | Drive ready | DC Injection Braking current |
| 07 | Accel/ Decel time selection 1 | DC bus undervoltage | Torque detection level |
| 08 | Baseblock command (N.O.) | During baseblock | Stall Prevention during run |
| 09 | Baseblock command (N.C.) | Frequency reference source | |
| 0A | Accel/decel ramp hold | Run command source | - |
| 0B | Drive overheat alarm (OH2) | Torque detection 1 (N.O.) | |
| 0C | Analog terminal input selection | Frequency reference loss | Overload detection level |
| 0D | PG encorder disable | Braking resistor fault | Frequency bias 2 |
| 0E | ASR integral reset | Fault | Motor temperature (PTC input) |
| 0F | Not used | Not used | Not used |
| 10 | Up command | Minor fault | Forward torque limit |
| 11 | Down command | During fault reset | Reverse torque limit |
| 12 | Forward jog | — | Regenerative torque limit |
| 13 | Reverse jog | Speed agree 2 | — |
| 14 | Fault reset | User-set speed agree 2 | Torque compensation |
| 15 | Emergency stop (N.O.) | Frequency detection 3 | General torque limit |
| 16 | Motor 2 selection | Frequency detection 4 | |
| 17 | Emergency Stop (N.C.) | Torque detection 1 (N.C.) | |
| 18 | | Torque detection 2 (N.O.) | |
| 19 | | Torque detection 2 (N.C.) | |
| 1A | Accel/decel time selection 2 | During reverse | - |
| 1B | Program lockout | During baseblock (N.C.) | |
| 1C | _ | Motor 2 selection | |
| 1D | | During regeneration | |
| 1E | Reference sample hold | - | |
| 1F | - | Motor overload alarm (oL1) | H3-09: Analog input is not used. |
| 20 | | Drive overheat prealarm (oH) | |
| 21 | | Brake release command | |
| 22 | External fault | Overload detection (N.O.) | |
| 23 | | Overload detection (N.C.) | - |
| 24-2E | | _ | - |
| 2F | | Maintenance Notification | - |
| 30 | Swift Lift 1 | During torque limit | |
| 31 | Forward travel limit (N.O.) | _ | |
| 32 | Forward travel limit (N.C.) | | 4 |
| 33 | Reverse travel limit (N.O.) | Zero Servo complete | 4 |
| 34 | Reverse travel limit (N.C.) | 4 | |
| 35 | Impact stop enable | - | |
| 36 | Swift Lift 2 enabled | | 4 – |
| 37 | | During Frequency Output | 4 |
| 38 | | | 4 |
| 39 | — | watt Hour Pulse Output | 4 |
| 3A-3B | | | 4 |
| 3C | | LUCAL Control Selected | 4 |
| 3D-3F | Formand DLIN (2 Wine) | 1 | |
| 40 | FORWARD KUN (2-WIFE) | 4 | |
| 41 | Keverse KUIN (2-wire) | 4 | |
| 42,43 | Add Officiat Erroquer av 1(47,01) | 4 – | |
| 44 | Add Offset Frequency 2(47.02) | 1 | |
| 45 | Add Offset Frequency 2(d7-02) | 4 | |
| 40 | Add Offset Frequency 5(d/-03) | 4 | |
| 47 | node Setup (CANopen) | | |

Table 4.2.4 Multi-Function Terminal Function List (1)

47 Node Setup (CANopen) * Layered setting are not possible, with the exception of OF.

| Table 1.2.4 Multi Eunction | Terminal Funct | ion List (2) |
|----------------------------|----------------|-----------------|
| Table4.2.4 Multi-Function | Terminal Funct | IOII LIST (2) |

| | 1000- | 2.1 Martin Fanetion Fernina Fanetion East | (2) |
|---------|---|---|--|
| Setting | Multi-Function Input Terminal Functions | Multi-Function Output Terminal Functions | Multi-Function Analog Input Terminal Functions |
| Value | (H1-01 to H1-08) | (H2-01 to H2-03) | (H3-02, H3-06, H3-10) |
| 48-4B | | | |
| 4C | | During Fast Stop | |
| 4D | | oH Pre-Alarm Time Limit | 1 |
| 4E | | Braking Transistor Fault (rr) | |
| 4F | = | Braking Resistor Overheat (rH) |] |
| 50 | | - | |
| 51 | | Safe Torque OFF | |
| 52-5F | | _ | 1 |
| 60 | DC Injection | Internal Cooling Fan Failure | |
| 61 | | - | |
| 62 | | Modbus Reg 1 Status Satisfied | |
| 63 | - | Modbus Reg 2 Status Satisfied | 1 |
| 64-65 | | _ | _ |
| 66 | | Comparator1 |] |
| 67 | Communication test mode | Comparator2 | |
| 68 | | _ | |
| 69 | _ | External Power 24V Supply | |
| 6A | | Data Logger Error | |
| 6B-71 | | | |
| 72 | Zero Servo | | |
| 73-76 | _ | - | |
| 77 | ASR gain | | |
| 78-B0 | | | 1 |
| B1 | _ | DC Injection Braking at Start | 1 |
| B2 | | DC Injection Braking at Stop | 1 |
| B3-FF | | - | |

 \ast Layered setting are not possible, with the exception of OF.

| | | | 0 | | | | |
|----------------------|--|-----------------|---------|------------|------------|---------|---------|
| | | | Setting | | Default | Setting | |
| No. | Name | Setting Range | Units | V/f | V/f w/PG | OLV | CLV |
| | | | Onits | A1-02=0 | A1-02=1 | A1-02=2 | A1-02=3 |
| b2-01 | Zero Speed Level | 0.0 to 10.0 | 0.1 Hz | 0.5 | 0.5 | 0.5 | 0.5 |
| b2-04 | DC Injection Braking Time at Stop | 0.00 to 10.00 | 0.01 s | 0.00 | 0.00 | 0.00 | 0.50 |
| C1-11 | Accel/Decel Time Switching Frequency | 0.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| C2-01 | S-Curve Characteristic at Accel Star | 0.00 to 10.00 | 0.01 s | 0.20 | 0.20 | 0.20 | 0.20 |
| C3-01 | Slip Compensation Gain | 0.0 to 2.5 | 0.1 | 0.0 | _ | 1.0 | 1.0 |
| C3-02 | Slip Compensation Primary Delay Time | 0 to 10000 | 1 ms | 2000 | _ | 200 | _ |
| C4-01 | Torque Compensation Gain | 0.00 to 2.50 | 0.01 | 1.00 | 1.00 | 1.00 | _ |
| C4-02 | Torque Compensation Primary Delay Time | 0 to 10000 | 1 ms | 200 | 200 | 20 | _ |
| C4-13 | Torque Comp Delay Time Select 1 | 0 to 60000 | 1ms | 200 | 200 | 20 | _ |
| C5-01 | ASR Proportional Gain 1 (P) | 0.00 to 300.00 | 0.01 | _ | 0.20 | _ | 20.00 |
| C5-02 | ASR Integral Time 1 (I) | 0.000 to 10.000 | 0.001 s | — | 0.200 | _ | 0.500 |
| C5-03 | ASR Proportional Gain 2 (P) | 0.00 to 300.00 | 0.01 | — | 0.02 | _ | 20.00 |
| C5-04 | ASR Integral (I) Time 2 | 0.000 to 10.000 | 0.001 s | _ | 0.050 | _ | 0.500 |
| C5-06 | ASR Primary Delay Time Constant | 0.000 to 0.500 | 0.001 | _ | _ | _ | 0.004 |
| C5-07 | ASR Gain Switch Frequency | 0.0 to 400.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| C6-02 | Carrier Frequency Selection | 1 to F | 1 | 1 | 1 | 1 | 1 |
| d3-01 | Jump Frequency 1 | 0.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| d3-02 | Jump Frequency 2 | 0.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| d3-03 | Jump Frequency 3 | 0.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| d3-04 | Jump Frequency Width | 0.0 to 20.0 | 0.1Hz | 1.0 | 1.0 | 1.0 | 1.0 |
| *3 E1-04 E3-02 | Max Output Frequency (Fmax) | 40.0 to 590.0 | 0.1 Hz | 60.0 | 60.0 | 60.0 | 60.0 |
| *3 E1-05 E3-03 | Max Voltage (Vmax) | 0.0 to 510.0 | 0.1 Vac | 400.0 | 400.0 | 400.0 | 400.0 |
| *3 E1-06 E3-04 | Base Frequency (Fa) | 0.0 to 590.0 | 0.1 Hz | 60.0 | 60.0 | 60.0 | 60.0 |
| *3 E1-07 E3-05 | Mid Output Frequency (Fb) | 0.0 to 590.0 | 0.1 Hz | 3.0 | 3.0 | 3.0 | 0.0 |
| *3 E1-08 E3-06 | Mid Output Frequency Voltage (Vc) | 0.0 to 510.0 | 0.1 Vac | *1 30.0 | *1 30.0 | 22.0 | 0.0 |
| *3 E1-09 E3-07 | Minimum Output Frequency (Fmin) | 0.0 to 590.0 | 0.1 Hz | 1.5 | 1.5 | 0.5 | 0.0 |
| *3 E1-10 E3-08 | Minimum Output Frequency Voltage (Vmin) | 0.0 to 510.0 | 0.1 Vac | *1 18.0 | *1 | 4.0 | 0.0 |
| E1-14 | Middle Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1 Vac | *1 30.0 | *1 30.0 | 22.0 | 0.0 |
| E1-15 | Minimum Out Freq Volt Select 1 | 0.0 to 510.0 | 0.1 Vac | *1 18.0 | *1 18.0 | 4.0 | 0.0 |

Table 4.2.5 Parameter Defaults the Change According to the Control Mode (A1-02) (1)

*1: This value applies to drives up to 1.5 kW.

*2: Upper value is for Open Loop Vector Control, lower value is for Closed Loop Vector.
*3: Default setting for the following parameters are determined by the control mode selected for motor 2 in parameter E3-01: E3-02, E3-03, E3-04, E3-05, E3-06, E3-07, E3-08

| | | | <u> </u> | 2 | Default | Setting | |
|--------|---------------------------------------|-----------------|----------|---------|----------|---------|---------|
| No. | Name | Setting Range | Setting | V/f | V/f w/PG | OLV | CLV |
| | | 0 0 | Units | A1-02=0 | A1-02=1 | A1-02=2 | A1-02=3 |
| F1-01 | PG 1 Pulses | 0 to 60000 | 1ppr | 600 | 600 | 600 | 600 |
| F1-05 | PG 1 Rotational Selection | 0 to 1 | _ | 0 | 0 | 0 | 0 |
| F1-09 | Overspeed (os) Detection Delay Time | 0.0 to 2.0 | 0.1 s | | 1.0 | | 0.0 |
| L1-01 | Motor Protection Function Selection | 0 to 4 | — | 1 | 1 | 1 | 1 |
| L3-05 | Stall Prevention Selection during Run | 0 to 2 | 1 | 1 | 1 | — | — |
| L3-20 | Main Circuit Voltage Tuning Gain | 0.00 to 5.00 | 0.01 | 1.00 | 1.00 | 0.30 | 0.30 |
| L3-21 | Accel/Decel Rate Calculation Gain | 0.00 to 200.00 | 0.01 | 1.00 | 1.00 | 1.00 | 1.00 |
| L3-36 | Current Suppression Gain@Accel | 0.0 to 100.0 | 0.1 | 10.0 | 10.0 | 20.0 | _ |
| L4-01 | Speed Agree Detection Level | 0.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| L4-02 | Frequency Detection Width | 0.0 to 20.0 | 0.1 Hz | 2.0 | 2.0 | 2.0 | 2.0 |
| L4-03 | Speed Agree Detection Level $(+/-)$ | -590.0 to 590.0 | 0.1Hz | 0.0 | 0.0 | 0.0 | 0.0 |
| L4-04 | Speed Agreement Detection Width (+/-) | 0.0 to 20.0 | 0.1 Hz | 2.0 | 2.0 | 2.0 | 2.0 |
| L8-38 | Carrier Frequency Reduction | 0 to 2 | _ | *4 | *4 | *4 | *4 |
| L8-40 | Carrier Frequency Reduction Time | 0.00 to 2.00 | 0.01 s | 0.50 | 0.50 | 0.50 | 0.50 |
| n1-15 | PWM Voltage Offset Calibration | 0 to 2 | 1 | 1 | 1 | 1 | 1 |
| o1-03 | Digital Operator Display Selection | 0 to 3 | _ | 0 | 0 | 0 | 0 |
| o1-04 | V/f Display Units | 0 to 1 | — | | | | 0 |
| S1-03 | Brake Delay Frequency | 0.0 to 400.0 | 0.1 Hz | 3.0 | 3.0 | 3.0 | 0.0 |
| S1-04 | Brake Delay Time | 0.00 to 10.00 | 0.01 s | 0.30 | 0.30 | 0.30 | 0.00 |
| | Torque Foreing (FWD) | 0 to 200^{*2} | | | | | |
| \$1-09 | Torque Porchig (PWD) | 010200 | 1% | _ | _ | 50 | 0 |
| 51 07 | Torque Compensation (FWD) | -200 to 200 | 170 | | | 50 | 0 |
| | | 200 10 200 | | | | | |
| S1-14 | Slip Prevention Frequency | 0.0 to 20.0 | 0.1 Hz | 3.0 | 3.0 | 3.0 | 0.0 |
| S1-15 | Slip Prevention Time | 0.00 to 10.00 | 0.01 s | 0.30 | 0.30 | 0.30 | 0.00 |
| S3-01 | Impact Stop Creep Frequency | 0.0 to 20.0 | 0.1 Hz | 6.0 | 6.0 | 3.0 | 3.0 |

Table 4.2.5 Parameter Defaults the Change According to the Control Mode (A1-02) (2)

*4: Default setting is dependent on the drive model (o2-04).

4.2.6 Default Settings Determined by Drive Capacity o2-04

Table 4.2.6 Default Settings Determined by Drive Capacity o2-04(400 V Class) (1)

| No. | Parameter Name | Units | | | | | Default | Setting | | | | |
|------------------|---|------------------|--------|--------|--------|--------|---------|---------|-------|-------|-------|-------|
| _ | Drive Capacity | kW | | | | | | | | | | |
| E2-11 | Motor Rated Output | 1 | 0.4 | 0.75 | 1.5 | 2.2 | 3.0 | 3.7 | 5.5 | 7.5 | 11 | 15 |
| E4-11 | Motor 2 Rated Output | 1 | | | | | | | | | | |
| o2-04 | Drive/kVA Selection | kHz | 92 | 93 | 94 | 95 | 96 | 97 | 99 | 9A | 9C | 9D |
| C5-17 (C5-37) | Motor Inertia | kgm ² | 0.0015 | 0.0028 | 0.0068 | 0.0088 | 0.0158 | 0.0158 | 0.026 | 0.037 | 0.053 | 0.076 |
| C6-02 | Carrier Frequency Selection | - | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 |
| E2-01 (E4-01) | Motor Rated Current | А | 1.00 | 1.6 | 3.1 | 4.2 | 5.7 | 7 | 9.80 | 13.3 | 19.9 | 26.5 |
| E2-02 (E4-02) | Motor Rated Slip | Hz | 2.9 | 2.6 | 2.5 | 3 | 2.7 | 2.7 | 1.5 | 1.3 | 1.7 | 1.6 |
| E2-03 (E4-03) | Motor No-Load Current | А | 0.6 | 0.8 | 1.4 | 1.5 | 1.9 | 2.3 | 2.6 | 4 | 5.6 | 7.6 |
| E2-05 (E4-05) | Motor Resistance Between Lines | Ω | 38.198 | 22.459 | 10.1 | 6.495 | 4.36 | 3.333 | 1.595 | 1.152 | 0.922 | 0.55 |
| E2-06 (E4-06) | Motor Leakage Inductance | % | 18.2 | 14.3 | 18.3 | 18.7 | 19 | 19.3 | 18.2 | 15.5 | 19.6 | 17.2 |
| E2-10 (E4-10) | Motor Iron Loss for Torque Compensation | W | 14 | 26 | 53 | 77 | 105 | 130 | 193 | 263 | 385 | 440 |
| E2-11 (E4-11) | Motor Rated Power | kW | 0.4 | 1.1 | 1.5 | 2.2 | 3.0 | 4.0 | 5.5 | 7.5 | 11 | 15 |
| L2-03 | Minimum Baseblock Time | S | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| L2-05 | DC Bus Undervoltage Detection Leve | Ι | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 |
| L3-24 | Inertia Calculated Acceleration Time | S | 0.178 | 0.142 | 0.166 | 0.145 | 0.145 | 0.154 | 0.168 | 0.175 | 0.265 | 0.244 |
| L8-02 | Overheat Pre-Alarm Operation Selection | °C | 100 | 105 | 112 | 100 | 100 | 100 | 105 | 105 | 115 | 120 |
| L8-09 | Ground Protection Selection | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| L8-38 | Carrier Frequency Reduction | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L8-39 | Reduced carrier frequency | — | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| n1-01 | Hunting Prevention Function Selection | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| n1-03 | Hunting Prevention Time Constant | ms | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| n1-16 | Hunting Prevention High Fc Gain | — | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| n2-01 | Speed Feedback Detection Suppression (AFR) Gain | — | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.50 | 1.50 | 1.50 | 1.00 |
| n5-02 | Motor Accel Time | s | 0.178 | 0.142 | 0.166 | 0.145 | 0.145 | 0.154 | 0.168 | 0.175 | 0.265 | 0.244 |

*1: Settings include, 0: Low Noise PWM, 1: 2 kHz, 2: 5.0 kHz, 3: 8.0 kHz, 4: 10 kHz, 5: 12.5 kHz, 6: 15 kHz.

| No. | Parameter Name | Units | | | | | Defaul | t Setting | | | | |
|------------------|---|------------------|-------|-------|-------|-------|--------|-----------|-------|-------|-------|-------|
| _ | Drive Capacity | kW | | | | | | | | | | |
| E2-11 | Motor Rated Output | 1 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 132 |
| E4-11 | Motor 2 Rated Output | 1 | 1 | | | | | | | | | |
| o2-04 | Drive/kVA Selection | kHz | 9E | 9F | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 |
| C5-17 (C5-37) | Motor Inertia | kgm ² | 0.138 | 0.165 | 0.220 | 0.273 | 0.333 | 0.49 | 0.90 | 1.10 | 1.90 | 2.10 |
| C6-02 | Carrier Frequency Selection | — | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 | 1 *1 |
| E2-01 (E4-01) | Motor Rated Current | А | 32.9 | 38.6 | 52.3 | 65.6 | 79.7 | 95 | 130 | 156 | 190 | 223 |
| E2-02 (E4-02) | Motor Rated Slip | Hz | 1.67 | 1.7 | 1.8 | 1.33 | 1.6 | 1.46 | 1.39 | 1.4 | 1.4 | 1.38 |
| E2-03 (E4-03) | Motor No-Load Current | А | 7.8 | 9.2 | 10.9 | 19.1 | 22 | 24. | 36 | 40 | 49 | 58 |
| E2-05 (E4-05) | Motor Resistance Between Lines | Ω | 0.403 | 0.316 | 0.269 | 0.155 | 0.122 | 0.088 | 0.092 | 0.056 | 0.046 | 0.035 |
| E2-06 (E4-06) | Motor Leakage Inductance | % | 20.1 | 23.5 | 20.7 | 18.8 | 19.9 | 20 | 20 | 20 | 20 | 20 |
| E2-10 (E4-10) | Motor Iron Loss for Torque Compensation | W | 508 | 586 | 750 | 925 | 1125 | 1260 | 1600 | 1760 | 2150 | 2350 |
| E2-11 (E4-11) | Motor Rated Power | kW | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 132 |
| L2-03 | Minimum Baseblock Time | S | 1 | 1 | 1.1 | 1.1 | 1.2 | 1.2 | 1.3 | 1.5 | 1.7 | 1.7 |
| L2-05 | DC Bus Undervoltage Detection Leve | — | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 |
| L3-24 | Inertia Calculated Acceleration Time | S | 0.317 | 0.355 | 0.323 | 0.32 | 0.387 | 0.317 | 0.533 | 0.592 | 0.646 | 0.673 |
| L8-02 | Overheat Pre-Alarm Operation Selection | °C | 120 | 130 | 120 | 115 | 126 | 120 | 110 | 105 | 120 | 120 |
| L8-09 | Ground Protection Selection | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| L8-38 | Carrier Frequency Reduction | — | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L8-39 | Reduced carrier frequency | — | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| n1-01 | Hunting Prevention Function Selection | — | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| n1-03 | Hunting Prevention Time Constant | ms | 10 | 10 | 10 | 10 | 10 | 30 | 30 | 30 | 30 | 30 |
| n1-16 | Hunting Prevention High Fc Gain | — | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| n2-01 | Speed Feedback Detection Suppression (AFR) Gain | — | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| n5-02 | Motor Accel Time | s | 0.317 | 0.355 | 0.323 | 0.32 | 0.387 | 0.317 | 0.533 | 0.592 | 0.646 | 0.673 |

Table 4.2.6 Default Settings Determined by Drive Capacity o2-04(400 V Class) (2)

*1: Settings include, 0: Low Noise PWM, 1: 2 kHz, 2: 5.0 kHz, 3: 8.0 kHz, 4: 10 kHz, 5: 12.5 kHz, 6: 15 kHz.

| No. | Parameter Name | Units | Default Setting | | | | | | |
|------------------|---|------------------|-----------------|-------|------|-------|-------|--|--|
| _ | Drive Capacity | kW | | | | | | | |
| E2-11 | Motor Rated Output | 1 | 160 | 185 | 220 | 250 | 315 | | |
| E4-11 | Motor 2 Rated Output | 1 | | | | | | | |
| o2-04 | Drive/kVA Selection | kHz | A9 | AA | AC | AD | AE | | |
| C5-17 (C5-37) | Motor Inertia | kgm ² | 3.30 | 3.60 | 4.10 | 6.50 | 11.00 | | |
| C6-02 | Carrier Frequency Selection | _ | 1 *1 | 1 *1 | 1 *1 | 1 | 1 *1 | | |
| E2-01 (E4-01) | Motor Rated Current | А | 270 | 310 | 370 | 500 | 500 | | |
| E2-02 (E4-02) | Motor Rated Slip | Hz | 1.35 | 1.3 | 1.3 | 1.25 | 1.25 | | |
| E2-03 (E4-03) | Motor No-Load Current | Α | 70 | 81 | 96 | 130 | 130 | | |
| E2-05 (E4-05) | Motor Resistance Between Lines | Ω | 0.029 | 0.025 | 0.02 | 0.014 | 0.014 | | |
| E2-06 (E4-06) | Motor Leakage Inductance | % | 20 | 20 | 20 | 20 | 20 | | |
| E2-10 (E4-10) | Motor Iron Loss for Torque Compensation | W | 2850 | 3200 | 3700 | 4700 | 4700 | | |
| E2-11 (E4-11) | Motor Rated Power | kW | 160 | 200 | 220 | 250 | 315 | | |
| L2-03 | Minimum Baseblock Time | S | 1.8 | 1.9 | 2 | 2.1 | 2.1 | | |
| L2-05 | DC Bus Undervoltage Detection Leve | — | 380 | 380 | 380 | 380 | 380 | | |
| L3-24 | Inertia Calculated Acceleration Time | S | 0.777 | 0.864 | 0.91 | 1.392 | 1.392 | | |
| L8-02 | Overheat Pre-Alarm Operation Selection | °C | 125 | 125 | 110 | 125 | 133 | | |
| L8-09 | Ground Protection Selection | — | 1 | 1 | 1 | 1 | 1 | | |
| L8-38 | Carrier Frequency Reduction | — | 2 | 2 | 2 | 2 | 2 | | |
| L8-39 | Reduced carrier frequency | _ | 2 | 2 | 2 | 2 | 2 | | |
| n1-01 | Hunting Prevention Function Selection | — | 2 | 2 | 2 | 2 | 2 | | |
| n1-03 | Hunting Prevention Time Constant | ms | 30 | 100 | 100 | 100 | 100 | | |
| n1-16 | Hunting Prevention High Fc Gain | — | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | | |
| n2-01 | Speed Feedback Detection Suppression (AFR) Gain | — | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| n5-02 | Motor Accel Time | s | 0.777 | 0.864 | 0.91 | 1.392 | 1.392 | | |

Table 4.2.6 Default Settings Determined by Drive Capacity o2-04(400 V Class) (3)

*1: Settings include, 0: Low Noise PWM, 1: 2 kHz, 2: 5.0 kHz, 3: 8.0 kHz, 4: 10 kHz, 5: 12.5 kHz, 6: 15 kHz.

5. Test Run

After reading through the basic settings and test run instructions in chapter 4 of the GA700technical manual (SIEP C710617 \Box), check the following points:

■Output Current at Maximum Load

- Make sure the output current at start as well as when opening and closing the brake does not exceed 150% of the drive rated current.
- · Check that the output current when operating at constant speed does not exceed the motor rated current.

If the output current exceeds the levels described above, then do the following:

- Perform Auto-Tuning (if Auto-Tuning has already been performed, then there is no need to repeat the process). Make sure that the load is decoupled from the motor for Auto-Tuning.
- Adjust parameter settings while referring to Appendix 1: Parameter Calculations and Appendix 3: Tuning Procedures (for hoisting application using Open Loop Vector Control).
- If there is excessive current when starting to hoist after just after lowering the load while operating in V/f Control or Open Loop Vector Control, then adjust the setting in parameter S2-03 (Run command delay timer (REV→FWD)). See section 6.2.2, "Run command Delay Timer (Reverse→Forward)" for a detailed description of how the timer works.

■ If other errors occur while performing a test run, then see the check list in Appendix-2 for appropriate counter-measures.

■Stall Prevention and overvoltage suppression functions settings can be extremely dangerous when used with crane and hoist applications. Make sure these functions are set appropriately for your application to ensure safety.

6. Description of Added Functions

Areas of Caution Before Use

- (1) Check that the wiring is set up so that the motor is rotating in reverse (REV) when lowering, and forward (FWD) when hoisting in all control modes.
- (2) Be sure to set S1-20 to "1" (enabling regen operation while the motor is rotating) when using the crane to lower or hoist the load without a counter-weight (necessary only when running in Open Loop Vector Control). Parameter S1-20 can be changed after setting the Access Level to "Advanced" (A1-02 = 2).
- (3) For safety, be sure overspeed detection and slip-down detection are set up properly.

6.1 Brake Sequence

For the brake to both close and release while maintaining the torque appropriate for the load at start and stop, the brake release command is output based on the size of the torque reference, motor current, or frequency reference internal to the drive. Use Appendix 1 to determine the correct parameter settings.

For the brake to both clamp and release while maintaining the torque appropriate for the load when starting or stopping, the brake release command is output based on the size of the torque reference, motor current, or frequency reference internal to the drive.

Operation Description

A time chart and the terminal functions are shown below when running the drive via the external terminals, once b1-01 and b1-02 have both been set to "1" (assigns the Run command and frequency reference to the external terminals). 3. Refer to the wiring diagram to make sure the brake sequence operates as described: when a terminal set for the brake release command is closed, then the brake is released; when the terminal relay is open, the brake is applied.



Closed Loop Vector Control

Note: 1: Areas to take note of when setting parameters:

- Set the Slip Prevention Time HT (S1-15) to "0" (default), and the Stop Timer ST (b2-04) = (Brake Delay Time).
- Default/default setting for BT and BF is zero when operating in Closed Loop Vector Control.

Note 2: Areas of caution when dealing with Torque Compensation:

- An application in which a counter-weight is not needed has a faster brake release time (shortening the operation cycle) or brake release with a low output frequency (jolt/jerk free operation). Here, the Brake Release Frequency FRF and FRR are set to zero.
- Torque compensation can be input from analog terminal A3 by setting parameters S1-09 and S1-10, as well as H3-06 to "14". When using analog input, the amount of torque compensation is fixed to the forward (reverse) run command input.

• The Torque Compensation Delay Time (ITCT) is the time it takes for the amount of torque compensation to change from 0% to 100% (i.e., the setting time is 1/2 when the amount of torque compensation is at 50%).



Open Loop Vector Control

Note: 1. Torque Forcing ITCF (default setting of 50%) is used to quickly release the brake in case a heavy load were to

2. If BT = 0, then Torque Forcing ITCF (ITCR) is built up until the timing for the output frequency FRF (FRR).

V/f Control Mode

slip.



- BF : Brake Delay Frequency (S1-03)
- BT : Brake Delay Time (S1-04)
- IF : FWD Brake Release Current (S1-05) based on motor rating
- IR : REV Brake Release Current (S1-06) based on motor rating
- TF : FWD Brake Release Torque (S1-07)
- TR : REV Brake Release Torque (S1-08)

- ITCT : Torque Compensation Delay Time (S1-11)
- FHF : FWD Brake Release Frequency (S1-12)
- FHR : REV Brake Release Frequency (S1-13)
- HF : Slip Prevention Frequency (S1-14)
- HT : Slip Prevention Time (S1-15)

* In Open Loop Vector Control Mode, the name of parameters \$1-09~11 change from "Torque Compensation" to "Torque Forcing".

(1) Terminal S1 and S2 (Forward Run Command, Reverse Run Command)

The operations shown below are executed when the status signal is entered based on the combination of the forward and reverse run commands.

Operations may be restricted in some way based on the Run command Tuning Function. For more information, see the description listed in section 6.2, "Run Command Tuning"

| FWD Command | REV Command | Operations |
|-------------|-------------|--|
| Open | Open | Decelerates to stop as shown in 6.1.2, "Stop Sequence". |
| Closed | Open | FWD Run |
| Open | Closed | REV Run |
| Closed | Closed | The drive coasts to a stop, and "SE1" appears on the keypad screen (a fault has been triggered). If S1-16 (SE1 Detection |
| | | Time) is set to 0.00, then "EF" will be displayed, and the drive will decelerate to stop (no fault is triggered). |

(2) Terminal S5 (Brake Release Check)

Used for the Brake Release Check (BX). When the relay is closed, the brake is checked to see if it has been released.

(3) Terminal M1, M2 (Brake Release Command)

Used for the Brake Release Command (BR). When Terminal M1-M2 is closed, the command to release the brake is given.

Note: Areas of note when running from the keypad:

- 1. When b1-02 equals zero (Run command from keypad), the brake sequence is disabled (S1-xx parameters).
- Make sure that operations via the keypad cannot be performed after connecting the brake. If attempting to operate the drive via the keypad after connecting the brake, a sequence error (SE) will occur. If Auto-Tuning is performed after the brake has been connected, then an "Acceleration Fault" or a "Motor Speed Fault" will occur.

6.1.1 Starting Sequence

To prevent any sudden slipping or a sudden drop at start, release the brake only after confirming that enough torque has been generated to protect the load.

Operation Description

- (1) When a Run command is entered (either FWD or REV is closed), the drive will accelerate up to the Brake Delay Frequency (BF) with the brake clamped shut. At this time either Torque Compensation (in Closed Loop Vector Control) or Torque Forcing (in Open Loop Vector) will be input in response to the setting value.
- (2) After confirming the 3 conditions listed below, the Brake Release Command relay will close. Once closed, the Brake Release Check (BX) will close based on external circuitry.

Conditions that close the Brake Release Command circuit:

- Output Freq (SFS Output) \geq Brake Release Frequency FRF (FRR)
- Drive Output Current > Brake Release Current IF (IR)
- Drive Torque Reference \geq Brake Release Torque TF (TR) Vector Control Mode only
- (3)After the Brake Delay Time (BT) has been executed at the Brake Delay Frequency (BF) (completing an "Acceleration Hold"), the drive will accelerate to the frequency input from external terminal A1.

If the Brake Delay Time (BT) is zero, then Acceleration Hold is not enabled by the Brake Delay Frequency (BF).

Note: Different settings are possible in both forward and reverse for the Brake Release Frequency, Brake Release Current, and Brake Release Torque (for the vector control modes only).

6.1.2 Stopping Sequence

In order to prevent slipping when the drive is stopped, enough torque must be produced to take care of the load until the brake is completely clamped shut.

Operation Description

- (1) If a Stop Command is input (i.e., both the FWD and REV commands are open), then the drive will stop by the method set to parameter b1-03. Deceleration will occur at the set decel time until the Slip Prevention Frequency (HF) is reached. In Closed Loop Vector Control, however, the drive will instead decelerate to zero speed.
- (2) If the output frequency (SFS Output) falls below the Brake Release Frequency (FHF, or HR when in reverse), then the Brake Release Command will open, and the Brake Release Check (BX) will also open on account of external circuitry.
- (3) The drive will stop after deceleration hold (Slip Prevention Time) at the Slip Frequency (HF).
 - In Closed Loop Vector Control, however, the drive will execute Stop Time Speed Control at Zero Speed.
- Note-1: If the output frequency (SFS Output) falls below the Brake Release Frequency (FRF, FRR) when the conditions described below have been met, then the Brake Release command relay will open.
 - · Both the Forward Command and Reverse Command relays are open
 - During FWD/REV switching
- Note-2: Without entering a Stop command (either the FWD or REV command relays are closed), the drive will continue running at the larger value found in either the Brake Release Frequency from the frequency reference (FRF, FRR), or simply the Brake Release Frequency (FHF, FHR). If the signal level for terminal A1 (H3-01) is set to "1", the stopping sequence is executed when the frequency reference falls below Zero Speed (b2-01), or if the minimum output frequency (set in E1-09) continues for more than 100ms. Here, if an output frequency reference of less than the value set to E1-09 is input, then output will be interrupted (Baseblock).

6.1.3 Forward / Reverse Switch

In control modes without a pulse generator, the sequence of operations cannot go from forward to reverse without the brake, and then switch directions from reverse back to forward again (Zero Speed Cross). When a Run command is entered from the reverse side while the drive is running, then the drive will follow operations discussed in 6.1.2, "Stop Sequence". After the brake has completely clamped shut, drive operations will begin on the reverse-side as shown in section 6.1.1, "Sequence at Start".

When using feedback from a pulse generator, the drive will operate by going from forward to reverse and from reverse to forward continuously (Zero Speed Cross). There are also times when the brake will still clamp down. See section 6.2.1, "Run Command Minimum ON Time", for a more detailed description.

Lastly, the brake will be applied if the frequency reference is set lower than the Brake Release Frequency (FRF, or FRR in reverse) when performing FWD/REV switching.

6.1.4 Brake Operations via Terminal A1 (speed reference input)

Time charts up to this point have been when the terminal A1 signal selection (H3-01) has been set to zero (0V to +10V). There, the brake cannot be applied or released by using the speed reference via terminal A1. In the diagram below, H3-01 has instead been set to "1" (allowing input of -10V to +10V). This permits the brake to be applied and released by using the speed reference Input via Terminal A1.



Operations when H3-01 (Terminal A1 Signal Level) is set to "1":

Note: 1. If the speed reference Input (terminal A1) is negative, then it is read as REV.

- 2. Once the speed reference Input (terminal A1) value is smaller than b2-01 and E1-09, then the Run command will be seen as open after 100ms has passed.
- 3. Until the Run command is seen as open, the drive will operate with a speed command of either FRF (FRR) or FHF (FHR), whichever is larger.

Operation Description

- (1)With terminal S1 closed, the larger value (absolute value) between parameters E1-09 (Min Output Freq) and b1-02 (Zero Speed Level) will be input to terminal A1 (speed reference input). That input will be seen as a Run command, and the operations discussed in 6.1.1 "Start Sequence" will be executed. When the signal to terminal A1 is positive, it is seen as a forward command, and reverse when negative.
 - Note: Use with terminal S2 always open. If terminal S2 is closed, then the motor will rotate in the opposite direction from the description above.
- (2) If a signal smaller than the absolute value of the E1-09 or b1-02 is input to terminal A1, then Run command relay will open after 100ms, and the operations described in 6.1.2 "Stop Sequence" will be executed.
 - Note: If the speed reference Input (terminal A1) changes slightly, the drive will continue to run until the Run command opens after the Brake Release Command opens, using the larger of either FRF (S1-01) or FHF (S1-12) when rotating forward, or the larger of either FRR (S1-02) or FHR (S1-13) when rotating in reverse as the Speed Reference. As the drive will continue to run even after the brake has clamped shut, set the speed reference Input for A1 to zero until just before 100ms, where the output frequency reaches the Brake Release Frequency (FRF in forward, FHR in reverse). This is one of the reasons the brake will slip.

6.1.5 Observations Functions

If the conditions for a brake sequence fault detection arise, then the drive will undergo baseblock and trigger a fault relay after the brake release command is opened.

| Fault | Description | Detection | Cause | Corrective Action | |
|-------|---|-----------|---|--|--|
| SE1 | Relays for both Forward and Reverse commands are closed at the same time. | S1-16 | External Operation Sequence Error | Check the sequence circuitry. | |
| SE2 | Brake Release Command (BR) is closed after the output frequency reaches zero following the input of a FWD or REV command | S1-17 | The motor isn't properly connected. Brake Release Current or Torque is set too high. | • Check the circuitry for the motor • Lower the parameter setting value so that it is appropriate for the load. | |
| SE3 | The Brake Release Check signal is open while the Brake Release Command (BR) relay is closed. | S1-18 | • Sequence error in the brake circuit. • The response (scan) of the sequence circuit is too slow/late. | Check the sequence circuitry. | |
| SE4 | The Brake Release Command (BR) relay is open, and the Brake Release Check signal (BX) is closed. | S1-19 | There is a bad connection between the relay, contactor, or brake (perhaps loose wiring). | Check the relay or contactor, the brake itself and the wiring. | |

Table 6.1.5 Sequence Fault Table

Note: The following settings will keep the sequence errors described above from being detected:

It is recommended that the drive is set up so that no errors/faults are detected, allowing the brake sequence to execute properly:

1. If the Brake Release Check signal is not set up to multi-function input, then SE3 and SE4 will not be detected.

2. If a detection time in $S1-16\sim19$ is set to 0.00, then that sequence fault will not be detected.

6.2 Run Command Adjustments

6.2.1 Run Command Minimum ON Time Function

With Minimum ON Time (S2-01, -02), parameters S2-01 and S2-02 will be saved internally along with the Run command.

Operation Description: When S2-01 (S2-02) ≠ 0



- (1) Entering a Run command when the drive is stopped (for all Control Modes):
 - (a) If the time for the Run command to be entered is shorter than the minimum "on-time" (S2-01, S2-02), then only the minimum "on-time" will be maintained by the drive internally.
 - (b) If the time for the Run command to be entered is longer than the minimum "on-time" (S2-01, S2-02), then the drive will maintain the Run command internally for the time taken to enter the Run command.

(2) Entering a Run Command while Decelerating to Stop

(a) When both the output frequency and a Run command in either direction are entered, then the drive will operate as shown below, regardless of the control mode.

| Run Cmd ON Conditions | Minimum ON Tim | e(S2-01, -02) = 0 | Minimum ON Time (S2-01, -02) $\neq 0$ | | | |
|--------------------------|------------------------------|------------------------------------|---------------------------------------|---------------------------------|--|--|
| Control Mode | Output Frequency > $F\alpha$ | Output Frequency \leq F α | Output Frequency > $F\alpha$ | Output Frequency $\leq F\alpha$ | | |
| All Control Modes | re-accelerates brief stop | | (stops for a minimum of 50ms) | | | |

(b) If the output frequency and a REV Run command is entered, then the drive will operate as follows: When in Closed Loop Vector Control Mode during deceleration at a frequency higher than Fα, if the minimum "on-time" setting is zero as a Run command is given on the REV side, then the drive will run (FWD/REV) without braking.

| Run Cmd ON Conditions | Minimum ON Time | e (S2-01, -02) = 0 | 1, -02) = 0 Minimum ON Time $(S2-01, -02) \neq 0$ | | |
|--|---|------------------------------------|---|------------------------------------|--|
| Control Mode | Output Frequency > $F\alpha$ | $Output \ Frequency \leq F \alpha$ | $Output\ Frequency > F\alpha$ | $Output \ Frequency \leq F \alpha$ | |
| Closed Loop Vector Control Mode | Brake is not applied, and FWD/REV switching is activated. | brief stop (stops for a mi | inimum of 50ms) | | |
| Not Closed Loop Vector Control Mode | | | | | |

Note: Fα is the larger of either the Brake Release Frequency (S1-01, or S1-02 when in reverse) or the Brake Release Frequency (S1-12, or S1-13 when in reverse).

6.2.2 Run Command Delay Timer (Reverse→Forward)

If hoisting operations start just after lowering the load in Open Loop Vector or V/f Control Modes, then a large amount of current may flow through the drive. In this type of situation, the peak of the output current can be reduced by delaying the hoist operation command.

Hoist operations can be delayed after lowering operations have just been executed by using the Run command Delay Timer (Reverse \rightarrow Forward) in parameter S2-03. If the FWD command switches from open \rightarrow closed \rightarrow open when this timer is functioning during run, then a forward command will not be accepted. After the crane has stopped lowering its load, hoist operations will be delayed if the time for the input of the next Run command is shorter than the time set to parameter S2-03. The Run command Delay Timer (S2-03) uses settings in the motor parameters (E2-*xx*) with the following formulas to calculate an appropriate delay time:

$$\frac{\sqrt{(E2-01)^2 - (E2-03)^2}}{2\pi \times (E2-02) \times (E2-03)} \times 1.5 \text{ s}$$

This parameter need not be set if excessive current does not flow through the drive when starting hoist operations just after the crane has finished lowering its load.

6.3 Impact Stop Function

On conveyer belt applications, once a stop command is given while the Impact Stop Command is closed, then the drive will stop as it assumes that impact has occurred with the cart (i.e., the load) if the torque reference or the output current exceed the standard value.

Refer to "Appendix-1: Parameter Calculations" when setting this parameter.

Enabled only when parameter b1-03 is set to zero (Deceleration Stop Mode).

Note: This function should not be used in cases where the wheels on the cart/container fail to catch upon impact. This is because no constriction is then applied to the motor, and the torque reference and output current do not increase.

Operation Description:

Impact Stop Selection closed (Multi-Function Trmnl) open Setting value = 35 Speed Cmd Input (Trmnl A1) closed open FWD (REV) Cmd Input (Trmnl S1-S2) (TCR)* Output Frequency HF FCR $ITR \ge IFOT (IROT)$ in Vector Control Mode TIOT FHF(FHR) \leftrightarrow IOUT \geq IFOT (IROT) in V/f Control Mode on Torque/Current Detectionclosed Brake Release Cmd BR open (Trmnl M1-M2) HT closed Brake Release Check BX open (Trmnl S5) BDT open Brake Operations closed

* If ITR is less than IFOT (IROT) in Vector Control Mode, or if IOUT is less than IFOT (IROT) in V/f Control mode, then the output frequency during FCR will become TCR during run.

| IOUT | : Drive Output Current | BDT : Brake Operation Delay Time | |
|------|---------------------------------------|---|-----------------------|
| ITR | : Drive Torque Reference | FCR : Impact Stop Creep Frequency (S3-01) | |
| FHF | : FWD Brake Release Frequency (S1-12) | TCR : Impact Stop Creep Time (S3-02) | |
| FHR | : REV Brake Release Frequency (S1-13) | IFOT : Forward Impact Stop Detection Torque (S3-03) | based on motor rating |
| HF | : Slip Prevention Frequency (S1-14) | IROT : Reverse Impact Stop Detection Torque (S3-04) | based on motor rating |
| HT | : Slip Prevention Time (S1-15) | TIOT : Impact Stop Detection Time (S3-05) | |
| | | | |

- (1) If the Impact Stop Command (setting = 35) is closed and the output frequency is at or above the Impact Stop Creep Frequency (FCR), then the drive will decelerate to the Impact Stop Creep Frequency that has been set once a stop command is input (both FWD and REV circuits are open).
- (2) If the torque reference (or output current in V/f Mode) is at or above IFOT (or IROT in reverse) for longer than the duration set to TIOT when running the drive at the Impact Stop Creep Frequency (FCR), then deceleration will occur until the output frequency reference equals the value in FRF (or FRR in reverse). Next the Brake Release Command (BR) will open, after which the brake Release Check (BX) relay will open from an external circuit.
- (3) If the conditions described above in (2) are not met for the duration set to TCR, then the Brake Release Command (BR) will open after which the Brake Release Check (BX) will also open from external circuitry.
- (4) If an Impact Stop occurs during run and the Impact Stop Command relay is opened, then the Impact Stop function will cease and the Brake Release Command switch will open. Afterwards, the Brake Release Check (BX) will also open via external circuitry.

6.4 Swift Lift Acceleration Function

6.4.1 Swift Lift Acceleration 1 Function

If the load is detected as being lighter than the amount of the output current or the torque reference, then the frequency reference is increased and the drive continues to run. This can help constrict operation time.

This function determines whether or not the acceleration is allowed (Swift Lift) to the frequency reference that has been set. In other words, when Swift Lift is operating, the drive can still run at the set frequency reference. Accordingly, the command following Swift Lift needs to be the frequency reference. See "Appendix-1: Parameter Calculations" for more information when setting this parameter.

When enabling or disabling Swift Lift 1 via one of the digital inputs, Multi-Function Input (H1-01~08) needs to be set to "30". To have Swift Lift always enabled, set the Swift Lift Control Selection (parameter S4-01) to "1".

. .

| Swift Lift Acceleration 1 Function is Enabled | | | | | | | |
|---|-----------------------------|--|--|--|--|--|--|
| Multi-Function Input Function Setting | S4-01 Setting | Swift Lift 1 Acceleration Enabled /Disabled | | | | | |
| H1 01 H1 08 set to "20" Digital Open | Not related to setting | Output frequency does not exceed S4-06 (detection frequency). | | | | | |
| Input Closed | Not related to setting. | | | | | | |
| | 1: (Acceleration 1 function | Swift Lift acceleration function is enabled. | | | | | |
| | enabled) | | | | | | |
| "30" not set to H1-01 ~ H1-08 | 2: (Acceleration 2 function | For the operation, refer to 6.4.2(Swift Lift acceleration 2 function). | | | | | |
| | enabled) | | | | | | |
| | 0: (Disabled) | Swift Lift acceleration function is disabled. | | | | | |
| | 0. (Disabled) | Ti is operated by frequency reference. | | | | | |

.....

| Multi-Function In | put (Swift Lift Acceleration 1 | Enable/Disable) |
|-------------------|--------------------------------|-----------------|
| | | |

| Setting | Name | Message | Description |
|---------|---|-------------------------------------|---|
| 30 | Swift Lift Acceleration 1 Enable/Disable | Swift Lift Acceleration 1 Selection | Swift Lift acceleration 1 function enable or disable is selected. |



Operation Description

FAMF : Forward Swift Lift 1 Max Frequency (S4-02) FAMR : Reverse Swift Lift 1Max Frequency (S4-03)

FAD : Swift Lift 1detection Frequency (S4-06)

TA : Swift Lift 1detection Time (S4-07)

IFAT : Forward Swift Lift 1 Detection Torque (S4-04)

based on motor rating IRAT : Reverse Swift Lift 1 Detection Torque (S4-05) based on motor rating

- (1) With S4-01 set to "1" (Swift Lift Function Selection), or with Swift Lift enabled via one of the digital inputs, the drive will accelerate by the frequency in FAD if a frequency reference larger than the Swift Lift 1 Detection Frequency (FAD) is detected. After 1/3 of the Swift Lift 1 Detection Time (TA) has passed, a load check is performed by comparing the torque reference and Swift Lift 1 Detection Torque (IFAT, or IRAT in reverse).
- (2) If the torque command (or output current in V/f Mode) lasts for 2/3 of the time set to TA but remains below the time in FAT (or IRAT in reverse), then the drive will re-accelerate (Swift Lift) and run at either the previously set frequency reference or the Swift Lift 1 Max Frequency (FAMF, or FAMR in reverse), whichever reference is lower.
- (3) If the torque command (or output current in V/f Mode) is greater than IFAT (or IRAT in Reverse), then the drive will continue running at the frequency set to FAD. Even if the torque reference decreases, re-acceleration (Swift Lift) will still not occur.

The Swift Lift function is reset by the conditions shown below. Once reset, the drive will accelerate until the load is checked again as described in (1).

- when the Run command relay is open
- when the Frequency Reference Input Value is below the Swift Lift 1 Detection Frequency (FAD)
- when a malfunction occurs
- when a reverse run command is input
- · when an External Baseblock Command has been entered

Swift Lift 1 Torque Bias (S4-19, -20) Tuning Open Loop Vector Control Mode

When lowering a load (reverse), there are times when Swift Lift is not executed based on the mechanical loss for the crane, regardless if Swift Lift 1 Detection Level (REV) is reached. Under these circumstances, adjust S4-20 (Swift Lift 1 Torque Bias) to be within following range:

When hoisting (FWD), Swift Lift 1 Detection Level (S4-04) has been added onto the value for mechanical loss, thus making it possible to skip Swift Lift 1 Torque Bias (S4-19) when tuning the drive.

Also, if the motor temperature changes, even an identical load may undergo and then not undergo Swift Lift (an error of approximately $5\% \sim 7\%$) due to the value of the torque reference changing. Keep this in mind when setting this parameter.

Swift Lift 1 Torque Bias (FWD) (S4-19) Tuning Range

- (1) When rotating <u>forward without a load</u>, the drive runs at the Swift Lift Detection Frequency (S4-06), and the torque reference is monitored in U1-09.
- (2) A value opposite of the signal from monitor U1-09 is set to parameter S4-19.
- (3) While using U4-15 to monitor the torque reference for Swift Lift, adjust the Swift Lift 1 Detection Level (S4-04).

Swift Lift 1 Torque Bias (REV) (S4-20) Tuning Area

- (1) When rotating in reverse without a load, the drive runs at the Swift Lift Detection Frequency (S4-06), and the torque reference is monitored in U1-09.
- (2) A value opposite of the signal from monitor U1-09 is set to parameter S4-20.
- (3) While U4-15 monitors the torque reference for Swift Lift, S4-05 is tuned (Swift Lift 1 Detection Level).

Note-1: Areas of caution when setting parameters:

(1) Set parameters so that the following conditions are met.

S4-06 (FAD: Acceleration 1 Detection Frequency) \leq S4-02 (FAMF: FWD Acceleration 1 Max Frequency)S4-03 (FAMR: REV Acceleration 1 Max Frequency) \leq E1-04 (Max Output Frequency: E3-04 when switching motors)

- (2) If FAMF (or FAMR when in reverse) is smaller than FAD, then the drive will decelerate when Swift Lift 1 functions are activated.
- (3) The operational frequency reference will be set to the smaller of either the Swift Lift Max Frequency (FAMF/FAMR), or the present frequency reference once Swift Lift is complete.
- Note-2: The distance the crane travels before stopping via the Run command being switched off is determined by the speed of the crane.

When running at high speeds, be sure to provide enough room when removing the Run command.

Note-3: The output current may increase following Swift Lift operations.

6.4.2 Swift Lift Acceleration 2 Function

If the acceleration time is set low, the drive will start automatically increasing the acceleration rate, and will then halt the acceleration part way through when above base speed. This will limit the kinetic energy in the load, protecting the load (mainly by braking), and operate at maximum efficiency.

Swift Lift 2 allows the drive to determine whether to accelerate or not up to the frequency provided, and operates the drive at the frequency reference provided when Swift Lift is enabled. In the same way, if Swift Lift 2 is enabled, then let the frequency reference be the command following Swift Lift operations. Refer to "Appendix 1: Parameter Calculations" when making parameter adjustments.

When switching to enable or disable Swift Lift 2, set one of the Multi-Function Input terminals to 36 (parameters H1-01~08). If normally enabled, then S4-01 (Swift Lift Function Selection) should be set to "2".

| Multi-Function Input Function Setting | | | S4-01 Setting | Swift Lift Acceleration Enable / Disable | |
|---------------------------------------|--------------|--------------------------------------|---|--|--|
| "36" is set to H1-01~08 Digital open | | open | No effect on settings | Output frequency does not exceed light load acceleration 2 enabled frequency (S4-08) | |
| | Input closed | | | Swift Lift accoloration 2 function is analyd | |
| | | | 2:(Acceleration 2 function enabled) | Switt Lift acceleration 2 function is enabled. | |
| "36" has not been set to H1-01~08 | | 1: (Acceleration 1 function enabled) | See section 6.4.1, "Swift Lift 1" for more information. | | |
| | | | 0: (Disabled) | Swift Lift Function is disabled, and drive operates at freq. reference. | |

Swift Lift Acceleration 2 Function is Enabled

Multi-Function Input (Swift Lift Acceleration2 Enable /Disable)

| Setting Value | Name | Message | Description |
|---------------|---|--|---|
| 36 | Swift Lift Acceleration 2 Enable/Disable | Swift Lift Acceleration 2 Selection | Swift Lift acceleration 2 function enable or disable is selected. |

Operation Description: Example when drive is motoring



FAM2 : Swift Lift Acceleration 2 Activation Frequency (S4-08)

- TA2 : Swift Lift Acceleration 2 Timer (S4-13)
- LGS : Swift Lift Acceleration 2 Motoring Limit Activation Level (S4-09)
- EA2 : Swift Lift Acceleration 2 Fault Operation Selection (S4-14)
- LGH : Swift Lift Acceleration 2 Motoring Hold Level (S4-10)
- LEA2 : Swift Lift Acceleration 2 Fault Detection Level (S4-15)
- LR : Swift Lift Acceleration 2 Regen Limit Activation Level (S4-11)
- TEA2 : Swift Lift Acceleration 2 Fault Detection Time (S4-16)

Note: The lines on the diagram above show room for output from the drive, although it will still stall if there isn't enough power.

(1) Either the Swift Lift Function Selection (S4-01) is set to "2", or it has been enabled via Multi-Function Digital Input. Once the frequency reference exceeds the Swift Lift 2 Frequency (FAM2), then the Accel time will become the same as the Swift Lift 2 Accel Time Gain (GAT), and the drive will observe the output power.

- (2) When the drive is motoring, the Swift Lift 2 Timer (TA2) counter will begin after gently increasing the acceleration rate once the output power has exceeded the Swift Lift 2 Motoring Limit Activation Level (LGS). The counter is cleared when the output power drops just below LGS.
- (3) If the output power reaches the Swift Lift 2 Motoring Hold Level (LGH) or if the Swift Lift 2 Counter reaches the value in TA2 (regardless whether the acceleration changes gently or not), then the drive will stop accelerating. If the counter exceeds TA2 and acceleration stops, then the motor will no longer accelerate until it comes to a complete stop.
- (4) During regeneration when Swift Lift 2 Regen Operation Selection is enabled (S4-18 = 1), operations are the same as when motoring except that LGS and LGH are switched with LRS and LRH respectively, as shown in descriptions (2) and (3).
- (5) When output frequency exceeds FAM2, the next fault is detected. If the output power exceeds the Swift Lift 2 Fault Detection Level (LEA2) and continues for the duration set in the Swift Lift 2 Fault Detection Time (TEA2), protection operations will be activated according to the setting of the Swift Lift 2 Fault Operation Selection (EA2).

| Setting | Operations after Detection | Fault Type | | |
|---------|---|---|--|--|
| 0 | Deceleration to stop (Deceleration by selected deceleration time) | Major fault (fault contact output is enabled.) | | |
| 1 | Coast to stop | Major fault (fault contact output is enabled.) | | |
| 2 | Deceleration to stop (Deceleration by fast stop time.) | Major fault (fault contact output is enabled.) | | |
| 3 | Acceleration prohibited (Operation continues) | Minor fault (reset when run command is opened and stopped.) | | |

Swift Lift Acceleration 2 Fault (OL6) Protection Operation (S4-14)

*All are detected during run only.

When the setting value is 0, 1, or 2:

"OL6" will flash on the keypad screen until the reset button is pushed after Swift Lift 2 Fault has been detected.

When the setting value is 3:

"OL6" will flash on the keypad screen until the motor comes to a complete stop and the Run command relay is opened if a Swift Lift 2 Fault is detected.

Note: When the setting value is "3" (alarm setting), then "OL6" will continue flashing on the keypad screen, even if the RESET key is pushed.

6.5 Overload Detection

Limits drive operations (Safety Procedures) based on the torque reference for the drive or the size of the output current. This limit is set by adjusting parameter values. Detection operations and detection levels can be set in two groups: When parameter b1-02 equals zero (input from the keypad), Overload Detection will not operate.

| No. | Name | | | | | Description | | | |
|--------|-----------------------|--|--|------------|----------|------------------------------|---|--|--|
| S5-01 | Overload Detection | Enables | Enables and disables overload detection, determines the conditions for detection, and the operations | | | | | | |
| | Operation Selection 1 | that foll | ow detect | ion. | | | | | |
| | | Value | Value Detection During Run Speed Agree Detection Operations Error / Fault Type | | | | | | |
| | | 0 | | - | | (no detection) | | | |
| | | 1 | Y | | Y | no Accel (continue running) | alarm (Run Cmd is open and reset by Stop) | | |
| | | 2 | Y | Y | | no Accel (continue running) | alarm (Run Cmd is open and reset by Stop) | | |
| | | 3 | Y | | Y | decel stop during Quick Stop | alarm (Run Cmd reset by open→closed after stop) | | |
| | | 4 | Y | Y | | decel stop during Quick Stop | alarm (Run Cmd reset by open→closed after stop) | | |
| | | 5 | Y | | Y | coast to stop | major error (fault output relay) | | |
| | | 6 | Y | Y | | coast to stop | major error (fault output relay) | | |
| | | After overload detection conditions arise, 'OLS' will hash on the keypad select and the keypad selection occurs, the drive will stop. The Run command input relay is opened, and "OL5" will flash on the screen until the relay is closed again. Once closed, the drive will start to run again. <u>Setting Value is 5 or 6:</u> "OL5" will flash on the keypad screen after overload detection until the fault reset is triggered. Note: With settings 1~4 (alarms), the keypad screen will continue to flash "OL5" even if the RESET key is pushed. | | | | | | | |
| S5-02 | Overload Detection | Sets the | overload | l Detecti | on Leve | el: | | | |
| | Level 1 | • In | V/f Cont | rol Mode | , the m | otor rated current is 1009 | % | | |
| | | • In | Vector C | ontrol M | ode, th | e motor rated torque is 10 | 00%. | | |
| S5-03 | Overload Detection | If the ti | me by wh | ich moto | r currei | nt or torque exceeds the | value set to S5-02 is longer than the value | | |
| | Time 1 | set in th | is parame | eter, then | an ove | rload detection relay is to | ipped. | | |
| \$5-04 | Overload Detection | Same as | s \$5_01 | iter, then | | fioud detection fetay is a | ipped. | | |
| 33-04 | | Same a | \$ 55-01. | | | | | | |
| | Operation Selection 2 | | | | | | | | |
| S5-05 | Overload Detection | Same as | s S5-02 | | | | | | |
| | Level 2 | | | | | | | | |
| S5-06 | Overload Detection | If the ti | me for th | e motor | current | or motor torque set by | S5-05 is longer than the time set in this | | |
| | Time 2 | paramet | ter, then o | verload | will be | detected. | č | | |

If overload detection has been set to Multi-Function Output (setting = 22 or 23), then the relay is triggered. See the table below for the conditions when the relay is open or closed.

| Multi-Function | Output | (Overload | Detection | Signal) | Descrit | otion |
|----------------|--------|-----------|-----------|---------|---------|-------|
| manu i unction | Juiput | (Overload | Detection | Dignai | Deserin | Juon |

| Setting | Name | Message | Description |
|---------|---------------------------|-------------------------|---|
| 22 | Overload Detection (N.O.) | Overload detection N.O. | If conditions for either Overload Detection 1 or 2 arise, then the output relay will close. It will remain closed for the duration that "OL5" appears on the keypad screen. |
| 23 | Overload Detection (N.C.) | Overload Detection N.C. | If conditions for either Overload Detection 1 or 2 arise, then the output relay will open. It will remain open for the duration that "OL5" appears on the keypad screen. |

Note: Overload Detection operates only when the brake has been released.

6.6 Overtorque Detection

Operations based on the magnitude of the drive's torque command (or the output current) can be selected via parameter settings (protection for the load manipulated by the crane drive). Two levels of protection can be set to the drive, one for the detection operation and the other for the detection level.

| No. | Name | Description | | | | | | |
|-------|---|---|---|-----------|-----------|---------------------------|---|--|
| S6-01 | Overtorque Detection | Enables | Enables or disables Overtorque Detection, the detection conditions, and the operations executed | | | | | |
| | Operation Selection 1 | followi | following detection | | | | | |
| | _ | 10110 1011 | | | | | | |
| | | Value Detection During Run Speed Agree Detection Operations Error / Fault Type | | | | | | |
| | | 0 | | | | (no detection) | | |
| | | 1 | Y | | Y | continue running | alarm (only during overtorque detection) | |
| | | 2 | Y | Y | | continue running | alarm (only during overtorque detection) | |
| | | 3 | Y | | Y | coast to stop | major error (fault relay output) | |
| | | 4 | Y | Y | | coast to stop | major error (fault relay output) | |
| | | 5 | Y | | Y | continue running | alarm (reset by stop) | |
| | | 6 | Y | Y | | continue running | alarm (reset by stop) | |
| | | Setting Value is 1 or 2: "OL3" will flash when overtorque is detected. Setting Value is 3 or 4: "OL 3" will flash until the RESET button is pushed | | | | | | |
| | | Setting | v Value is | 5 or 6. | | _ | | |
| | | "OL3" | will flas | h on the | keypad | screen until the motor co | omes to a complete stop. | |
| S6-02 | Overtorque Detection | Sets the | Overtor | ue Dete | ction Le | vel: | | |
| | Level 1 | • In | V/f Cont | rol Mode | , tha m | otor rated current is 100 | 0⁄~ | |
| | | . 111 | V/I COIII | | z, me m | otor rated current is 100 | 70 | |
| | | • In | Vector C | Control M | lode, the | e motor rated torque is 1 | 00%. | |
| S6-03 | Overtorque Detection | If the ti | me that the | he motor | current | t (or motor torque) exce | eds the value set in S6-02 is longer than | |
| | Time 1 | the time | e set to th | is param | eter, the | en an Overtorque 1 condi | ition will be detected. | |
| S6-04 | Overtorque Detection Operation Selection 2 | Same as | s S6-01, a | lthough | "OL4" • | will appear on the keypa | d display. | |
| S6-05 | Overtorque Detect Level 2 | Same as | Same as S6-02 | | | | | |
| S6-06 | Overtorque Detection | If the t | ime the r | notor cu | rrent or | motor torque set by S | 6-05 is longer than the time set in this | |
| | Time 2 | parame | ter, then o | overtorqu | e will b | e detected. | | |

Overtorque Detection is not enabled when b1-02 is set to zero (allowing the Run command from the keypad).

If overtorque detection has been set to Multi-Function Output (setting = 0B, $17 \sim 19$), then the relay is triggered. See the table below for conditions when the relay is open or closed.

Description of Multi-Function Output (Overtorque Detection Signal)

| Setting | Name | Message | Description |
|---------|----------------------------------|--------------------------------|--|
| 0 B | Overtorque Detection 1 (N.O.) | Overtorque Detection 1 N.O. | If overtorque is detected as a result of Overload Detection 1, then the output relay will close. It will remain closed for the duration that "OL3" appears on the keypad screen. |
| 17 | Overtorque Detection 1 (N.C.) | Overtorque Detection 1 N.C. | If overtorque is detected as a result of Overload Detection 1, then the output relay will open. It will remain open for the duration that "OL3" appears on the keypad screen. |
| 18 | Overtorque Detection 2 (N.O.) | Overtorque Detection 2 N.O. | If overtorque as a result of Overload Detection 1, then the output relay will close. It will remain closed for the duration that "OL4" appears on the keypad screen. |
| 19 | Overtorque Detection 2 (N.C.) | Overtorque Detection 2 N.C. | If overtorque as a result of Overload Detection 1, then the output relay will open. It will remain open for the duration that "OL4" appears on the keypad screen. |

Note: Changes for the crane version of GA700:

1. S5-01, S5-04: Overtorque Detection Operation Selection: settings 5 and 6 were added.

2. S6-02, S6-05: Level settings were changed to from the drive rated current to the motor rated current (in V/f Control only).



The Travel Limit Function is a switch that prevents the cart/container from traveling past the target location, and hoisting functions from raising the load up too high. Based on the Multi-Function Input setting, selections can be made for the FWD/REV side, or for N.O./N.C. relays. Setting values for the operations that follow detection are shown in the table below.

Note: If either the forward or reverse run commands are disabled, the keypad will display "FWD

Limit Active" (or "REV Limit Active" when disabled on the reverse side) based on the input

relay for the Travel Limit.

| Setting | Name | Message | Operation after Detection |
|---------|----------------------|----------------|--|
| | | | If the Multi-Function Input relay is closed during forward run, then the Brake |
| | EWD Side Limit Input | | Release Command will open (causing the drive to brake), and the motor will coast |
| 31 | (NO) | FWD Limit N.O. | to stop as the output frequency reaches zero. If closed while running reverse, there |
| | (11.0.) | | will be no change to drive operations. When this relay is open, it is enabled along |
| | | | with both forward and reverse commands. |
| | | | If the Multi-Function Input relay is opened during forward run, then the Brake |
| | FWD Side Limit Input | | Release Command will open (causing the drive to brake), and the motor will coast |
| 32 | (N C) | FWD Limit N.C. | to stop as the output frequency reaches zero. If opened while running reverse, |
| | (N.C.) | | there will be no change to drive operations. When this relay is closed, it is |
| | | | enabled along with both forward and reverse commands. |
| | | | If the Multi-Function Input relay is closed while in reverse, then the Brake |
| | REV Side Limit Input | REV Limit N.O. | Release Command will open (causing the drive to brake), and the motor will coast |
| 33 | (NO) | | to stop as the output frequency reaches zero. If closed during forward run, there |
| | (11.0.) | | will be no change to drive operations. When this relay is open, it is enabled along |
| | | | with both forward and reverse commands. |
| | | | If the Multi-Function Input relay is open while in reverse, then the Brake Release |
| | REV Side Limit Input | | Command will open (causing the drive to brake), and the motor will coast to stop |
| 34 | (NC) | REV Limit N.C. | as the output frequency reaches zero. If open during forward run, there will be no |
| | (11.0.) | | change to drive operations. When this relay is closed, it is enabled along with |
| | | | both forward and reverse commands. |

Operation after Travel Limit Detection:

6.8 Motor Switch Function

Separate motors can be operated from a single drive. An external sequence is used to switch between motors.

Control Modes for motor 2 (i.e., the motor used after switching) include Open Loop Vector and V/f only (PG cannot be used).

Note: When operating the drive with motor 2, certain limitations exist due to restrictions on motor 2 parameter settings (refer



(1) If the Motor Switch Command goes from being closed to open (or from open to closed) during stop (the Run command is OFF during Baseblock), then the motor controlled by the drive will be switched from motor 1 to motor 2 (or the other way around). Refer to the following table:

(2) When the Motor Switch Control is complete, it closes (or opens) while switching motors.

- Note: 1. Be sure to switch motors only when the drive has stopped (i.e., the Run command is OFF during baseblock). If motors are switched during run, a message indicating that the drive will change motors will flash on the keypad screen until the motor comes to a complete stop. Once stopped, the drive will switch to the other motor.
 - 2. When switching from motor 2 to motor 1, the operations enclosed in brackets will be executed.

Motor Switch Control

- (1) Motor Switch Control is active for approximately 50ms (500ms with a pulse generator)
- (2) All parameters regarding Control Mode, V/f Characteristics, Motor Parameter functions are re-initialized with motor 2 (or motor 1).

| Function | Motor 1 | Motor 2 |
|---------------------|---------------------|---------------------|
| Control Mode | A1-02 | E3-01 |
| V/f Characteristics | E1-04 ~ E1-13 | E3-04 ~ E3-13 |
| Motor Parameters | E2-01 through E2-11 | E4-01 through E4-11 |

(3) The following table shows parameters factory/default settings for each control mode (E3-01) regarding motor 2 operations. These values cannot be changed:

| Damara dan Nama | Na | Access Level | Default | | | |
|-----------------------------|-------|-----------------|---------|-------------|--------|--------|
| Parameter Name | INO. | | V/f | V/f with PG | OLV | CLV |
| DC Suppression Time at Stop | b2-04 | А | 0.00 s | 0.00 s | 0.00 s | 0.50 s |
| Impact Stop Creep Frequency | S3-01 | А | 6.0 Hz | 6.0 Hz | 3.0 Hz | 3.0 Hz |
| V/f Pattern Selection | E1-03 | Q | OF | OF | — | — |
| Overspeed Detection Time | F1-09 | А | — | 1.0 s | | 0.0 s |

(4) The following parameters are enabled only when running the drive with motor 1:

| Doromotor Nome | No | Access Level | Default | | | |
|--------------------------------------|-------|-----------------|---------|-------------|------|-----|
| Parameter Ivame | INO. | | V/f | V/f with PG | OLV | CLV |
| Run command Delay Timer (REV→FWD) | S2-03 | А | 0.00 | 0.00 | 0.00 | No |
| Swift Lift 1 Torque Bias (FWD) | S4-19 | А | 0.0 | 0.0 | 0.0 | 0.0 |
| Swift Lift 1 Torque Bias (REV) | S4-20 | А | 0.0 | 0.0 | 0.0 | 0.0 |

(5) As shown above, operation occur at the same values for motor 1, except for (2), (3), and (4).

To allow the drive to switch between motors, Multi-Function Input (parameters H1-08) must be set to "16". To send the switching status (i.e., whether the switch is open or closed) to the output terminals, then "1C" must be set to Multi-Function Output (parameters H2-01~03).

Multi-Function Input (Motor Switch Function) Description

| Setting | Name | Message | Description |
|---------|-----------------------------|---------------------|---|
| 16 | Motor Changeover Command | Motor Changeover | Switches between motor 1 and motor 2. Open: Select motor 1. Closed: Select motor 2. If one of the Multi-Function Inputs has not been set to "16", then the drive will continue operating motor 1. |

| Multi-Function | Output | (During M | otor Switch | Signal) | Description |
|----------------|--------|------------|-------------|---------|-------------|
| manu i anouon | Output | During 111 | | Dignai, | Desemption |

| | Frank Fanetion Supple (Baring Frietor Schen Signal) Besenption | | | | |
|---------|--|---------------------|---|--|--|
| Setting | Name | Message | Description | | |
| 1C | Motor 2 Selected | Motor 2 Selected | Outputs the motor that has been selected (either motor 1 or 2). Open: While motor 2 is selected. Closed: While motor 1 is selected. | | |

- Note: 1. When the Motor Switch Command (H1-01~08 = 16) is set to one of the Multi-Function Input terminals, OPE08 settings errors are checked as follows:
 The drive will operate using any areas where setting errors are present, and without checking all functions for OPE08 errors (such as Multi-Function Input, Output, Analog Input, or Monitor Output).
- Note: 2. Because the maximum output frequency for motor 1 (E1-04) and the max output frequency for motor 2 (E3-04) are different, the frequency reference will be limited by the max output frequency if it exceeds the max output frequency that has been set to the drive.

For example, if settings are as follows, E1-04 = 60 Hz, E3-04 = 50 Hz, d1-04 = 60 Hz, and d1-04 has been set for Multi-Step Speed, then the frequency reference for motor 1 will be 60 Hz, and 50 Hz for motor 2.

6.9 Operations when External Baseblock Command Input is cleared:

To avoid any sudden slipping or dropping of the load during speed search control operations when the external baseblock command is cleared, the following operations occur (i.e., these operations occur once an external baseblock command has been entered and is then cleared):

- (1) Operations when External Baseblock has been entered:(a) Baseblock (output current is interrupted). Baseblock will occur for a minimum of 0.1 s.(b) SFS output is set to zero.
- (2) Operations when Clearing External Baseblock Command
 - (a) If a Run Cmd is input, then acceleration will start from zero speed without performing speed search.
 - (b) If no Run Cmd is entered, then the drive will maintain baseblock.

7. Drive Faults: Display, Description, and Corrective Action (difference in Crane GA700)

The table below lists faults specific to the crane version of GA700. For trouble-shooting and other information concerning faults found in Yaskawa's standard model drives, please refer to the standard GA700 technical manual SIEP C710617 \Box .

| Display | Fault Name | Description | Corrective Action | Fault Type |
|---------|---------------------------------|---|---------------------------------|---|
| OL3 | Torque Detection Level 1 | When overtorque detection is enabled (S6-01=1 to 6) for overtorque selection 1, the drive output current in V/f Control (or the torque reference in vector control) exceeded the overtorque detection level (S6-02) for longer than the detection time (S6-03). | | A (when S6-01 = 3 or 4) B (when S6-01 = 1, 2, 5, or 6) |
| OL4 | Torque Detection Level 2 | When overtorque detection is enabled (S6-04=1 to 6) for overtorque selection 2, and the drive's output current in V/f Control (or the drive torque reference in vector control) has exceeded overtorque detection level 2 (S6-05) for longer than the detection time (S6-06). | | A (when S6-04 =3 or 4) B (when S6-04 = 1, 2, 5, or 6) |
| OL5 | Overload Detection | When Overload Selection 1 or 2 has been set to enabled Overload Detection $(S5-01 = 1 \text{ thru } 6 \text{ for overload operation selection } 1, \text{ or } S5-04 = 1 \text{ thru } 6 \text{ for overload operation selection } 1, \text{ or } S5-04 = 1 \text{ thru } 6 \text{ for overload operation selection } 2), the drive's output current in V/f Control mode (or the drive's torque reference when running in vector control mode) has exceeded the overload detection level (S5-02 for overload operation selection 1, and S5-05 for overload operation selection 2), and has continued at that state for the time set in S5-03 (or in S5-06 for overload operation selection 2).$ | | A (when S5-01 = 5 or 6) (when S5-04 = 5 or 6) B (when S5-01 = 1 thru 4) (when S5-04 = 1 thru 4) |
| OL6 | Swift Lift Acceleration 2 Fault | Swift Lift 2 has been enabled, and the output frequency matches the frequency set to enable Swift Lift 2 (S4-08). The output power has exceeded the Swift Lift fault detection level (S4-15) for the duration set into S4-16 (Swift Lift 2 fault detection time). | _ | A (when $S4-14 = 0, 1, 2$) B (when $S4-14 = 3$) |
| OPE22 | Parameter Setting Error | The following relations have not been established or set up: When the brake delay time (S1-04) ≠ 0 and the brake release frequency (S1-03) or Brake Delay Frequency (S1-03) ≤ Base Frequency (S1-03) or Brake Delay Frequency (S1-03) ≤ Light-load 1 Detect Frequency(S4-06) When the brake delay time (S1-04) = 0 and Brake Release Frequency(S1-01,02) ≤ Base Frequency (E1-06) or Brake Release Frequency(S1-01,02) ≤ Light-load 1 Detect Frequency (S4-06) When the brake delay time (S1-15) ≠ 0, and Brake Release Frequency (S1-12, 13) ≥ slip prevention frequency (S1-14) or Brake release frequency (S1-12, 13) ≥ Minimum Output Frequency(E1-09) ≠ Slip Prevention Frequency (S1-14) Impact Stop Function (H1-xx = 35) has been set to multi-function input, and the impact stop clip frequency (S3-01) > brake release frequency (S1-12, S1-13) Although the Brake Release Check has been set to multi-function digital input (H1-xx = 0), the brake close" command has not been set to multi-function digital output (H2-xx = 21). If a multi-function Frequency (S4-06) ≤ Swift Lift 1 Max. Frequency(S4-02,03) Swift Lift 1 Detection Frequency (S4-08) ≤ Swift Lift 1 Max. Frequency(S4-02,03) This relation is not established or not set. When L-L 2 Freq Upper Limit Select(S4-22) = Enabled(1),set Light-load 2 Activation Freq(S4-08) < 3Hz. | Check parameter settings. | С |
| OPE23 | Parameter Setting Error | While using a vector control mode, one of the following parameters is set to a value greater than the torque limit for the motoring side (L7-01, L7-02). When detection is triggered for the forward/reverse brake release torque (S1-07, S1-08), Impact stop detection torque (S3-03, S3-04) Swift-Lift 1 detection torque (S4-04, S4-05) Overload detection level (S5-02, S5-05) Overload torque detection level (S6-02, S6-05) | Check parameter settings. | С |
| OPE24 | Parameter Setting Fault | Swift Lift 1 and Swift Lift 2 have both been selected at the same time. | Check parameter settings. | С |

Table 7. Fault Display and Corrective Action (specific for crane applications) (1)

Table 7. Fault Display and Corrective Action (specific for crane applications) (2)

| Display | Fault Name | Description | Corrective Action | Fault Type |
|---------|-------------------------|---|---------------------------|------------|
| OPE25 | Parameter Setting Error | multi-function input terminal set to switch to motor 2 has been triggered while the following incorrect data is set for motor 2: When Motor2 Brake Delay Time(S1-26) ≠ 0.00 s and Motor2 Brake Release Freq(S1-23,24) ≤ Motor2 Brake Delay Frequency (S1-25) or Motor2 Brake Delay Frequency (S1-25) or Motor2 Brake Delay Frequency (S1-25) > Light-load 1 Detect Frequency(S4-06) When S1-26 = 0and Motor2 Brake Release Freq(S1-23,24) > Motor 2 Base Frequency(E3-06) or Motor2 Brake Release Freq(S1-23,24) > Light-load 1 Detect Frequency(S4-06) Motor 2 Slip Prevention Time(S1-37) ≠ 0 and Motor2 Brake Hold Freq(S1-34,35) ≥ Motor2 Slip Prevention Frequency(S1-36) or Motor2 Brake Hold Freq(S1-34,35) ≠ Motor 2 Minimum Output Frequency(E3-09) ≠ Motor2 Slip Prevention Frequency(S1-36) The impact stop creep frequency (S3-01) is greater than the break close frequency while at the same time a multi-function input terminal is set for "Impact stop" (H1-xx = 35). | Check parameter settings. | С |
| SE1 | Brake Sequence Fault 1 | | _ | A |
| SE2 | Brake Sequence Fault 2 | Fault occurred in brake sequence. | _ | Α |
| SE3 | Brake Sequence Fault 3 | (for more information, see 6.1.5: Observation Functions) | _ | A |
| SE4 | Brake Sequence Fault 4 | | _ | Α |

Note: Faults are ranked by their degree of seriousness: Rank A: Fault (motor coasts to stop, flashing operator display, fault relay tripped) Rank B: Minor Fault (continue running, operator display will flash, no fault relay tripped, minor error relay tripped (when using Multi-Function Output Selection)) Rank C: Alarm (operation not possible, operator display flashes, no fault relay output, no minor error relay output)

Appendix-1: Parameter Calculations

Use the following information to adjust parameter settings.

(1) Reverse Operation (S1-20) in Open Loop Vector Control Mode only

Utilized when operating a crane to hoist or lower without a counter weight.

(2) Brake Delay Frequency BF (S1-03)

Sets the motor rated slip frequency up to +1.0 Hz. For example, if the motor rated slip frequency is 2.0 Hz, then: S1-01 = S1-02 = (up to 3.0 Hz)

• If set too low, current will be unable to flow through the motor at start, and a Sequence Fault (SE2) is likely to occur.

• If set too high, then excessive current at start could cause an electrical shock.

Set to zero when operating in Closed Loop Vector Control.

(3) Brake Delay Time BT (S1-04)

Sets the delay between the time when the Brake Release Command is given and the time when the brake is actually released. Set to zero when operating in Closed Loop Vector Control.

(4) Brake Release Frequency FRF (S1-01), FRR (S1-02)

Sets to a value smaller than BF (S1-03), and larger than both E1-09 and b2-01 (Zero Speed Level and Minimum Output Frequency respectively).

When hoisting without a counter-weight in Closed Loop Vector Control, then FRF and FRR will both be set to zero. Here, ITCF (S1-09) will be increased if slipping occurs at start.

(5) Brake Release Current IF (S1-05), IR (S1-06)

Setting is based on the following equation: $(E2-03) \times 100 / (E2-01)$ E2-03 = De-Coupled Load Current, E2-01 = MotorRatedCurrent *V/f Control Mode:*

Sets the hoisting load at 100% and the traverse load at 50%.

Adjust the setting to be appropriate for the load if the load varies in forwards and reverse.

- If set too low, then slipping is likely to occur when starting to hoist the load.
- If set too high, then the sequence fault SE2 will occur, and the brake will slip before being released.
- (6) Brake Release Torque TF (S1-07), TR (S1-08)

Vector Control Modes only:

Vector Control:

Sets 100% for FWD TF (hoist), and 0% to REV TR (lowering) when a load is being hoisted.

Sets 50% when performing traverse movement. This setting is changed if the load varies in FWD and REV directions.

- If set too low, then slipping is likely to occur when starting to hoist the load.
- If set too high, then the sequence fault SE2 will occur, and the brake is likely to slip just before it is released.
- (7) Torque Compensation Amount ITCF (S1-09), ITCR (S1-10)

Sets the amount of Torque Forcing when operating in Open Loop Vector Control Mode.

Normally set to zero. Refer to the description found in, "(4) Brake Release Frequency".

Increase the setting if the output of the Brake Release Command is slow/late, or if slipping occurs at start.

Open Loop Vector Control Mode

Closed Loop Vector Control

Increases the setting when the output of the Brake Release Command is late or too slow.

Decreases the setting value if the load experiences and jolting or jerking when the drive is powered up.

If any slipping occurs at start with a heavy load (particularly when hoisting), then the torque limit (L7-01) on the motor side (ITCF, S1-09) is increased.

- (8) Torque Compensation Delay Time ITCT (S1-11) Normally set to 50 ms.Sets the degree of torque compensation produced by the drive until the brake is actually release.
- (9) Slip Prevention Frequency HF (S1-14) Normally set to the same value as the Brake Delay Frequency Bf.
- (10) Slip Prevention Time HT (S1-15)Sets the delay time from when the Braking Command is given and the brake is actually applied.

(11) Brake ON Frequency FHF (S1-12), FHR (S1-13)

Normally set to setting be +3 Hz to 4 Hz of HF. Use the following equation in case there are serious problems with the brake being activated.

 $FHF, FHR = DelayTime \times MaxOutputFreq / DecelTime (until the brake actually closes)$

(12) Run Command Minimum ON Time (S2-01, -02)

During an abnormally early inching operation, drive control and brake operation cannot accurately track movement of the load. The setting value needs to be increased when slipping results.

(13) Run Command Delay Timer (Reverse→Forward) (S2-03) V/f Control, Open Loop Vector Control

Normally set to 0.0 s. Utilizes the settings for motor parameters (E2-xx) with the following equation when hoisting operations begin just after the load has been lowered:

 $\times 1.5 \text{ s}$

 $\sqrt{(E2-01)^2}$ – $(E2-03)^2$

 $2\pi \times (E2-02) \times (E2-03)$

For more information on this operation, refer to section 6.2.2, "Run Command Delay Timer".

- (14) Impact Stop Clip Frequency FCR (S3-01) Set to value larger than the Slip Prevention Frequency (HF).
- (15) Impact Stop Clip Time TCR (S3-02)

Normally set to 10 s, although this setting is changed for motor protection, as the drive will continue operating for the TCR setting time at the FCR frequency when no impact is detected.

(16) Impact Stop Detection Torque IFOT (S3-03), IROT (S3-04)

Set to a value based on the motor rated current that is larger than the electrical current value while the drive is performing traverse functions at the FCR frequency (normally 100%).

- If set too low, then the drive will stop before impact occurs.
- If set too high, then the drive will continue to operate at the TCR time by the FCR frequency.
- (17) Impact Stop Detection Time TIOT (S3-05)

Normally between 0.2~0.3 s. If the detection time is too short, then the drive will stop before impact occurs.

(18) V/f Settings, Torque Compensation Gain KT (C4-01)

No need to change when operating in Closed Loop Vector Control.

Torque from the motor is proportional to approximately the value of $(V/f)^2$.

If the width of the V/f ratio is changed at low speeds, then insufficient torque will be produced. Overcurrent (overexcitation, etc) is likely to occur during Swift Lift. Adjust the V/f ratio by monitoring the motor current.

V/f Control Mode

(1) The V/f characteristics are set by using the motor data to calculate the output current, the minimum voltage, and the minimum frequency from the torque required to maintain the load (150% torque when hoisting, 100% torque during traverse operations).

Fmax (E1-04) = motor max output frequency

Vmax (E1-05) = motor rated voltage



(2) When motor data is unknown, then the following formulas are used to set the drive:

- Identical to the default setting in E1-04~13, KT (C4-01) = 1.0.
- If any slipping or sequence fault SE2 occurs at start, then increase the value of Vb and Vmin.

- Open Loop Vector Control Mode

If slipping occurs at start, then increase both Vb and Vmin by 4V~6V after performing Auto-Tuning.

- (19) Torque Compensation Primary Delay Time Parameter (C4-02)
- Open Loop Vector Control Mode

Shortens the setting beyond the desired 20 ms if torque develops too quickly when lowering or hoisting without a counter-weight.

- (20) Swift Lift 1 Max Frequency FAMF (S4-02), FAMR (S4-03) Sets the output frequency after Swift Lift operations within the motor and crane specifications. If the output frequency following Swift Lift (FAMF, FAMR) is greater than the max output frequency (E1-04), then that larger output frequency will be set to parameter E1-04. Be aware that if the setting in E1-04 is changed, then acceleration and deceleration rates will also be changed automatically.
- (21) Swift Lift 1 Detection Torque IFAT (S4-04), IRAT (S4-05) Normally, set to 50%, and is based on motor rating standards.
- (22) Swift Lift 1 Detection Frequency FAD (S4-06) Normally sets the Base Frequency (E1-06).
- (23) Swift Lift 1 Detection Time TA (S4-07) Normally set to 1 s.
 - If set too short, then the drive won't be able to detect the load properly, causing the crane to fluctuate.
 - If the setting is too long, then operational time will be less effective.
- (24) Swift Lift 2 Activation Frequency FAM2 (S4-08) Normally set as high as 80%~100% of the motor's base frequency (E1-06).
- (25) Swift Lift 2 Motoring Limit Start Level LGS (S4-09)
 - With a motoring load, this parameter sets the activation level that automatically smoothes out the acceleration time in response to the acceleration time and the load within the high speed area (i.e., above base speed). Set as a percentage relative to the motor rated output.

Normally set to 50~80%, a value lower than the S4-10 (Swift Lift 2 Motoring Hold Level).

(26) Swift Lift 2 Motoring Hold Level LGH (S4-10)

Sets the level at which acceleration is stopped ("hold") so that output power is not suppressed even if the acceleration time is automatically smoothed out when the load is hoisted at a rate above base speed. Set as a percentage relative to the motor rated output, usually between 50% and 120%.

- If set too low, then Swift Lift will occur even with a very light load.
- · If set too high, then even heavy loads will reach very high speeds, the motor will lose speed, and the load may slip down.
- (27) Swift Lift 2 Regen Limit Start Level LRS (S4-11)

During load regeneration, this parameter sets the activation level that automatically smoothes out the acceleration time in response to the acceleration time and the load when above base speed. Set as a percentage relative to the motor rated output. Normally set between 0% and 80%, a value lower than the S4-12 (Swift Lift 2 Regeneration Hold Level).

The motor load rate during regen acceleration is lower than the motoring load and the reverse acceleration power.

• MotorLoadRateDuringMotoringAcceleration = LoadPower + AccelerationPower

= -(LoadPower) + AccelerationPower MotorLoadRateDuringRegenAcceleration

Accordingly, in order to properly detect load regeneration, set the Swift Lift 2 Regen Limit Activation Level to a low value (between 0% and 50%) along with an acceleration time above base speed that is smoother than the Swift Lift 2 Aceel Time Gain <u>(S4-17)</u>.

(28) Swift Lift 2 Regen Hold Level LRH (S4-12)

So that the output power of the motor is not suppressed when in the high-speed area (fixed output) during regen load, this parameter sets the level at which acceleration is stopped ("hold"). Normally set between 50% and 120%.

• If set too low, then Swift Lift will occur even with a very light load.

· If set too high, then even heavy loads will reach very high speeds, the motor will lose speed, and the load may slip down.

(29) Swift Lift 2 Limit Timer TA2 (S4-13)

If the acceleration hold or acceleration time extension in the high-speed area continues for longer than the time set to the Swift Lift 2 Timer, then acceleration will cease for that period of time. Normally, set between 50% to 100% of the acceleration time in the high speed area.

Prevents re-acceleration when making a transition in Swift Lift or when the load being hoisted has reached the ground.

- (30) Swift Lift 2 Fault Detection Level LEA2 (S4-15), Detection Time TEA2 (S4-16) This parameter sets the level of protection level and the detection time so that the output power is not suppressed even if the drive stops acceleration with acceleration time is smoothed out. S4-15 is set relative to the motor rated power (normally between 100% to 150%). S4-16 is set as high as 0.1~1.0 s.
- (31) Swift Lift 2 Accel Time Gain GAT (S4-17)

In order to accurately detect the load power and reduce the effects of acceleration power, this parameter adjusts the acceleration time to keep it above S4-08 (Swift Lift 2 Activation Frequency). The actual acceleration time becomes a combination of the value in C1-xx and S4-17 (Swift Lift 2 Acceleration Time Gain). Normally set between 1.5 and 3.0 (at 1.0, the acceleration rate is identical to the acceleration time setting value in C1-xx).

(32) Operation Selection During Swift Lift 2 Regen (S4-18) Affected by the acceleration power, when detection cannot be performed due to insufficient load power during regeneration or when Swift Lift is unnecessary during regen, then parameter S4-18 is disabled (default settings = disabled). If regeneration is occurring, then the Swift Lift 2 Activation Frequency will not be reached even with Swift Lift 2 functions enabled.

Note: Be sure that adequate precautions are taken for load-slipping detection, etc when using Swift Lift 1 or 2, the load side

(33) Swift Lift 1 Torque Bias (S4-19, -20) Open Loop Vector Control Mode Sets the mechanical loss for the crane. For information on tuning, see section 6.4.1, "Swift Lift 1 Function".

(34) Output Phase Loss Detection Level (L8-08)

Normally set to 5.0%.

• By using motor switching functions, the setting value is reduced so that the output phase (LF) is not inaccurately detected when the motor capacity is much smaller in relation to the drive capacity.

Be sure the wiring on the output side of the drive is correct when the setting value is reduced. Also, avoid reducing the setting more than is necessary.

When using applications with a contactor installed to the output side of the drive, be sure that the contactor is not left open while the drive is running, or phase loss detection will not work.

Appendix 2. Checklist

Refer to the table below for any problems that may occurring while operating the drive.

| D 11 | | |
|--|---|---|
| Problem | Cause | Corrective Action |
| Fault OPE22 or OPE23 has occurred. | Parameter setting error. | See section "7. Troubleshooting" |
| Fluctuation is occurring in Open Loop Vector | Setting error when operating in reverse (S1-20). | Set S1-20 to "1". |
| Mode when lowering the load without a | | |
| counter-weight (using a hoisting crane). | | |
| | | |
| Fluctuation occurs in Open Loop Vector Mode | Setting error when operating in reverse (S1-20). | Set S1-20 to "1". |
| when performing lowering operations in a | | |
| traverse crane or a hoist crane with a | | |
| counter-weight. | | |
| Sequence Fault SE1~SE4 has occurred. | External sequence or parameter setting error. | See section 6.1.5, "Sequence Errors". |
| The crane sequence and/or impact stop sequence | Parameter b1-02 equals zero (allowing the Run | Change b1-02 to "1" (Control Circuit Terminal), |
| aren't functioning. | Command via the digital operator), | and have the Run Command entered via the |
| | | control circuit. |
| The drive remains stopped although a Run | The external baseblock signal continues to be | Have the External Baseblock signal input to the |
| Command has been entered. | given (using an N.C. relay). | terminal selected for External Baseblock, or |
| | | simply don't use the External Baseblock signal. |
| Poles are scrambled due to the stop position and | Decel time is not functioning properly due to the | Increase the deceleration time to the point where |
| the load rate. | stall prevention setting. | the Stall Prevention Function isn't triggered. |
| The motor stops when running at the speed of the | Excessive motor slip | Increase the Brake Release Frequency (S1-01, |
| Brake Release Frequency. | Setting error in the Brake Release Frequency | -02). |
| | (\$1-01, -02) | |
| Output Current is too high, and/or the crane is | Brake Sequence has not been tuned | Refer to, "Appendix-3: Tuning Procedures". |
| fluctuating (in Open Loop Vector Control). | • Drive parameter gain setting and motor do not | |
| | match | |
| Excessive current just after the crane has stopped | Depends on the characteristics of the motor. | • Set parameter S2-03 based on the formulas |
| lowering and started to hoist the load. | | in, "Appendix-1: Parameter Calculations". |
| The load slips down or drops suddenly. | • V/f setting is to low. | • Increase the V/f setting. |
| | When operating in Vector Control Mode: | When in Open Loop or Closed Loop Vector |
| | Motor parameters have not been tuned | Control: |
| | Torque Limit is set too low. | Perform Auto-Tuning |
| | | Increase the setting for the Torque Limit. |
| Excessive slipping at start. | • Brake Release Current / Torque (S1-05~08) | Increase the Brake Release Current / Torque |
| | is set too low. | (S1-05~08). |
| | • V/f setting is too low | • Increase the V/f setting. |
| | When in Open Loop or Closed Loop Vector | When in Open Loop or Closed Loop Vector |
| | Control: | Control: |
| | • The setting in C4-02 is too long during | Lower the Torque Compensation Primary |
| | Torque Compensation (Open Loop Vector) | Delay Time (C4-02) to as low as 20 ms. |
| | Torque Compensation Amount / Torque | Increase the Torque Compensation / Forcing |
| | Forcing Amount (S1- 09) is too low. | Amount (S1-09). |
| | | Refer to, "Appendix-3: Tuning |
| | | Procedures". |
| Excessive slipping when the drive has stopped. | Slip Prevention Time (S1-15) setting is to | Set a longer Slip Prevention Time in S1-15 |
| | short (when not in Closed Loop Vector | (when not in Closed Loop Mode) |
| | Control | • Set a longer DC Injection time at stop (in |
| | • Stop Timer (b2-04) setting is too short (Closed | Closed Loop Vector Control) |
| | Loop Vector Control) | Refer to, "Appendix-3: Tuning Procedures". |

| Problem | Cause | Corrective Action |
|---|--|--|
| Brake slips at start. | Brake Release current, Torque (S1-05~08) setting is too high. V/f setting is too high. | Decrease the Brake Release Current / Torque (S1-05~08). Lower the V/f setting. <i>Refer to, "Appendix-3: Tuning Procedures".</i> |
| Brake slips when the drive has stopped. | Slip Prevention Time (S1-15) is too long Slip Prevention Frequency (S1-14) is set too high | Shorten the Slip Prevention Time (S1-15) Lower the Slip Prevention Frequency (S1-14) Refer to, "Appendix-3: Tuning Procedures". |
| The drive fails to accelerate despite Stall Prevention During Accel being activated when speed is lost during acceleration. | Brake Delay Time (S1-04) is too longAccel Time setting is too short. | Shorten the Brake Delay Time (S1-04)Increase the acceleration time. |
| Slipping occurs during an abnormally early Inching Operation. | Drive Control / Brake Operation isn't following Inching Operations. | Increase the Run Command Minimum On-Time (S2-01, -02). |
| Drives stops <i>before</i> an impact although Impact Stop is enabled. | Impact Stop Detection Torque (S3-03, -04) is too low. Impact Stop Detection Time (S3-05) is too short. | Increase Impact Stop Detection Torque setting (S3-03, -04). Increase the Impact Stop Detection Time (S3-05) |
| At an Impact Stop, the drives keep operating at the Clip Frequency (Fcr). | Impact Stop Detection Torque (S3-03, -04) is set too high. Motor torque fails to increase upon impact Impact Stop Clip Time (S3-02) is too long | Lower the Impact Stop Detection Torque setting (S3-03, -04). Check the friction on the load side (wheel slippage, etc). Impact Stop Clip Time (S3-02) is too short. |
| Speed increases despite a heavy load during Swift Lift 2. | The value set in Swift Lift 1 Detection Torque (S4-04, -05) is too high Swift Lift 1Detection Time (S4-07) is too short. | Decrease the Swift Lift Detection 1 Torque (S4-04, -05) setting. Increase the Swift Lift 1 Detection Time (S4-07). |
| Hoisting of light load does not accelerate, although Swift Lift 1 is enabled. | Swift Lift 1 isn't activating. Swift Lift 1 Detection Torque (S4-04, -05) is set too low. Mechanical loss is larger than Swift Lift 1 Detection Torque (S4-05) when in reverse | Enable the Swift Lift 1 function. See section 6.4, "Swift Lift Function". Increase the setting value for the Swift Lift 1 Detection Torque (S4-04, -05) Adjust the Swift Lift 1 Torque Bias (S4-19, -20). See section 6.4.1, "Swift Lift 1". |
| Fault OPE24 has occurred. | Parameter setting error. | See section 7, "Faults and Counter-Measures" |
| Fault OL6 has occurred. | The accel time set to the drive is too short | Increase the acceleration time. |
| Speed increases despite a heavy load during Swift Lift 2. | The Limit Starting Level / Hold Level (S4-09, -10) is set too high | Lower the Limit Starting Level / Hold Level (S4-09, -10) |
| Hoisting of light load does not accelerate, although Swift Lift 2 is enabled. | Swift Lift 2 is not activating. The Limit Starting Level / Hold Level (S4-09, -10) is set too low. | Enable the Swift Lift 2 function See section 6.4.2, "Swift Lift 2". Increase the Limit Starting Level / Hold Level (S4-09, -10) |

Note: In addition, special wiring is needed when running two drives synchronically or when switching motors that are running off of the same drive. Be sure to consult with technical support before making these changes.

Appendix-3: Tuning Procedures For use with hoisting applications in Open Loop Vector Mode.

If fluctuation or output current is too large when performing a test run, then adjust parameters by following the tuning procedure below. When changing parameters, follow the directions in the table below.

Procedure:

- 1. Following the parameter setting instructions, determine the default values below:
 - S1-01, S1-05 to S1-07, S1-12 to S1-14
 - E1-08, E1-10, C2-01 to C2-04, L7-01 to L7-04

| 2. Adjust parameter settings during no-load testing if the following problems occur: | | | | |
|--|---------------------|--|--|--|
| Fluctuation occurs when hoisting: | n2-01 | | | |
| Fluctuation occurs when lowering: | S1-02, S1-03, n2-01 | | | |
| 3. Adjust drive setting if the following situations arise when operating at the rated load: | | | | |
| • When stopped, the load seem as though it may fall even though the brake is shut | S1-12 to S1-15 | | | |
| Slipping occurs when hoisting the load up: | S1-09 | | | |
| • Fluctuation occurs when hoisting or lowering the load: | C4-02, n2-01, -02 | | | |
| 4. Tune the drive if the following problems occur during overload: | | | | |
| Slipping occurs when hoisting: | S1-09 | | | |
| 5. Adjust the following parameters when changing the acceleration or deceleration times: | S1-12 to S1-15 | | | |
| 6. Adust drive settings for any excessive current when hoisting the load just after lowering it: S2-03 | | | | |

Drive Parameter Setting Instructions

| No | Contents | Parameter Name | Setting Instructions |
|----|----------------------------|---|---|
| 1 | Brake Sequence | S1-01: Brake Release Frequency (FWD) | Set to 0.6 Hz. |
| | | S1-02: Brake Release Frequency (REV) | Slowly increase this setting if there appears to be fluctuation when lowering the load. Do not set this parameter to be greater than the value in S1-03. |
| | | S1-03: Brake Delay Frequency | Slowly increase this setting if there appears to be fluctuation when lowering the load. Keep this setting under 3.0 Hz. |
| | | S1-05, -06: Brake Release Current | Set as high as: (E2-03) / (E2-01) × 100. |
| | | S1-07: Brake Release Torque (FWD) | Set between 80% and 120%. |
| | | S1-09: Torque Forcing Amount | Set as high as 80% of L7-01 (forward side torque limit). Increase if slipping occurs when hoisting the load at during overload or at the rated load. |
| | | S1-12, S1-13: Brake Release Frequency | Refer to Appendix-1, "Parameter Calculations". Needs to be changed if the deceleration time is adjusted. |
| | | S1-14: Slip Prevention Frequency | Set as high as 1.5 Hz. After determining that there is no fluctuation when stopped, adjust this parameter with 1.0 Hz as the lower limit. Increase the setting if any fluctuation occurs when stopped. |
| | | S1-15: Slip Prevention Time | Increase the time if slipping occurs when the motor is stopped. |
| | | S2-03: Run Cmd Delay Timer (REV→FWD) | Refer to section 6.2.2 for setting description and instructions. |
| 2 | V/f Characteristics | E1-08: Mid Output Frequency Voltage | Normally this setting is fine after performing Auto-Tuning. Set the upper limit as high as 25.2V for 400 V class drives. |
| | | E1-10: Minimum Output Frequency Voltage | Normally this setting is fine after performing Auto-Tuning. Set the upper limit as high as 8.6V for 400 V class drives. |
| 3 | S-Curve Characteristics | C2-01 to C2-04: S-Curve Characteristics | Set to 0.00sec. |
| 4 | Torque Limit | L7-01 to L7-04: Torque Limit | Use the following equation to determine the upper limit value from the rated current of the motor and the drive: |
| | | | $\frac{\sqrt{(\text{Inverter Rated Current \times 1.50})^2 - (\text{E2-}03)^2 \times 100}}{\sqrt{(\text{E2-}01)^2 - (\text{E2-}03)^2}}$ |
| 5 | Other | C4-02: Torque Compensation | Adjust this setting between 20 ms and 50 ms. Increase the setting if there is excessive fluctuation. |
| | | n2-01: AFR Gain | Normally, set the gain between 1.0 and 2.0. Slowly increase the gain if there is too much fluctuation. |
| | | n2-02: AFR | Set as high as 50 ms (default setting, normally need not be changed). Decreasing this setting can reduce fluctuation when lowering the load, but this may increase fluctuation when hoisting. Set by checking fluctuation during both hoisting and lowering. |
Appendix 4. Flux Compensation (Current Suppression at Start)

Motor torque can be expressed as follows:

 $\mathsf{T} = \boldsymbol{\varphi} \cdot \mathbf{I}_1 \\ = \boldsymbol{\varphi} \cdot \mathbf{I}_q$

If the flux is constant, this determines the ratio of current and torque. Current suppression at start work as follows:

①Quickly build up motor flux

- Initial flux
- DC Injection Braking at start
- Flux compensation

②For V/f Control and Open Loop Vector Control, increase the V/f settings as much as possible.

The diagram below shows how to quickly create motor flux.

1 Basic waveform



2 Initial excitation using external terminals (for OLV only, other control modes have not been tested)



③ DC Injection Braking at start (for all control modes)



Once a certain amount of torque has been generated, the motor can start working the application. Note the potential response delay in mid-sized motors, as they require over 1 sec. for flux to develop torque (a 0.2 to 0.3 s delay is normal).

④ Flux compensation (for OLV)



This function increases the flux current at start by the compensation value set to b2-08 in order for torque to develop more quickly. Setting 200% to b2-08 will increase flux by 1/2. Note that this value depends on the time set for DC Injection Braking.

(5) Field-forcing (OLV, CLV) when d6-03 = 1



To compensate the delay for torque to arise, up to 400% of flux current at start is possible, although the most appropriate value probably lies between 200% to 400%. Field-forcing in d6-06 determines the upper limit. Values should be set appropriately for when using Speed Control, not for DC Injection Braking at start and stop.

YASKAWA AC Drive GA700

Crane Software Control Specifications

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