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# VARISPEED-676H5
# INSTRUCTION MANUAL

INVERTER FOR SYSTEM DRIVES (VS-676H5)

MODEL: CIMR-H5□□□

200V CLASS 0.4 to 75kW (1.0 to 100kVA)
400V CLASS 0.4 to 300kW (1.0 to 400kVA)

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Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

---

**REFERENCE**

VARISPEED-676H5 DESCRIPTIVE MANUAL FOR CONSTANTS (TOEZ-S676-7.1)

efesotomasyon.com

YASKAWA

MANUAL NO. TOE-S676-7B

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# PREFACE

YASKAWA's VS-676H5 is an inverter for system drives provided with both V/f control and vector control for standard models. This instruction manual describes installation, maintenance and inspection, troubleshooting, and specifications of the VS-676H5. Read this instruction manual thoroughly before operation.

YASKAWA ELECTRIC CORPORATION

## General Precautions

- Some drawings in this manual are shown with the protective cover or shields removed, in order to describe detail with more clarity. Make sure all covers and shields are replaced before operating this product.
- This manual may be modified when necessary because of improvement of the product, modification, or changes in specifications.
  Such modifications are denoted by a revised manual No.
- To order a copy of this manual, if your copy has been damaged or lost, contact your YASKAWA representative.
- YASKAWA is not responsible for any modification of the product made by the user, since that will void your guarantee.

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# NOTES FOR SAFE OPERATION

Read this instruction manual thoroughly before installation, operation, maintenance or inspection of the VS–676H5. In this manual, NOTES FOR SAFE OPERATION are classified as "WARNING" or "CAUTION".

**⚠WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**⚠ CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.
It may also be used to alert against unsafe practices.

Even items described in ⚠ CAUTION may result in a vital accident in some situations. In either case, follow these important notes.

NOTE : These are steps to be taken to insure proper operation.

## RECEIVING

**⚠ CAUTION**

(Ref. page)

- Do not install or operate any inverter which is damaged or has missing parts.
  Failure to observe this caution may result in personal injury or equipment damage. 12

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## INSTALLATION

### ⚠ CAUTION

(Ref. page)

- Lift the cabinet by the base. When moving the unit, never lift by the front cover.
  Otherwise, the main unit may be dropped causing damage to the unit. ..... 14
- Mount the inverter on nonflammable material (i.e. metal).
  Failure to observe this caution can result in a fire. ..... 14
- When mounting units in an enclosure, install a fan or other cooling device to keep the intake air temperature below 45°C.
  Overheating may cause a fire or damage to the unit. ..... 14

## WIRING

### ⚠ WARNING

(Ref. page)

- Only commence wiring after verifying that the power supply is turned OFF.
  Failure to observe this warning can result in an electrical shock or a fire. ..... 23
- Wiring should be performed only by qualified personnel.
  Failure to observe this warning can result in an electrical shock or a fire. ..... 23
- When wiring the emergency stop circuit, check the wiring thoroughly before operation.
  Failure to observe this warning can result in personal injury. ..... 23
- Make sure to ground the ground terminal ⏚.
  (Ground resistance
  200V class: 100Ω or less, 400V class: 10Ω or less)
  Failure to observe this warning can result in an electrical shock or a fire. ..... 32

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## ⚠ CAUTION

(Ref. page)

- Verify that the inverter rated voltage coincides with the AC power supply voltage.
  Failure to observe this caution can result in personal injury or a fire. ..... 22
- Do not perform a withstand voltage test of the inverter.
  It may cause semi–conductor elements to be damaged. ..... 22
- To connect a braking resistor, braking resistor unit or braking unit, follow the procedures described in APPENDIX 3.
  Improper connection may cause a fire. ..... 22
- Tighten terminal screws to the specified tightening torque.
  Failure to observe this caution can result in a fire. ..... 22
- Never connect the AC main circuit power supply to output terminals U, V and W.
  The inverter will be damaged and invalidate the guarantee. ..... 32

# PREPARATION FOR OPERATION

## ⚠ CAUTION

(Ref. page)

- Before starting test run, disconnect the coupling that directly connects the motor to the machine, belt or others to allow the motor to be run independently. If the inverter should be operated for the test with the motor connected to the machine, do so only after ensuring the safety.
  Failure to observe this caution can result in personal injury. ..... 49

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## OPERATION

### ⚠ WARNING

(Ref. page)

- Only turn ON the input power supply after replacing the front cover. Do not remove the cover while current is flowing.
  Failure to observe this warning can result in an electrical shock. ..... 69
- When the retry function is selected, do not approach the inverter or the load, since it may restart suddenly after being stopped.
  (Construct machine system, so as to assure safety for personnel, even if the inverter should restart.) Failure to observe this warning can result in personal injury. ..... 69
- Since the stop button can be disabled by a function setting, install a separate emergency stop switch.
  Failure to observe this warning can result in personal injury. ..... 69
- If an alarm is reset with the operation signal ON, the inverter restarts automatically. Only reset the alarm after verifying that the operation signal is OFF.
  Failure to observe this warning can result in personal injury. ..... 69

### ⚠ CAUTION

(Ref. page)

- Never touch the heatsink or discharging resistor since the temperature is very high.
  Failure to observe this caution can result in harmful burns to the body. ..... 69
- Since it is easy to change operation speed from low to high speed, verify the safe working range of the motor and machine before operation.
  Failure to observe this caution can result in personal injury and machine damage. ..... 69
- Install a holding brake separately if necessary.
  Failure to observe this caution can result in personal injury. ..... 69
- Do not check signals during operation.
  The machine or the inverter may be damaged. ..... 69
- All the constants of the inverter have been preset at the factory. Do not change the settings unnecessarily.
  The inverter may be damaged. For supply voltage, follow Para. 4.2. ..... 69

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## MAINTENANCE AND INSPECTION

### ⚠ WARNING

(Ref. page)

- Never touch high-voltage terminals in the inverter.
  Failure to observe this warning can result in an electrical shock. . . . . 78
- Replace all protective covers before powering up the inverter. To remove the cover, make sure to shut OFF the molded-case circuit breaker.
  Failure to observe this warning can result in an electrical shock. . . . . 78
- Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main circuit power supply is turned OFF.
  The capacitors are still charged and can be dangerous. . . . . 78
- Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.
  [Remove all metal objects (watches, bracelets, etc.) before operation.]
  (Use tools which are insulated against electrical shock.)
  Failure to observe this warning can result in an electrical shock. . . . . 78

### ⚠ CAUTION

(Ref. page)

- The control PC board employs CMOS ICs. Do not touch the CMOS elements.
  They are easily damaged by static electricity. . . . . 78
- Do not connect or disconnect wires or connectors while power is applied to the circuit.
  Failure to observe this caution can result in personal injury. . . . . 78

## OTHERS

### ⚠ WARNING

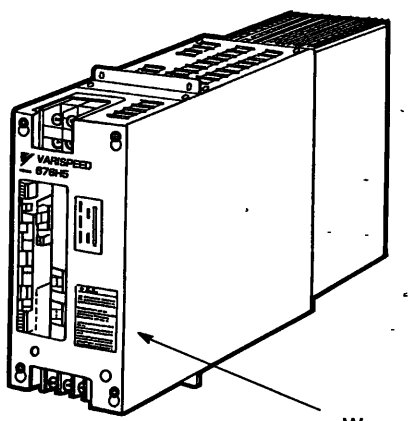
- Never modify the product.
  Failure to observe this warning can result in an electrical shock or personal injury and will invalidate the guarantee.

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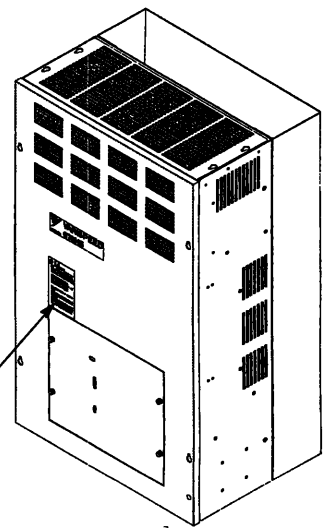


## WARNING LABEL

A warning label is displayed on the front cover of the inverter, as shown below. Follow these instructions when handling the inverter.



Warning Label



Book type: Model CIMR-H5D27P5

Cubic type: Model CIMR-H5D2030

Warning Label

**⚠ WARNING**

May cause injury or electric shock.

- Please follow the instructions in the manual before installation or operation.
- Disconnect all power before opening front cover of unit. Wait 1 minute until DC Bus capacitors discharge.
- Use proper grounding techniques.

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# 1 RECEIVING

> **⚠ CAUTION**
>
> • Do not install or operate any inverter which is damaged or has missing parts.
> Failure to observe this caution may result in personal injury or equipment damage.

This chapter describes how to verify the inverter after delivery to the user.

## 1.1 INSPECTION CHECKPOINTS

### (1) Receiving Checkpoints

Table 1 Checkpoints

| Checkpoints | Description |
|---|---|
| Does the inverter model number correspond with the purchase order? | Check the model number on the nameplate on the side of the VS-676H5 (Refer to page 13 ) |
| Are any parts damaged? | Visually check the exterior and verify that there was no damage during transport |
| Is hardware properly seated and securely tightened? | Remove inverter front cover<br>Check all visible hardware with appropriate tools |

If any of the above checkpoints are not satisfactory, contact your YASKAWA representative.

### (2) Checking the Nameplate Data

#### (a) Nameplate Data

Example of model CIMR-H5D20P4

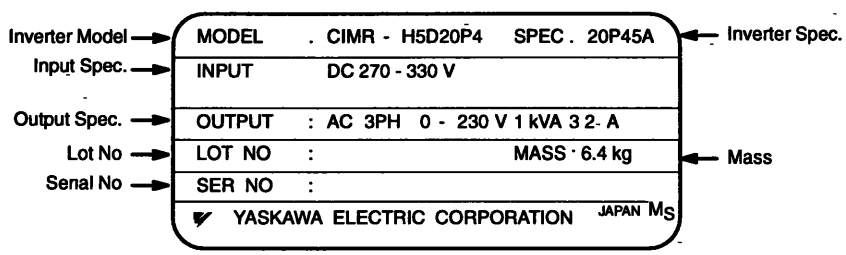



Fig. 1 Nameplate Data

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(b) Model Designation

CIMR - H5 D 2 0P4

Inverter

VS - 676H5 Series

| Symbol | Specifications |
|---|---|
| A | Japan use 3-phase input |
| D | Japan use DC input |

| Symbol | Voltage |
|---|---|
| 2 | 3-phase 200 V class (Note: 300 V DC) |
| 4 | 3-phase 400 V class (Note: 600 V DC) |

| Symbol | Max. applicable motor output |
|---|---|
| 0P4 | 0.4 kW |
| 0P7 to 075 | 0.75 kW to 75 kW |

Fig. 2 Model Designation

(c) Specification Designation

2 0P4 5 A*

Revision symbol

| Symbol | Voltage |
|---|---|
| 2 | 3-phase 200 V class (Note: 300 V DC) |
| 4 | 3-phase 400 V class (Note: 600 V DC) |

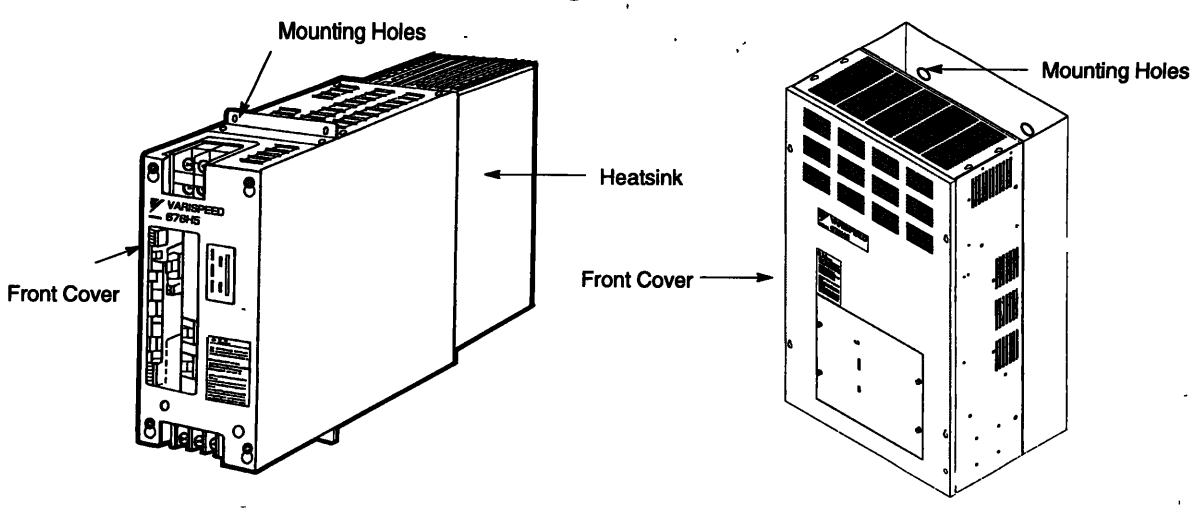
| Symbol | Max. applicable motor output |
|---|---|
| 0P4 | 0.4 kW |
| 0P7 to 075 | 0.75 kW to 75 kW |

| Symbol | Enclosure |
|---|---|
| 0 | Open chassis type (self-cooling) |
| 5 | Open chassis type (force-cooling) |

* For special specifications, a spec. sheet No. appears on the nameplate.

Fig. 3 Specification Designation

## 1.2 IDENTIFYING THE PARTS




Book type: Model CIMR-H5D27P5 (200 V, 7.5 kW)

Cubic type: Model CIMR-H5D2030 (200 V, 30 kW)

Fig. 4 Configuration of VS-676H5

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# 2 INSTALLATION

> **⚠ CAUTION**
>
> - Lift the cabinet by the base. When moving the unit, never lift by the front cover. Otherwise, the main unit may be dropped causing damage to the unit.
> - Mount the inverter on nonflammable material (i.e. metal). Failure to observe this caution can result in a fire.
> - When mounting units in an enclosure, install a fan or other cooling device to keep the intake air temperature below 45°C. Overheating may cause a fire or damage to the unit.

This chapter describes the configuration, location and space when mounting the VS-676H5.

## 2.1 REMOVING AND REPLACING THE FRONT COVER

### (1) Book Type (200V 0.4 to 15kW,400V 0.4 to 18.5kW)

To remove the front cover from the inverter, pull it out in the direction shown by arrow ② while lifting it in the direction shown by arrow ①. After pulling it a little, disconnect the wires from the control card to the base driver card. Follow the procedure in the reverse order when mounting it to the inverter.

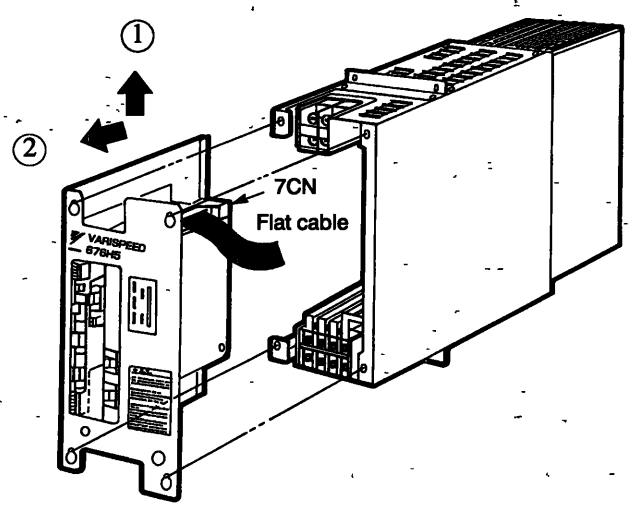



Fig. 5 Removing and Replacing the Front Cover
(Book Type : 200V 0.4 to 15 kW, 400V 0.4 to 18.5kW)

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(2) Book Type (200V 8.5 to 22kW, 400V 22 to 45kW)

To remove the front cover from the inverter, pull it out in the direction shown by arrow ② while lifting it in the direction shown by arrow ①.

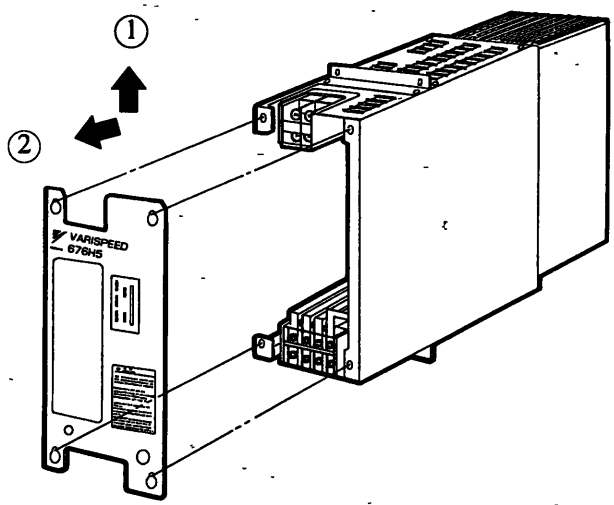



Fig. 6 Removing and Replacing the Front Cover
(Book Type : 200V 8.5 to 22 kW, 400V 22 to 45kW)

(3) Cubic Type

To remove the front cover from the inverter, pull it in the direction shown by arrow ② while lifting it in the direction shown by arrow ①. Follow the procedure in the reverse order when mounting it to the inverter.

The control card and the option cards are accessible by opening the sub cover at the front.

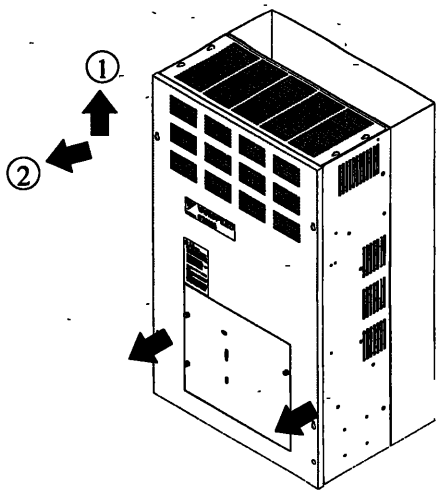



Fig. 7 Removing and Replacing the Front Cover (Cubic Type)

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## 2.2 MOUNTING OPTION CARDS

(1) Insert the option card that fits to connector 2CN, 3CN, or 4CN.

(2) Fit the option card onto the support spacer at (S) .

(3) For the option card that fits onto connector 2CN, attach screw (N) .

(4) To remove option cards, follow steps (1) to (3) in the reverse order.

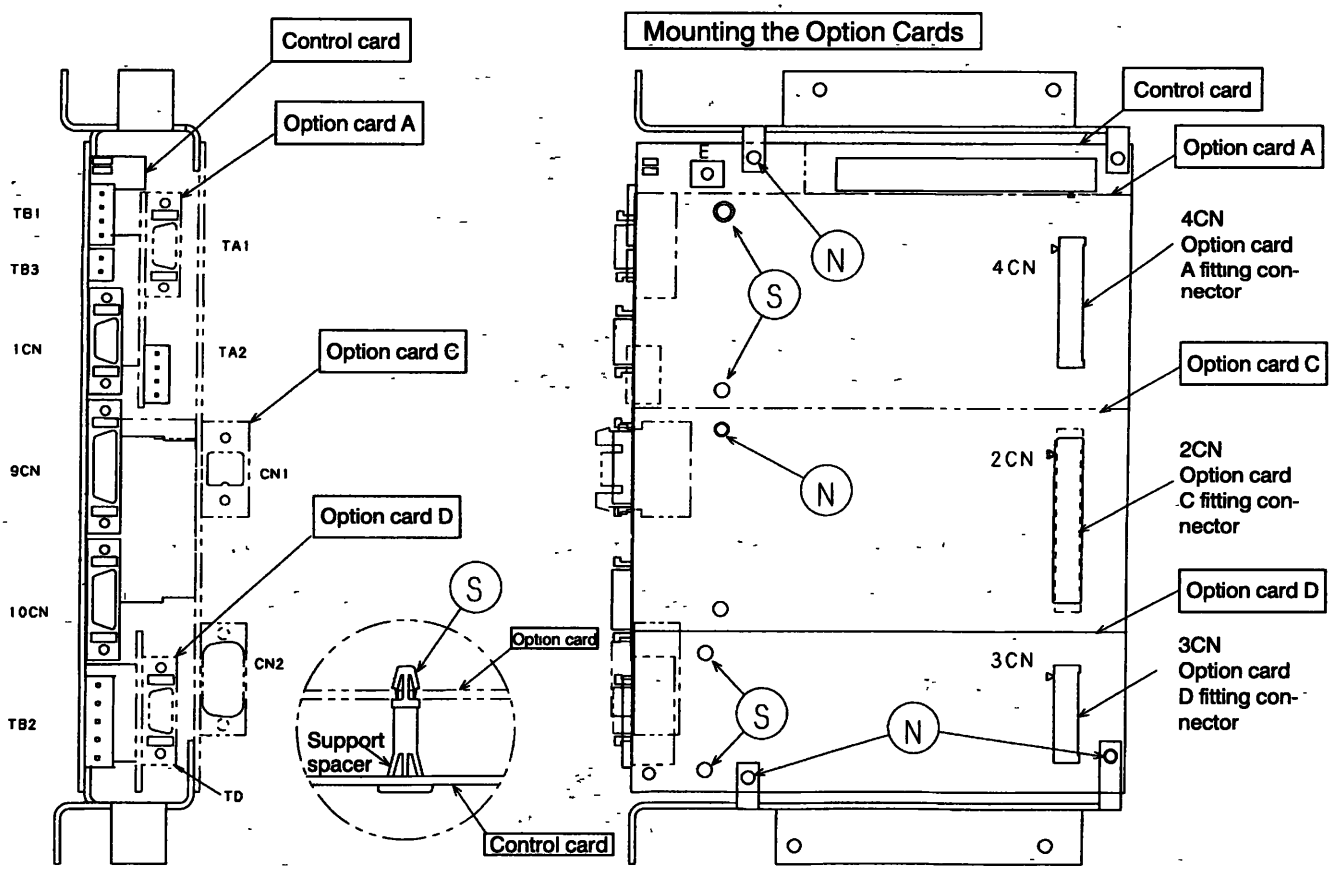



Fig. 8 Mounting Option Cards

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NOTE

1. When mounting option cards A and D, make sure that part (S) of support spacer is correctly fitted (support tongues are opened) after mounting the board.
2. When mounting option card C, make sure that screws (N) are securely tightened after mounting the board.
3. Note that some of the connectors are of the same type. Therefore, make sure to mount option cards to the correct connectors each of which is identified by device symbol.

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Table 2 Table of Option Cards

| Type | | Name | Code No. | Function | Position | Remarks |
|---|---|---|---|---|---|---|
| Built-in type (mounted to connector) | Feedback detection option card | PG speed control card PG-A2/H | 73600-A017X | - A-phase pulse (single pulse) input<br>- PG frequency range 50 to 32767 Hz<br>- Pulse monitor output +12V, 20 mA (Max ) | Mounted to 4CN on the control card (note) | See TOE-C736-40 12 |
| | | PG speed control card PG-B2/H | 73600-A018X | - For complementary output PG<br>- A- and B-phase pulses for vector control (2-phase pulse) Input<br>- PG frequency range 50 to 32767 Hz<br>- Pulse monitor output +24 V, 30 mA (Max ) (open collector output) | | See TOE-C736-40 13 |
| | | Synchronous input control card SP-A2/H (exclusive for EMS) | 73600-A019X | Applicable frequency 0 to approx 100 Hz | | See TOE-C736-40 14 |
| | Monitor option card | Analog monitor card AO-12/H | 73600-D008X | Outputs analog signals that are used to monitor the operation status (output speed, torque, etc )<br>- Output resolution 11 bits + sign (1/2048)<br>- Output voltage -10 to +10 V (non-insulated)<br>- Output channels: 2-channels | Mounted to 3CN on the control card (note) | See TOE-C736-40 10 |
| | | Digital output card DO-08/H | 73600-D009X | Outputs the inverter's operation status and fault contents (multi-function output).<br>- Photocoupler output 8 channels (with same common terminal) | | See TOE-C736-40 11 |
| | Communication control option card | Inverter kit controller CP-916A | 87916-1100X-s0100Y | Board-type controller directly mounted to the inverters.<br>- Program steps: 1k steps<br>- Communication CP-215 (1 port) | Mounted to 2CN on the control card (note) | See: SIE-C873-16 4 SIE-C879-16 1 |
| | | CP-216 communication interface card CP-216IF/INV | 87216-1100X-s0100Y | Used to connect to the CP-216 transmission line | | See SIE-C873-16 1 SIE-C873-16 4 |

NOTE

1. Only one card can be connected to each connector.
2. The numbers represented by X and Y are changed according to the modifications and version upgrading of the hardware and software.
   X: The number representing modifications made to the hardware
   Y: The number representing modifications made to the software

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## 2.3 CHOOSING A LOCATION TO MOUNT THE INVERTER

To ensure proper performance and long operating life, follow the recommendations below when choosing a location for installing the VS-676H5. Make sure the inverter is protected from the following conditions.

- ☐ Direct sunlight. (Avoid using outdoors.)
- ☐ Corrosive gases or liquids.
- ☐ Oil sprays, splashes
- ☐ Salt spray.
- ☐ Rain, moisture
- ☐ Dust metallic particles in the air.
- ☐ Physical shock, vibration.
- ☐ High hymidity
- ☐ Extreme cold and heat. Allowable ambient temperature range: –10 to +40°C
- ☐ Magnetic noise. (Example: Welding machines, power devices, etc.)
- ☐ Radioactive materials.
- ☐ Combustibles

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## 2.4 CLEARANCES

Install the VS-676H5 vertically and allow sufficient clearances for effective cooling as shown in Fig. 9 and 10.

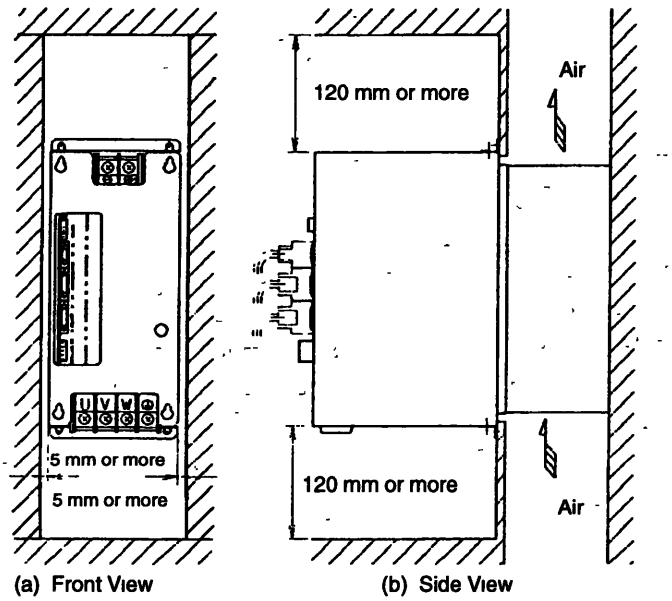



Fig. 9 Clearances (Type of 200 V 22 kW/400 V 45 kW or Less)

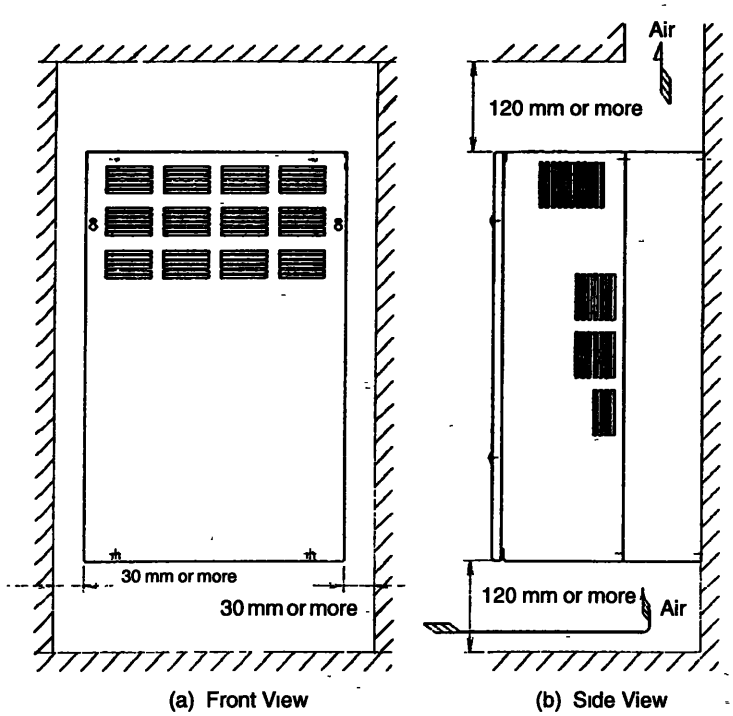



Fig. 10 Clearances (Type of 200 V 30 kW/400 V 55 kW or Larger)

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NOTE

1. For the external dimensions and mounting dimensions, refer to APPENDIX 2 "DIMENSIONS".
2. Allowable intake air temperature to the inverter.
   Open chassis type: –10 to +45°C
3. For the types of 200 V, 22 kW or less and those of 400 V, 45 kW or less, cooling air indicated below must be secured since these types do not have a built-in cooling fan.

Table 3 Required Cooling Air

| Model Name of VS-676H5 CIMR-□ | Wind Velocity of Cooling Air at Heat Sink m/s |
|---|---|
| H5D20P4 | 1.5 |
| H5D20P7 | |
| H5D21P5 | |
| H5D22P2 | |
| H5D23P7 | |
| H5D25P5 | 2.0 |
| H5D27P5 | |
| H5D2011 | 2.5 |
| H5D2015 | |
| H5D2018 | 3.5 |
| H5D2022 | |

| Model Name of VS-676H5 CIMR-□ | Wind Velocity of Cooling Air at Heat Sink m/s |
|---|---|
| H5D40P4 | 1.5 |
| H5D40P7 | |
| H5D41P5 | |
| H5D42P2 | |
| H5D43P7 | |
| H5D45P5 | 2.0 |
| H5D47P5 | |
| H5D4011 | 2.5 |
| H5D4015 | |
| H5D4018 | 3.5 |
| H5D4022 | |
| H5D4030 | |
| H5D4037 | |
| H5D4045 | |

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# 3 WIRING

## ⚠ WARNING

- Only commence wiring after verifying that the power supply is turned OFF.
  Failure to observe this warning can result in an electrical shock or a fire.
- Wiring should be performed only by qualified personnel.
  Failure to observe this warning can result in an electrical shock or a fire.
- When wiring the emergency stop circuit, check the wiring thoroughly before operation.
  Failure to observe this warning can result in personal injury.

## ⚠ CAUTION

- Verify that the inverter rated voltage coincides with the AC power supply voltage.
  Failure to observe this caution can result in personal injury or a fire.
- Do not perform a withstand voltage test of the inverter.
  It may cause semi-conductor elements to be damaged.
- To connect a braking resistor, braking resistor unit or braking unit, follow the procedures described in APPENDIX 3.
  Improper connection may cause a fire.
- Tighten terminal screws to the specified tightening torque.
  Failure to observe this caution can result in a fire.

This chapter describes the main circuit wiring and the control circuit wiring of the VS-676H5.

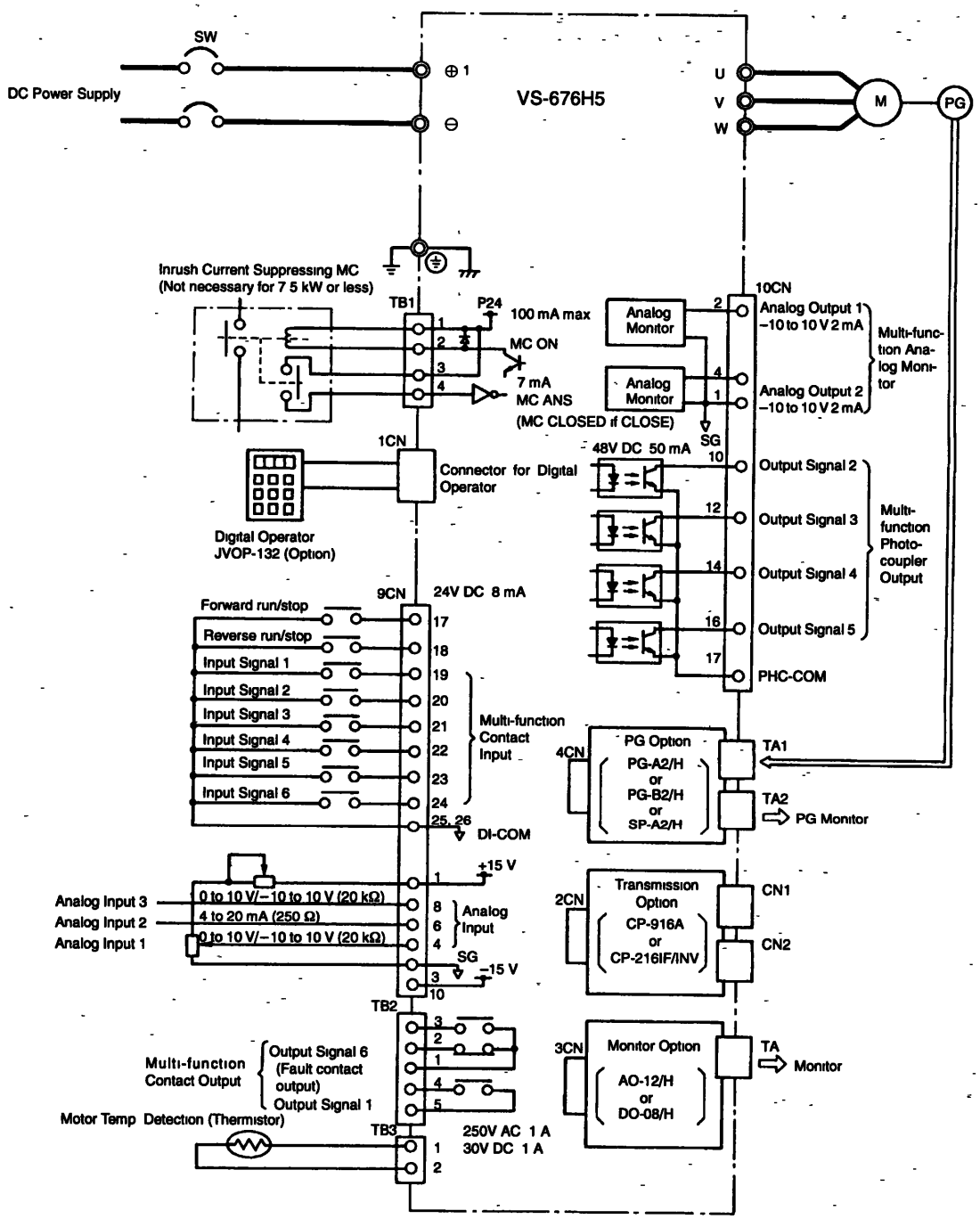
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## 3.1 CONNECTION DIAGRAMS

The following are connection diagrams including those of option cards.

### (1) Connection diagram of standard inverter




9CN DI-COM: 25, 26 10CN SG: 1, 3, 5
9CN SG: 3, 5, 7, 9, 12, 13 10CN PHC-COM: 17, 18, 19, 20

Fig. 11 Connection Diagram of Standard Inverter
(Model CIMR-H5D2030, 200 V 30 kW)

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NOTE

1. Control circuit terminal (connector 9CN-1, 10) of +15V/–15V has a maximum output current capacity of 20 mA.
2. Multi-function analog output should be used for monitoring meters such as a frequency meter and an ammeter and should not be used for feedback control system. It is recommended to use analog monitor card (Model DO-08/H or AO-12/H) for the control system.

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(2) Connection Diagram of PG Card Option

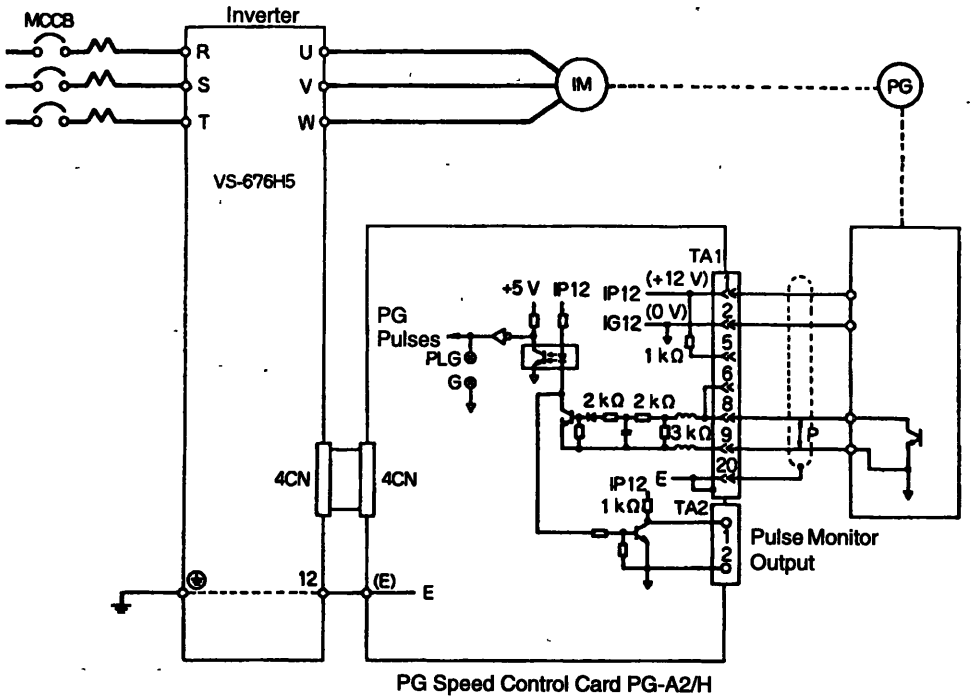
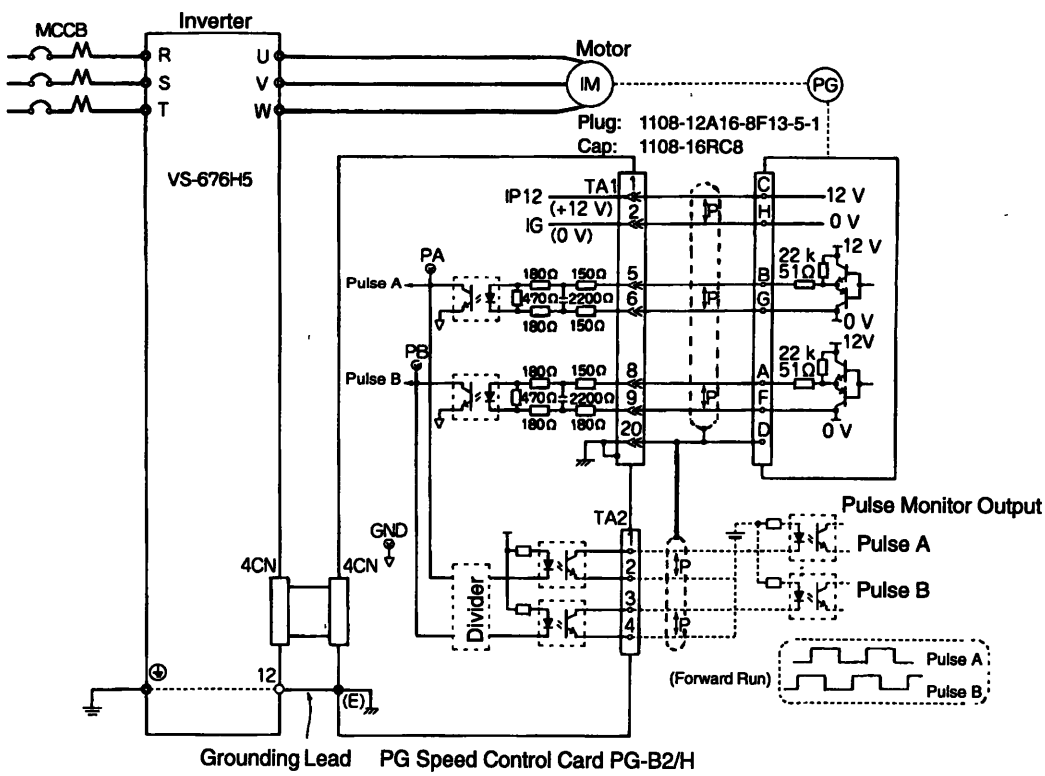



Fig. 12 Connection Diagram of PG-A2/H (Single-Pulse Input)




Note: Terminal symbols of PG are examples assuming Yaskawa's motor is used
PG model: LMA-□□B-S185Y (Complementary output)

Fig. 13 Connection Diagram of PG-B2/H (Double-Pulse Input)

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NOTE

Cautions on Wiring

1. Isolate the control signal wires (terminals TA1 and TA2) of the PG speed control cards PG-A2/H and PG-B2/H from the main circuit wires and power cables.
2. For connection with a PG, use shielded wires to prevent malfunctions due to noise. The allowable maximum wiring distance varies depending on the type of cables used for connection.

| | |
|---|---|
| KPEV-S (0.75 $mm^2$, three-pair wire): | Max. 50 m |
| KPEV-S (1.25 $mm^2$, three-pair wire): | Max. 300 m (junction terminal must be used.) |

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### (3) Connection Diagram of Synchronous Control Option

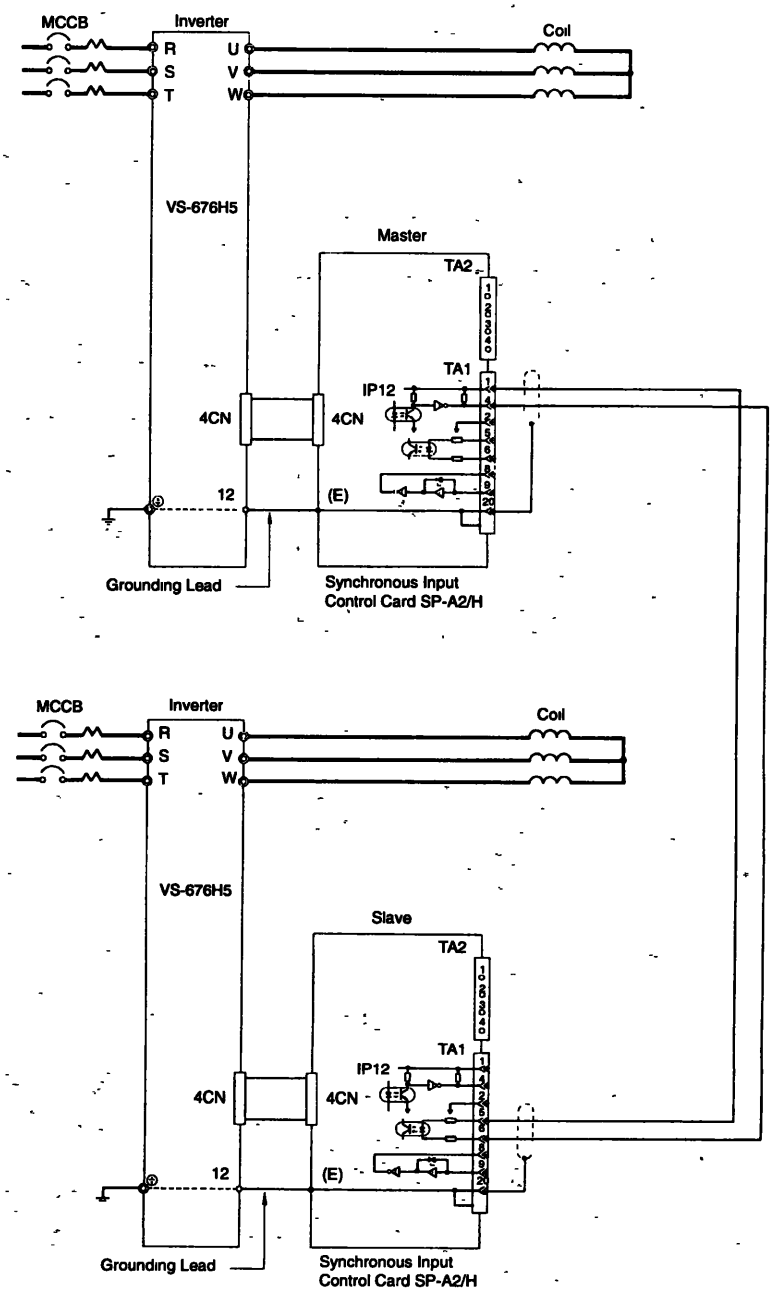



Fig. 14 Connection Diagram of SP-A2/H (Exclusive for EMS Control)

NOTE

Cautions on Wiring

1. Isolate the control signal wires (terminals TA1 and TA2) of the synchronous control card SP-A2/H from the main circuit wires and power cables.
2. For connection within a specified area, use shielded wires to prevent malfunctions due to noise. The wiring distance should be less than 50 m.

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### (4) Connection Diagram of Analog Output Option

The following diagram shows an example of connection of the inverter, analog monitor card AO-12/H, and a peripheral: outputs of AO-12/H are connected to a frequency meter and an ammeter.

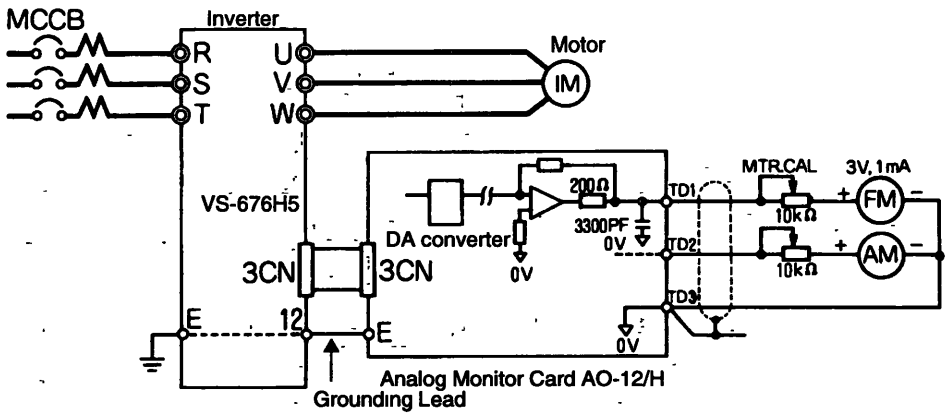



Fig. 15 Connection Diagram of AO-12/H

NOTE

Cautions on Wiring

1. Isolate the control signal wires (terminals TD1 to TD3) of the analog monitor card AO-12/H from the main circuit wires and power cables.
2. For the connection of control signals, use shielded wires and treat the termination of wires in the manner shown below to prevent malfunctions due to noise. The wiring distance should be less than 50 m.

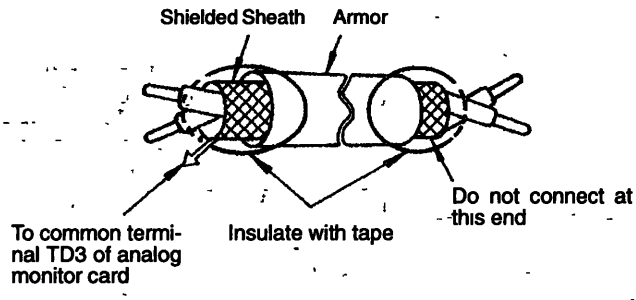



Fig. 16 Termination Treatment of Shielded Wires

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### (5) Connection Diagram of Digital Output Option

The following diagram shows an example of connection of the inverter, digital output card DO-08/H, and a peripheral: outputs of DO-08/H are connected to DC relays.

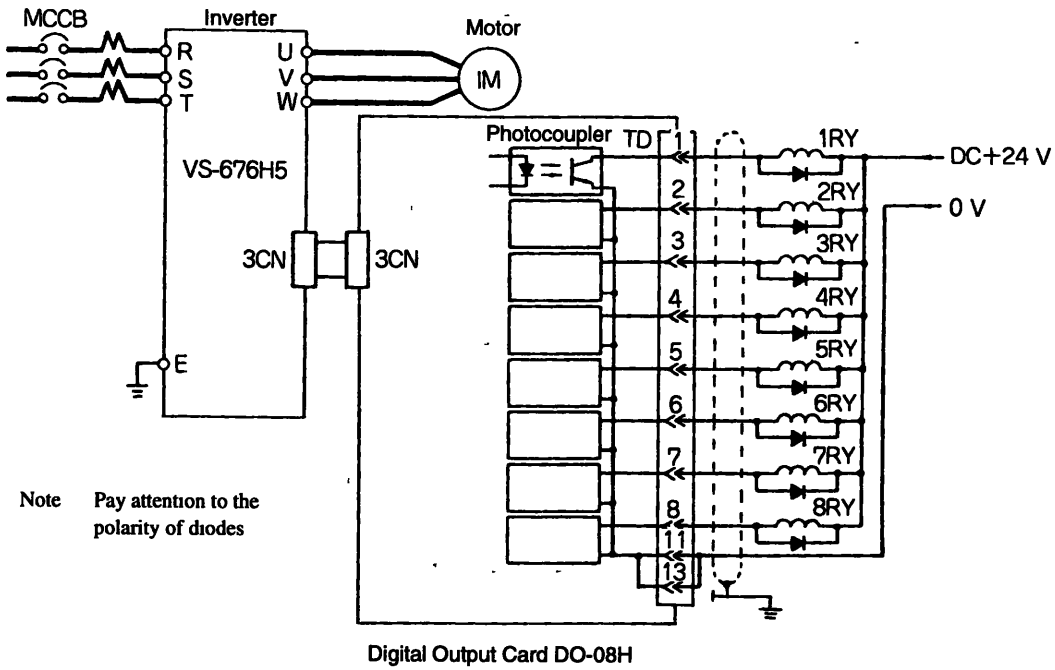



Fig. 17 Connection Diagram of DO-08/H

NOTE

Cautions on Wiring

1. Isolate the wiring connected to terminals TD from the main circuit wires and power cables.
2. For the wiring connected to terminals TD, use shielded wires to prevent malfunctions due to noise. The wiring distance should be less than 50 m.

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(6) Connection Diagram of Inverter Kit Controller Option

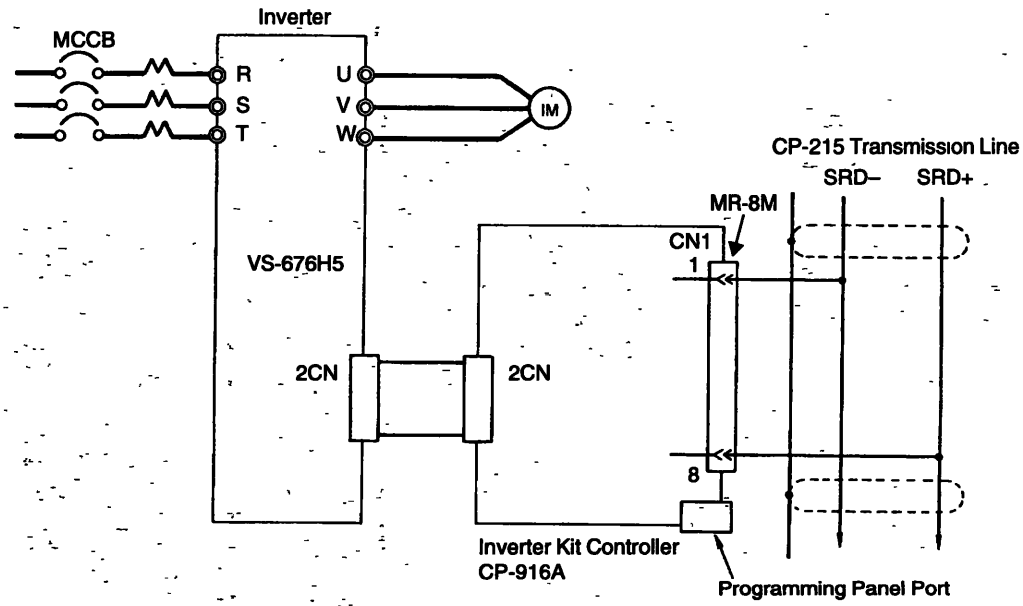



Fig. 18 Connection Diagram of CP-916A

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(7) Connection Diagram of Communication Option

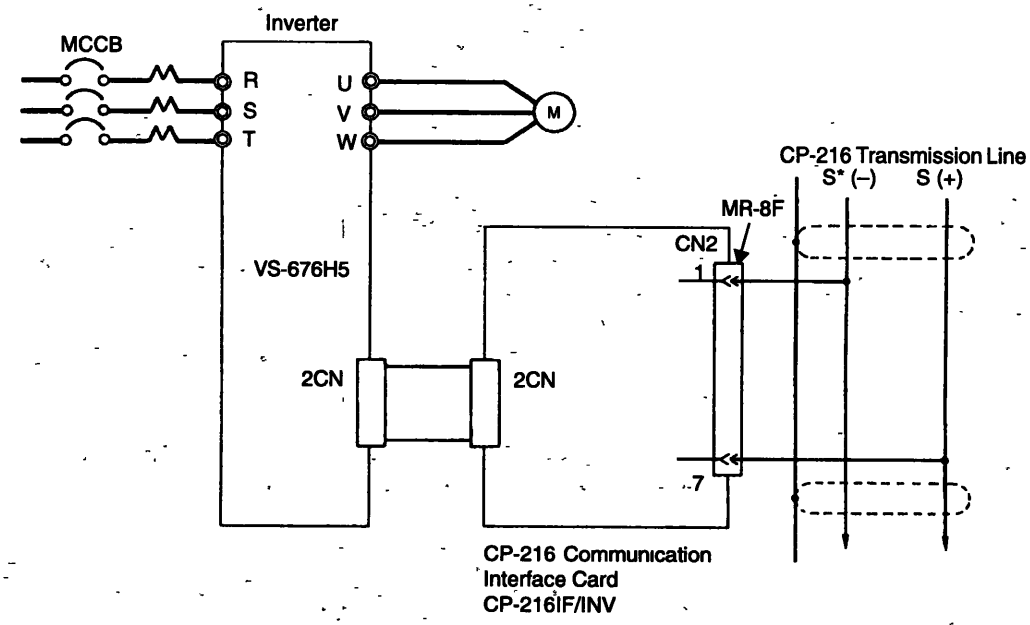



Fig. 19 Connection Diagram of CP-216 IF/INV

NOTE

Isolation of Power Cables in the Panel

The low-voltage line must be isolated from the main line by separating them at least 200 mm from each other. In addition, use the shilded wires for the low-voltage line to protect it from influence of the operation line and other lines run in parallel to it.

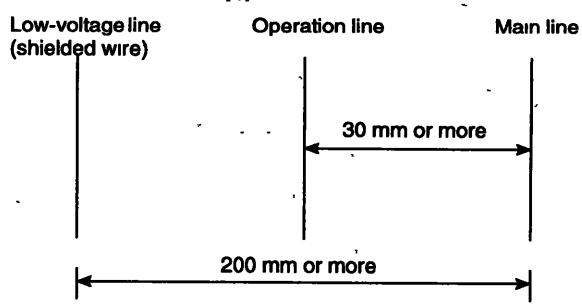



Fig. 20 Isolation of Cables in the Panel and the Minimum Isolating Distance

Connection of Shielded Sheath

Connect the shield wire in the power cable to the earth terminal Es.

For details, refer to "FDS System Installation Manual" (SIE-C873-16.4).

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## 3.2 WIRING THE MAIN CIRCUIT

**⚠ WARNING**

- Make sure to ground the ground terminal ⏚ .
  (Ground resistance 200 V class: 100 Ω or less, 400 V class: 10Ω or less)
  Failure to observe this warning can result in an electrical shock or a fire.

**⚠ CAUTION**

- Never connect the AC main circuit power supply to output terminals U, V and W.
  The inverter will be damaged and invalidate the guarantee.

### (1) Wiring Precautions for Main Circuit Input

< AC Input >

#### (a) Installation of Ground Fault Interrupter

When connecting a ground fault interrupter to input terminals R, S, and T, select one that is not affected by high frequency.

Examples: NV series by Mitsubishi Electric Co., Ltd.
(manufactured in or after 1988)
EG, SG series by Fuji Electric Co., Ltd.
(manufactured in or after 1984)

#### (b) Installation of Magnetic Contactor

When using a braking resistor unit, install a magnetic contactor at the primary side of the inverter to protect the braking resistor unit, and program the sequence to turn off the magnetic contactor upon actuation of the overload relay trip contact. If the inverter malfunctions, the braking resistor unit could be burned out.

#### (c) Terminal Block Connection Sequence

Input power supply phases can be connected to any terminal regardless of the order of R, S, and T on the terminal block.

#### (d) Installation of Surge Suppressor

For inductive loads (magnetic contactors, magnetic relays, solenoid valves, solenoids, magnetic brake, etc.) connected near the inverter, connect a surge suppressor at the same time.

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### (e) Prohibition of Installation of Phase Advancing Capacitor

For the improvement of the power factor, use an AC reactor on the input power supply side. If a phase advancing capacitor or surge suppressor is connected in order to improve the power factor, it may become overheated and damaged by high harmonic components of the inverter. Also, the inverter may malfunction because of overcurrent.

< DC Input >

### (a) Installation of DC Power ON/OFF Switch (SW)

With the following types of inverters, inrush current suppressing function is not built into the inverter.

Book type: 200 V, 11 kW to 22 kW
400 V, 11 kW to 45 kW

Therefore, it is necessary to prepare the inrush current suppressing circuit at the output side of the SW if one is installed.

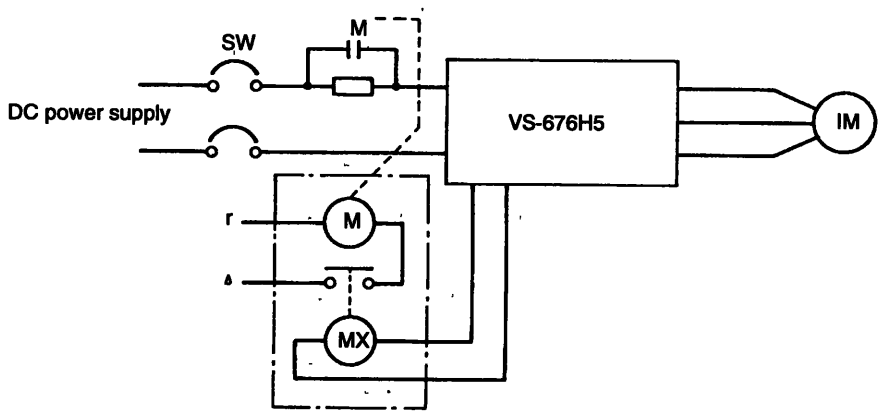



Fig. 21 Example of Installation of Inrush Current Suppressing Circuit

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### (2) Wiring Precautions for Main Circuit Output

#### (a) Connection of Terminal Block and Load

Connect output terminals U, V and W to motor lead wires U, V and W. Verify that the motor rotates in the forward direction (CCW: counterclockwise when viewed from the motor load side) with the forward run command. If the motor rotation is incorrect, exchange any two of output terminals U, V or W.

For the vector control with PG, wiring of the PG must also be changed. Refer to 4.4 "CHECKING THE ROTATION DETECTION DIRECTION OF PG".

#### (b) Strict Prohibition of Connection of Input Power Supply to Output Terminals

Never connect the input power supply to output terminals U, V and W.

#### (c) Strict Prohibition of Short Circuiting or Grounding of Output Circuit

Never touch the output circuit directly or put the output line in contact with the inverter case. Otherwise, it may cause an electrical shock or grounding. In addition, never short circuit the output line.

#### (d) Prohibition of Connection of Phase Advancing Capacitor or LC/RC Noise Filter

Never connect a phase advancing capacitor or LC/RC noise filter to the output circuit.

#### (e) Installation of Magnetic Starter or Contactor

When a magnetic starter or magnetic contactor is connected to the output circuit, the inverter overcurrent protective circuit could operate due to inrush current if the magnetic starter or contactor is opened while the inverter is running.

The sequence must be designed so that the magnetic starter or contactor is opened only during base block state.

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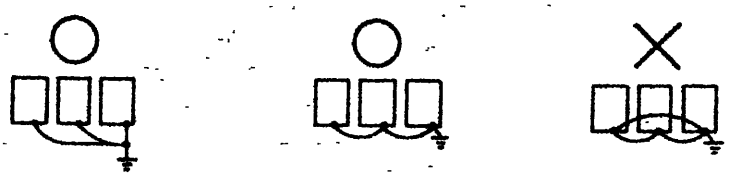
### (f) Installation of Thermal Overload Relay

An electronic overload protective function is incorporated into the inverter. It is necessary, however, to connect a thermal overload relay when driving several motors with one inverter or when using a multi-pole motor. If a thermal overload relay is used, its setting must be as indicated below.

| | |
|---|---|
| At 50 Hz | The same rated current value as that described on the motor nameplate. |
| At 60 Hz | 1.1 times larger than the rated current value described on the motor nameplate. |

## (3) Grounding

- Ground resistance
  200 V class: 100Ω or less, 400 V class: 10Ω or less.
- Never ground VS-676H5 in common with welding machines, motors, or other large-current electrical equipment. Run all the ground wires in a conduit separate from wires for large-current electrical equipment.
- Use the ground wires described in Tables 7, 8, or 9 and keep the length as short as possible.
- When using several inverter units side by side, ground the units as shown in Fig. 22, (a) or (b). Do not loop the ground wires as shown in (c).



(a) Acceptable (b) Acceptable (c) Not Acceptable

Fig. 22 Grounding of Three Inverter Units

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### (4) Functions of Main Circuit Terminals

The following table outlines the functions of the main circuit terminals.
Wire according to each terminal function.

Table 4 200V Class DC Input Terminal Functions

| Model CIMR-H5D ☐ | 20P4 to 2022 | 2030 to 2075 |
|---|---|---|
| Max Applicable Motor Output | 0.4 to 22 kW | 30 to 75 kW |
| ⊖ | DC input power supply | |
| ⊕1 | | |
| U | Inverter output | |
| V | | |
| W | | |
| ▲ | — | Cooling fan power supply |
| r | | |
| ⏚ | Ground terminal (Grounding resistance: 100 Ω or less) | |

Table 5 400V Class DC Input Terminal Functions

| Model CIMR-H5D ☐ | 40P4 to 47P5 | 4011 to 4015 | 4018 to 4045 | 4055 to 4160 |
|---|---|---|---|---|
| Max Applicable Motor Output | 0.4 to 7.5 kW | 11 to 15 kW | 18.5 to 45 kW | 55 to 160 kW |
| ⊖ | DC input power supply | | | |
| ⊕1 | | | | |
| U | Inverter output | | | |
| V | | | | |
| W | | | | |
| r | — | | | Cooling fan power supply (Control power supply) r - ▲200 : 200 to 230V AC input r - ▲400 : 380 to 460V AC input |
| ▲200 | | | | |
| ▲400 | | | | |
| ⏚ | Ground terminal (Grounding resistance : 10Ω or less) | | | |

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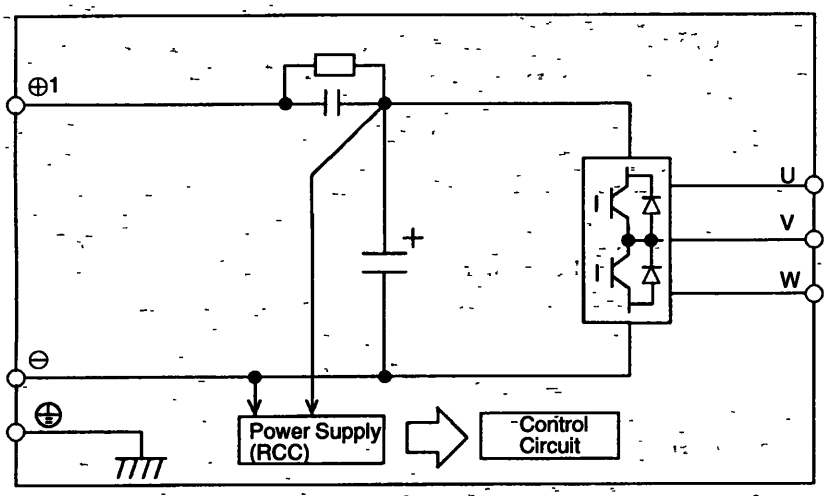
Table 6 200/400 V Class AC Input Terminal Functions

| Voltage | 200 V Class | 400 V Class | |
|---|---|---|---|
| Model CIMR-H5A□ | 2030 to 2075 | 4055 to 4160 | 4185 to 4300 |
| Max Applicable Motor Output | 30 to 75 kW | 55 to 160 kW | 185 to 300 kW |
| R | Main circuit input power supply | | |
| S | | | |
| T | | | |
| ⊖ | Braking unit (⊕3 - ⊖) (⊕1 terminal is not provided) | | DC power supply (⊕1 - ⊖) Braking unit (⊕3 - ⊖) |
| ⊕1 | | | |
| ⊕3 | | | |
| U | Inverter output | | |
| V | | | |
| W | | | |
| ▲ | Cooling fan power supply | — | |
| r | | Cooling fan power supply (Control power supply) r - ▲200 : 200 to 230V AC input r - ▲400 : 380 to 460V AC input | |
| ▲200 | — | | |
| ▲400 | | | |
| ⏚ | Ground terminal (Grounding resistance 200V class: 100 Ω or less, 400 V class 10 Ω or less) | | |

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## (5) Main Circuit Configuration

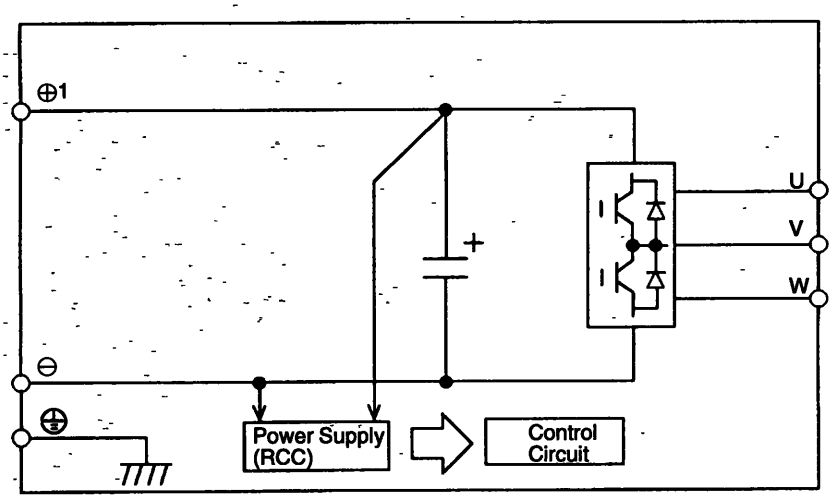
### (a) Configuration A (DC input)




- 200 V Class:
  CIMR-H5D20P4 - 27P5
  0.4 to 7.5 kW
- 400 V Class:
  CIMR-H5D40P4 - 47P5
  0.4 to 7.5 kW

Note: C: [Inverter capacity] × 50%

### (b) Configuration B (DC input)



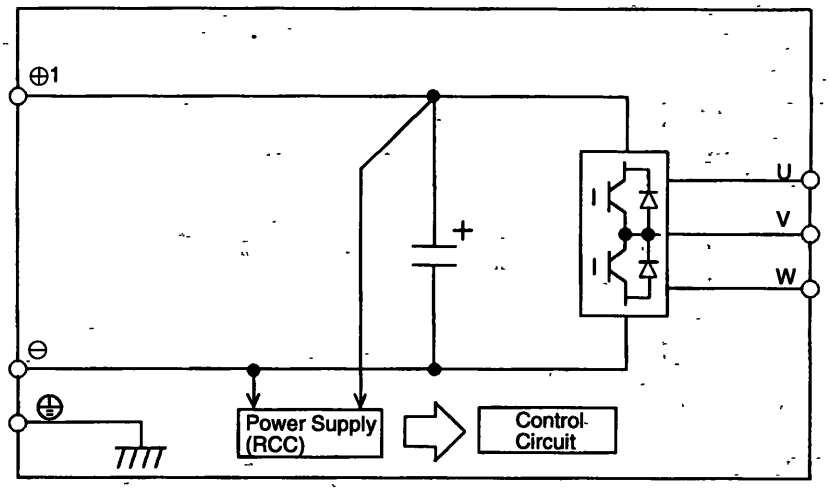

- 200 V Class:
  CIMR-H5D2011 - 2015
  11 to 15 kW
- 400 V Class:
  CIMR-H5D4011 - 4015
  11 to 15 kW

Note: C: [Inverter capacity] × 50%

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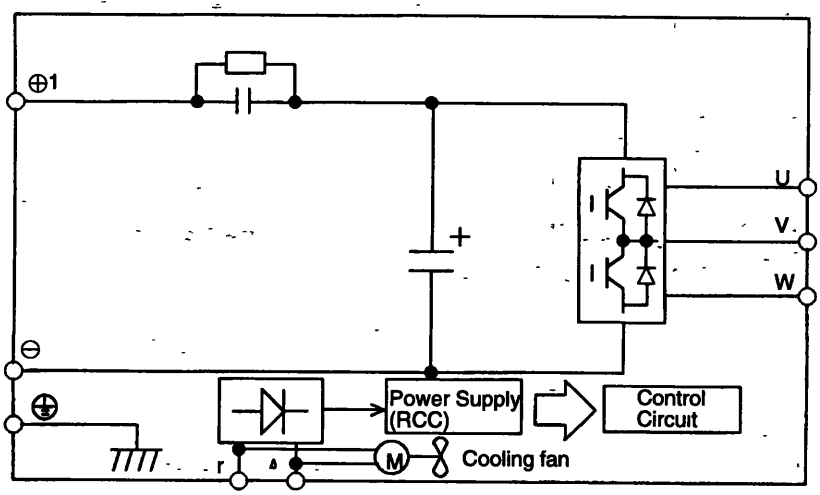
(c) Configuration C (DC input)




- 200 V Class:
  CIMR-H5D2018 - 2022
  18.5 to 22 kW
- 400 V Class:
  CIMR-H5D4018 - 4045
  18.5 to 45 kW

Note: C: [Inverter capacity] × 60%

(d) Configuration D (DC input)

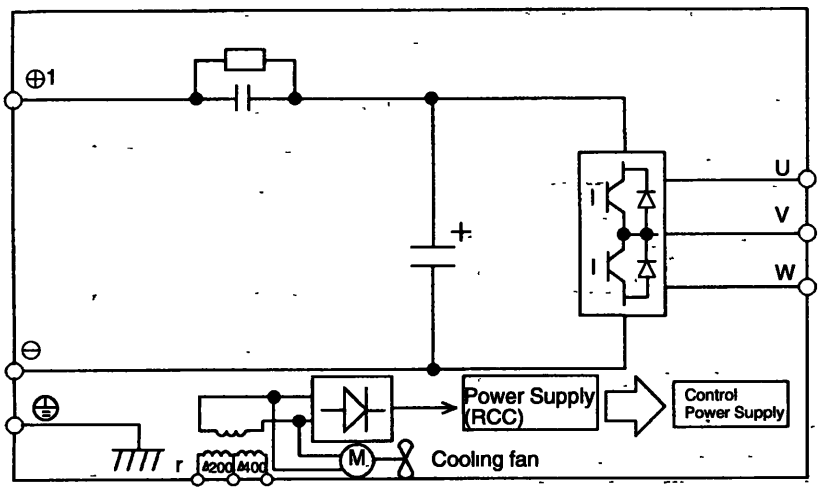



- 200 V Class:
  CIMR-H5D2030 - 2075
  30 to 75 kW

Note: C: [Inverter capacity] × 60%

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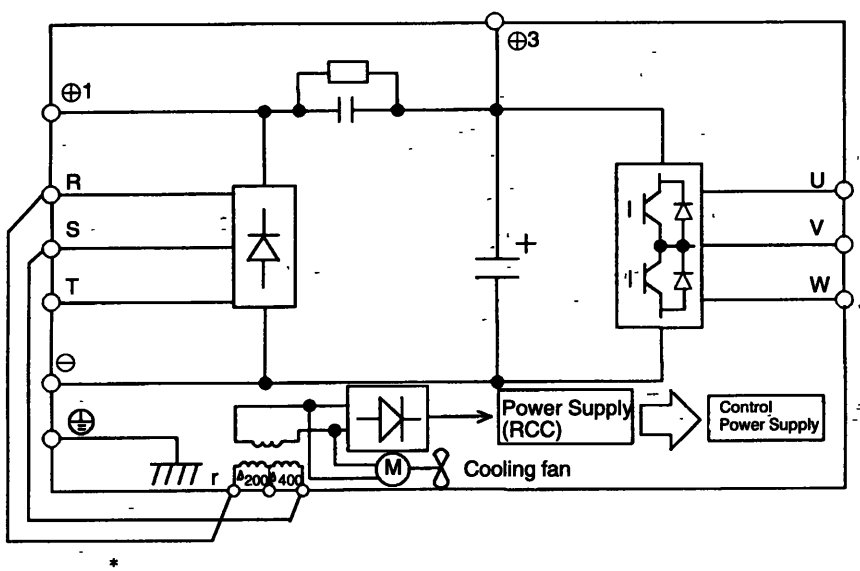
(e) Configuration E (DC input)




- 400 V Class:
  CIMR-H5D4055 - 4160
  55 to 160 kW

Note: C: [Inverter capacity] × 60%

(f) Configuration F (AC/DC input)




- 400 V Class:
  CIMR-H5A4185 - 4300
  185 to 300 kW

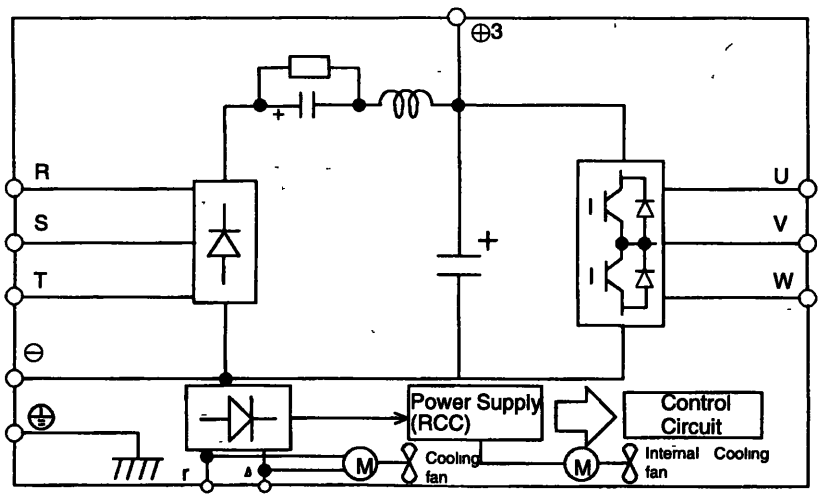
Note: C: [Inverter capacity] × 100%

*When using DC input power supply (terminals⊕1 and⊖), remove the wiring between both terminals R and r, S and ▲400

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### (g) Configuration g (AC input)



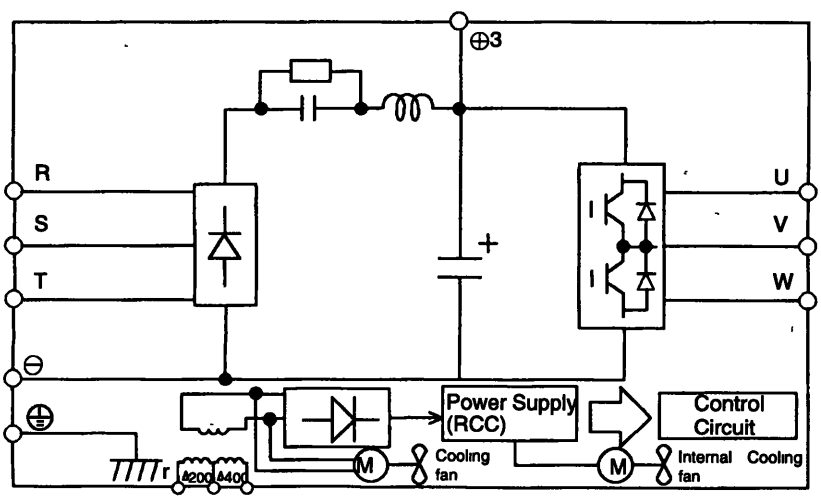

- 200 V Class:

  CIMR-H5A2030 - 2075

  30 to 75 kW

Note: C: [Inverter capacity] × 100%

### (h) Configuration h (AC input)




- 400 V Class:

  CIMR-H5A4055 - 4160

  55 to 160 kW

Note: C: [Inverter capacity] × 100%

for more: efesotomasyon - Yaskawa drive

## (6) Parts Required for Wiring

Select wires and solderless terminals to be used for wiring from Tables 7, 8, and 9.

### Table 7 Wire Size for 200V Class (DC Input)

| Circuit | Model CIMR-□ | Terminal Symbol | Terminal Screw | Wire Size*1 mm² | Wire Type |
|---|---|---|---|---|---|
| Main | H5D20P4 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | Power cable. 600V fire-retardant polyflex cable |
| | | ⏚ | | | |
| | H5D20P7 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D21P5 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D22P2 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D23P7 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D25P5 | ⊖, ⊕1 | M6 | 5.5 - 22 | |
| | | ⏚ U, V, W | M5 | 5.5 - 14 | |
| | H5D27P5 | ⊖, ⊕1 | M6 | 5.5 - 22 | |
| | | ⏚ U, V, W | M5 | 5.5 - 14 | |
| | H5D2011 | ⊖, ⊕1 U, V, W | M8 | 14 - 38 | |
| | | ⏚ | | 8 | |
| | H5D2015 | ⊖, ⊕1 U, V, W | M8 | 14 - 38 | |
| | | ⏚ | | 8 | |
| | H5D2018 | ⊖, ⊕1 U, V, W | M8 | 30 - 60 | |
| | | ⏚ | | 14 | |
| | H5D2022 | ⊖, ⊕1 U, V, W | M8 | 30 - 60 | |
| | | ⏚ | | 14 | |
| | H5D2030 | ⊖, ⊕1 U, V, W | M10 | 100 | |
| | | ⏚ | M8 | 22 | |
| | | r, ℓ | M4 | 0.5 - 5.5 | |
| | H5D2037 | ⊖, ⊕1 U, V, W | M10 | 100 | |
| | | ⏚ | M8 | 22 | |
| | | r, ℓ | M4 | 0.5 - 5.5 | |
| | H5D2045 | ⊖, ⊕1 U, V, W | M10 | 60 × 2P | |
| | | ⏚ | M8 | 22 | |
| | | r, ℓ | M4 | 0.5 - 5.5 | |
| | H5D2055 | ⊖, ⊕1 U, V, W | M10 | 60 × 2P | |
| | | ⏚ | M8 | 30 | |
| | | r, ℓ | M4 | 0.5 - 5.5 | |
| | H5D2075 | ⊖, ⊕1 U, V, W | M12 | 100 × 2P | |
| | | ⏚ | M8 | 50 | |
| | | r, ℓ | M4 | 0.5 - 5.5 | |
| Control | Common to all models | TB1 to TB3, 1CN, 9CN to 11CN | – | *2 | Twisted shielded wire |

*1 Wire size is determined using 110°C temperature-rated copper wire

*2 Specifications of the control card terminals are indicated in page 45

for more: efesotomasyon - Yaskawa drive



Table 8 Wire Size for 400V Class (DC Input)

| Circuit | Model CIMR-□ | Terminal Symbol | Terminal Screw | Wire Size*1 mm² | Wire Type |
|---|---|---|---|---|---|
| Main | H5D40P4 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | Power cable 600V fire-retardant polyflex cable |
| | | ⏚ | | | |
| | H5D40P7 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D41P5 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D42P2 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D43P7 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D45P5 | ⊖, ⊕1 U, V, W | M4 | 2 - 5.5 | |
| | | ⏚ | | | |
| | H5D47P5 | ⊖, ⊕1 U, V, W | M4 | 2 – 5.5 | |
| | | ⏚ | | | |
| | H5D4011 | ⊖, ⊕1 U, V, W | M5 | 5.5 - 14 | |
| | | ⏚ | | 8 | |
| | H5D4015 | ⊖, ⊕1 U, V, W | M5 | 5.5 - 14 | |
| | | ⏚ | | 8 | |
| | H5D4018 | ⊖, ⊕1 U, V, W | M6 | 14 – 22 | |
| | | ⏚ | | 8 | |
| | H5D4022 | ⊖, ⊕1 U, V, W | M6 | 14 – 22 | |
| | | ⏚ | | 8 | |
| | H5D4030 | ⊖, ⊕1 U, V, W | M8 | 38 – 60 | |
| | | ⏚ | | 8 | |
| | H5D4037 | ⊖, ⊕1 U, V, W | M8 | 38 – 60 | |
| | | ⏚ | | 14 | |
| | H5D4045 | ⊖, ⊕1 U, V, W | M8 | 38 – 60 | |
| | | ⏚ | | 14 | |
| | H5D4055 | ⊖, ⊕1 U, V, W | M10 | 100 | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵200, ▵400 | M4 | 0.5 - 5.5 | |
| | H5D4075 | ⊖, ⊕1 U, V, W | M10 | 100 | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵200, ▵400 | M4 | 0.5 - 5.5 | |
| | H5D4110 | ⊖, ⊕1 U, V, W | M10 | 60 × 2P | |
| | | ⏚ | M8 | 30 | |
| | | r, ▵200▵400 | M4 | 0.5 - 5.5 | |
| | H5D4160 | ⊖, ⊕1 U, V, W | M12 | 100 × 2P | |
| | | ⏚ | M8 | 50 | |
| | | r, ▵200▵400 | M4 | 0.5 - 5.5 | |
| | H5D4185 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 50 | |
| | | r, ▵200▵400 | M4 | 0.5 - 5.5 | |
| | H5D4220 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 60 | |
| | | r, ▵200▵400 | M4 | 0.5 - 5.5 | |
| | H5D4300 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 60 | |
| | | r, ▵200▵400 | M4 | 0.5 - 5.5 | |
| Control | Common to all models | TB1 to TB3, 1CN, 9CN to 11CN | – | *2 | Twisted shielded wire |

*1 Wire size is determined using 110°C temperature-rated copper wire

*2 Specifications of the control card terminals are indicated in page 45

for more: efesotomasyon - Yaskawa drive

## Table 9 Wire Size for 200/400V Class (AC Input)

| Circuit | Model CIMR-□ | Terminal Symbol | Terminal Screw | Wire Size*1 mm² | Wire Type |
|---|---|---|---|---|---|
| Main | H5A2030 | R, S, T, U, V, W | M10 | 100 | Power cable 600V fire-retardant polyflex cable |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵ | M4 | 0.5 - 5.5 | |
| | H5A2037 | R, S, T, U, V, W | M10 | 60 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵ | M4 | 0.5 - 5.5 | |
| | H5A2045 | R, S, T, U, V, W | M10 | 60 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵ | M4 | 0.5 - 5.5 | |
| | H5A2055 | R, S, T, U, V, W | M10 | 60 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 30 | |
| | | r, ▵ | M4 | 0.5 - 5.5 | |
| | H5A2075 | R, S, T, U, V, W | M12 | 100 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 50 | |
| | | r, ▵ | M4 | 0.5 - 5.5 | |
| | H5A4055 | R, S, T, U, V, W | M10 | 100 | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4075 | R, S, T, U, V, W | M10 | 100 | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4110 | R, S, T, U, V, W | M10 | 60 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 22 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4160 | R, S, T, U, V, W | M12 | 100 × 2P | |
| | | ⊖, ⊕3 | M8 | – | |
| | | ⏚ | M8 | 50 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4185 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 50 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4220 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 60 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| | H5A4300 | R, S, T, ⊖, ⊕1, ⊕3 U, V, W | M16 | 325 × 2P | |
| | | ⏚ | M8 | 60 | |
| | | r, ▵200, ▵ 400 | M4 | 0.5 - 5.5 | |
| Control | Common to all models | TB1 to TB3, 1CN, 9CN to 11CN | – | *2 | Twisted shielded wire |

*1 Wire size is determined using 110°C temperature-rated copper wire. When connecting a braking unit, select wire size referring to the instructions of braking unit (manual No. TOE-C726-2).

*2 Specifications of the control card terminals are indicated in page 45

for more: efesotomasyon - Yaskawa drive



NOTE

When determining wire size, consider voltage drop. Select a wire size so that voltage drop will be less than 2% of the rated voltage. Voltage drop is calculated by the following equation:

Line voltage drop (V)

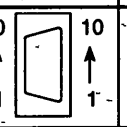
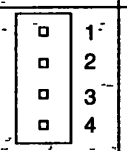
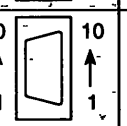
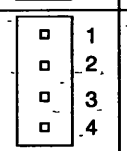
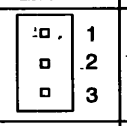
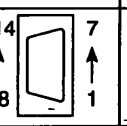
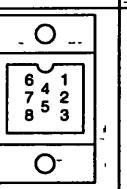
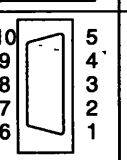
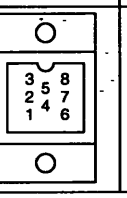
$= \sqrt{3} \times$ wire resistance ($\Omega$/km) $\times$ wiring distance (m) $\times$ current (A) $\times 10^{-3}$

### (7) Control Circuit Terminals

Table 10 Control Circuit Terminals

| | Connector No. | Function | Connector Type | | Connector Pin Nos. | Applicable Max. Wire Size | Connector Manufacturer |
|---|---|---|---|---|---|---|---|
| | | | Inverter Side | Wiring Side | | | |
| Control Card | TB1 | Inrush current suppression circuit | MC1 5/4G-3.81 | MC1 5/4ST-3 81 | 1 2 3 4 | 1 5 mm$^2$ | Phoenix Contact GmbH & Co |
| | TB3 | Motor thermistor | MC1.5/2G-3 81 | MC1 5/2ST-3 81 | 1 2 | 1 5 mm$^2$ | Phoenix Contact GmbH & Co. |
| | 1CN | Digital operator | 10214-52A2JL | 10114-3000VE 10314-52A0-008 (case) | 14 7 8 1 | 0 2 mm$^2$ | Sumitomo 3M Ltd. |
| | 9CN | Control signals | 10226-52A2JL | 10126-3000VE 10326-52A0-008 (case) | 26 13 14 1 | 0.2 mm$^2$ | Sumitomo 3M Ltd |
| | 10CN | Control signals | 10220-52A2JL | 10120-3000VE 10320-52A0-008 (case) | 20 10 11 1 | 0.2 mm$^2$ | Sumitomo 3M Ltd |
| | TB2 | Inverter dry contact | MSTB2 5/5-GF | MSTBT2 5/5-ST | 1 2 3 4 5 | 2.5 mm$^2$ | Phoenix Contact GmbH & Co |
| Option Cards PG-A2/H | TA1 | Control signals | 10220-52A2JL | 10120-3000VE 10320-52A0-008 (case) | 20 10 11 1 | 0 2 mm$^2$ | Sumitomo 3M Ltd |
| | TA2 | Control signals | MC1 5/2G-3 81 | MC1.5/2ST-3 81 | 1 2 | 1.5 mm$^2$ | Phoenix Contact GmbH & Co |

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| | | Connector No. | Function | Connector Type | | Connector Pin Nos. | Applicable Max. Wire Size | Connector Manufacturer |
|---|---|---|---|---|---|---|---|---|
| | | | | Inverter Side | Wiring Side | | | |
| Option Cards | PG-B2/H | TA1 | Control signals | 10220-52A2JL | 10120-3000VE 10320-52A0-008 (case) |   | 0 2 mm² | Sumitomo 3M Ltd |
| | | TA2 | Control signals | MC1.5/4G-3 81 | MC1 5/4ST-3 81 |   | 1 5 mm² | Phoenix Contact GmbH & Co |
| | SP-A2/H | TA1 | Control signals | 10220-52A2JL | 10120-3000VE 10320-52A0-008 (case) |   | 0 2 mm² | Sumitomo 3M Ltd |
| | | TA2 | Control signals | MC1.5/4G-3 81 | MC1 5/4ST-3.81 |   | 1 5 mm² | Phoenix Contact GmbH & Co |
| Option Cards | AO-12/H | TD | Control signals | MC1 5/3G-3 81 | MC1 5/3-ST-3 81 |   | 1.5 mm² | Phoenix Contact GmbH & Co |
| | DO-08/H | TD | Control signals | 10214-52A2JL | 10114-3000VE 10314-52A0-008 (case) |   | 0 2 mm² | Sumitomo 3M Ltd |
| | CP-916A | CN1 | CP-215 transmission | MR-8RFA4 (G) | MR-8M (G) MR-8L (case) |   | IPEV-S (Cu) 1 25 mm² × 1P | Honda Tsushin Kogyo Co , Ltd |
| | | CN2 | PP/digital operator | 17LE-13090-27 (D2BC) | 17JE-23090-02 (D8B) (with case) |   | Use a special cable. Code No DUD005010 | Daiichi Denshi Kogyo Co., Ltd |
| | 2161F/ INV | CN2 | CP-216 transmission | MR-8RMA4 (G) | MR-8F (G) MR-8L (case) |   | IPEV-S (Cu) 1 25 mm² × 1P | Honda Tsushin Kogyo Co , Ltd |

NOTE

Some of the connectors attached with control cards and option cards are of the same type. Therefore, make sure to mount the cards to the correct connectors each of which is identified by device symbol. If connection is wrong, it may cause damage to the inverter.

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## 3.3 WIRING THE CONTROL CIRCUIT

The following table outlines the functions of the control circuit terminals. Wire correctly according to the purpose.

### (1) Functions of Control Circuit Terminals

Table 11 Control Circuit Terminals

| Terminal Symbol | | Signal Name | Terminal Function | | Signal Level |
|---|---|---|---|---|---|
| 9CN | 17 | Forward run/stop | Forward run when closed, stop when open | Valid if B1-02 = 1<br>Through mode in other cases | Photocoupler insulation<br>Input 24 VDC 8 mA |
| | 18 | Reverse run/stop | Reverse run when closed, stop when open | | |
| | 19 | Input signal 1 | – | Multi-function contact inputs (H1-01 to H1-06) | |
| | 20 | Input signal 2 | – | | |
| | 21 | Input signal 3 | – | | |
| | 22 | Input signal 4 | – | | |
| | 23 | Input signal 5 | – | | |
| | 24 | Input signal 6 | – | | |
| | 25 | DI-COM | – | | |
| | 1 | +15 power supply output | +15 V power supply for analog commands | | +15 V<br>(Allowable current. 20 mA max ) |
| | 10 | –15 power supply output | –15 V power supply for analog commands | | –15 V<br>(Allowable current. 20 mA max ) |
| | 4 | Analog input 1 | 0 to 10 V/–10 to 10 V | Valid if B1-01 = 1<br>Through mode in other cases | –10 to 10 V (20 kΩ)<br>0 to 10 V (20 kΩ) |
| | 6 | Analog input 2 | 0 to 10 V/–10 to 10 V | Through mode only | –10 to 10 V (20 kΩ)<br>0 to 10 V (20 kΩ) |
| | | | 4 to 20 mA | | 4 to 20 mA (250 Ω) |
| | 8 | Analog input 3 | 0 to 10 V/–10 to 10 V | | –10 to 10 V (20 kΩ)<br>0 to 10 V (20 kΩ) |
| TB2 | 2 | Output signal 1 (fault contact input) | Outputs an error signal if the inverter hardware is defective (TB-1 to TB-3: Closed) | Multi-function contact output (H2-06) | Dry contact<br>Contact capacity:<br>250VAC 1 A or less<br>30VDC 1A or less |
| | 3 | | | | |
| | 1 | | | | |
| | 4 | Output signal 6 | – | Multi-function contact output (H2-01) | |
| | 5 | | | | |
| 10CN | 2 | Analog output 1 | – | Multi-function analog monitor (H4-01 to H4-07) | 0 to ±11 V Max ±5%<br>2 mA or less |
| | 4 | Analog output 2 | – | | |
| | 10 | Output signal 2 | – | Multi-function PHC output (H2-02 to H2-05) | Open collector output<br>48 V 50 mA or less |
| | 12 | Output signal 3 | – | | |
| | 14 | Output signal 4 | – | | |
| | 16 | Output signal 5 | – | | |
| | 17 | PHC-COM | – | | – |
| TB3 | 1 | Motor thermistor | Detects motor temperature | | – |
| | 2 | | | | |
| TB1 | 1 | Interface to the inrush current suppressing circuit installed externally | Closed: Inrush current suppressing circuit contactor ON command | | 24VDC 100 mA |
| | 2 | | | | |
| | 3 | | Closed Inrush current suppressing circuit contactor ON answer | | 24VDC 7 mA |
| | 4 | | | | |

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(2) Precautions on Control Circuit Wiring

- Isolate the control circuit wires (connectors: 9CN, 10CN, TB1 to TB3) from the main circuit wires (terminals: R, S, T, U, V, W, ⊖, ⊕1, ⊕3) and other power cables to prevent malfunctions of the inverter due to noises.
- Isolate the wire connected to the control circuit terminal (TB2: contact output) from the wires connected to 9CN, 10CN, TB1, and TB3.
- Use twisted shielded or twisted-pair shielded wires for the control circuit line to prevent malfunctions of the inverter due to noise. The ending of the wires should be insulated as shown below. Wiring distance should be less than 50 m.

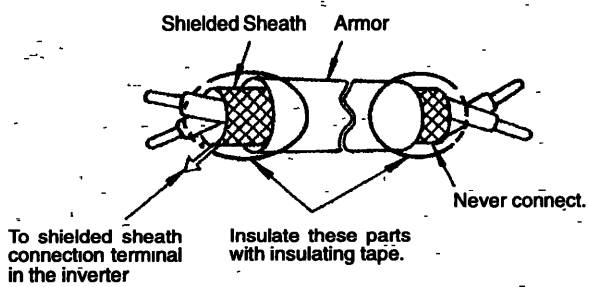



Fig. 23 Shielded Wire Termination

## 3.4 WIRING INSPECTION

After completing installation and wiring, check the following items. In this check, never test the buzzer in the control circuit.

- ☐ Wiring is proper.
- ☐ Wire clippings or screws are not left in the unit.
- ☐ Screws are securely tightened.
- ☐ Bare wire in the terminal does not in contact with other terminals.

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# 4 PREPARATION FOR OPERATION

> **⚠ CAUTION**
>
> • Before starting test run, disconnect the coupling that directly connects the motor to the machine, belt or others to allow the motor to be run independently.
> If the inverter should be operated for the test with the motor connected to the machine, do so only after ensuring the safety.
> Failure to observe this caution can result in personal injury.

## 4.1 INSPECTION BEFORE TURNING THE POWER ON

Check the following items after completing installation and wiring.

(1) Wiring is proper.

(2) Wire clippings or screws are not left in the unit that could cause short-circuit.

(3) Screws are securely tightened.

(4) Connected loads are proper.

for more: efesotomasyon - Yaskawa drive

## 4.2 SETTING THE LINE VOLTAGE USING JUMPER

This setting is necessary only for the inverters of 55 kW or larger types of 400 V class.

Set the line voltage jumper according to the main circuit power supply as shown in Fig. 24. Insert the jumper at the appropriate location corresponding to the input voltage.

It has been preset at the factory to 440 V.

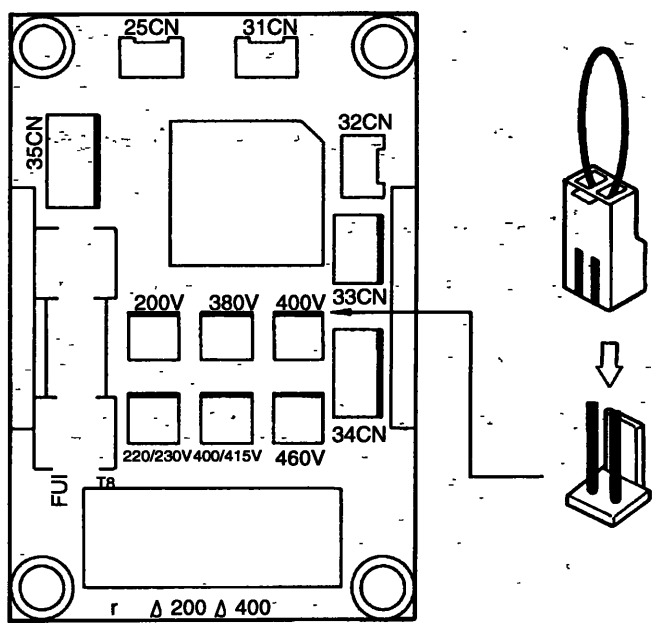



Fig. 24 Line Voltage Jumper

for more: efesotomasyon - Yaskawa drive



## 4.3 TURNING ON THE MAIN CIRCUIT POWER

After turning on the main circuit power, verify that there are no abnormalities.

When the power is turned on, the CHARGE indicating lamp lights and then the display unit in the digital operator lights (when a digital operator is connected.).

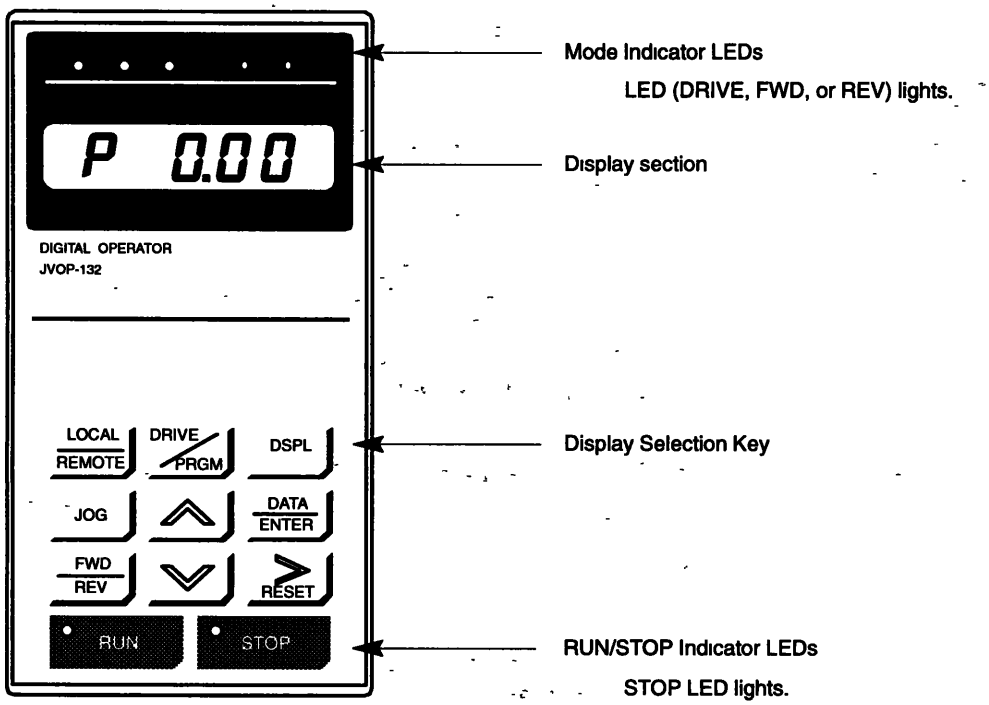



Fig. 25 Digtal Operator

NOTE

If an exclusive-use thermistor is not provided with the motor, **rHn** (thermistor open circuit) is displayed.
In this case, set "0" (without thermistor) for **L9-01** and perform fault reset. This recovers correct display.
When No. 2 motor is selected, set "0" for **L9-04** and perform fault reset.

for more: efesotomasyon - Yaskawa drive

## 4.4 CHECKING THE ROTATION DETECTION DIRECTION OF PG

Select motor speed display on the display unit in the digital operator and turn the motor shaft. Make sure that display of motor rotation direction and polarity is correct and also that the motor speed is displayed correctly.

Forward direction: Counterclockwise as viewed from the load side (standard setting). See Fig. 26.

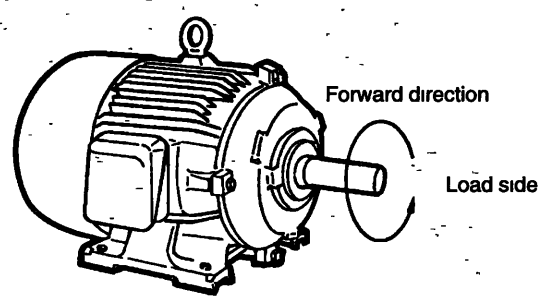



Fig. 26 Motor Rotation Direction

This inspection can be carried out only after making sure that the STOP LED on the digital operator is lit.

Procedure:

① Press the display selection key [DSPL] on the digital operator to change the display mode to motor speed display.

P 000 (%) → 000

(command display) (feedback display)

② Turn the motor counterclockwise as viewed from the load side.

Make sure that the displayed rotation direction is forward and that the displayed motor speed corresponds to the present rotating speed.

Example: 300 (%)

③ Turn the motor clockwise as viewed from the load side.

Make sure that the displayed rotation direction is reverse and that the displayed motor speed corresponds to the present rotating speed.

Example: -300 (%)

④ If the display unit does not show the motor rotation direction and motor speed correctly, check the wiring by referring to Para. 3.2 (2) "Connection Diagram of PG Card Option".

for more: efesotomasyon - Yaskawa drive



## 4.5 SETTING THE CARRIER FREQUENCY

If magnetic noise of a motor poses problems, it is possible to lower noise level by changing the setting for the upper limit of the carrier frequency at C6-01. Note that this is not possible for all types of inverters. Table 12 shows whether or not noise reduction is possible by changing the setting for the carrier frequency upper limit for the individual inverter types.

Carrier frequency is set at 2 kHz at the factory. The setting range of the carrier frequency upper limit is indicated in Table 12.

Table 12 Setting the Carrier Frequency Upper Limit

| Type CIMR-H5 ☐ | Noise Reduction | Setting Range of Carrier Frequency |
|---|---|---|
| D20P4 - D2018 | Possible | 0.4 to 15.0 kHz* |
| D2022 - D2075, A2030 - A2075 | Possible | 0.4 to 10.0 kHz* |
| D40P4 - D4030, D4037 - D4160, A4055 - A4160 | | |
| A4185 - A4300 | Not possible | 0.4 to 2.5 kHz* |

*Carrier frequency lower limit is 2.0 kHz during vector control

NOTE

When changing the carrier frequency, contact your Yaskawa representative. The continuous rated current can be output when carrier frequency is set at 2 kHz. To reduce noise level by increasing the carrier frequency, it will be necessary to lower the rated current.

## 4.6 SETTING THE RATED SPEED

The inverter is set at the factory so that the motor rotates at the rated speed when the speed reference of "100%" is input.

To change the rated speed meeting the machine specifications, set the required speed for constant C9-01 (rated speed adjustment).

Motor speed at 100% speed reference
= Max. speed (E1-04) × Rated speed adjustment (C9-01)

Note: The value of "max speed × rated speed adjustment" must not exceed 1.2 times the rated motor speed

Example: Adjustment for rotating the motor (rated speed: 1750 r/min) at 2100 r/min by inputting speed reference of 100%.
Rated speed adjustment (C9-01): 1.0000 → 1.2000
With No. 2 motor, "E4-01" is used instead of "E1-04".

for more: efesotomasyon - Yaskawa drive

## 4.7 SETTING FOR THERMISTOR

Standard motors for inverter have specific thermistor as standard.

If the motor to be used is a general-purpose motor which does not have a thermistor, set "0" for "L9-01 (No. 2 motor: L9-04)".

## 4.8 SELECTION OF OPERATION MODE

With VS-676H5, two operation modes of LOCAL and REMOTE are provided. Selection of the operation mode is possible by using the [LOCAL/REMOVE] key on the digital operator while the inverter is stopped. The presently selected operation mode can be visually confirmed by the SEQ and REF LEDs on the digital operator.

The operation mode is set to "REMOTE" in the factory, in which the inverter operates by the speed reference set by the option and the run command given by the option. The multi-function inputs of 9CN-19 to 9CN-24 are valid, regardless of the selected operation mode.

- LOCAL: The digital operator is used to set both the speed reference and run command. In the LOCAL mode, neither the SEQ nor the REF LEDs are not lit.
- REMOTE: The speed reference and run command are selected by the constants as indicated in Table 13.

Table 13 Command Selection by Constants in the REMOTE Mode

| Constant No. | Name | Description |
|---|---|---|
| B1-01 | Speed reference selection | 0 Master speed reference from the digital operator (D1-01) (REF LED on the digital operator: OFF)<br>1 : Master speed reference from control circuit terminals 9CN-4 and 9CN-6 (REF LED on the digital operator: ON)<br>2 : Master speed reference set by MEMOBUS (REF LED on the digital operator. Blinking)<br>3 : Master speed reference set by the MEMOBUS option (REF LED on the digital operator: Blinking) |
| B1-02 | Run command selection | 0 : The motor starts running in response to the run command of the digital operator (SEQ LED on the digital operator: OFF)<br>1 The motor starts running in response to the run command input from the control circuit terminal 9CN-17. (SEQ LED on the digital operator: ON)<br>2 The motor starts running in response to the run command input by MEMOBUS. (SEQ LED on the digital operator: Blinking)<br>3 The motor starts running in response to the run command input from the MEMOBUS option (SEQ LED on the digital operator: Blinking) |

for more: efesotomasyon - Yaskawa drive



## 4.9 AUTO-TUNING

NOTE

1. Since the motor starts running automatically during auto-tuning, disconnect the motor from the machine so that starting the motor does not create hazardous conditions.
2. In the auto-tuning mode, signals input to the control circuit terminals are all disregarded.
3. At the start of tuning, input the RUN command only after making sure that the motor has been stopped.

### (1) Operation Procedure

#### (a) Confirm the safety.

Confirm the following:

- ☐ The motor is disconnected from the machine.
- ☐ The lock key is removed from the motor shaft.
- ☐ There are no persons or objects near the motor shaft.
- ☐ The brake has been released (for the motor with the braking unit).
- ☐ Inspection and setting have been made according to the instructions stated in Paras. 4.1 and 4.2.

#### (b) Turn the power to the inverter ON.

Confirm the following:

- ☐ There are no abnormalities.
- ☐ Rotation direction of the PG (for the inverter with the PG).

#### (c) Select the program mode.

Select the program mode by the [DRIVE/PRGM] key. When the program mode is selected, the DRIVE LED is turned off.

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(d) Input the values indicated on the nameplate or motor constants.

- Auto-tuning by inputting the values indicated on the nameplate
  Input the nameplate values to the T2 constants.

| Constant No. | Input Data | Setting Range | Description |
|---|---|---|---|
| T2-01 | Motor base voltage | 0.0 to 255.0 V | Input the value indicated on the nameplate |
| T2-02 | Motor rated current | 0.00 to 2000.0 A | Input the value indicated on the nameplate<br>Input the base side value<br>7.5 kW or smaller types: 0.01 A units |
| T2-03 | Motor base frequency | 0.00 to 400.00 Hz | Input the value indicated on the nameplate |
| T2-04 | Motor base speed | 0 to 24000 r/min | Input the value indicated on the nameplate |
| T2-05 | Number of poles | 2 to 48 | Input the value indicated on the nameplate |
| T2-06 | Motor insulation class | 0 to 4 | Input the number corresponding to the value indicated on the nameplate<br>Insulation class A (100°C) 0<br>E (120°C) 1<br>B (130°C) 2<br>F (155°C) 3<br>H (180°C) 4 |
| T2-07 | PG constants | 0 to 10000 | |

- Auto-tuning by inputting the motor constants to the E constants
  Input the data directly to the E constants.

(e) Input the motor selection and tuning mode selection.

- Input the data to the T1 constants

| Constant No. | Input Data | Setting Range | Description |
|---|---|---|---|
| T1-01 | Motor selection | 1/2 | 1: No. 1 motor<br>2: No. 2 motor |
| T1-02 | Tuning mode | 0 to 4 | 0: Normal operation mode<br>1: Tuning by inputting nameplate value (digital operator)<br>2: Tuning by inputting motor constants (digital operator)<br>3: Tuning by inputting nameplate value (master controller)<br>4: Tuning by inputting motor constants (master controller) |

Notes
1 No. 2 motor setting is valid for PROM No. 1030 and after. With previous model inverters, selection of No. 2 motor is not permitted. With No. 2 motor, auto-tuning is possible only in the "open loop vector control" if the PG card is not installed. (PROM No. can be monitored by U1-14.)
2 Auto-tuning is disabled if a fault occurs. (Return to 0.)

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(f) Select the drive mode.

Select the drive mode by pressing the [DRIVE/PRGM] key. When the drive mode is selected, the DRIVE LED is turned ON.

The following is displayed.

CAL□■ □: Selected motor No. ■: Tuning mode

(g) Execute the auto-tuning.

Press the [RUN] key.

The following begins flashing and tuning starts.

CAL□■

(h) End of tuning

Ending normally: End is displayed.

Ending abnormally: Er-XX is displayed (see Table 14).

Warning: If the load exceeds 20% during tuning, warning message of "End20" is displayed.

for more: efesotomasyon - Yaskawa drive

### (2) Error Processing in Auto-tuning

- Fault (major, minor) which could occur during normal operation is detected during auto-tuning.
- If a fault occurs including minor fault, the motor stops after coasting (base block) and auto-tuning is interrupted regardless of the fault stop mode.
- During auto-tuning, errors indicated in Table 14 are also detected in addition to the faults which could occur in normal operation.
  The motor stops after coasting (base block) and auto-tuning is interrupted if any of these errors is detected. The error messages are not logged in the fault history.
- It is possible to forcibly interrupt auto-tuning by pressing the [STOP] key. When the [STOP] key is pressed, the motor stops after coasting (base block).
  The stop command given from the master controller has the same effect as the input of the [STOP] key.
- When the auto-tuning is interrupted, the value set for T1-02 is automatically returned to "0" and the setting for all constants (including T□-0□) is automatically returned to the setting made before the start of auto-tuning.
- If an error has occurred during coasting and regaining speed or during deceleration to stop at the end of tuning, error display is given in the display unit of the digital operator. In this case, the auto-tuning is not interrupted and the results of tuning are valid.

for more: efesotomasyon - Yaskawa drive



Table 14 Auto-tuning Error Messages

| Error Message | Contents | Description |
|---|---|---|
| Er-01 | Motor data error (only in the nameplate value input mode) | The initial values calculated by the input data are outside the setting range |
| Er-02 | Acceleration error | The set speed is not reached within the time of "acceleration time + 10 seconds" |
| Er-03 | Motor rotation direction error (only in the control with PG) | During acceleration, torque reference is 100% or larger and the signs of speed reference and detected speed value do not agree with each other<br>= Incorrect connection of PG (A- and B-phase) or inverter output (U-, V-, and W-phase) |
| Er-04 | Motor speed error | With PG<br>During acceleration, torque reference is 100% or larger and the signs of speed reference and detected speed value agree with each other<br>= Motor overload, setting error of number of PG pulses<br>Without PG<br>During acceleration, torque reference is 100% or larger<br>= Motor overload |
| Er-05 | Line resistance error | · Voltage command exceeds 100%<br>· Feedback current is less than 1% of motor rated current even when the voltage reference exceeds 50%<br>· Result of tuning is negative (Feeder resistance value is excessive )<br>· Tuning has not been completed within 5 minutes |
| Er-06 | No-load current error | These errors are detected according to the setting for the constants.<br>· The result of tuning is outside the setting range of a constant<br>In the case of upper limit over of iron-core saturation coefficient 1 and 2, it is processed as limit over and it does not cause an error<br>· Tuning has not been completed within 1 minute for the individual tuning and constants |
| Er-07 | Iron-core saturation coefficient 1 error | |
| Er-08 | Iron-core saturation coefficient 2 error | |
| Er-09 | Rated slip error | |
| Er-10 | Stop command input | The stop command is input by the pressing of the [STOP] key, etc |

### (3) Processing after the Completion of Tuning

- According to the selection of No. 1/No. 2 motor, the results of tuning are entered into the constants. The constants other than the tuning results such as accel./decel. time and ASR gain are automatically returned to the previously set values.
- After the completion of entire processing of auto-tuning, the setting for T1-02 is returned to "0" and "End" display is given for 3 seconds.
- If load exceeds 20% during tuning, the warning message indicated in Table 14 is given.

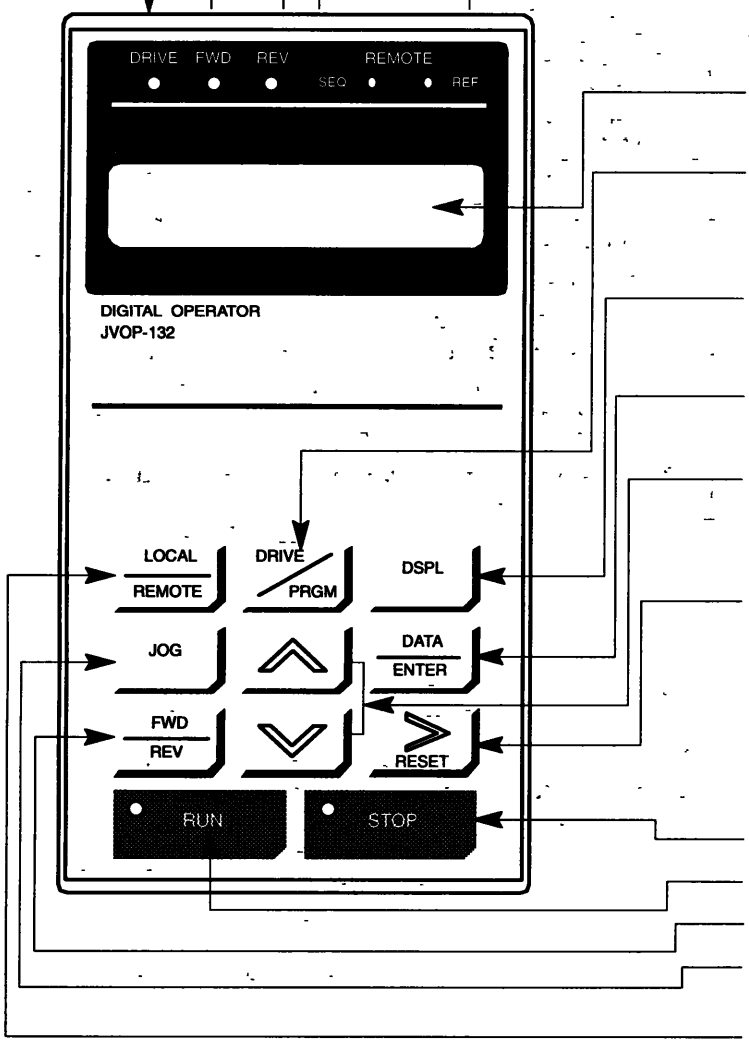
Table 15 Auto-tuning Warning Messages

| Warning Message | Contents | Description |
|---|---|---|
| End20 | Overload during tuning | During tuning, torque reference has exceeded 20% |

for more: efesotomasyon - Yaskawa drive

# 5 SETTING OPERATION CONDITIONS

## 5.1 DIGITAL OPERATOR KEY DESCRIPTION




**Mode Indicator LEDs**
All LEDs blink if an error occurs in the drive mode

Drive Mode Display
Lights when the drive mode is selected - OFF when the program mode is selected

Rotating Direction Display
FWD Lights when forward run command is input
REV Lights when reverse run command is input

Remote Mode
Operation mode using the signals input from the control circuit terminals or option cards
SEQ Lights when the remote mode is selected for the run command
REF Lights when the remote mode is selected for the speed reference

Display
Displays set values of each function or monitoring values such as speed and output current (5 characters)

Mode Selection Key
Selects the drive mode and the program mode alternately Selection of a mode is possible even during operation When the drive mode is selected, the DRIVE LED lights

Display Selection Key
Selects the data to be displayed in predetermined sequence Display sequence is explained in Para 5 3 "DRIVE MODE"

Read/Write Key
Displays the set values of the constants. Pressing this key again after setting a value enters it

Numeric Value Change Keys
Changes set values or constant numbers
∧ : Increment key
∨ : Decrement key

Digit Selection Key
Selects the digit of a set value to be changed The selected digit blinks This key is also used as the reset key if a fault is displayed

**Operation Command Keys**

Used to operate the inverter by the digital operator They are valid only in the drive mode

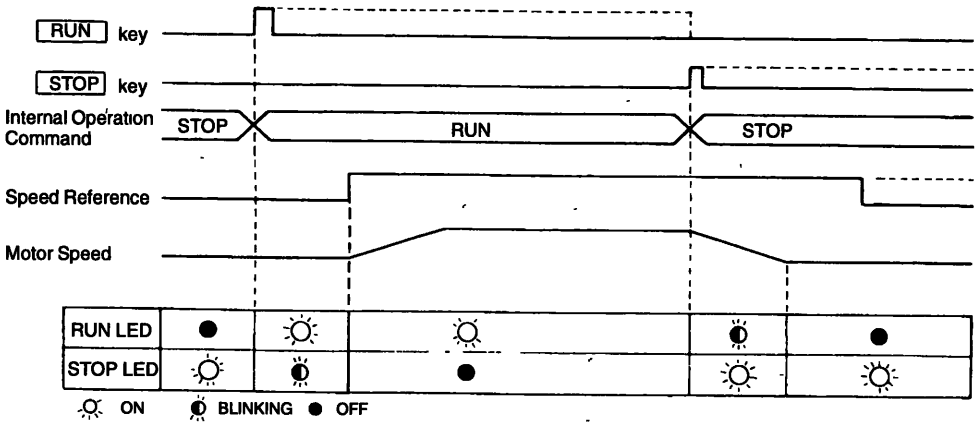
| | | |
|---|---|---|
| * STOP | : | Red LED lights when STOP is pressed |
| * RUN | : | Red LED lights when RUN is pressed |
| FWD/REV | | Selects forward or reverse run |
| JOG | : | Jog run is possible while JOG key is held pressed |

Operation Mode Selection Key
Selects the REMOTE and LOCAL (digital operator) mode alternately

for more: efesotomasyon - Yaskawa drive



* RUN or STOP LED changes in accordance with the following operations.




Note : The RUN and STOP LED light, blink, and go OFF according to the run status.

Fig. 27 Digital Operator Key Description

## 5.2 DIGITAL OPERATOR MODE SELECTION

The digital operator of the VS-676H5 has the two operation modes, drive mode and program mode.

Mode selection is made by the mode selection key. Even during operation, it is possible to change the mode. The inverter keeps operating even if the mode is changed to the program mode during running to set or display the constant values. There are constants for which setting is not allowed during running. For these constants, refer to Appendix 6, "TABLE OF CONSTANTS".

When the run command is input while the inverter is at a stop with the program mode selected, the inverter does not start operating.

Drive mode: Inverter operation is possible. Displays monitor values, fault trace or fault log.

Program mode: Sets/reads constants.

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## 5.3 DRIVE MODE

The inverter can operate in this mode. Run data display and fault display are possible.

Each time the display selection key is pressed, the item to be monitored is changed. At an occurrence of a fault, the digital operator enters the fault display mode automatically. The display mode returns to the one selected previously by pressing the [RESET] key.

Table 16 Typical Operation in Drive Mode

| Description | Key Operation | Digital Operator Display |
|---|---|---|
| Power ON*1 | | P00.00 |
| Speed Reference*2 | DSPL | 0.00 |
| Motor Speed | DSPL | 0.00A |
| Output Current | DSPL | 0.0u |
| Output Voltage*3 | DSPL | U1-01 *5 |
| U Constants*4 | DSPL | |

*1 · The first item to be displayed after power ON can be selected from speed reference, motor speed, output current, and output voltage by setting an appropriate value for O1-02.

*2 · A speed reference can be set by using the numerical value change keys and digit selection key.

*3 Instead of the output voltage, required U1 constant can be displayed by setting the appropriate value corresponding to the U constant to be displayed for O1-01.

*4 · Select the U constant to be displayed by using the numerical value change keys and digit selection key

*5 : The U constant selected previously is displayed

for more: efesotomasyon - Yaskawa drive



### (1) Changing the Speed Reference Value

(Operation Example)
Changing the speed reference value from 0.00% to 100.00% in the LOCAL and drive modes.

Table 17 Changing the Speed Reference Value

| Description | Key Operation | Digital Operator Display | Remarks |
|---|---|---|---|
| • To display the speed reference value | DSPL | P 0.00 | |
| • To change the value to "100.00%" | ∨ ∧ RESET | P 100.0 | The value to be set blinks |
| • To write the set value | DATA ENTER | P 100.0 | Display stops blinking for 2 seconds |
| | | P 100.0 | Display starts blinking again |

### (2) Monitor Display

(Operation Example)
Monitoring DC bus voltage (U1-07) during speed reference display.

Table 18 Typical Monitor Display Operation

| Description | Key Operation | Digital Operator Display | Remarks |
|---|---|---|---|
| • During the display of speed reference | | P 100.0 | |
| • To display the U constant | DSPL | U1-01 | The U constant selected previously is displayed |
| • To select U1-07 | ∨ ∧ RESET | U1-07 | |
| • To display monitored value | DATA ENTER | Pn310 | |
| • To return to U1-07 display | DSPL | U1-07 | |
| • To return to speed reference display | DSPL | P 100.0 | |

for more: efesotomasyon - Yaskawa drive

## 5.4 SETTING THE INVERTER OPERATION ENVIRONMENT

Access level to set/read constants and control mode (V/f control, vector control) can be set as indicated below. Make sure to set the environment setting constants before using the VS-676H5.

The following table shows the major environment setting constants.

Table 19 Environment Setting Constants

| Constant No. | Name | Description |
|---|---|---|
| A1-01 | Access level<br>(can be changed during run) | 0 For monitoring<br>(To set/read A1-01 and read U constants for quick-start level)<br>2 QUICK-START<br>(To set/read the constants necessary for simplified operation)<br>3 BASIC<br>(To set/read the basic constants)<br>4 ADVANCED<br>(To set/read the application constants) |
| A1-02 | Control mode selection | 0 V/f control<br>1 V/f control with PG feedback<br>2 Open loop vector<br>3 Flux vector<br>4 EMS control |
| A1-03 | Initialization | 2220 Constants initialization |
| A1-04 | Password 1 (for inputting) | Input password 1 |
| A1-05 | Password 2 (for setting) | Input password 2 (set/read is possible only in the MEMOBUS) |

NOTE

If password 1 ≠ password 2, setting is disabled for A1-01 to A1-03. For these constants, only reading is permitted and the environment setting constants are locked.

for more: efesotomasyon - Yaskawa drive



### (1) Changing the Control Mode

(Operation Example)
Changing the operation mode from the open loop vector to the V/f control

Table 20 Typical Control Mode Change Operation

| Description | Key Operation | Digital Operator Display | Remarks |
|---|---|---|---|
| • During the display of speed reference | | P 100.0 | |
| • To change the mode to the program mode | DRIVE/PRGM | | The constant number selected previously is displayed |
| • To select A1-02 | ∨ ∧ | A 1-02 | |
| • To display the set value | DATA/ENTER | 02 | |
| • To change the control mode | ∨ ∧ >/RESET | 01 | |
| • To write the set value | DATA/ENTER | | |
| | | End | Display for 0 5 sec |
| | | 01 | Returns to the display before writing |
| • To return to the display of constant number | DSPL | A 1-02 | |
| • To return the mode to the drive mode | DRIVE/PRGM | P 100.0 | |

for more: efesotomasyon - Yaskawa drive

## 5.5 SETTING AND READING CONSTANTS (PROGRAM MODE)

The constants of the VS-676H5 are composed of group symbol, function number and serial umber of each function. Use numeric value change keys to change the group and function display and select one by the [DATA/ENTER] key. For details of the constants, refer to Appendix 6, "TABLE OF CONSTANTS".

Constant No.

□ □ - 1 5

- 1 5: Serial No. for each function
- □ □: Function No.
- □: Group symbol
  - U: Monitor constants (only reading is enabled.)
  - A: Environment setting constants
  - B: Application-related constants
  - C: Adjustment constants
  - D: Speed reference related constants
  - E: Motor related constants
  - F: Option related constants
  - H: Control circuit terminal related constants
  - L: Protection related constants
  - O: Digital operator related constants
  - T: Auto-tuning related constants (not stored)

for more: efesotomasyon - Yaskawa drive



(Operation Example 1)
Changing the deceleration time (C1-02) from 10.0 seconds to 20.0 seconds during the display of speed reference when QUICK-START is selected (A1-01 = 2).

Table 21 Typical Constant Data Change Operation (QUICK-START Selected)

| Description | Key Operation | Digital Operator Display | Remarks |
|---|---|---|---|
| • During the display of speed reference | | P 10.0.0 | |
| • To change the mode to the program mode | DRIVE / PRGM | | The constant number selected previously is displayed |
| • To select C1-02 | ∨ ∧ | C 1-02 | |
| • To display the present setting | DATA ENTER | 00 10.0 | |
| • To change the set value | ∨ ∧ RESET | 00 20.0 | |
| • To write the set value | DATA ENTER | End | Display for 0.5 sec |
| | | 00 20.0 | |
| • To return to the display of constant number | DSPL | C 1-02 | Returns to the display before writing |
| • To return the mode to the drive mode | DRIVE / PRGM | P 10.0.0 | |

NOTE

When the QUICK-START is selected, to select the constant number of U constants, use the [RESET] key to select the digit to be changed and select the constant number by pressing the numeric value change keys.

for more: efesotomasyon - Yaskawa drive

(Operation Example 2)
Changing the deceleration time (C1-02) from 10.0 seconds to 20.0 seconds during the display of speed reference when BASIC or ADVANCED is selected.

Table 22 Typical Constant Data Change Operation (BASIC or ADVANCED Selected)

| Description | Key Operation | Digital Operator Display | Remarks |
|---|---|---|---|
| • During the display of speed reference | | P 100.0 | |
| • To change the mode to the program mode | DRIVE/PRGM | | The constant number selected previously is displayed |
| • To select C1-02 | ∨ ∧ RESET | C 1-02 | |
| • To display the present setting | DATA/ENTER | 10.0 | |
| • To change the set value | ∨ ∧ RESET | 20.0 | |
| • To write the set value | DATA/ENTER | End | Display for 0 5 sec |
| | | 20.0 | Returns to the display before writing |
| • To return to the display of constant number | DSPL | C 1-02 | |
| • To return the mode to the drive mode | DRIVE/PRGM | P 100.0 | |

for more: efesotomasyon - Yaskawa drive



# 6 OPERATION

## ⚠ WARNING

- Only turn ON the input power supply after replacing the front cover. Do not remove the cover while current is flowing.
  Failure to observe this warning can result in an electrical shock.
- When the retry function (L5-02) is selected, do not approach the inverter or the load, since it may restart suddenly after being stopped.
  (Construct machine system, so as to assure safety for personnel, even if the inverter should restart.)
  Failure to observe this warning can result in personal injury.
- Since the stop button can be disabled by a function setting, install a separate emergency stop switch.
  Failure to observe this warning can result in personal injury.
- If an alarm is reset with the operation signal ON, the inverter restarts automatically. Only reset the alarm after verifying that the operation signal is OFF.
  Failure to observe this warning can result in personal injury.

## ⚠ CAUTION

- Never touch the heatsink or discharging resistor since the temperature is very high.
  Failure to observe this caution can result in harmful burns to the body.
- Since it is easy to change operation speed from low to high speed, verify the safe working range of the motor and machine before operation.
  Failure to observe this caution can result in personal injury and machine damage.
- Install a holding brake separately if necessary.
  Failure to observe this caution can result in personal injury.
- Do not change signals during operation.
  The machine or the inverter may be damaged.
- All the constants of the inverter have been preset at the factory. Do not change the settings unnecessarily.
  The inverter may be damaged. For supply voltage, follow Para. 4.3.

This chapter describes the basic operation procedures of the VS-676H5.

for more: efesotomasyon - Yaskawa drive

## 6.1 TEST RUN

### (1) Digital Operator Display at Power-up

When the system is ready for operation, turn ON the power supply. Verify that the inverter powers up properly. If any problems are found, turn OFF the power supply immediately. The digital operator display illuminates as shown below when turning the power supply ON.

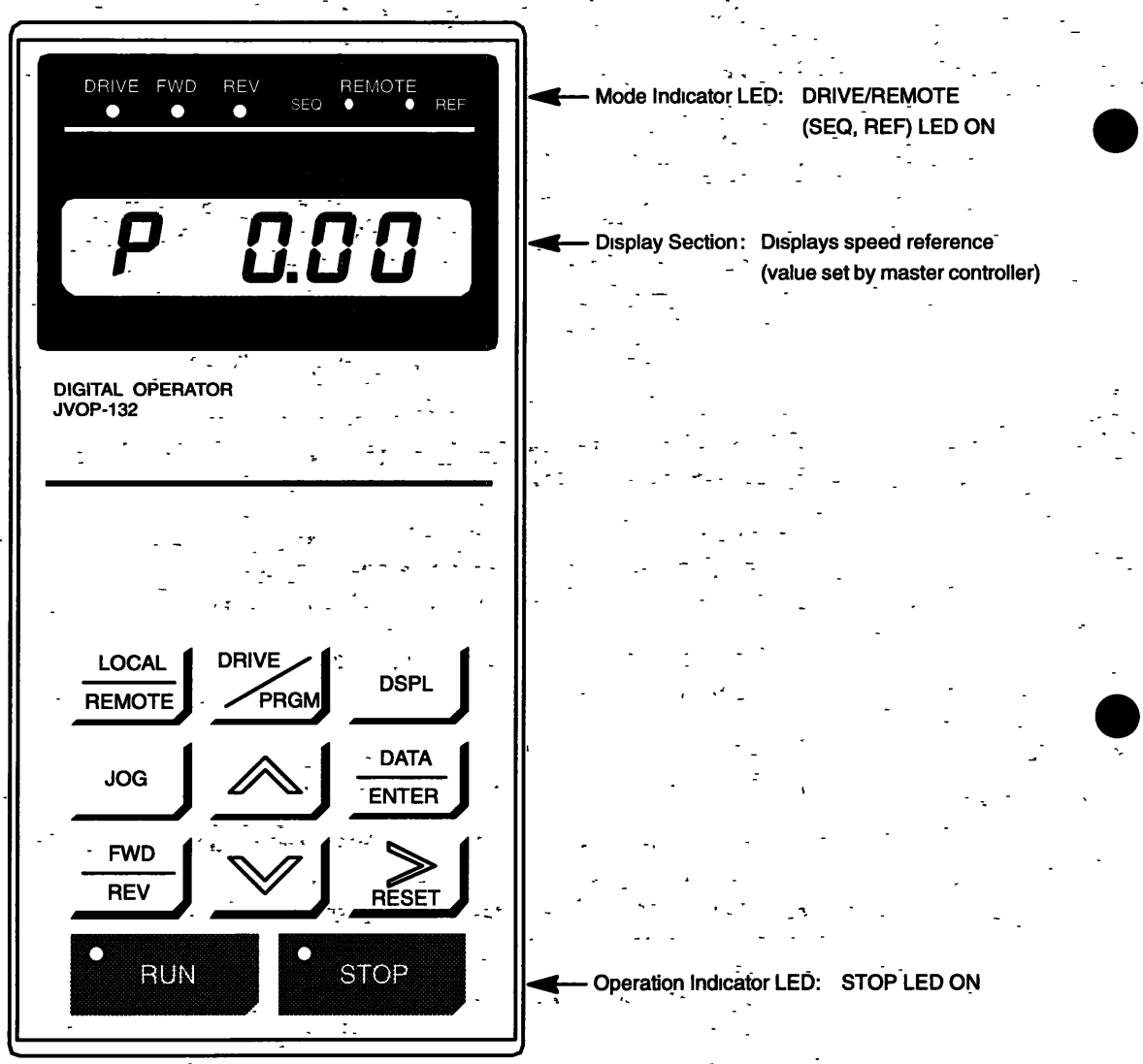



Fig. 28 Digital Operator Display at Power-up

for more: efesotomasyon - Yaskawa drive



### (2) Operation Check Points

Check the following items during operation.

- ☐ Motor rotates smoothly.
- ☐ Motor rotates in the correct direction.
- ☐ Motor does not have abnormal vibration or noise.
- ☐ Acceleration and deceleration are smooth.
- ☐ The current matching the load flows.
- ☐ Status indicator LEDs and digital operator display are correct.

### (3) Example of Basic Operation

#### (a) Operation by Digital Operator

The diagram below shows a typical operation pattern using the digital operator.

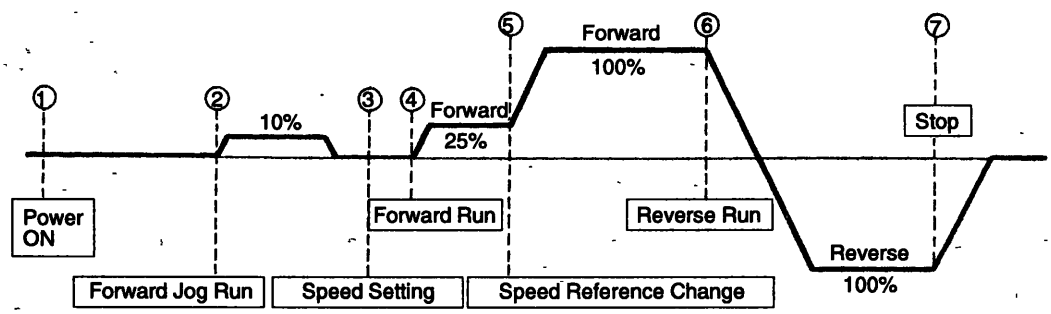
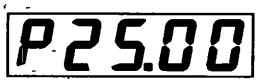
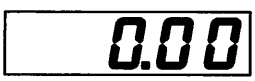
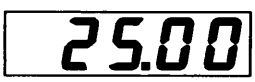



Fig. 29 Operation Sequence by Digital Operator

for more: efesotomasyon - Yaskawa drive

Table 23 Typical Operation by Digital Operator

| Description | Key Sequence | Digital Operator Display |
|---|---|---|
| ① Power ON<br>↓<br>· Displays speed reference value.<br>Operation Condition Setting<br>· Select LOCAL mode.<br>↓ | LOCAL / REMOTE | <br>REMOTE LED OFF<br>(SEQ, REF)<br>FWD LED lights. |
| ② Forward Jog Run<br>(10%)<br>· JOG run procedure<br>(Runs while depressing JOG key.)<br>↓ | JOG |  |
| ③ Speed Setting<br>· Change reference value. | | <br>Digit to be changed blinks. |
| | Change the value by pressing<br>▼ ▲ RESET |  |
| · Write-in set value. | DATA / ENTER | <br>(Stops blinking for 2 sec.) |
| · Select motor speed monitor display. | DSPL |  |
| ④ Forward Run<br>· Forward run (25%)<br>↓ | RUN | <br>RUN LED lights.<br>RUN |

for more: efesotomasyon - Yaskawa drive



Table 23 Typical Operation by Digital Operator (Cont'd)

| Description | Key Sequence | Digital Operator Display |
|---|---|---|
| ⑤ Speed Reference Value Change (25% → 100%)<br>· Select frequency reference value display. | DSPL | P25.00 |
| · Change set value. | Change the value by pressing RESET ≫ ∨ ∧ | P 10.0.0<br>Digit to be changed blinks. |
| · Write-in set value. | DATA ENTER | P 100.0<br>(Stops blinking for 2 sec.) |
| · Select motor speed monitor display. | DSPL | 25.00 ↓ 100.0 |
| ⑥ Reverse Run<br>· Switch to reverse run. | FWD REV | - 100.0<br>REV LED lights. |
| ⑦ Stop<br>· Decelerates to a stop. | STOP | 0.00<br>STOP LED lights. (RUN LED blinks during deceleration.)<br>STOP |

for more: efesotomasyon - Yaskawa drive

(b) Operation by Control Circuit Terminal Signal

The diagram below shows a typical operation pattern using the control circuit terminal signals.

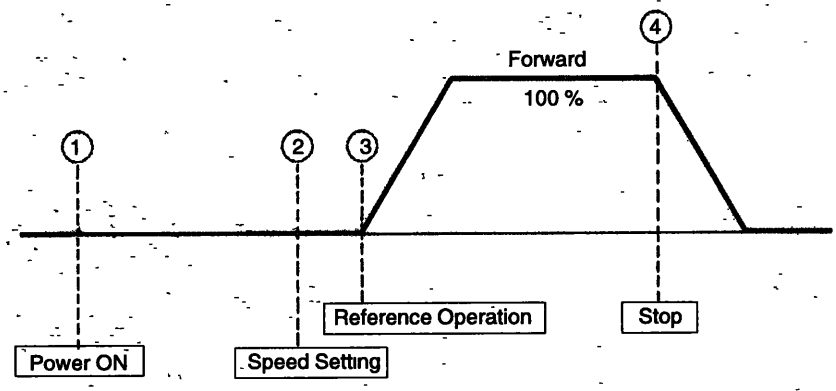



Fig. 30 Operation Sequence by Control Circuit Terminal Signal

for more: efesotomasyon - Yaskawa drive



Table 24 Typical Operation by Control Circuit Terminal Signal

| Description | Key Sequence | Digital Operator Display |
|---|---|---|
| ① Power ON | | |
| Program mode selection | DRIVE/PRGM | |
| Setting speed reference from the control circuit terminal<br>Setting "B1-01 = 1" | ∨ ∧ | b1-01 |
| | DATA/ENTER | 03 |
| | ∨ ∧ RESET | 01 |
| | DATA/ENTER | End |
| | | 01 |
| | DSPL | b1-01 |
| Setting run command from the control circuit terminal<br>Setting "B1-02 = 1" | ∨ ∧ | b1-02 |
| | DATA/ENTER | 03 |
| | ∨ ∧ RESET | 01 |
| | DATA/ENTER | End |
| | | 01 |
| | DSPL | b1-02 |
| Drive mode selection | DRIVE/PRGM | P 0.00<br>Displays speed reference value. |

for more: efesotomasyon - Yaskawa drive

Table 24 Typical Operation by Control Circuit Terminal Signal (Cont'd)

| Description | Key Sequence | Digital Operator Display |
|---|---|---|
| ② Speed Setting<br>· Input speed reference voltage from control circuit terminal 9CN-4 and verify the input value by the digital operator. | | P 100.0<br>Reference voltage. 10 V |
| Changing to motor speed display | DSPL | 0.00 |
| ③ Forward Run<br>· Close the control circuit terminals 9CN-17 to 9CN-25 to perform forward run. | | 100.00<br>RUN LED lights. FWD LED lights.<br>RUN |
| ④ Stop<br>· Open the control circuit terminals 9CN-17 to 9CN-25 to stop operation. | | 0.00<br>STOP LED lights. (RUN LED blinks during deceleration.)<br>STOP |

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# 7 MAINTENANCE AND INSPECTION

## ⚠ WARNING

- Never touch high-voltage terminals in the inverter.
  Failure to observe this warning can result in an electrical shock.
- Replace all protective covers before powering up the inverter. To remove the cover, make sure to shut OFF the molded-case circuit breaker.
  Failure to observe this warning can result in an electrical shock.
- Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main circuit power supply is turned OFF.
  The capacitors are still charged and can be dangerous.
- Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.
  [Remove all metal objects (watches, bracelets, etc.) before operation.]
  (Use tools which are insulated against electrical shock.)
  Failure to observe this warning can result in an electrical shock.

## ⚠ CAUTION

- The control PC board employs CMOS ICs. Do not touch the CMOS elements.
  They are easily damaged by static electricity.
- Do not connect or disconnect wires or connectors while power is applied to the circuit.
  Failure to observe this caution can result in personal injury.

This chapter describes basic maintenance and inspection procedures for the VS-676H5.

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## 7.1 PERIODIC INSPECTION

Perform the inspection as indicated below to ensure reliable operation of VS-676H5 for a prolonged time by preventing faults.

Before servicing, turn OFF the main circuit power and be sure that the CHARGED LED is OFF.

Table 25 Periodic Inspection

| Component | Check | Corrective Action |
|---|---|---|
| External Terminals, Unit Mounting Bolts, Connectors, etc. | Loose screws | Tighten |
| | Loose connectors | Tighten. |
| Heatsink | Build-up of dust and dirt | Blow with dry compressed air of $39.2 \times 10^4$ to $58.8 \times 10^4$ Pa (4 to 6kg cm$^2$) pressure. |
| Printed Circuit Board | Accumulation of conductive dust or oil | Blow with dry compressed air of $39.2 \times 10^4$ to $58.8 \times 10^4$ Pa (4 to 6kg·cm$^2$) pressure If dust and oil cannot be removed, replace the board |
| Cooling Fan | For abnormal noise and vibration Whether the cumulative operation time exceeds 20,000 hours or not | Replace the cooling fan |
| Power Elements | Accumulation of dust and dirt | Blow with dry compressed air of $39.2 \times 10^4$ to $58.8 \times 10^4$ Pa (4 to 6kg·cm$^2$) pressure |
| Smoothing Capacitor | Discoloration or odor | Replace the capacitor or inverter unit |

## 7.2 PARTS REPLACEMENT SCHEDULE (GUIDELINES)

Replace the following parts periodically, for a long, safe, trouble free working life of VS-676H5.

Table 26 Parts Replacement Schedule

| Parts | Interval (Approx.) | Remarks |
|---|---|---|
| Cooling Fan | 2 to 3 years | Replace with new one. |
| Smoothing Capacitor | 5 years | Replace with new one. (Decided after inspection.) |
| Breakers or Relays | — | Decided after inspection. |
| Fuse | 10 years | Replace with new one. |
| Aluminum Electrolytic Capacitor on PC Board | 5 years | Replace with new one. (Decided after inspection.) |

NOTE

Operating conditions are as follows:

Ambient temperature : 30°C yearly average
Load factor : 80% or below
Operation rate : 20 hours or below /day

for more: efesotomasyon - Yaskawa drive



# 8 TROUBLESHOOTING

This chapter describes the inverter fault display and the fault contents caused by motor/machine malfunctions and the corrective actions to be taken.

## 8.1 FAULT DIAGNOSIS AND CORRECTIVE ACTIONS

(1) When the VS-676H5 detects a fault, it activates the fault contact output to turn ON or blink the LEDs on the control card as indicated in Table27. Details of faults can be checked by connecting the digital operator to 1CN. Check the cause in the tables in the following pages and take the corrective actions by referring to Table 28, "Fault Diagnosis and Corrective Actions".

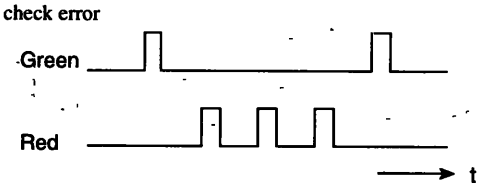
(2) If the inspections or corrective actions described cannot solve the problem, contact your YASKAWA representative immediately.

(3) To restart, turn ON the reset input signal or depress [>RESET] key or shut OFF the main circuit power supply once, to reset the stop status.

Table 27 Status Indication by LEDs

| Green | Red | Description |
|---|---|---|
| OFF | OFF | Base block status (excluding major fault) |
| ON | – | Running |
| Blinking | – | The motor does not run although the run command is input<br>Speed reference < E1-09 (V/f control without PG, V/f control with PG, vector control without PG)<br>External base block signal is input |
| – | Blinking | Minor fault |
| – | ON | Major fault |
| ON | ON | Flash write-in mode |
| During one blinking cycle (Note) | Blinks 1 time | Watchdog error (Control card error) |
| | Blinks 2 time | RAM check error (Control card error) |
| | Blinks 3 time | Sum check error (Control card error) |
| | Blinks 4 time | Illegal command (Control card error) |
| | Blinks 5 time | Slot illegal command (Control card error) |
| | Blinks 6 time | CPU bus error (Control card error) |
| | Blinks 7 time | DMA bus error (Control card error) |

(Note) Example Sum check error



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## Table 28 Fault Diagnosis and Corrective Actions

| Fault Display | Description | Details | Corrective Action | Rank* (Standard Value) |
|---|---|---|---|---|
| Uu1 | Main circuit undervoltage (PUV) | Undervoltage in the direct current main circuit during running<br>Detection level<br>200 V class Approx 190 V or less<br>400 V class Approx 380 V or less | Check the power supply wiring<br>Correct the line voltage | A |
| Uu2 | Control circuit undervoltage (CUV) | Undervoltage in the control circuit during running | | A |
| Uu3 | Pre-charge contactor open | The pre-charge contactor opened during running | | A |
| Uu4 | Power unit control supply undervoltage | Undervoltage in the power unit control supply during running | | A |
| Uu | Momentary power loss | The main circuit direct current voltage fell below the PUV level<br>The pre-charge contactor opened<br>The control power source fell below the CUV level | — | B |
| GF | Ground fault (GF) (Earth fault) | Inverter output grounding current exceeded 50% of inverter rated current | Check that motor insulation has not deteriorated<br>Check that connection between inverter and motor is not damaged | A |
| oC | Overcurrent (OC) | The inverter output current exceeded the OC level | Check the motor coil resistance<br>Extend the accel/decel time<br>Check the motor insulation<br>Multi-meter check | A |
| ou | Overvoltage (OV) | The main circuit direct current voltage exceeded the OV level<br>Detection level<br>200 V class Approx 400 V<br>400 V class Approx 800 V | Extend the deceleration time, add braking circuit | A |
| oS | Overspeed (OS) | The motor speed exceeded the overspeed level | Check the load | A |
| dEu | Speed deviation (DEV) | The deviation of the speed reference and speed feedback exceeded the regulation level | Check the load | A |
| PGo | PG open circuit (PGO) | The PG line is broken | Check the PG line<br>Check the condition of the motor lock or the load | A |
| rH | Thermistor open circuit | Motor temperature detection thermistor wiring is broken | Check the thermistor | A |
| PF | Excessive ripple in DC bus bar voltage | Inverter input power supply has open-phase<br>Large unbalance in input voltage | Check the line voltage<br>Re-tighten the input terminal screws | A |
| LF | Output open-phase | Inverter output has open-phase | Check the output wiring<br>Check the motor impedance<br>Re-tighten the output terminal screws | A |

for more: efesotomasyon - Yaskawa drive



Table 28 Fault Diagnosis and Corrective Actions (Cont'd)

| Fault Display | Description | Details | Corrective Action | Rank* (Standard Value) |
|---|---|---|---|---|
| SC | Load short-circuit (SC) | Inverter output (load) is short-circuited | Check the motor coil resistance<br>Check the motor insulation | A |
| UnbC | Current unbalance | Output current of individual power units became unbalanced (Detects models of 600kW or larger) | Check the wiring | A |
| oH4 | Converter overheat | Converter fin temperature exceeds 105℃ (Detects models of 600kW or larger) | Check the fan and the ambient temperature | A |
| PUF | Fuse blown (FU) | The output transistors were damaged<br>The direct current circuit fuse is blown | Check for damaged transistor, load side short circuit, grounding, etc | A |
| oH | Heatsink overheat warning | The transistor heatsink temperature exceeded the allowable value | · Check the heatsink and ambient temperature<br>Check the filter and fan | B |
| oH1 | Heatsink overheat | The transistor heatsink temperature exceeded the allowable value | | A |
| oH3 | Motor overheat | The motor temperature exceeded the allowable value | Reduce the load<br>· Check the ambient temperature. | A |
| oL1 | Motor overload | Inverter output exceeded the motor overload level | · Reduce the load | A |
| oL2 | Inverter overload | Inverter output exceeded the inverter overload level | Reduce the load<br>Extend the acceleration/deceleration time | A |
| oL3 | Overtorque 1 | Torque exceeded the overtorque detection level | Check the load | A/B |
| oL4 | Overtorque 2 | Torque exceeded the overtorque detection level 2 | | A/B |
| rr | Braking transistor failure | The braking transistor has failed. | Replace the inverter. | A |
| rH | Braking resistor unit overheat | The braking resistor unit temperature has exceeded the allowable value.<br>(Protects only inverter built-in type) | Reduce the regenerative load | A |
| EF0 | External fault by master controller | External fault was input from the master controller | External fault, defined by user specification, was input from the master controller Find the external fault items from the I/O list and correct it. | A/B |
| EF3 | External fault at terminal 3 (9CN-19) | Fault occurred in the external control circuit | Check the condition of the input terminal<br>If the LED lights when terminal is not connected, replace the inverter | A |
| EF4 | External fault at terminal 4 (9CN-20) | | | A |
| EF5 | External fault at terminal 5 (9CN-21) | | | A |
| EF6 | External fault at terminal 6 (9CN-22) | | | A |

for more: efesotomasyon - Yaskawa drive

Table 28 Fault Diagnosis and Corrective Actions (Cont'd)

| Fault Display | Description | Details | Corrective Action | Rank* (Standard Value) |
|---|---|---|---|---|
| EF7 | External fault at terminal 7 (9CN-23) | Fault occurred in the external control circuit | Check the condition of the input terminal<br>If the LED lights when terminal is not connected, replace the inverter | A |
| EF8 | External fault at terminal 8 (9CN-24) | | | A |
| SE 10 | Motor change error | Motor was changed in program mode, EMS control mode, or during motor running | Make sure that the digital operator is in the drive mode<br>Make sure that the control mode is not EMS control<br>Make sure that the motor is not running | B |
| CPF00 | Control circuit fault 1 | Transmission between the inverter and digital operator cannot be established until 5 seconds after supplying power<br>MPU peripheral element check faulty (at power–up ) | Insert the digital operator connector again<br>Check the control circuit wiring<br>Replace the control card | A/B |
| CPF01 | Control circuit fault 2 | Transmission between the inverter and digital operator is established once after supplying power, but later transmission faults continue three times for a duration of more than 2 seconds each time<br>MPU peripheral element check fault (at power–up) | Insert the digital operator connector again<br>Check the control circuit wiring<br>Replace the control card | A/B |
| CPF02 | Baseblock circuit fault (CPF02) | Inverter control unit fault | Replace the control card | A |
| CPF03 | EEPROM fault (CPF03) | | | A |
| CPF04 | CPU internal A/D converter fault | | | A |
| CPF05 | CPU external A/D converter fault | | | A |
| CPF06 | Option card connection fault | The option card is not installed correctly | Install the option card again | A |
| CPF07 | PWM timer fault | Inverter control unit fault (Detects models of 600kW or larger ) | Replace the control card | A |
| CPF08 | Common RAM BCC error | | | A |
| CPF09 | Cross-diagnose fault between common RAMs | | | A |
| CPF10 | Common RAM initial check fault | | | A |
| CPF21 | Transmission control card hardware fault | Transmission control card hardware check error (at power–up) | Replace the control card | A |
| CPF22 | Transmission control card code No error | Transmission control card which is not applicable for the inverter is connected | Replace the control card with applicable one | A |
| CPF23 | Cross-diagnose fault between master controller and control card | Diagnosis data has not been updated for more than 0 2 seconds between the transmission control card and the control card | Replace the transmission control card | A |

for more: efesotomasyon - Yaskawa drive



Table 28 Fault Diagnosis and Corrective Actions (Cont'd)

| Fault Display | Description | Details | Corrective Action | Rank* (Standard Value) |
|---|---|---|---|---|
| Err | EEPROM writing fault (ERR) | EEPROM internal data did not match when initializing the constant | Replace the control card | B |
| bUS | CP-216 Transmission error | CP–216 Transmission error continued for 2 5 seconds | Check transmission devices and transmission signals | A/B |
| bASE | Base test mode fault | During the test, main circuit DC power supply voltage exceeded 20 V | Lower the main circuit DC voltage | C |
| oPE01 | kVA selection fault | Inverter capacity selection fault | Check and set the constant data | C |
| oPE02 | Constant setting range fault | Constant data is out of range | Check the constant data settings | C |
| oPE03 | Multi-function contact input selection fault | In H1-01 to H1-06 settings<br>Not set in the ascending order<br>The same values are set except for F and FF | Check the function selection | C |
| oPE05 | Option reference selection fault (OPE05) | C-option is not connected although speed reference from C-option is selected<br>C-option is not connected although run command from C-option is selected | Check and set the constant data.<br>Connect the C-option | B |
| oPE06 | Control mode selection fault | PG card is not connected during flux vector control or V/f with PG feedback | Connect PG card | B |
| oPE10 | V/f data setting fault (E1-04 to E1-10) | When the settings of E1-04 to E1-10 do not satisfy the following conditions:<br>E1-04 ≧ E1-11 ≧ E1-06 > E1-07 ≧ E1-09 | Check the constants. | C |
| oPE11 | Carrier frequency constant setting fault | Any of the following constant setting is not correct<br>Carrier frequency upper limit (C6-01) > 5 Hz<br>Carrier frequency lower limit (C6-02) ≦ 5 kHz<br>Carrier frequency proportional gain (C6-03) > 6<br>(C6-01) < (C6-02) | Check and set the constant data | C |
| oPr | Digital operator fault | In the digital operator run command mode, the digital operator circuit is open (Detected only when O2–06 is set to 1 | Check the wiring and connectors<br>Replace the control card | A |

* The ranks are classified as follows:

Rank A : Major fault (Motor coasts to stop, digital operator indication lights, and fault contact is output.)

Rank B : Fault [Operation continues, digital operator indication blinks, no fault contact is output, and minor fault contact is output (when multi-function output is selected).]

Rank C : Warning (Operation cannot be performed, digital operator indication lights, no fault contact is output, no minor fault contact is output.)

for more: efesotomasyon - Yaskawa drive

## 8.2 MOTOR FAULTS AND CORRECTIVE ACTIONS

(1) If any of the faults shown in 29 occurs in the motor, check the cause and provide the relevant corrective action.

(2) If these inspections and corrective actions cannot solve the problem, contact your YASKAWA representative immediately.

Table 29 Motor Faults and Corrective Actions

| Fault | Check Point | Corrective Action |
|---|---|---|
| Motor does not rotate | Power supply voltage applied to power supply terminals R, S, T? Is CHARGE LED ON? | · Turn ON power supply<br>· Turn OFF power supply, and then ON again<br>· Check power supply voltage<br>· Make sure terminal screws are tight |
| | Use rectifier type voltmeter to test Voltage output to output terminals U, V, W correct? | Turn OFF power supply, then turn ON again |
| | Motor locks due to excessive load? | Reduce the load and release the lock |
| | Fault displayed in operator display? | Check troubleshooting table |
| | FWD or REV run command entered? | Check the wiring |
| | Frequency setting voltage entered? | · Correct the wiring<br>· Check frequency setting voltage |
| | Reference selection (b1–01), operation method selection(b1–02) correct? | Input the correct set value |
| Motor rotation reverses | Wiring of terminals U, V, W correct? | Match wiring to the phase order of the motor leads U, V, W . |
| | FWD and REV wiring run signals entered? | Correct the wiring |
| Motor rotates, but variable speed not available | Wiring of frequency setting circuit correct? | Correct the wiring |
| | Reference selection (b1–01), operation method selection(b1–02) correct? | With the digital operator, check the reference selecton or operation mode selection |
| | Load excessively large? | Reduce the load |
| Motor r/min too high or too low | Motor ratings (number of poles, voltage) correct? | Check motor nameplate specifications |
| | Accel/decel speed change ratio for gears, etc correct? | Check speed changer (gears, etc ) |
| | Maximum frequency set value correct? | Check the maximum frequency set value |
| | Use rectifier voltmeter Voltage between motor terminals not excessively reduced? | Check V/f characteristics values |
| Motor r/min not stable during operation | Load excessively large? | Reduce the load |
| | Load variation excessively large? | · Reduce the load variation<br>· Increase inverter motor capacity |
| | Open phase? | · Check the wiring if power supply is open phase |

for more: efesotomasyon - Yaskawa drive

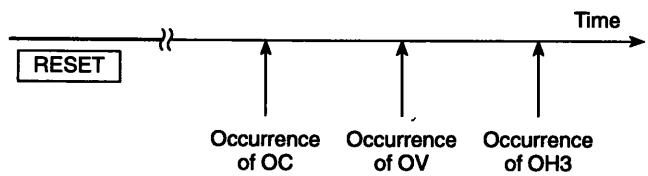


## 8.3 DISPLAY SEQUENCE OF FAULT CODES

If more than one fault occurs, up to four faults are logged in the order of occurrence (excluding CPF00 and CPF01). They are displayed in order by pressing the ∧ and ∨ keys in the drive mode by connecting the digital operator.

The record of major fault is cleared when the fault is cleared by the fault reset operation.

Example of display:




① First display — oC

② Pressing ∧ — 1 oC

③ Pressing ∧ — 2 ou

④ Pressing ∧ — 3 oH3

⑤ Pressing ∧ — 1 oC Returns to ②

for more: efesotomasyon - Yaskawa drive

## 8.4 MONITOR CONSTANTS RELATED WITH FAULTS

By using the U2 constants, it is possible to check the controlled status of the inverter at the occurrence of major faults only.

With the U3 constants, it is possible to check the contents of previous major faults only and the cumulative operation time until the occurrence of that fault (U1–13). The data are displayed for up to four faults from the latest fault. Since U2 and U3 constants are stored to the EEPROM, the stored data are retained even after the power is turned OFF.

NOTE

1. Concerning the contents of faults stored to U3–01 to U3–04, only lower three digits can be displayed since "F " is displayed in the first two digits.
   Example: CPF05 is displayed as "F F05".
2. By initialization processing called by A1–03, U2 and U3 constants are cleared.

for more: efesotomasyon - Yaşkawa drive.

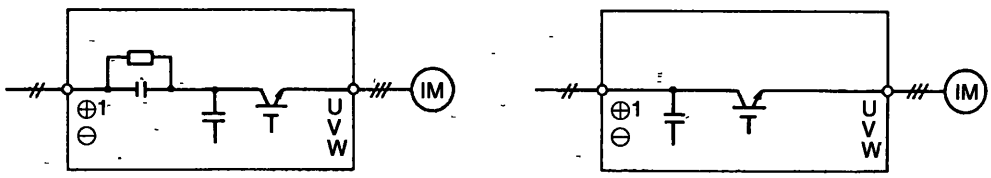


# APPENDIX 1 SPECIFICATIONS

Table A-1 200 V Class Specifications (DC Input)

| | Inverter Model CIMR-H5D ☐ | 20P4 | 20P7 | 21P5 | 22P2 | 23P7 | 25P5 | 27P5 | 2011 | 2015 | 2018 | 2022 | 2030 | 2037 | 2045 | 2055 | 2075 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Max Applicable Motor Output (*1) kW | 0 4 | 0 75 | 1 5 | 2 2 | 3 7 | 5 5 | 7 5 | 11 | 15 | 18 5 | 22 | 30 | 37 | 45 | 55 | 75 |
| Output Characteristics | Inverter Capacity kVA | 1 | 1 5 | 2 | 3 | 5 | 7 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 100 |
| | Rated Output Current A | 3 2 | 6 | 8 | 11 | 17 5 | 25 | 33 | 49 | 64 | 80 | 96 | 130 | 160 | 183 | 224 | 300 |
| | Max Output Voltage | 3-phase, 190 V (*2) | | | | | | | | | | | | | | | |
| | Rated Output Frequency | Up to 400 Hz available by programming | | | | | | | | | | | | | | | |
| Power Supply | Rated Input Voltage and Frequency | DC 270 to 330 V | | | | | | | | | | | | | | | |
| | Allowable Voltage Fluctuation | +10%, −15% | | | | | | | | | | | | | | | |
| Control Characteristics | Control Method | Sine wave PWM | | | | | | | | | | | | | | | |
| | Starting Torque | 150% / 0 r/min (150% / 1 Hz without PG) | | | | | | | | | | | | | | | |
| | Speed Control Range | 1 1000 (1 100 without PG) | | | | | | | | | | | | | | | |
| | Speed Control Accuracy | ±0 01% ( ±0 2% without PG) | | | | | | | | | | | | | | | |
| | Speed Response | 30 Hz (5 Hz without PG) (*3) | | | | | | | | | | | | | | | |
| | Torque Limit | Available (Parameter setting, 4 quadrants can be changed) | | | | | | | | | | | | | | | |
| | Torque Accuracy | ±3% (*4) | | | | | | | | | | | | | | | |
| | Torque Response | 150 Hz (20 Hz without PG) (*5) | | | | | | | | | | | | | | | |
| | Speed Control Range | 0 to 24000 r/min (2-pole motor) | | | | | | | | | | | | | | | |
| | Speed Reference Setting Resolution | Digital reference 30000/100% | | | | | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | | | | | |
| | Torque Reference Setting Resolution (Calculation Resolution) | Digital reference 10000/100% | | | | | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | | | | | |
| | Overload Capacity | 150% of rated output current for 1 minute | | | | | | | | | | | | | | | |
| | Accel/Decel Time | 0 01 to 6000 0 sec (Accel/decel time setting independently, 2 steps available) | | | | | | | | | | | | | | | |
| | Braking Torque | Approx 20% | | | | | | | | | | | | | | | |
| Protective Functions | Motor Overload Protection | Protected by thermistor (*6) or electronic thermal overload relay | | | | | | | | | | | | | | | |
| | Instantaneous Overcurrent | Motor coasts to a stop at approx 200% of inverter rated current | | | | | | | | | | | | | | | |
| | DC Bus Line Protection | Motor coasts to a stop by blown-fuse | | | | | | | | | | | | | | | |
| | Overload | 150% of rated output current | | | | | | | | | | | | | | | |
| | Overvoltage | Motor coasts to a stop if converter output voltage exceeds 410 V | | | | | | | | | | | | | | | |
| | Undervoltage | Motor coasts to a stop if converter output voltage drops to 190 V or below | | | | | | | | | | | | | | | |
| | Momentary Power Loss | Immediately stop by 15 ms and above momentary power loss (Factory setting)<br>Continuous operation during power loss less than 2 sec can be selected by operation mode | | | | | | | | | | | | | | | |
| | Heatsink Overheat | Protected by thermistor | | | | | | | | | | | | | | | |
| | Stall Prevention | Stall prevention during accel/decel and constant speed operation | | | | | | | | | | | | | | | |
| | Ground Fault | Protected by electronic circuit (Overcurrent level) | | | | | | | | | | | | | | | |
| | Power Charge Indication | Charge LED stays ON until bus voltage drops below 50 V | | | | | | | | | | | | | | | |
| Environment | Ambient Temperature | −10°C to +45°C (Enclosed wall-mounted type) | | | | | | | | | | | | | | | |
| | Humidity | 90% RH or less (Non-condensing) | | | | | | | | | | | | | | | |
| | Storage Temperature | −20°C to +60°C (Not frozen) | | | | | | | | | | | | | | | |
| | Location | Indoor (protected from corrosive gases and dust) | | | | | | | | | | | | | | | |
| | Elevation | 1000 m or less | | | | | | | | | | | | | | | |
| | Vibration | 9 8 m/s$^2$ (1G) at 10 to less than 20 Hz, up to 2 m/s$^2$ (0 2G) at 20 to 50 Hz | | | | | | | | | | | | | | | |

*1 Based on a YASKAWA standard 4-pole motor for max applicable motor output
*2 Output voltage in the vector control mode (300 V DC input)
*3 Response when ratio of inertia between motor and load is 1 1
*4 To achieve this value tests are required by actually connecting to a motor
*5 Electric torque response
*6 Valid for the motor with built-in thermistor




CIMR-H5D20P4 - 27P5
CIMR-H5D2030 - 2075

CIMR-H5D2011 - 2022

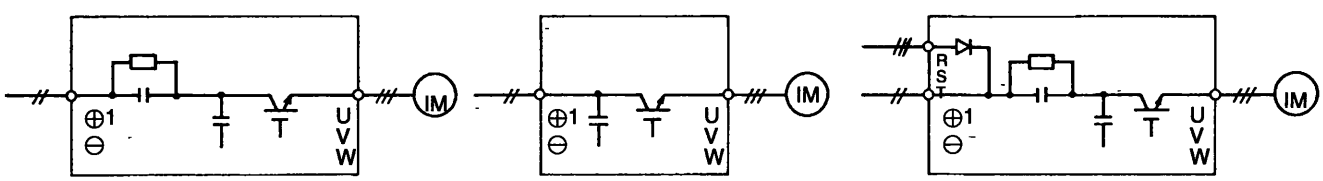
Fig. A-1 Main Circuit Configuration (200 V Class DC Input)

for more: efesotomasyon - Yaskawa drive

## Table A-2 400 V Class Specifications (DC Input)

| | Inverter Model CIMR-H5D□ | 40P4 | 40P7 | 41P5 | 42P2 | 43P7 | 45P5 | 47P5 | 4011 | 4015 | 4018 | 4022 | 4030 | 4037 | 4045 | 4055 | 4075 | 4110 | 4160 | 4185 (*7) | 4220 (*7) | 4300 (*7) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max Applicable Motor Output (*1) kW | | 0.4 | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 110 | 160 | 185 | 220 | 300 |
| Output Characteristics | Inverter Capacity kVA | 1 | 1.5 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 | 140 | 200 | 250 | 300 | 400 |
| | Rated Output Current A | 1.8 | 3.4 | 4.8 | 6.2 | 8 | 14 | 18 | 27 | 34 | 41 | 48 | 65 | 80 | 96 | 128 | 165 | 224 | 302 | 340 | 450 | 605 |
| | Rated Output Voltage | 3-phase, 380 V (*2) | | | | | | | | | | | | | | | | | | | | |
| | Rated Output Frequency | Up to 400 Hz available by programming | | | | | | | | | | | | | | | | | | | | |
| Power Supply | Rated Input Voltage and Frequency | DC 540 to 660 V | | | | | | | | | | | | | | | | | | | | |
| | Allowable Voltage Fluctuation | +10%, −15% | | | | | | | | | | | | | | | | | | | | |
| Control Characteristics | Control Method | Sine wave PWM | | | | | | | | | | | | | | | | | | | | |
| | Starting Torque | 150% / 0 r/min (150% / 1 Hz without PG) | | | | | | | | | | | | | | | | | | | | |
| | Speed Control Range | 1:1000 (1:100 without PG) | | | | | | | | | | | | | | | | | | | | |
| | Speed Control Accuracy | ±0.01% (±0.2% without PG) | | | | | | | | | | | | | | | | | | | | |
| | Speed Response | 30 Hz (5 Hz without PG) (*3) | | | | | | | | | | | | | | | | | | | | |
| | Torque Limit | Available (Parameter setting, 4 quadrants can be changed) | | | | | | | | | | | | | | | | | | | | |
| | Torque Accuracy | ±3% (*4) | | | | | | | | | | | | | | | | | | | | |
| | Torque Response | 150 Hz (20 Hz without PG) (*5) | | | | | | | | | | | | | | | | | | | | |
| | Speed Control Range | 0 to 24000 r/min (2-pole motor) | | | | | | | | | | | | | | | | | | | | |
| | Speed Reference Setting Resolution | Digital reference 30000/100% | | | | | | | | | | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | | | | | | | | | | |
| | Torque Reference Setting Resolution (Calculation Resolution) | Digital reference 10000/100% | | | | | | | | | | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | | | | | | | | | | |
| | Overload Capacity | 150% of rated output current for 1 minute | | | | | | | | | | | | | | | | | | | | |
| | Accel/Decel Time | 0.01 to 6000.0 sec (Accel/decel time setting independently, 2 steps available) | | | | | | | | | | | | | | | | | | | | |
| | Braking Torque | Approx. 20% | | | | | | | | | | | | | | | | | | | | |
| Protective Functions | Motor Overload Protection | Protected by thermistor (*6) or electronic thermal overload relay | | | | | | | | | | | | | | | | | | | | |
| | Instantaneous Overcurrent | Motor coasts to a stop at approx. 200% of inverter rated current | | | | | | | | | | | | | | | | | | | | |
| | DC Bus Line Protection | Motor coasts to a stop by blown-fuse | | | | | | | | | | | | | | | | | | | | |
| | Overload | 150% of rated output current | | | | | | | | | | | | | | | | | | | | |
| | Overvoltage | Motor coasts to a stop if converter output voltage exceeds 820 V | | | | | | | | | | | | | | | | | | | | |
| | Undervoltage | Motor coasts to a stop if converter output voltage drops to 380 V or below | | | | | | | | | | | | | | | | | | | | |
| | Momentary Power Loss | Immediately stop by 15 ms and above momentary power loss (Factory setting)<br>Continuous operation during power loss less than 2 sec can be selected by operation mode | | | | | | | | | | | | | | | | | | | | |
| | Heatsink Overheat | Protected by thermistor | | | | | | | | | | | | | | | | | | | | |
| | Stall Prevention | Stall prevention during accel and constant speed operation | | | | | | | | | | | | | | | | | | | | |
| | Ground Fault | Protected by electronic circuit (Overcurrent level) | | | | | | | | | | | | | | | | | | | | |
| | Power Charge Indication | Charge LED stays ON until bus voltage drops below 50 V | | | | | | | | | | | | | | | | | | | | |
| Environment | Ambient Temperature | −10°C to +45°C (Enclosed wall-mounted type) | | | | | | | | | | | | | | | | | | | | |
| | Humidity | 90% RH or less (Non-condensing) | | | | | | | | | | | | | | | | | | | | |
| | Storage Temperature | −20°C to +60°C (Not frozen) | | | | | | | | | | | | | | | | | | | | |
| | Location | Indoor (protected from corrosive gases and dust) | | | | | | | | | | | | | | | | | | | | |
| | Elevation | 1000 m or less | | | | | | | | | | | | | | | | | | | | |
| | Vibration | 9.8 m/s² (1G) at 10 to less than 20 Hz, up to 2 m/s² (0.2G) at 20 to 50 Hz | | | | | | | | | | | | | | | | | | | | |

*1 Based on a YASKAWA standard 4-pole motor for max. applicable motor output
*2 Output voltage in the vector control mode (600 V DC input)
*3 Response when ratio of inertia between motor and load is 1:1
*4 To achieve this value tests are required by actually connecting to a motor
*5 Electric torque response
*6 Valid for the motor with built-in thermistor
*7 For 185 to 300 kW, model name is CIMR-H5A□ since an AC input and a unit are in common




CIMR-H5D40P4 - 47P5
CIMR-H5D4055 - 4160

CIMR-H5D4011 - 4045

CIMR-H5A4185 - 4300

Fig. A-2 Main Circuit Configuration (400 V Class DC Input)

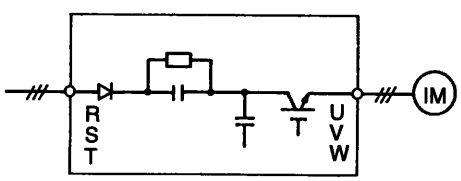
for more: efesotomasyon - Yaskawa drive



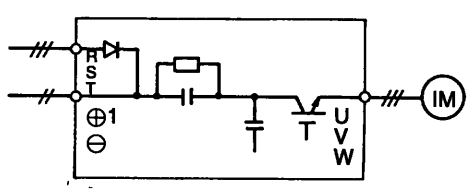
## Table A-3 200/400 V Class Specifications (AC Input)

| | Inverter Model CIMR-H5A ☐ | 2030 | 2037 | 2045 | 2055 | 2075 | 4055 | 4075 | 4110 | 4160 | 4185 | 4220 | 4300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Max Applicable Motor Output (*1) kW | 30 | 37 | 45 | 55 | 75 | 55 | 75 | 110 | 160 | 185 | 220 | 300 |
| Output Characteristics | Inverter Capacity kVA | 40 | 50 | 60 | 70 | 100 | 80 | 100 | 140 | 200 | 250 | 300 | 400 |
| | Rated Output Current A | 130 | 160 | 183 | 224 | 300 | 128 | 165 | 224 | 302 | 340 | 450 | 605 |
| | Max Output Voltage | 3-phase, 190 V (*2) | | | | | 3-phase, 380 V (*2) | | | | | | |
| | Rated Output Frequency | Up to 400 Hz available by programming | | | | | | | | | | | |
| Power Supply | Rated Input Voltage and Frequency | 3-phase 200/208/220 V 50 Hz<br>200/208/220/230 V 60 Hz | | | | | 3-phase 380/400/415/440/460 V 50/60 Hz | | | | | | |
| | Allowable Voltage Fluctuation | +10%, −15% | | | | | | | | | | | |
| | Allowable Frequency Fluctuation | ±5% | | | | | | | | | | | |
| Control Characteristics | Control Method | Sine wave PWM | | | | | | | | | | | |
| | Starting Torque | 150% / 0 r/min (150% / 1 Hz without PG) | | | | | | | | | | | |
| | Speed Control Range | 1:1000 (1:100 without PG) | | | | | | | | | | | |
| | Speed Control Accuracy | ±0.01% (±0.2% without PG) | | | | | | | | | | | |
| | Speed Response | 30 Hz (5 Hz without PG) (*3) | | | | | | | | | | | |
| | Torque Limit | Available (Parameter setting, 4 quadrants can be changed) | | | | | | | | | | | |
| | Torque Accuracy | ±3% (*4) | | | | | | | | | | | |
| | Torque Response | 150 Hz (20 Hz without PG) (*5) | | | | | | | | | | | |
| | Speed Control Range | 0 to 24000 r/min (2-pole motor) | | | | | | | | | | | |
| | Speed Reference Setting Resolution | Digital reference 30000/100% | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | |
| | Torque Reference Setting Resolution (Calculation Resolution) | Digital reference 10000/100% | | | | | | | | | | | |
| | | Analog reference 1000/100% | | | | | | | | | | | |
| | Overload Capacity | 150% of rated output current for 1 minute | | | | | | | | | | | |
| | Accel/Decel Time | 0.01 to 6000.0 sec (Accel/decel time setting independently, 2 steps available) | | | | | | | | | | | |
| | Braking Torque | Approx. 20% | | | | | | | | | | | |
| Protective Functions | Motor Overload Protection | Protected by thermistor (*6) or electronic thermal overload relay | | | | | | | | | | | |
| | Instantaneous Overcurrent | Motor coasts to a stop at approx. 200% of inverter rated current | | | | | | | | | | | |
| | DC Bus Line Protection | Motor coasts to a stop by blown-fuse | | | | | | | | | | | |
| | Overload | Motor coasts to a stop after 1 minute at 150% of rated output current | | | | | | | | | | | |
| | Overvoltage | Motor coasts to a stop if converter output voltage exceeds 410 V | | | | | Motor coasts to a stop if converter output voltage exceeds 820 V | | | | | | |
| | Undervoltage | Motor coasts to a stop if converter output voltage drops to 190 V or below | | | | | Motor coasts to a stop if converter output voltage drops to 380 V or below | | | | | | |
| | Momentary Power Loss | Immediately stop by 15 ms and above momentary power loss (Factory setting)<br>Continuous operation during power loss less than 2 sec can be selected by operation mode | | | | | | | | | | | |
| | Heatsink Overheat | Protected by thermistor | | | | | | | | | | | |
| | Stall Prevention | Stall prevention during accel/decel and constant speed operation | | | | | | | | | | | |
| | Ground Fault | Protected by electronic circuit (Overcurrent level) | | | | | | | | | | | |
| | Power Charge Indication | Charge LED stays ON until bus voltage drops below 50 V | | | | | | | | | | | |
| Environment | Ambient Temperature | −10°C to +45°C (Enclosed wall-mounted type) | | | | | | | | | | | |
| | Humidity | 90% RH or less (Non-condensing) | | | | | | | | | | | |
| | Storage Temperature | −20°C to +60°C (Not frozen) | | | | | | | | | | | |
| | Location | Indoor (protected from corrosive gases and dust) | | | | | | | | | | | |
| | Elevation | 1000 m or less | | | | | | | | | | | |
| | Vibration | 9.8 m/s$^2$ (1G) at 10 to less than 20 Hz, up to 2 m/s$^2$ (0.2G) at 20 to 50 Hz | | | | | | | | | | | |

*1 Based on a YASKAWA standard 4-pole motor for max. applicable motor output
*2 Output voltage in the vector control mode (220/440V AC input)
*3 Response when ratio of inertia between motor and load is 1:1
*4 To achieve this value tests are required by actually connecting to a motor
*5 Electric torque response
*6 Valid for the motor with built-in thermistor




CIMR-H5A2030 - 2075
CIMR-H5A4055 - 4110



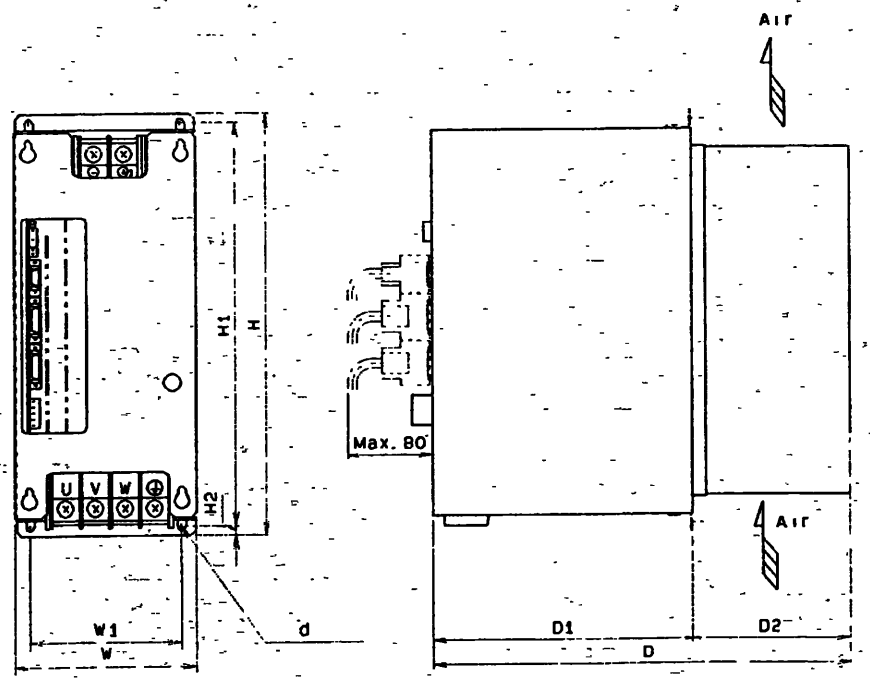

CIMR-H5A4185 - 4300

Fig. A-3 Main Circuit Configuration (200/400 V Class AC Input)

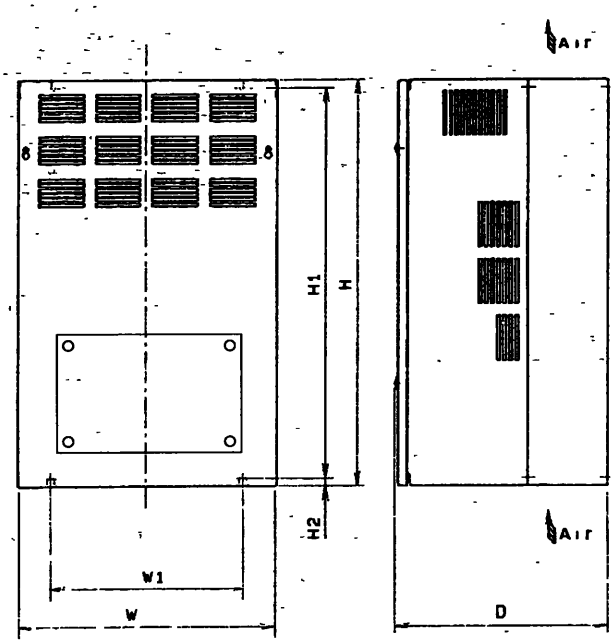
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# APPENDIX 2 DIMENSIONS (mm)

The figures below show 200V 7.5 kW model and 30 kW model.




(a) Book Type (CIMR-H5D27P5)




(b) Cubic Type (CIMR-H5D2030)

Fig. A-4 Dimensions of VS-676H5

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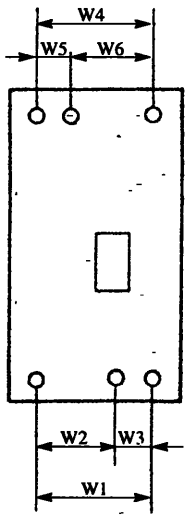
## Table A-4 Dimensions (mm) and Approx. Mass (kg) of VS-676H5

| Voltage | Motor Capacity kW | Enclosed Wall-mounted Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | W | H | D | W1 | H1 | H2 | D1 | D2 | Mass (kg) DC input | Mass (kg) AC input | d | Type |
| 200V Class | 0 4 | 100 | 350 | 350 | 75 | 335 | 7 5 | 220 | 130 | 7 | – | M5 | Book type |
| | 0 75 | | | | | | | | | | | | |
| | 1 5 | | | | | | | | | | | | |
| | 2 2 | | | | | | | | | | | | |
| | 3 7 | | | | | | | | | | | | |
| | 5 5 | 125 | 350 | 350 | 100 | 335 | 7 5 | 220 | 130 | 8 | – | M5 | |
| | 7 5 | | | | | | | | | | | | |
| | 11 | 150 | 350 | 350 | 125 | 335 | 7 5 | 220 | 130 | 10 | – | M5 | |
| | 15 | | | | | | | | | | | | |
| | 18 5 | 200 | 350 | 350 | 150 | 335 | 7 5 | 220 | 130 | 15 | – | M5 | |
| | 22 | | | | | | | | | | | | |
| | 30 | 425 | 675 | 355 | 320 | 650 | 12 5 | – | – | 48 | 61 | M10 | Cubic type |
| | 37 | | | | | | | | | | 62 | | |
| | 45 | 475 | 800 | 355 | 370 | 775 | 12 5 | – | – | 65 | 80 | M10 | |
| | 55 | | | | | | | | | | | | |
| | 75 | 575 | 925 | 405 | 445 | 895 | 15 | – | – | 110 | 135 | M12 | |
| 400V Class | 0 4 | 100 | 350 | 350 | 75 | 335 | 7 5 | 220 | 130 | 7 5 | – | M5 | Book type |
| | 0 75 | | | | | | | | | | | | |
| | 1 5 | | | | | | | | | | | | |
| | 2 2 | | | | | | | | | | | | |
| | 3 7 | | | | | | | | | | | | |
| | 5 5 | 125 | 350 | 350 | 100 | 335 | 7 5 | 220 | 130 | 9 5 | – | M5 | |
| | 7 5 | | | | | | | | | | | | |
| | 11 | 150 | 350 | 345 | 125 | 335 | 7 5 | 215 | 130 | 9 5 | – | M5 | |
| | 15 | | | | | | | | | | | | |
| | 18 5 | 200 | 350 | 350 | 150 | 335 | 7 5 | 220 | 130 | 15 | – | M5 | |
| | 22 | | | | | | | | | | | | |
| | 30 | 250 | 350 | 350 | 200 | 335 | 7 5 | 220 | 130 | 19 5 | – | M5 | |
| | 37 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 55 | 455 | 820 | 355 | 350 | 795 | 12 5 | – | – | 62 | 79 | M10 | Cubic type |
| | 75 | | | | | | | | | | 80 | | |
| | 110 | 575 | 925 | 380 | 445 | 895 | 15 | – | – | 112 | 135 | M12 | |
| | 160 | | | 405 | | | | | | 116 | 145 | | |
| | 185 (*2) | 950 | 1450 | 435 | (*1) | 1400 | 25 | – | – | – | 360 | M12 | |
| | 220 (*2) | | | | | | | | | | | | |
| | 300 (*2) | 960 | 1600 | 455 | (*1) | 1550 | 25 | – | – | – | 420 | | |

*1 Mounting dimensions of 400V 185 kW to 300 kW models are indicated on next page

*2 400 V 185 kW to 300 kW models are AC input models

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| Applicable Motor Capacity kW | W1 | W2 | W3 | W4 | W5 | W6 |
|---|---|---|---|---|---|---|
| 185, 220 | 750 | 440 | 310 | 850 | 285 | 565 |
| 300 | 750 | 440 | 310 | 873 | 298 | 575 |

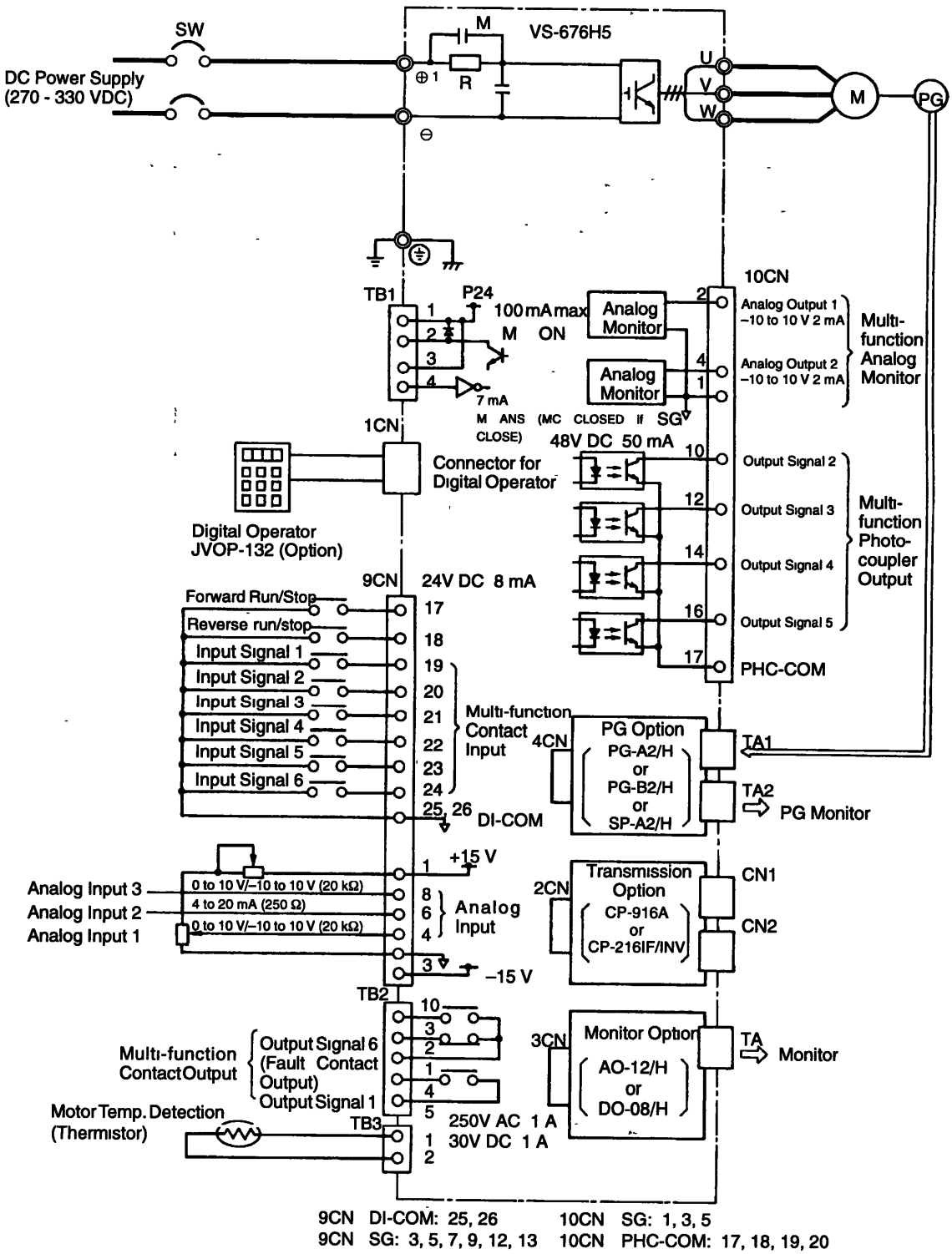
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# APPENDIX 3 TYPICAL CONNECTION DIAGRAMS

## 3.1 USING DC INPUT UNIT WITH BUILT-IN INRUSH CURRENT SUPPRESSING CIRCUIT

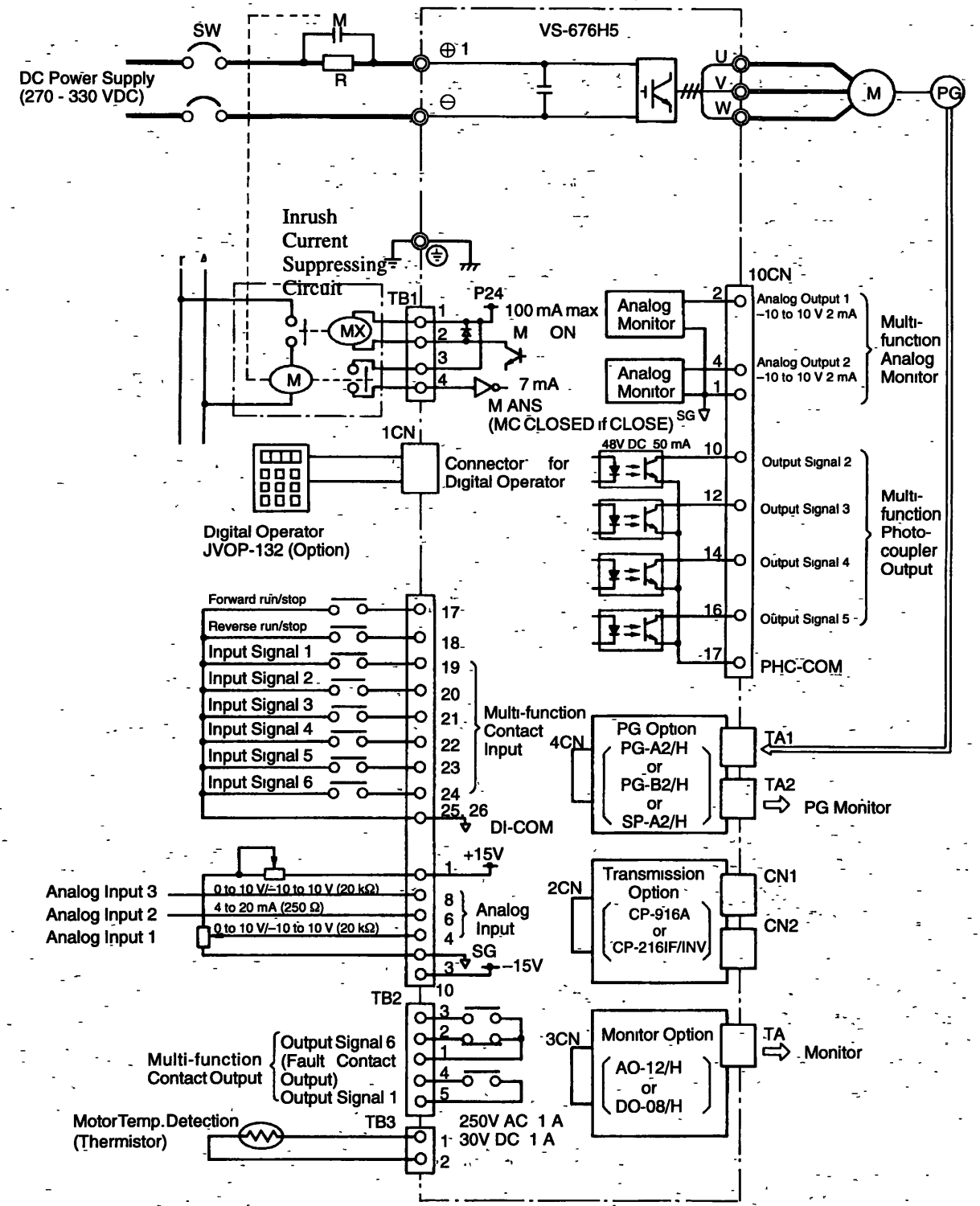
For Models CIMR-H5D20P4 to H5D27P5 (200 V Class 0.4 to 7.5 kW),
Models CIMR-H5D40P4 to H5D47P5 (400 V Class 0.4 to 7.5 kW)
For Models CIMR-H5D2030 to H5D2075 (200 V Class 30 to 75 kW),
Models CIMR-H5D4055 to H5D4160 (400 V Class 55 to 160 kW)



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## 3.2 USING DC INPUT UNIT WITHOUT BUILT-IN INRUSH CURRENT SUPPRESSING CIRCUIT

For models CIMR-H5D2011 to H5D2022 (200 V Class 11 - 22 kW)
For models CIMR-H5D4011 to H5D4045 (400 V Class 11 - 45 kW)



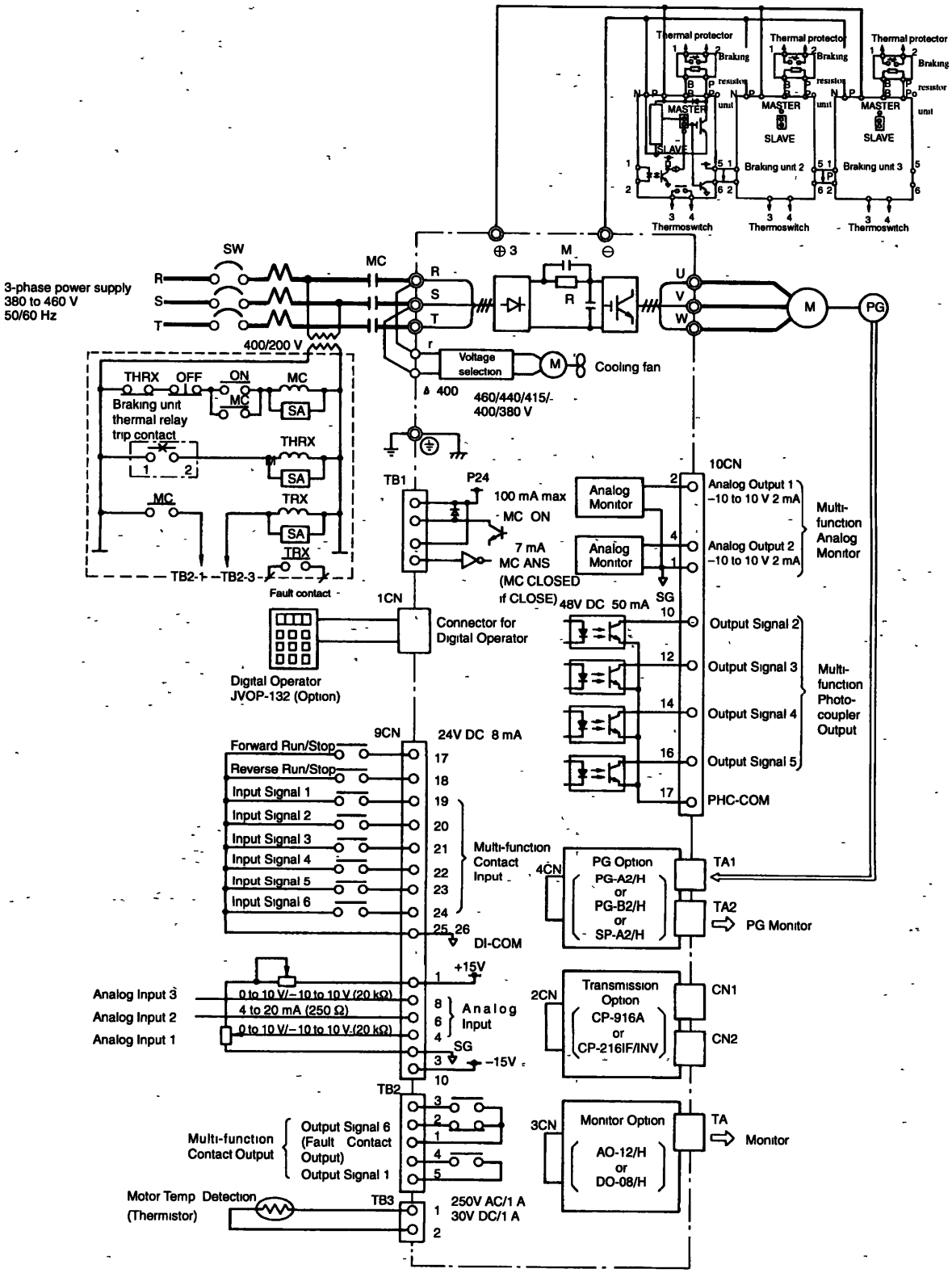

9CN DI-COM: 25, 26 10CN SG: 1, 3, 5
9CN SG: 3, 5, 7, 9, 12, 13 10CN PHC-COM: 17, 18, 19, 20

for more: efesotomasyon - Yaskawa drive



## 3.3 USING AC INPUT UNIT

For models CIMR-H5A2030 to H5A2075 (200 V Class 30 to 75 kW)
For models CIMR-H5A4055 to H5A4300 (400 V Class 55 to 300 kW)

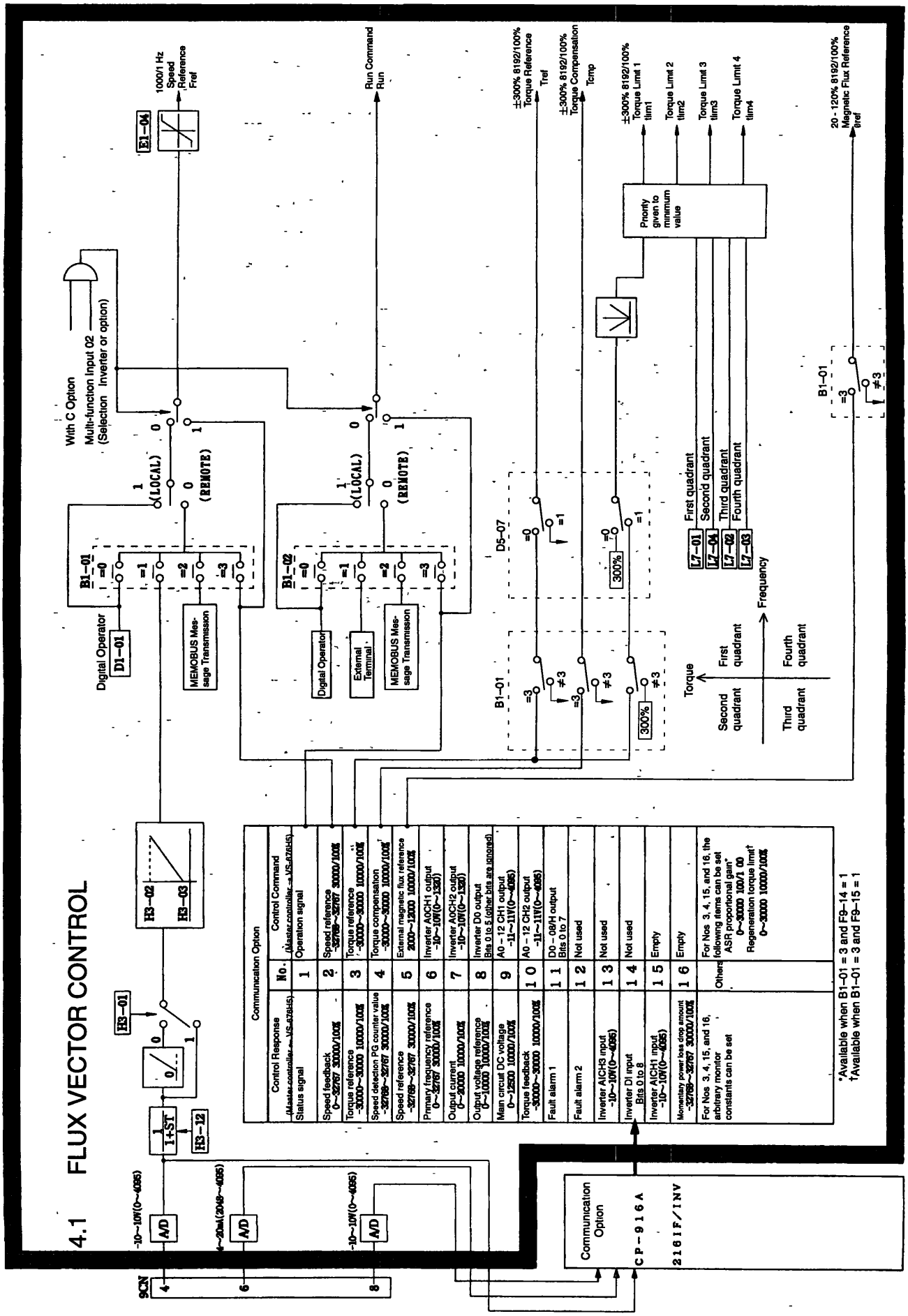



9CN DI-COM: 25, 26 10CN SG: 1, 3, 5
9CN SG. 3, 5, 7, 9, 12, 13 10CN PHC-COM: 17, 18, 19, 20

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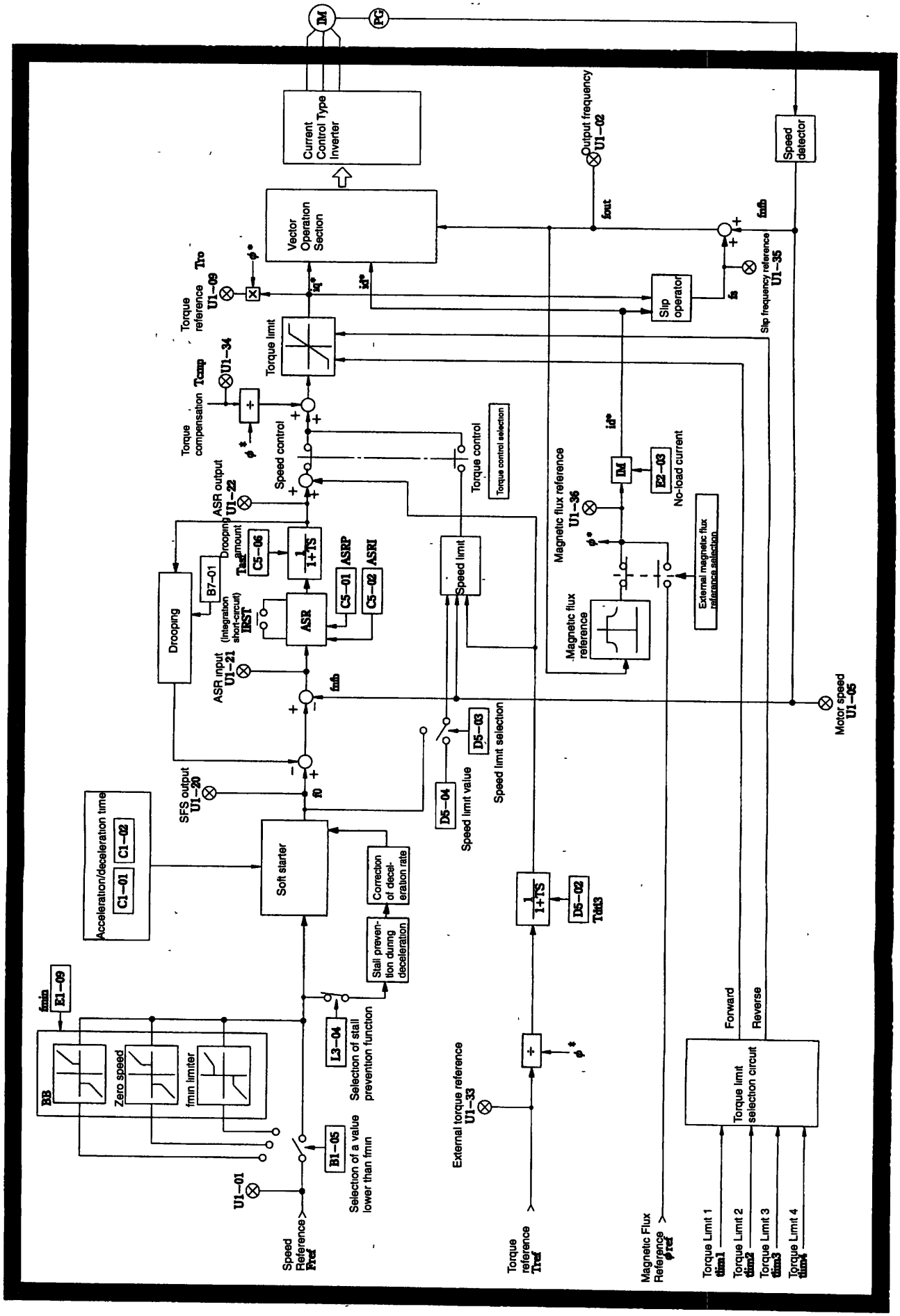
## 4.1 FLUX VECTOR CONTROL



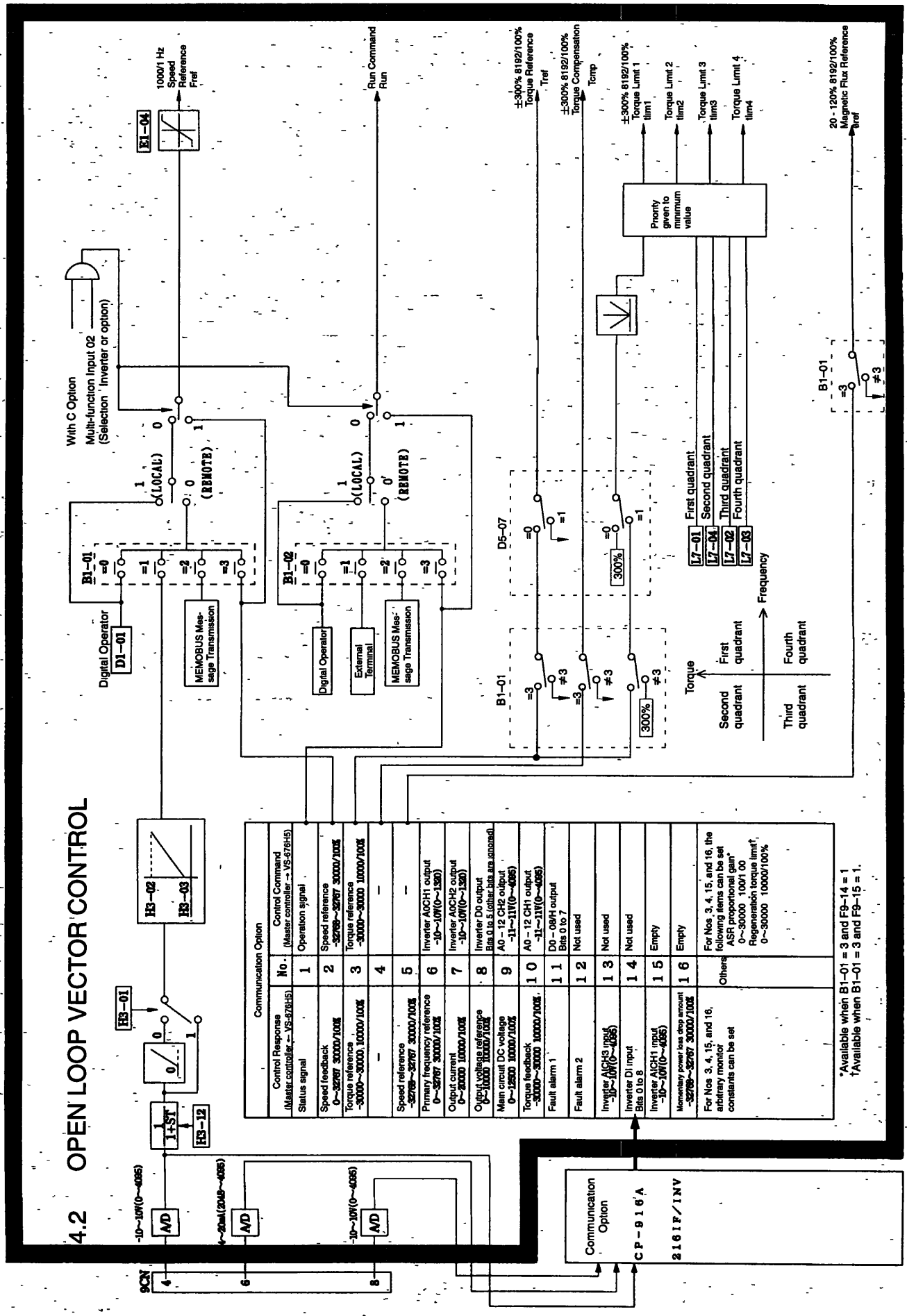
for more: efesotomasyon - Yaskawa drive



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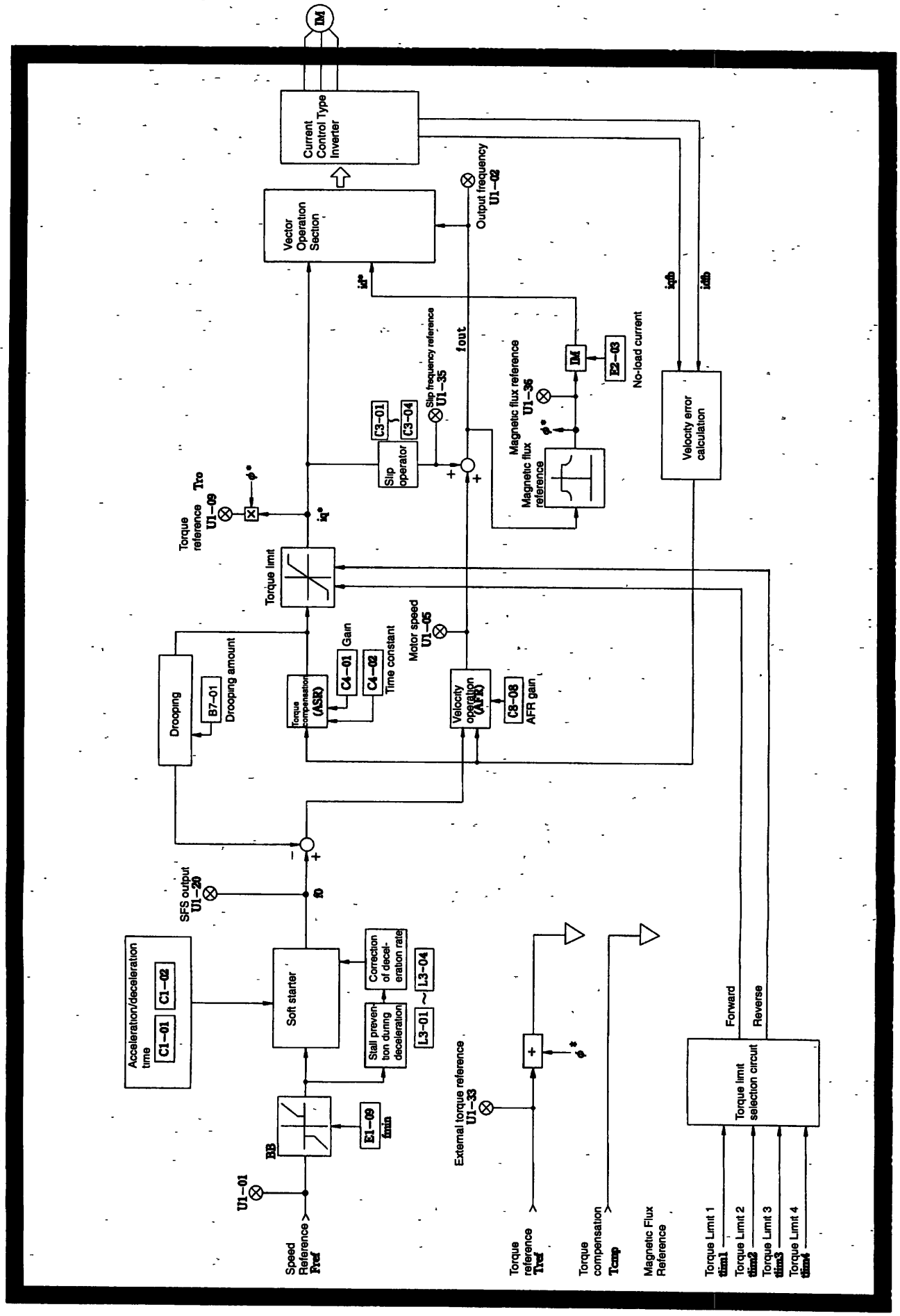
for more: efesotomasyon - Yaskawa drive



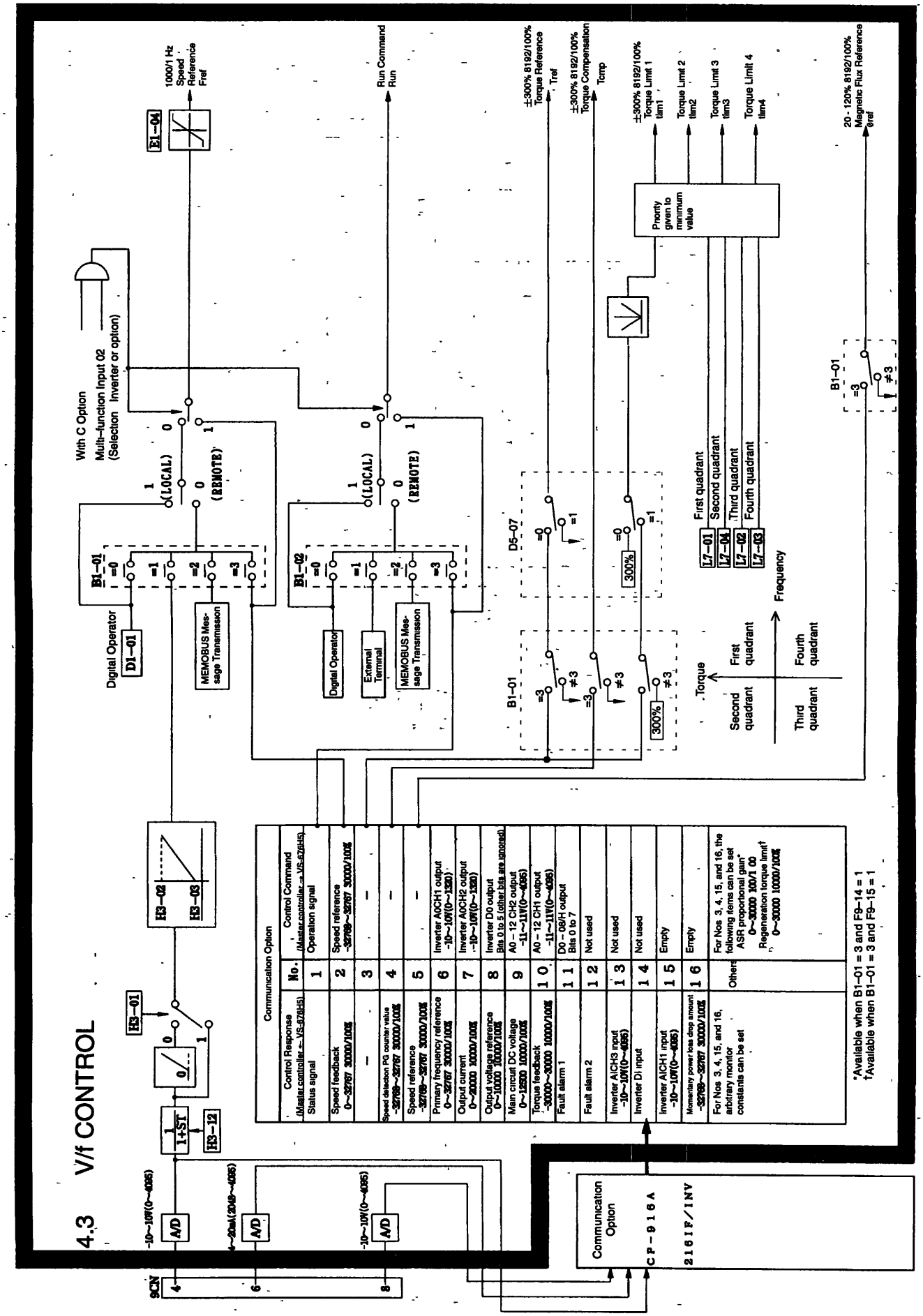
for more: efesotomasyon - Yaskawa drive



(cont'd)



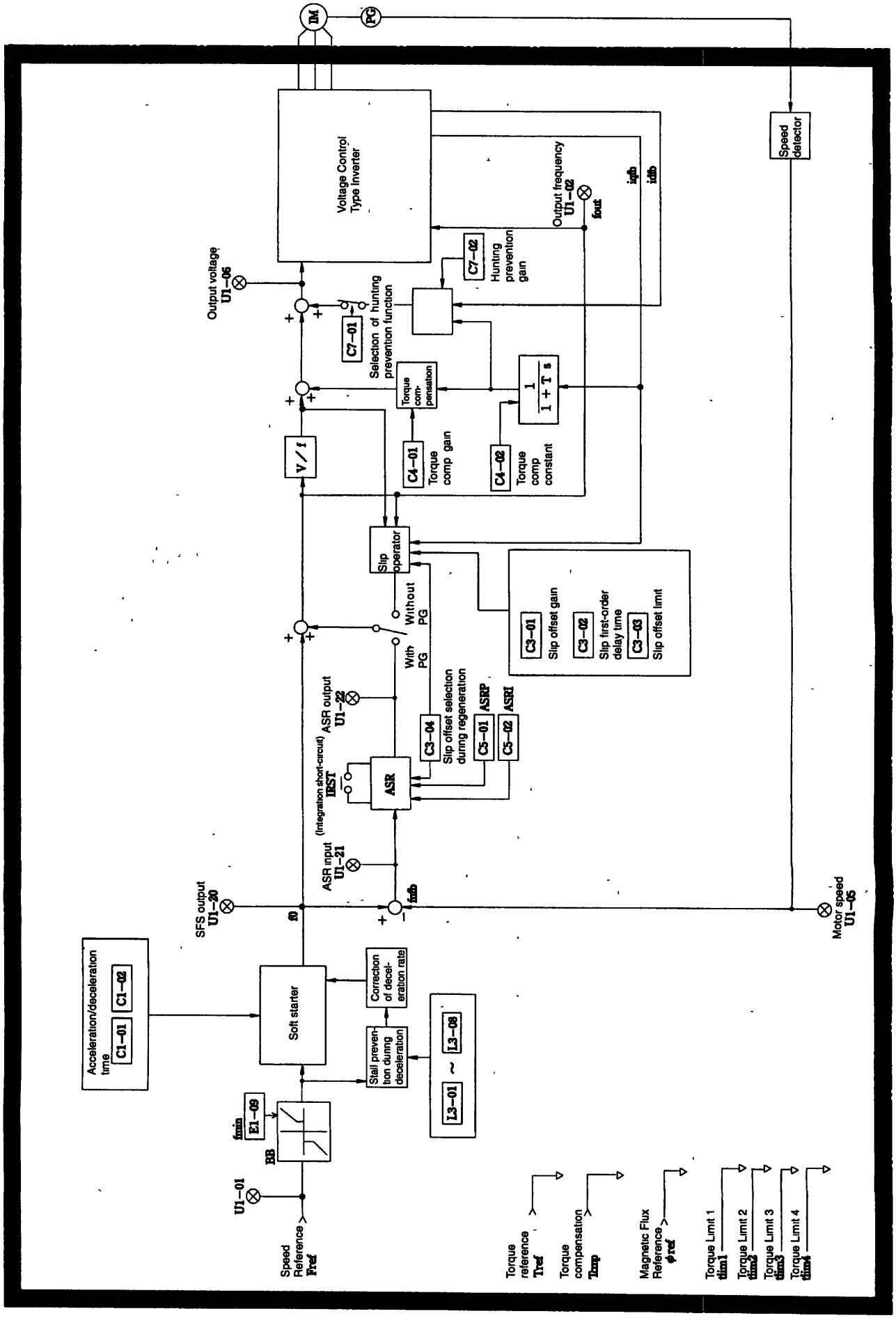
for more: efesotomasyon - Yaskawa drive



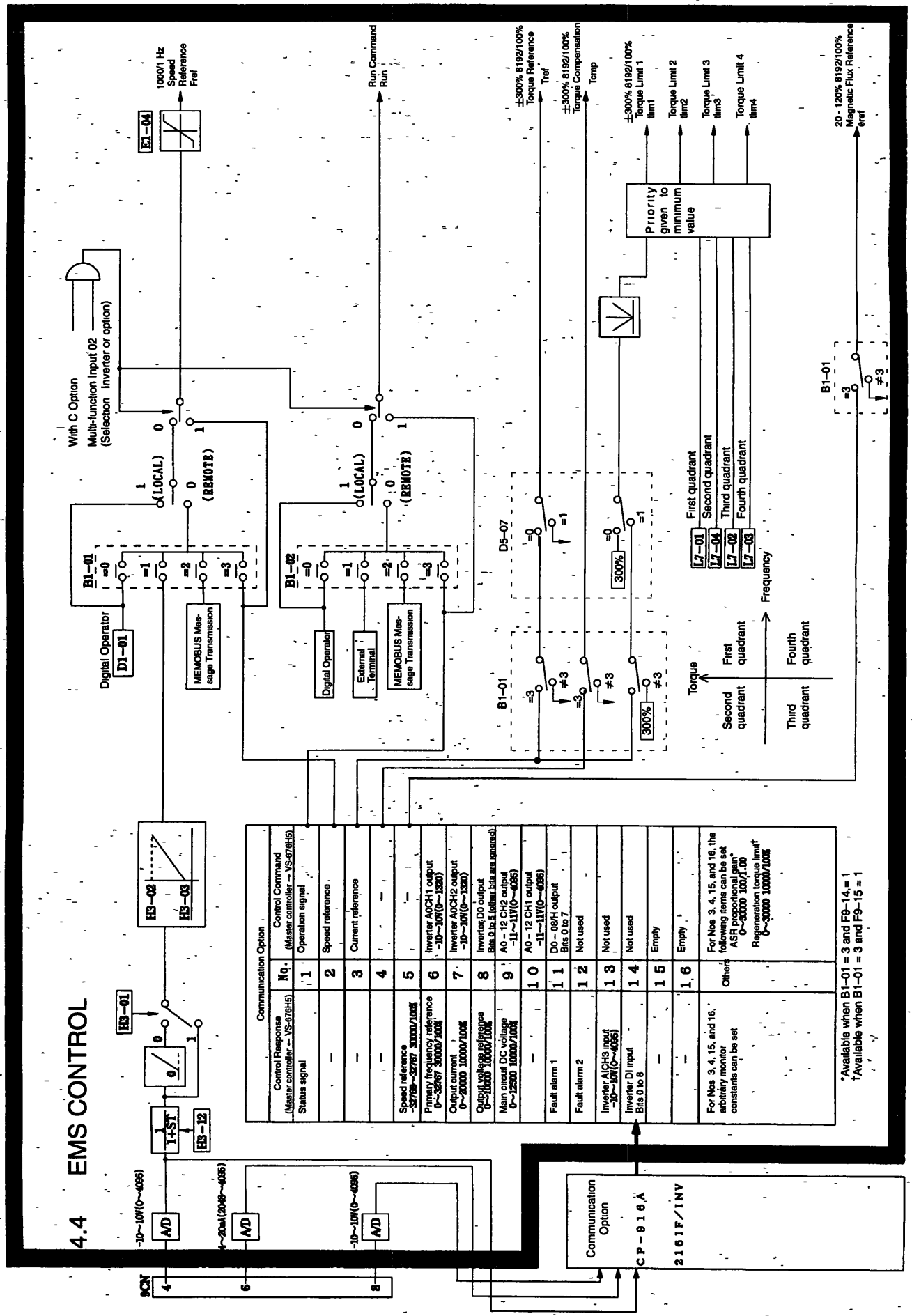
for more: efesotomasyon - Yaskawa drive



(cont'd)



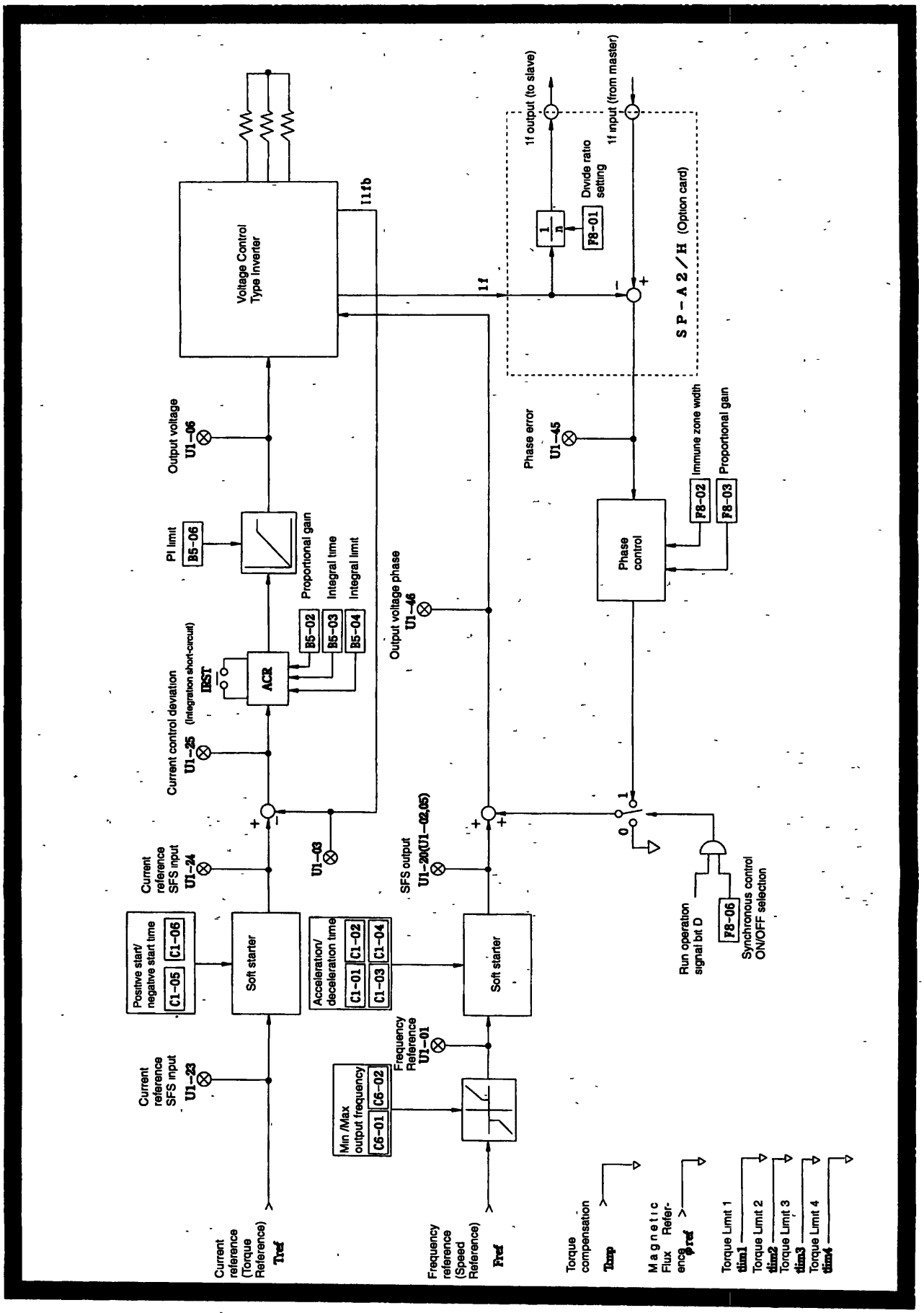
for more: efesotomasyon - Yaskawa drive



for more: efesotomasyon - Yaskawa drive



(cont'd)



# APPENDIX 5 TABLE OF COMMUNICATION DATA

Table A-5 Control Commands (Master Controller to VS-676H5)

| No. | V/f Control | | V/f with PG Feedback | | Open Loop Vector | | Flux Vector | | EMS Control | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Item | Specification | Item | Specification | Item | Specification | Item | Specification | Item | Specification |
| 1 | Operation signal | | Operation signal | | Operation signal | | Operation signal | | Operation signal | |
| 2 | Speed reference | 0 to 32767 30000/100% | Speed reference | 0 to 32767 30000/100% | Speed reference | –32768 to 32767 30000/100% | Speed reference | –32768 to 32767 30000/100% | Frequency reference | 0 to 32767 30000/100% |
| 3 | – | – | – | – | Torque reference | –30000 to 30000 10000/100% | Torque reference | –30000 to 30000 10000/100% | Current reference | 0 to 20000 10000/100% |
| 4 | – | – | – | – | – | – | Torque compensation | –30000 to 30000 10000/100% | – | – |
| 5 | – | – | – | – | – | – | External magnetic flux reference | –2000 to 12000 10000/100% | – | – |
| 6 | Inverter AO CH1 output | –10 to 10 V/0 to 1320 | Inverter AO CH1 output | –10 to 10 V/0 to 1320 | Inverter AO CH1 output | –10 to 10 V/0 to 1320 | Inverter AO CH1 output | –10 to 10 V/0 to 1320 | Inverter AO CH1 output | –10 to 10 V/0 to 1320 |
| 7 | Inverter AO CH2 output | –10 to 10 V/0 to 1320 | Inverter AO CH2 output | –10 to 10 V/0 to 1320 | Inverter AO CH2 output | –10 to 10 V/0 to 1320 | Inverter AO CH2 output | –10 to 10 V/0 to 1320 | Inverter AO CH2 output | –10 to 10 V/0 to 1320 |
| 8 | Inverter DO output | Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregarded) | Inverter DO output | Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregarded) | Inverter DO output | Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregarded) | Inverter DO output | Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregarded) | Inverter DO output | Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregarded) |
| 9 | AO-12 CH1 output | –11 to 11 V/0 to 4095 | AO-12 CH1 output | –11 to 11 V/0 to 4095 | AO-12 CH1 output | –11 to 11 V/0 to 4095 | AO-12 CH1 output | –11 to 11 V/0 to 4095 | AO-12 CH1 output | –11 to 11 V/0 to 4095 |
| 10 | AO-12 CH2 output | –11 to 11 V/0 to 4095 | AO-12 CH2 output | –11 to 11 V/0 to 4095 | AO-12 CH2 output | –11 to 11 V/0 to 4095 | AO-12 CH2 output | –11 to 11 V/0 to 4095 | AO-12 CH2 output | –11 to 11 V/0 to 4095 |
| 11 | DO-08/H output | Bits 0 to 7 are used 0 to FFH | DO-08/H output | Bits 0 to 7 are used 0 to FFH | DO-08/H output | Bits 0 to 7 are used 0 to FFH | DO-08/H output | Bits 0 to 7 are used 0 to FFH | DO-08/H output | Bits 0 to 7 are used 0 to FFH |
| 12 | Not used | – | Not used | – | Not used | – | Not used | – | Not used | – |
| 13 | Not used | – | Not used | – | Not used | – | Not used | – | Not used | – |
| 14 | Not used | – | Not used | – | Not used | – | Not used | – | Not used | – |
| 15 | Empty | – | Empty | – | Empty | – | Empty | – | Empty | – |
| 16 | Empty | – | Empty | – | Empty | – | Empty | – | Empty | – |

Notes 1 Notes 1 No 1 to No 4 are accessed in a scan cycle (1 to 2 msec)

2 For Nos 3, 4, 15, and 16, data items can be changed by the setting for a parameter In addition to the parameter items indicated above, the following parameters are added

- ASR proportional gain (No 17) 0 to 30000 (100/1)
- Regeneration torque limit (No 18) 0 to 30000 (10000/100%)

3 The data of Nos 6 and 11 are disregarded at the inverter unless the communication mode is the "through mode"

4 If the same data is set in the selection permitted area and the selection not permitted area, only the high–speed data are accessed The data at the low–speed communication side are disregarded

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## Table A-6 Control Response (VS-676H5 to Master Controller)

| No. | V/f Control | | V/f with PG Feedback | | Open Loop Vector | | Flux Vector | | EMS Control | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Item | Specification | Item | Specification | Item | Specification | Item | Specification | Item | Specification |
| 1 | Status signal | | Status signal | – | Status signal | – | Status signal | – | Status signal | – |
| 2 | – | – | Speed feedback | – | Speed feedback*1 | – | Speed feedback | – | – | – |
| 3 | – | – | – | – | Torque reference | –30000 to 30000 10000/100% | Torque reference | –30000 to 30000 10000/100% | – | – |
| 4 | – | – | Speed detection PG count value | 0 to 32767 | – | – | Speed detection PG count value | –32768 to 32767 | – | – |
| 5 | Speed reference | 0 to 32767 30000/100% | Speed reference | 0 to 32767 30000/100% | Speed reference | –32768 to 32767 30000/100% | Speed reference | –32768 to 32767 30000/100% | Speed reference | –32768 to 32767 30000/100% |
| 6 | Primary frequency reference | 0 to 32767 30000/100% | Primary frequency reference | 0 to 32767 30000/100% | Primary frequency reference | 0 to 32767 30000/100% | Primary frequency reference | 0 to 32767 30000/100% | Primary frequency reference | 0 to 32767 30000/100% |
| 7 | Output current | 0 to 20000 10000/100% | Output current | 0 to 20000 10000/100% | Output current | 0 to 20000 10000/100% | Output current | 0 to 20000 10000/100% | Output current | 0 to 20000 10000/100% |
| 8 | Output voltage reference | 0 to 10000/100% | Output voltage reference | 0 to 10000/100% | Output voltage reference | 0 to 10000/100% | Output voltage reference | 0 to 10000/100% | Output voltage reference | 0 to 10000/100% |
| 9 | Main circuit DC voltage | 0 to 12500 (200 V class 400 [V]) 10000/100% (400 V class: 800 [V]) | Main circuit DC voltage | 0 to 12500 (200 V class 400 [V]) 10000/100% (400 V class: 800 [V]) | Main circuit DC voltage | 0 to 12500 (200 V class. 400 [V]) 10000/100% (400 V class: 800 [V]) | Main circuit DC voltage | 0 to 12500 (200 V class: 400 [V]) 10000/100% (400 V class: 800 [V]) | Main circuit DC voltage | 0 to 12500 (200 V class: 400 [V]) 10000/100% (400 V class: 800 [V]) |
| 10 | – | – | – | – | Torque feedback | –30000 to 30000 10000/100% | Torque feedback | –30000 to 30000 10000/100% | – | –30000 to 30000 10000/100% |
| 11 | Fault alarm signal 1 | – | Fault alarm signal 1 | – | Fault alarm signal 1 | – | Fault alarm signal 1 | – | Fault alarm signal 1 | – |
| 12 | Fault alarm signal 2 | – | Fault alarm signal 2 | – | Fault alarm signal 2 | – | Fault alarm signal 2 | – | Fault alarm signal 2 | – |
| 13 | Inverter AI CH3 input | –10V to +10V/ 0 to 4095 | Inverter AI CH3 input | –10V to +10V/ 0 to 4095 | Inverter AI CH3 input | –10V to +10V/ 0 to 4095 | Inverter AI CH3 input | –10V to +10V/ 0 to 4095 | Inverter AI CH3 input | –10V to +10V/ 0 to 4095 |
| 14 | Inverter DI input | – | Inverter DI input | – | Inverter DI input | – | Inverter DI input | – | Inverter DI input | – |
| 15 | Inverter AI CH1 input | –10V to +10V/ 0 to 4095 | Inverter AI CH1 input | –10V to +10V/ 0 to 4095 | Inverter AI CH1 input | –10V to +10V/ 0 to 4095 | Inverter AI CH1 input | –10V to +10V/ 0 to 4095 | Inverter AI CH1 input | –10V to +10V/ 0 to 4095 |
| 16 | Momentary power loss drop amount | –32768 to 32767 30000/100% | Momentary power loss drop amount | –32768 to 32767 30000/100% | Momentary power loss drop amount | –32768 to 32767 30000/100% | Momentary power loss drop amount | –32768 to 32767 30000/100% | Momentary power loss drop amount | –32768 to 32767 30000/100% |

Notes 1 Nos 1 to 4 are output in ASR scan (1 to 2 msec)

2 For Nos 3, 4, 15, and 16, data items can be changed by the setting for a parameter
By setting the selection permitted parameter, data items can be changed. Send the data to a master controller in the internal access cycle

3 With Nos 13 to 15 (inverter input signals), the contents of the signals are sent to the master controller even when the communication mode is not the through mode

4. (*1) The assumed speed is output



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## Table A-7 Operation Signals (Master Controller to VS-676H5)

| Bit No. | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control |
|---|---|---|---|---|---|
| 0 | Run/stop | Run/stop | Run/stop | Run/stop | Run/stop |
| 1 | Reverse run | Reverse run | Reverse run | Reverse run | Reverse run |
| 2 | Base block/release | Base block/release | Base block/release | Base block/release | Base block/release |
| 3 | Trace start/stop | Trace start/stop | Trace start/stop | Trace start/stop | Trace start/stop |
| 4 | External fault | External fault | External fault | External fault | External fault |
| 5 | Fault reset | Fault reset | Fault reset | Fault reset | Fault reset |
| 6 | Changing acceleration/deceleration time | Changing acceleration/deceleration time | Changing acceleration/deceleration time | Changing acceleration/deceleration time | Changing acceleration/deceleration time |
| 7 | Accel /decel prohibit (speed hold) / release | Accel /decel prohibit (speed hold) / release | Accel./decel prohibit (speed hold) / release | Accel./decel. prohibit (speed hold) / release | Accel /decel. prohibit (speed hold) / release |
| 8 | DB command | DB command | Initial excitation | Initial excitation | Not used |
| 9 | – | Integration reset (ASR) | – | Integration reset (ASR) | Integration reset (ACR) |
| A | – | Integration hold (ASR) | – | Integration hold (ASR) | Integration hold (ACR) |
| B | Soft starter cancel | Soft starter cancel | Soft starter cancel | Soft starter cancel | Soft starter cancel |
| C | Trace reset (after occurrence of fault) | Trace reset (after occurrence of fault) | Trace reset (after occurrence of fault) | Trace reset (after occurrence of fault) | Trace reset (after occurrence of fault) |
| D | Energy saving control ON/OFF | Energy saving control ON/OFF | – | Servo ON | Synchronous control ON/OFF |
| E | Empty | Empty | Empty | Torque/speed control selection | Not used |
| F | Motor selection (No. 2/No. 1) | Motor selection (No. 2/No. 1) | Motor selection (No 2/No 1) | Motor selection (No 2/No 1) | Not used |

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## Table A-8 Status Signals (VS-676H5 to Master Controller)

| Bit No. | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control |
|---|---|---|---|---|---|
| 0 | Run/stop | Run/stop | Run/stop | Run/stop | Run/stop |
| 1 | Zero speed | Zero speed | Zero speed | Zero speed | – |
| 2 | Reverse run | Reverse run | Reverse run | Reverse run | – |
| 3 | Reset signal input | Reset signal input | Reset signal input | Reset signal input | Reset signal input |
| 4 | Speed agree | Speed agree | Speed agree | Speed agree | Current agree/not agree |
| 5 | Inverter ready/not ready | Inverter ready/not ready | Inverter ready/not ready | Inverter ready/not ready | Inverter ready/not ready |
| 6 | Minor fault | Minor fault | Minor fault | Minor fault | Minor fault |
| 7 | Major fault | Major fault | Major fault | Major fault | Major fault |
| 8 | Command error (control data 16W) | Command error (control data 16W) | Command error (control data 16W) | Command error (control data 16W) | Command error (control data 16W) |
| 9 | Recovery from power loss/momentary power loss | Recovery from power loss/momentary power loss | Recovery from power loss/momentary power loss | Recovery from power loss/momentary power loss | Recovery from power loss/momentary power loss |
| A | Remote/Local | Remote/Local | Remote/Local | Remote/Local | Remote/Local |
| B | Regeneration/Current | Regeneration/Current | Regeneration/Current | Regeneration/Current | Regeneration/Current |
| C | Current (torque) limit | Current (torque) limit | Current (torque) limit | Current (torque) limit | – |
| D | – | Speed limited (ASR limit) | – | Speed limited (ASR limit) | Synchronous control |
| E | Motor selection (No 2/No 1) | Motor selection (No. 2/No. 1) | Motor selection (No 2/No 1) | Motor selection (No 2/No. 1) | – |
| F | – | – | – | Zero servo complete | – |



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## Table A-9 Fault and Alarm Signals (VS-676H5 to Master Controller)

| Bit No. | Signal 1 | | Fault Rank |
|---|---|---|---|
| | V/f, Vector | EMS | |
| 0 | Overcurrent (OC) | Overcurrent (OC) | A |
| 1 | Ground fault (GF) | Ground fault (GF) | A |
| 2 | Over voltage (OV) | Over voltage (OV) | A |
| 3 | Main circuit low voltage (UV1) | Main circuit low voltage (UV1) | B |
| 4 | Control power supply low voltage (UV2) | Control power supply low voltage (UV2) | A |
| 5 | Inrush current resistor short MC fault (UV3) | Inrush current resistor short MC fault (UV3) | A |
| 6 | Fuse blown (FU) | Fuse blown (FU) | A |
| 7 | – | – | A |
| 8 | Inverter overheat alarm (OH) | Inverter overheat alarm (OH) | B |
| 9 | Inverter overheat (OH1) | Inverter overheat (OH1) | A |
| A | Inverter overload (OL2) | Inverter overload (OL2) | A |
| B | Over torque 1 (OL3) | – | A |
| C | Over torque 2 (OL4) | – | A |
| D | Motor overload (OL1) | – | B |
| E | Motor overheat (OH3)*1 | – | A |
| F | Thermistor open circuit (THM)*1 | – | A |
| | Signal 2 | | |
| 0 | Braking transistor fault (RR)*1 | – | A |
| 1 | Braking resistor overheat (RH)*1 | – | A |
| 2 | External fault (EF1 to EF8) | External fault (EF1 to EF8) | B |
| 3 | Over speed (OS)*1 | – | A |
| 4 | Speed deviation (DEV)*1 | Excessive current deviation (DEV)*1 | B |
| 5 | PG open circuit (PGO)*1 | – | A |
| 6 | Excessive ripple in DC bus bar voltage (PF) | Excessive ripple in DC bus bar voltage (PF) | A |
| 7 | Output open-phase (LF) | Output open-phase (LF) | A |
| 8 | Load short circuit (SC) | Load short circuit (SC) | A |
| 9 | – | – | A |
| A | Digital operator fault (OPR) | Digital operator fault (OPR) | A |
| B | CP-216 transmission error (CE) | CP-216 transmission error (CE) | A |
| C | Hardware fault (CPF**) | Hardware fault (CPF**) | A |
| D | – | Synchronous control error | A |
| E | – | – | |
| F | – | – | |

Note(*1) Error or fault is detected only when the corresponding hardware is installed.

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# APPENDIX 6 TABLE OF CONSTANTS

Table A-10 Table of Monitor Constants

| Constant No. | MEMOBUS Address | Constant Name | Unit | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| U1-01 | 20H | Speed reference | 0 01% | Q | Q | Q | Q | Q | The unit varies depending on the setting of O1–03 |
| U1-02 | 21H | Output frequency | 0 01 Hz | Q | Q | Q | Q | Q | |
| U1-03 | 22H | Output current | 0 1 A | Q | Q | Q | Q | Q | For 7 5 kW model or smaller, minimum unit is 0 01A |
| U1-04 | 23H | Control method | – | Q | Q | Q | Q | Q | 0 V/f control<br>1 V/f with PG feedback<br>2: Open loop vector<br>3. Flux vector<br>4· EMS control |
| U1-05 | 24H | Motor speed | 0 01% | Q | Q | Q | Q | Q | The unit varies depending on the setting of O1-03 |
| U1-06 | 25H | Output voltage | 0 1 V | Q | Q | Q | Q | Q | |
| U1-07 | 26H | DC bus voltage | 1 V | Q | Q | Q | Q | Q | |
| U1-08 | 27H | Output power | 0 1 kW | Q | Q | Q | Q | Q | |
| U1-09 | 28H | Torque reference (internal) | 0 1% | – | – | Q | Q | – | |
| U1-10 | 29H | Input terminal status | – | Q | Q | Q | Q | Q | |
| U1-11 | 2AH | Output terminal status | – | Q | Q | Q | Q | Q | |
| U1-12 | 2BH | Operation status | – | Q | Q | Q | Q | Q | |
| U1-13 | 2CH | Cumulative operation time | 1H | Q | Q | Q | Q | Q | |
| U1-14 | 2DH | PROM No. (at FLASH side) | – | Q | Q | Q | Q | Q | |
| U1-15 | 2EH | Input voltage at 9CN-4 (AI-1) terminal | 0 1% | B | B | B | B | B | |
| U1-16 | 2FH | Input voltage at 9CN-6 (AI-2) terminal | 0.1% | B | B | B | B | B | |
| U1-17 | 30H | Input voltage at 9CN-8 (AI-3) terminal | 0 1% | B | B | B | B | B | |
| U1-18 | 31H | Motor secondary current (Iq) | 0 1% | B | B | B | B | – | |
| U1-19 | 32H | Motor exciting current (Id) | 0 1% | – | – | B | B | – | |
| U1-20 | 33H | Soft starter output | 0.01% | A | A | A | A | A | The unit varies depending on the setting of O1-03. |
| U1-21 | 34H | ASR input (speed deviation) | 0 01% | – | A | – | A | – | |
| U1-22 | 35H | ASR output | 0.01% | – | A | – | A | – | |





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| Constant No. | MEMOBUS Address | Constant Name | Unit | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| U1-23 | 36H | Current reference soft starter input | 0.01% | – | – | – | – | Q | |
| U1-24 | 37H | Current reference soft starter output | 0.01% | – | – | – | – | Q | |
| U1-25 | 38H | Current control deviation | 0.01% | – | – | – | – | A | |
| U1-26 | 39H | Output voltage reference (Vq) | 0.1 V | – | – | A | A | – | |
| U1-27 | 3AH | Output voltage reference (Vd) | 0.1 V | – | – | A | A | – | |
| U1-28 | 3BH | PROM No. (at CPU ROM side) | – | A | A | A | A | A | |
| U1-29 | 3CH | LED check (diagnosis) | – | A | A | A | A | A | |
| U1-30 | 3DH | Operation status 2 | – | Q | Q | Q | Q | Q | |
| U1-31 | 3EH | Master controller command 1 | – | Q | Q | Q | Q | Q | |
| U1-32 | 3FH | Master controller command 2 | – | Q | Q | Q | Q | Q | |
| U1-33 | 40H | External torque reference | 0.01% | – | – | A | A | – | |
| U1-34 | 41H | Torque compensation | 0.01% | – | – | – | A | – | |
| U1-35 | 42H | Slip frequency reference | 0.01% | – | – | A | A | – | |
| U1-36 | 43H | Magnetic flux reference | 0.01% | A | A | A | A | – | |
| U1-37 | 44H | DO-08/H output status | – | Q | Q | Q | Q | Q | |
| U1-38 | 45H | Momentary power loss drop amount | 0.01% | B | B | B | B | – | The unit varies depending on the setting of O1-03 |
| U1-39 | 46H | Motor temperature | 1°C | B | B | B | B | – | Valid when thermistor provided is selected |
| U1-40 | 47H | Speed detection PG counter value | Pulse | – | A | – | A | – | |
| U1-41 | 48H | Acceleration torque monitor (observer) | 0.1% | – | – | – | A | – | |
| U1-42 | 49H | Acceleration torque reference (observer) | 0.1% | – | – | – | A | – | |
| U1-43 | 4AH | Torque observer control PI output | 0.1% | – | – | – | A | – | |
| U1-44 | 4BH | Torque observer control output | 0.1% | – | – | – | A | – | |
| U1-45 | 4CH | Synchronous phase difference | 0.1 deg | – | – | – | – | A | |
| U1-46 | 4DH | Output voltage phase | 0.1 deg | – | – | – | – | A | |
| U1-47 | 4EH | Zero-servo move pulse | Pulse | – | – | – | A | – | |
| U1-48 | 4FH | ACRq output | 0.1% | – | – | A | A | – | |
| U1-49 | 50H | ACRd output | 0.1% | – | – | A | A | – | |
| U1-50 | 51H | Not used | – | – | – | – | – | – | |

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| Constant No. | MEMOBUS Address | Constant Name | Unit | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| U2-01 | 70H | Current fault | – | Q | Q | Q | Q | Q | |
| U2-02 | 71H | Last fault | – | Q | Q | Q | Q | Q | |
| U2-03 | 72H | Speed reference (U1-01) at fault | 0 01% | Q | Q | Q | Q | Q | The unit varies depending on the setting of O1-03 |
| U2-04 | 73H | Output frequency (U1-02) at fault | 0 01 Hz | Q | Q | Q | Q | Q | |
| U2-05 | 74H | Inverter output current (U1-03) at fault | 0 1 A | Q | Q | Q | Q | Q | For 7 5 kW model or smaller, minimum unit is 0 01A |
| U2-06 | 75H | Motor speed (U1-05) at fault | 0 01% | Q | Q | Q | Q | Q | The unit varies depending on the setting of O1-03 |
| U2-07 | 76H | Output voltage reference (U1-06) at fault | 0 1 V | Q | Q | Q | Q | Q | |
| U2-08 | 77H | DC bus voltage (U1-07) at fault | 1 V | Q | Q | Q | Q | Q | |
| U2-09 | 78H | Output power (U1-08) at fault | 0 1 kW | Q | Q | Q | Q | Q | |
| U2-10 | 79H | Torque reference (U1-09) at fault | 0 1% | – | – | Q | Q | – | |
| U2-11 | 7AH | Input terminal status (U1-10) at fault | – | Q | Q | Q | Q | Q | |
| U2-12 | 7BH | Output terminal status (U1-11) at fault | – | Q | Q | Q | Q | Q | |
| U2-13 | 7CH | Operation status (U1-12) at fault | – | Q | Q | Q | Q | Q | |
| U2-14 | 7DH | Cumulative operation time (U1-13) at fault | 1H | Q | Q | Q | Q | Q | |
| U2-15 | 7EH | Speed controller (ASR) output (U1-22) at fault | 0 01% | – | A | – | A | – | |
| U2-16 | 7FH | Current control deviation (U1-25) at fault | 0.01% | – | – | – | – | A | |
| U2-17 | 80H | Operation status 2 (U1-30) at fault | – | Q | Q | Q | Q | Q | |
| U2-18 | 81H | Master controller command 1 (U1-31) at fault | – | Q | Q | Q | Q | Q | |
| U2-19 | 82H | Master controller command 2 (U1-32) at fault | – | Q | Q | Q | Q | Q | |
| U2-20 | 83H | External torque reference (U1-33) at fault | 0 01% | – | – | A | A | – | |
| U2-21 | 84H | Torque compensation (U1-34) at fault | 0.01% | – | – | – | A | – | |
| U2-22 | 85H | Magnetic flux reference (U1-36) at fault | 0 01% | A | A | A | A | – | |





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| Constant No. | MEMOBUS Address | Constant Name | Unit | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| U2-23 | 86H | Observer control output (U1-44) at fault | 0.1% | – | – | – | A | – | |
| U2-24 | 87H | Output voltage phase (U1-46) at fault | 0.1 deg | – | – | – | – | A | |
| U3-01 | 90H | Most recent fault | – | Q | Q | Q | Q | Q | |
| U3-02 | 91H | Second most recent fault | – | Q | Q | Q | Q | Q | |
| U3-03 | 92H | Third most recent fault | – | Q | Q | Q | Q | Q | |
| U3-04 | 93H | Fourth/oldest fault | – | Q | Q | Q | Q | Q | |
| U3-05 | 94H | Cumulative operation time at fault | 1H | Q | Q | Q | Q | Q | |
| U3-06 | 95H | Accumulated operation time of second fault | 1H | Q | Q | Q | Q | Q | |
| U3-07 | 96H | Accumulated operation time of third fault | 1H | Q | Q | Q | Q | Q | |
| U3-08 | 97H | Accumulated operation time of fourth/oldest fault | 1H | Q | Q | Q | Q | Q | |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1-00 | 100H | Not used | – | – | – | – | – | – | – | – | |
| A1-01 | 101H | Access level | 2 | 0 to 9999 | ○ | Q | Q | Q | Q | Q | 0. For monitoring<br>2 Quick-start (Q)<br>3 Basic (B)<br>4 Advanced (A) |
| A1-02 | 102H | Control method selection | 3 | 0 to 4 | | Q | Q | Q | Q | Q | 0 V/f control<br>1 V/f with PG feedback<br>2 Open loop vector<br>3 Flux vector<br>4 EMS control |
| A1-03 | 103H | Initialize | 0000 | 0000 to 9999 | | Q | Q | Q | Q | Q | 0000, 1110, 3330<br>Setting permitted, no processing<br>2220 Constants initialization |
| A1-04 | 104H | Password 1 (for inputting) | 0 | 0000 to 9999 | | Q | Q | Q | Q | Q | |
| A1-05 | 105H | Password 2 (for setting) | 0 | 0000 to 9999 | | – | – | – | – | – | |
| A2-01 to 32 | 106H to 125H | Not used | – | – | – | – | – | – | – | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B1-01 | 180H | Reference selection | 3 | 0 to 3 | | Q | Q | Q | Q | Q | 0 Digital operator<br>1. Control circuit terminal<br>2. Transmission<br>3. Option |
| B1-02 | 181H | Operation method selection | 3 | 0 to 3 | | Q | Q | Q | Q | Q | 0· Digital operator<br>1· Control circuit terminal<br>2: Transmission<br>3 Option |
| B1-03 | 182H | Stopping method selection (for stop command) | 0 | 0 to 3 | | Q | Q | Q | Q | Q | 0. Deceleration to stop<br>1. Coast to stop<br>2: DC injection braking to stop<br>3. Timer controlled coast to stop<br>Note· For flux vector control, selection is possible only from 0 and 1. |
| B1-04 | 183H | Reverse run prohibition selection | 0 | 0/1 | | B | B | B | B | – | 0. Reverse run enabled<br>1· Reverse run prohibited |
| B1-05 | 184H | Operation selection at a speed lower than the minimum r/min (E1-09) | 0 | 0 to 3 | | – | – | – | A | – | 0. Normal operation<br>1: Stop<br>2. Run at E1-09<br>3· Zero-speed run |
| B1-06 | 185H | Read sequence input twice | 1 | 0/1 | | A | A | A | A | A | 0 1 ms - 2 scans<br>1· 5 ms - 2 scans |
| B2-01 | 186H | Zero-speed level (DC injection braking starting speed) | 0 50 | 0 00 to 10 00% | | B | B | B | B | – | The unit varies depending on the setting of O1-03 |
| B2-02 | 187H | DC injection braking current | 50 | 0 to 100% | | B | B | B | – | – | |
| B2-03 | 188H | Initial excitation (DC injection braking) time at start | 0 00 | 0 00 to 10 00 sec | | B | B | B | B | – | |
| B2-04 | 189H | DC injection braking time at stop | 0 00 | 0 00 to 10 00 sec | | B | B | B | B | – | |
| B2-05 | 18AH | Not used | – | – | – | – | – | – | – | – | |
| B2-06 | 18BH | Not used | – | – | – | – | – | – | – | – | |
| B2-07 | 18CH | Not used | – | – | – | – | – | – | – | – | |
| B3-01 | 18DH | Speed search selection at start | 1 | 0/1 | | A | A | A | A | – | For V/f control and open loop vector control, initial value is 0<br>0· Disabled<br>1 Enabled |
| B3-02 | 18EH | Speed search operating current at start | 150 | 0 to 200% | | A | – | – | – | – | |
| B3-03 | 18FH | Speed search deceleration time | 2 0 | 0 0 to 10 0 sec | | A | – | – | – | – | |
| B3-04 | 190H | Not used | – | – | – | – | – | – | – | – | |
| B4-01 | 191H | Not used | – | – | – | – | – | – | – | – | |

for more: efesotomasyon - Yaskawa drive

| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B4-02 | 192H | Not used | – | – | – | – | – | – | – | – | |
| B5-01 | 193H | Not used | – | – | – | – | – | – | – | – | |
| B5-02 | 194H | EMS current control proportional gain | 0.10 | 0 00 to 10.00 | ○ | – | – | – | – | A | |
| B5-03 | 195H | EMS current control integral time | 0 10 | 0 00 to 360 00 sec | ○ | – | – | – | – | A | |
| B5-04 | 196H | EMS current control integral limit | 115 0 | 0 0 to 200 0% | ○ | – | – | – | – | A | |
| B5-05 | 197H | Not used | – | – | – | – | – | – | – | – | |
| B5-06 | 198H | PI limit | 115.0 | 0 0 to 200 0% | ○ | – | – | – | – | A | |
| B5-07 | 199H | Not used | – | – | – | – | – | – | – | – | |
| B5-08 | 19AH | Not used | – | – | – | – | – | – | – | – | |
| B6-01 | 19BH | Not used | – | – | – | – | – | – | – | – | |
| B6-02 | 19CH | Not used | – | – | – | – | – | – | – | – | |
| B6-03 | 19DH | Not used | – | – | – | – | – | — | – | – | |
| B6-04 | 19EH | Not used | – | – | – | – | – | – | – | – | |
| B7-01 | 19FH | Droop amount | 0 0 | 0 0 to 100 0% | ○ | – | – | A | A | – | |
| B7-02 | 1A0H | Not used | – | – | – | – | – | – | – | – | |
| B8-01 | 1A1H | Not used | – | – | – | – | – | – | – | – | |
| B8-02 | 1A2H | Not used | – | – | – | – | – | – | – | – | |
| B9-01 | 1A3H | Zero-servo gain | 5 | 0 to 100 | ○ | – | – | – | A | – | |
| B9-02 | 1A4H | Zero-servo completion width | 10 | 0 to 16383 pulse | | – | – | – | A | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C1-01 | 200H | Acceleration time 1 | 10 0 | 0 0 to 6000.0 sec (C1-10=1) 0 00 to 600 00 sec (C1-10=0) | ○ | Q | Q | Q | Q | Q | |
| C1-02 | 201H | Deceleration time 1 | 10.0 | | ○ | Q | Q | Q | Q | Q | |
| C1-03 | 202H | Acceleration time 2 | 10 0 | | ○ | B | B | B | B | B | |
| C1-04 | 203H | Deceleration time 2 | 10 0 | | ○ | B | B | B | B | B | |
| C1-05 | 204H | Current reference positive start time (EMS) | 10 0 | | | – | – | – | – | Q | |
| C1-06 | 205H | Current reference negative start time (EMS) | 10 0 | | | – | – | – | – | Q | |
| C1-07 | 206H | Not used | – | | – | – | – | – | – | – | |
| C1-08 | 207H | Not used | – | | – | – | – | – | – | – | |
| C1-09 | 208H | Emergency stop time | 10 0 | | | B | B | B | B | – | |
| C1-10 | 209H | Accel./decel time setting unit | 1 | 0/1 | | A | A | A | A | A | 0 0 01 sec<br>1 0 1 sec |
| C1-11 | 20AH | Not used | – | – | – | – | – | – | – | – | |
| C2-01 | 20BH | Not used | – | – | – | – | – | – | – | – | |
| C2-02 | 20CH | Not used | – | – | – | – | – | – | – | – | |
| C2-03 | 20DH | Not used | – | – | – | – | – | – | – | – | |
| C2-04 | 20EH | Not used | – | – | – | – | – | – | – | – | |
| C3-01 | 20FH | Slip compensation gain | 0 0 | 0 0 to 2 5 | ○ | A | – | A | A | – | For open loop vector control, initial value is 1 0 |
| C3-02 | 210H | Slip compensation primary delay time | 200 | 0 to 10000 msec | | A | – | A | – | – | For V/f control, initial value is 2000 |
| C3-03 | 211H | Slip compensation limit | 200 | 0 to 250% | | A | – | A | – | – | |
| C3-04 | 212H | Slip compensation selection during regeneration | 0 | 0/1 | | A | A | A | – | – | 0 Disabled<br>1 Enabled |
| C4-01 | 213H | Torque compensation gain | 1 00 | 0 00 to 2 50 | ○ | B | B | B | – | – | |
| C4-02 | 214H | Torque compensation time constant | 20 | 0 to 10000 msec | | A | A | A | – | – | For V/f control, initial value is 200 |
| C5-01 | 215H | ASR proportional (P) gain 1 | 20 00 | 0 00 to 300 00 | ○ | – | B | – | B | – | For V/f with PG feedback, initial value is 0 20<br>For flux vector control, lower limit is 1 00 |
| C5-02 | 216H | ASR integral (I) time 1 | 0 500 | 0.000 to 10 000 sec | ○ | – | B | – | B | – | For V/f with PG feedback, initial value is 0 200 |
| C5-03 | 217H | ASR proportional (P) gain 2 | 20 00 | 0 00 to 300 00 | ○ | – | B | – | B | – | For V/f with PG feedback, initial value is 0 02<br>For flux vector control, lower limit is 1 00 |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C5-04 | 218H | ASR integral (I) time 2 | 0 500 | 0 000 to 10.000 sec | ○ | – | B | – | B | – | For V/f with PG feedback, initial value is 0 050 |
| C5-05 | 219H | ASR limit | 5.0 | 0.0 to 20 0% | | – | A | – | – | – | |
| C5-06 | 21AH | ASR primary delay time | 0 000 | 0 000 to 0 500 sec | ○ | – | – | – | A | – | |
| C5-07 | 21BH | ASR switching speed | 0 00 | 0 00 to 100 00% | | – | – | – | A | – | The unit varies depending on the setting of O1-03. |
| C6-01 | 21CH | Carrier frequency upper limit | 2 0 | 0 4 to 15.0 kHz | | A | A | A | A | A | For vector control, lower limit is 2 0 Upper limit changes depending on the inverter capacity (Refer to para 4 5) |
| C6-02 | 21DH | Carrier frequency lower limit | 2 0 | 0 4 to 15.0 kHz | | A | A | – | – | – | For vector control, lower limit is 2 0 Upper limit changes depending on the inverter capacity (Refer to para 4 5) |
| C6-03 | 21EH | Carrier frequency proportional gain | 00 | 00 to 99 | | A | A | – | – | – | |
| C7-01 | 21FH | Hunting prevention selection | 1 | 0/1 | | A | A | – | – | – | 0 Disabled<br>1. Enabled |
| C7-02 | 220H | Hunting prevention gain | 1.00 | 0 00 to 2.50 | | A | A | – | – | – | |
| C7-03 | 221H | Not used | – | – | – | – | – | – | – | – | |
| C7-04 | 222H | Not used | – | – | – | – | – | – | – | – | |
| C8-01 | 223H | Not used | – | – | – | – | – | – | – | – | |
| C8-02 | 224H | Not used | – | – | – | – | – | – | – | – | |
| C8-03 | 225H | Not used | – | – | – | – | – | – | – | – | |
| C8-04 | 226H | Not used | – | – | – | – | – | – | – | – | |
| C8-05 | 227H | Not used | – | – | – | – | – | – | – | – | |
| C8-06 | 228H | Not used | – | – | – | – | – | – | – | – | |
| C8-07 | 229H | Not used | – | – | – | – | – | – | – | — | |
| C8-08 | 22AH | AFR gain | 2.00 | 0 00 to 10.00 | | – | – | A | – | – | |
| C8-09 | 22BH | Not used | – | – | – | – | – | – | – | – | |
| C8-10 | 22CH | Not used | – | – | – | – | – | – | – | – | |
| C8-11 | 22DH | Not used | – | – | – | – | – | – | – | – | |
| C8-12 | 22EH | Not used | – | – | – | – | – | – | – | – | |
| C8-13 | 22FH | Not used | – | – | – | – | – | – | – | – | |
| C8-14 | 230H | Not used | – | – | – | – | – | – | – | – | |
| C8-15 | 231H | Not used | – | – | – | – | – | – | – | – | |
| C8-16 | 232H | Not used | – | – | – | – | – | – | – | – | |
| C8-17 | 233H | Not used | – | – | – | – | – | – | – | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C8-18 | 234H | Not used | – | – | – | – | – | – | – | – | |
| C8-19 | 235H | Not used | – | – | – | – | – | – | – | – | |
| C8-20 | 236H | Test (simulation) mode | 0 | 0 to 3 | | A | A | A | A | A | 0 Normal operation<br>1 Simulation mode<br>2 Base test mode<br>(only when individual control power supplies are used )<br>3 V/f test mode |
| C8-21 | 237H | Not used | – | – | – | – | – | – | – | – | |
| C8-22 | 238H | Not used | – | – | – | – | – | – | – | – | |
| C8-23 | 239H | Not used | – | – | – | – | – | – | – | – | |
| C8-24 | 23AH | Not used | – | – | – | – | – | – | – | – | |
| C8-25 | 23BH | Not used | – | – | – | – | – | – | – | – | |
| C8-26 | 23CH | Not used | – | – | – | – | – | – | – | – | |
| C8-27 | 23DH | Not used | – | – | – | – | – | – | – | – | |
| C8-28 | 23EH | Not used | – | – | – | – | – | – | – | – | |
| C8-29 | 23FH | Not used | – | – | – | – | – | – | – | – | |
| C8-30 | 240H | Not used | – | – | – | – | – | – | – | – | |
| C8-31 | 241H | Not used | – | – | – | – | – | – | – | – | |
| C8-32 | 242H | Not used | – | – | – | – | – | – | – | – | |
| C8-33 | 243H | Not used | – | – | – | – | – | – | – | – | |
| C8-34 | 244H | Not used | – | – | – | – | – | – | – | – | |
| C8-35 | 245H | Not used | – | – | – | – | – | – | – | – | |
| C9-01 | 246H | Rated speed adjustment | 1.0000 | 0.5000 to 1.3000 | | B | B | B | B | – | |
| C9-02 | 247H | Energy-saving control selection | 0 | 0/1 | | A | A | – | – | – | 0 Normal mode<br>1. Energy-saving mode |
| C9-03 | 248H | Energy-saving control coefficient K2 | 0.00 | 0.00 to 655.00 | | A | A | – | – | – | |
| C9-04 | 249H | Energy-saving voltage upper limit (60 Hz) | 120 | 0 to 120% | | A | A | – | – | – | |
| C9-05 | 24AH | Energy-saving voltage upper limit (6 Hz) | 16 | 0 to 25% | | A | A | – | – | – | |
| C9-06 | 24BH | Energy-saving voltage lower limit (60 Hz) | 50 | 0 to 120% | | A | A | – | – | – | |
| C9-07 | 24CH | Energy-saving voltage lower limit (6 Hz) | 12 | 0 to 25% | | A | A | – | – | – | |
| C9-08 | 24DH | Power average time | 1.00 | 0.01 to 5.00 sec | | A | A | – | – | – | |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C9-09 | 24EH | Probing operation voltage limit | 0 | 0 to 100% | | A | A | – | – | – | |
| C9-10 | 24FH | Probing operation voltage step (at Vout 100%) | 0 5 | 0 1 to 10 0% | | A | A | – | – | – | |
| C9-11 | 250H | Probing operation voltage step (at Vout 5%) | 0 2 | 0 1 to 10 0% | | A | A | – | – | – | |
| C9-12 | 251H | Power detection filter time constant | 0 140 | 0 000 to 2 000 sec | | A | A | – | – | – | |
| C9-13 | 252H | Power detection filter switching width | 10 | 1 to 100% | | A | A | – | – | – | |
| C9-14 | 253H | Torque observer selection | 0 | 0/1 | | – | – | – | A | – | 0 Control OFF<br>1 Control ON |
| C9-15 | 254H | Speed/torque control switching | 0 | 0/1 | | – | – | – | A | – | 0 Speed control<br>1. Torque control<br>Valid only when C9-14=1 |
| C9-16 | 255H | Droop control selection | 0 | 0/1 | | – | – | – | A | – | 0 Speed control<br>1 Droop speed control<br>Valid only when C9-14=1 |
| C9-17 | 256H | Motor mechanical time constant | 0.000 | 0 000 to 5 000 sec | | – | – | – | A | – | |
| C9-18 | 257H | Torque observer proportional gain | 0.000 | 0 000 to 2 000 | ○ | – | – | – | A | – | |
| C9-19 | 258H | Torque observer integral time | 0.000 | 0 000 to 0 500 sec | ○ | – | – | – | A | – | |
| C9-20 | 259H | Torque observer secondary filter time constant 1 | 0 000 | 0 000 to 1 000 sec | ○ | – | – | – | A | – | |
| C9-21 | 25AH | Torque observer secondary filter time constant 2 | 0 000 | 0 000 to 5 000 sec | ○ | – | – | – | A | – | |
| C9-22 | 25BH | Torque observer output leading time | 0 000 | 0 000 to 0 050 sec | ○ | – | – | – | A | – | |
| C9-23 | 25CH | Filter time constant for torque observer acceleration torque monitor | 0 000 | 0 000 to 0 500 sec | | – | – | – | A | – | |
| C9-24 | 25DH | Torque observer control integral hold | 0.00 | 0 00 to 100 00% | | – | – | – | A | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D1-01 | 280H | Speed reference | 0 00 | 0 00 to 100.00% | ○ | Q | Q | Q | Q | Q | The unit varies depending on the setting of O1-03. |
| D1-02 | 281H | Current reference (EMS) | 0 0 | 0 0 to 100.0% | ○ | – | – | – | – | Q | |
| D1-03 | 282H | Not used | – | – | – | – | – | – | – | – | |
| D1-04 | 283H | Not used | – | – | – | – | – | – | – | – | |
| D1-05 | 284H | Not used | – | – | – | – | – | – | – | – | |
| D1-06 | 285H | Not used | – | – | – | – | – | – | – | – | |
| D1-07 | 286H | Not used | – | – | – | – | – | – | – | – | |
| D1-08 | 287H | Not used | – | – | – | – | – | – | – | – | |
| D1-09 | 288H | Jog speed reference | 10 00 | 0 00 to 100 00% | ○ | Q | Q | Q | Q | – | The unit varies depending on the setting of O1-03 |
| D2-01 | 289H | Not used | – | – | – | – | – | – | – | – | |
| D2-02 | 28AH | Not used | – | – | – | – | – | – | – | – | |
| D3-01 | 28BH | Not used | – | – | – | – | – | – | – | – | |
| D3-02 | 28CH | Not used | – | – | – | – | – | – | – | – | |
| D3-03 | 28DH | Not used | – | – | – | – | – | – | – | – | |
| D3-04 | 28EH | Not used | – | – | – | – | – | – | – | – | |
| D4-01 | 28FH | Not used | – | – | – | – | – | – | – | – | |
| D4-02 | 290H | Not used | – | – | – | – | – | – | – | – | |
| D5-01 | 291H | Not used | – | – | – | – | – | – | – | – | |
| D5-02 | 292H | Torque reference delay time | 0 | 0 to 1000 msec | | – | – | – | A | – | |
| D5-03 | 293H | Speed limit selection | 1 | 1/2 | | – | – | – | A | – | 1 Speed reference<br>2 D5-04 |
| D5-04 | 294H | Speed limit | 0 | –120 to 120% | | – | – | – | A | – | |
| D5-05 | 295H | Speed limit bias | 5 | 0 to 120% | | – | – | – | A | – | |
| D5-06 | 296H | Speed/torque control switching timer | 50 | 0 to 1000 msec | | – | – | – | A | – | |
| D5-07 | 297H | Torque reference function selection | 0 | 0/1 | | – | – | A | A | – | 0 Torque reference<br>1 Torque limit |
| D6-01 | 298H | External magnetic flux reference selection | 0 | 0/1 | | – | – | – | A | – | 0 Magnetic flux reference input from master controller is invalid<br>1 Magnetic flux reference input from master controller is valid |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E1-01 | 300H | Input voltage setting | 200 | 180 to 230 V | | Q | Q | Q | Q | Q | For 400 V class, the value to be set is twice as that of 200 V class |
| E1-02 | 301H | Motor selection (V/f or vector) | 2 | 0 to 2 | | Q | Q | Q | Q | – | 0 General-purpose motor<br>1 V/f control motor<br>2 Vector control motor |
| E1-03 | 302H | V/f pattern selection | 0F | 00 to 0F | | Q | Q | – | – | – | 00 - 0E: Preset V/f pattern (15 kinds)<br>0F: Custom V/f pattern<br>In vector control mode, fixed to 0F |
| E1-04 | 303H | Rated r/min | 1750 | 0 to 24000 r/min | | Q | Q | Q | Q | – | The unit varies depending on the setting of O1-04<br>With V/f control and V/f with PG feedback, initial value is 1800 |
| E1-05 | 304H | Rated voltage | 180 0 | 0 0 to 255 0 V | | Q | Q | Q | Q | – | For 400 V class, the value to be set is twice as that of 200 V class. |
| E1-06 | 305H | Base r/min | 1750 | 0 to 24000 r/min | | Q | Q | Q | Q | – | The unit varies depending on the setting of O1-04.<br>With V/f control and V/f with PG feedback, initial value is 1800 |
| E1-07 | 306H | Middle r/min | 90 | 0 to 24000 r/min | | Q | Q | A | – | – | The unit varies depending on the setting of O1-04 |
| E1-08 | 307H | Middle voltage | 0 0 | 0 0 to 255 0 V | | Q | Q | A | – | – | Initial values<br>11 0 Open loop vector<br>15 0 . V/f control, 0 4 to 1 5 kW<br>14 0 . V/f control, 2 2 to 45 kW<br>12 0 . V/f control, 55 kW or more<br>For 400 V class, the value to be set is twice as that of 200 V class |
| E1-09 | 308H | Minimum r/min | 100 | 0 to 24000 r/min | | Q | Q | Q | B | – | Initial values<br>15 . Open loop vector<br>45 . . V/f control<br>The unit varies depending on the setting of O1-04. |
| E1-10 | 309H | Minimum voltage | 0.0 | 0.0 to 255.0 V | | Q | Q | A | – | – | Initial values.<br>2 0 . . Open loop vector<br>9 0 V/f control, 0 4 to 1 5 kW<br>7 0 . . V/f control, 2 2 to 45 kW<br>6 0 V/f control, 55 kW or more<br>For 400 V class, the value to be set is twice as that of 200 V class |
| E1-11 | 30AH | Middle r/min 2 | 0 | 0 to 24000 r/min | | B | B | B | B | – | The unit varies depending on the setting of O1-04 |
| E1-12 | 30BH | Middle voltage 2 | 0 0 | 0.0 to 255 0 V | | B | B | B | B | – | For 400 V class, the value to be set is twice as that of 200 V class. |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E1-13 | 30CH | Base voltage | 180 0 | 0.0 to 255 0 V | | Q | Q | Q | Q | – | With V/f control and V/f with PG feedback, initial value is 0 0. For 400 V class, the value to be set is twice as that of 200 V class |
| E2-00 | 30DH | Motor rated output (not used) | * | 00 to FF | | Q | Q | Q | Q | – | Same setting as the inverter output |
| E2-01 | 30EH | Motor rated current | * | 0 01 to 2000.0 A** | | Q | Q | Q | Q | Q | *. Initial values vary depending on the kVA setting and motor selection<br>**. For 7 5 kW model or smaller, minimum unit is 0 01A |
| E2-02 | 30FH | Motor rated slip | * | 0.00 to 20 00 Hz | ○ | A | A | Q | Q | – | |
| E2-03 | 310H | Motor no-load current | * | 0.01 to 1500 0 A** | ○ | A | A | Q | Q | – | |
| E2-04 | 311H | Number of motor poles | 4 | 2 to 48 | | Q | Q | Q | Q | – | |
| E2-05 | 312H | Motor line-to-line resistance | * | 0 000 to 65 000 ohm | ○ | A | A | A | A | – | |
| E2-06 | 313H | Motor leak inductance | * | 0 0 to 30 0% | ○ | – | – | A | A | – | |
| E2-07 | 314H | Motor iron-core saturation coefficient 1 | 0 50 | 0 00 to 1 00 | ○ | – | – | A | A | – | |
| E2-08 | 315H | Motor iron-core saturation coefficient 2 | 0 75 | 0.00 to 1 00 | ○ | – | – | A | A | – | |
| E2-09 | 316H | Motor mechanical loss | 0 0 | 0 0 to 10 0% | ○ | – | – | – | A | – | |
| E2-10 | 317H | Motor overheat temperature | 120 | 50 to 200°C | | Q | Q | Q | Q | – | |
| E2-11 | 318H | Motor feeder resistance | 1 0 | 0 0 to 10 0% | ○ | A | A | A | A | – | |
| E3-01 | 319H | Motor 2 control method selection | 2 | 0 to 3 | | A | A | A | A | – | 0 V/f control<br>1: V/f with PG feedback<br>2: Open loop vector<br>3: Flux vector |
| E3-02 | 31AH | Motor 2 rated output (not used) | * | 00 to FF | | A | A | A | A | – | Same setting as the inverter capacity |
| E3-03 | 31BH | Motor 2 PG constant | 600 | 0 to 10000 | | – | A | – | A | – | |
| E4-01 | 31CH | Motor 2 rated r/min | 1750 | 0 to 24000 r/min | | A | A | A | A | – | The unit varies depending on the setting of O1-04<br>With V/f control and V/f with PG feedback, initial value is 1800 |
| E4-02 | 31DH | Motor 2 rated voltage | 180.0 | 0.0 to 255 0 V | | A | A | A | A | – | For 400 V class, the value to be set is twice as that of 200 V class. |
| E4-03 | 31EH | Motor 2 base r/min | 1750 | 0 to 24000 r/min | | A | A | A | A | – | The unit varies depending on the setting of O1-04<br>With V/f control and V/f with PG feedback, initial value is 1800 |
| E4-04 | 31FH | Motor 2 mid. r/min | 90 | 0 to 24000 r/min | | A | A | A | – | – | The unit varies depending on the setting of O1-04. |

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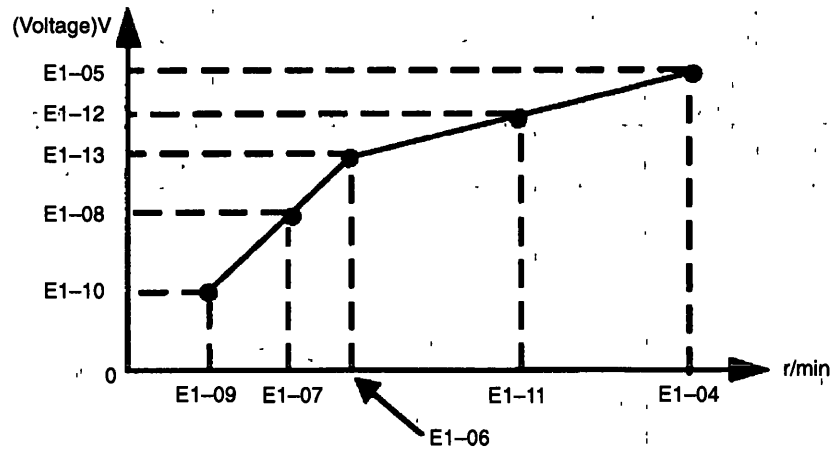
| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E4-05 | 320H | Motor 2 mid. voltage | 0.0 | 0 0 to 255 0 V | | A | A | A | – | – | Initial values<br>11 0 Open loop vector<br>15 0 V/f control, 0 4 to 1 5 kW<br>14 0 V/f control, 2 2 to 45 kW<br>12 0 V/f control, 55 kW or more<br>For 400 V class, the value to be set is twice as that of 200 V class. |
| E4-06 | 321H | Motor 2 minimum r/min | 100 | 0 to 24000 r/min | | A | A | A | A | – | Initial values.<br>15 . . Open loop vector<br>45 V/f control<br>The unit varies depending on the setting of O1-04 |
| E4-07 | 322H | Motor 2 minimum voltage | 0 0 | 0.0 to 255.0 V | | A | A | A | – | – | Initial values<br>2 0 Open loop vector<br>9 0 V/f control, 0 4 to 1 5 kW<br>7 0 V/f control, 2 2 to 45 kW<br>6 0 V/f control, 55 kW or more<br>For 400 V class, the value to be set is twice as that of 200 V class |
| E4-08 | 323H | Motor 2 input voltage selection | 200 | 180 to 230 V | | A | A | A | A | – | For 400 V class, the value to be set is twice as that of 200 V class |
| E4-09 | 324H | Motor 2 motor selection (V/f or vector) | 0 | 0 to 2 | | A | A | A | A | – | 0 General-purpose motor<br>1 V/f control motor<br>2 Vector control motor |
| E4-10 | 325H | Motor 2 rated current | 0F | 00 to 0F | | A | A | – | – | – | 00 - 0E Preset V/f pattern (15 kinds)<br>0F. Custom V/f pattern<br>In vector control mode, fixed to 0F |
| E4-11 | 326H | Motor 2 rated slip | 0 | 0 to 24000 r/min | | A | A | A | A | – | The unit varies depending on the setting of O1-04 |
| E4-12 | 327H | Motor 2 no-load current | 0.0 | 0 0 to 255 0 V | | A | A | A | A | – | For 400 V class, the value to be set is twice as that of 200 V class |
| E4-13 | 328H | Motor 2 base voltage | 180 0 | 0.0 to 255.0 V | | A | A | A | A | – | With V/f control and V/f with PG feedback, initial value is 0 0<br>For 400 V class, the value to be set is twice as that of 200 V class |
| E5-01 | 329H | Motor 2 rated current | * | 0.00 to 2000.0 A** | | A | A | A | A | – | *. Initial values vary depending on the kVA setting and motor selection.<br>** For 7 5 kW model or smaller, minimum unit is 0 01A |
| E5-02 | 32AH | Motor 2 rated slip | * | 0 00 to 20 00 Hz | ○ | A | A | A | A | – | |
| E5-03 | 32BH | Motor2 no-load current | * | 0 00 to 1500.0 A** | ○ | A | A | A | A | – | |
| E5-04 | 32CH | Motor 2 number of poles | 4 | 2 to 48 | | A | A | A | A | – | |
| E5-05 | 32DH | Motor 2 line-to-line resistance | * | 0.000 to 65.000 ohm | ○ | A | A | A | A | – | |
| E5-06 | 32EH | Motor 2 leak inductance | * | 0 0 to 30.0% | ○ | – | – | A | A | – | |
| E5-07 | 32FH | Motor 2 iron-core saturation coefficient 1 | 0 50 | 0 00 to 1 00 | ○ | – | – | A | A | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E5-08 | 330H | Motor 2 iron-core saturation coefficient 2 | 0.75 | 0.00 to 1.00 | ○ | – | – | A | A | – | |
| E5-09 | 331H | Motor 2 mechanical loss | 0.0 | 0.0 to 10.0% | ○ | – | – | – | A | – | |
| E5-10 | 332H | Motor 2 overheat temperature | 120 | 50 to 200°C | | A | A | A | A | – | |
| E5-11 | 333H | Motor 2 feeder resistance | 1.0 | 0.0 to 10.0% | ○ | A | A | A | A | – | |
| E6-01 | 334H | Maximum output frequency (EMS) | 60.0 | 0.0 to 400.0 Hz | | – | – | – | – | Q | |
| E6-02 | 335H | Minimum output frequency (EMS) | 1.5 | 0.0 to 400.0 Hz | | – | – | – | – | Q | |

[V/f Pattern Setting]




Set r/min to be E1–09 ≦ E1–07 < E1–06 ≦ E1–11 ≦ E1–04

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F1-01 | 380H | PG constant | 600 | 0 to 10000 | | – | Q | – | Q | – | |
| F1-02 | 381H | Operation selection at PG open circuit | 1 | 0 to 3 | | – | B | – | B | – | For flux vector control, selection is possible only from 1 and 3<br>0: Ramp to stop<br>1 Coast to stop<br>2 Emergency stop<br>3 Operation continue |
| F1-03 | 382H | Operation selection at overspeed detection | 1 | 0 to 3 | | – | B | – | B | – | 0 Ramp to stop<br>1 Coast to stop<br>2: Emergency stop<br>3: Operation continue |
| F1-04 | 383H | Operation selection at excessive speed deviation detection | 3 | 0 to 3 | | – | B | – | B | – | 0 Ramp to stop<br>1: Coast to stop<br>2 Emergency stop<br>3 Operation continue |
| F1-05 | 384H | PG rotation | 0 | 0/1 | | – | B | – | B | – | 0 Forward direction<br>1 Reverse direction |
| F1-06 | 385H | PG division rate (PG pulse monitor output) | 1 | 1 to 132 | | – | B | – | B | – | Valid only for PG-B2/H |
| F1-07 | 386H | Integral value during accel/decel enable/disable | 0 | 0/1 | | – | B | – | – | – | 0 Disabled<br>1 Enabled |
| F1-08 | 387H | Overspeed detection level | 115 | 0 to 120% | | – | A | – | A | – | |
| F1-09 | 388H | Overspeed detection delay time | 0 0 | 0 0 to 2 0 sec | | – | A | – | A | – | For V/f with PG feedback, initial value is 1 0 |
| F1-10 | 389H | Excessive speed deviation detection level | 10 | 0 to 50% | | – | A | – | A | – | |
| F1-11 | 38AH | Excessive speed deviation detection delay time | 0 5 | 0 0 to 10 0 sec | | – | A | – | A | – | |
| F1-12 | 38BH | Number of PG gear teeth 1 | 0 | 0 to 1000 | | – | A | – | – | – | |
| F1-13 | 38CH | Number of PG gear teeth 2 | 0 | 0 to 1000 | | – | A | – | – | – | |
| F2-01 | 38DH | Not used | – | – | – | – | – | – | – | – | |
| F3-01 | 38EH | Not used | – | – | – | – | – | – | – | – | |
| F4-01 | 38FH | AO-12/H channel 1 monitor selection | 0 | 0 to 50 | ○ | B | B | B | B | B | 0 Through mode |
| F4-02 | 390H | AO-12/H channel 1 gain | 1 00 | –300.00 to 300 00 | ○ | B | B | B | B | B | Digital operator setting range<br>–99 99 ~ +99 99 |
| F4-03 | 391H | AO-12/H channel 2 monitor selection | 0 | 0 to 50 | ○ | B | B | B | B | B | 0 Through mode |
| F4-04 | 392H | AO-12/H channel 2 gain | 1 00 | –300 00 to 300 00 | ○ | B | B | B | B | B | Digital operator setting range<br>–99.99 ~ +99 99 |
| F4-05 | 393H | AO-12/H channel 1 bias | 0 | –32768 to 32767 | ○ | B | B | B | B | B | 30000/10V |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F4-06 | 394H | AO-12/H channel 2 bias | 0 | –32768 to 32767 | ○ | B | B | B | B | B | 30000/10V |
| F5-01 | 395H | Not used | – | – | – | – | – | – | – | – | |
| F5-02 | 396H | Not used | – | – | – | – | – | – | – | – | |
| F6-01 | 397H | DO-08/H output mode selection | 2 | 0 to 2 | | B | B | B | B | B | 0: Individual outputs at 8 channels<br>1. Code output<br>2 General-purpose individual outputs |
| F7-01 | 398H | Not used | – | – | | – | – | – | – | – | |
| F8-01 | 399H | Division rate setting (EMS) | 1 | 1 to 10 | | | – | – | – | A | |
| F8-02 | 39AH | Not used | – | – | – | – | – | – | – | – | |
| F8-03 | 39BH | Not used | – | – | – | – | – | – | – | – | |
| F8-04 | 39CH | Not used | – | – | – | – | – | – | – | – | |
| F8-05 | 39DH | Not used | – | – | – | – | – | – | – | – | |
| F8-06 | 39EH | Synchronous control ON/OFF selection (EMS) | 0 | 0/1 | | – | – | – | – | A | 0: OFF<br>1. ON |
| F9-01 | 39FH | External fault bit selection | 0 | 0/1 | | A | A | A | A | A | 0 Fault at "1"<br>1 Fault at "0" |
| F9-02 | 3A0H | External fault detection mode | 0 | 0/1 | | A | A | A | A | A | 0 Detected always<br>1. Detected during run |
| F9-03 | 3A1H | Operation selection at external fault detection | 1 | 0 to 3 | | A | A | A | A | A | 0 Ramp to stop<br>1 Emergency stop<br>2 Coast to stop<br>3 Operation continue |
| F9-04 | 3A2H | Operation selection at bus error | 1 | 0 to 3 | | A | A | A | A | A | 0: Ramp to stop<br>1 Emergency stop<br>2: Coast to stop<br>3 Operation continue |
| F9-05 | 3A3H | Control data item selection, at high-speed side 1 | 3 | 1 to 18 | | A | A | A | A | A | Third control data |
| F9-06 | 3A4H | Control data item selection, at high-speed side 2 | 4 | 1 to 18 | | A | A | A | A | A | Fourth control data |
| F9-07 | 3A5H | Control data item selection, at low-speed side 1 | 15 | 1 to 18 | | A | A | A | A | A | 15th control data |
| F9-08 | 3A6H | Control data item selection, at low-speed side 2 | 16 | 1 to 18 | | A | A | A | A | A | 16th control data |
| F9-09 | 3A7H | Monitor data item selection, at high-speed side 1 | 9 | 1 to 50 | | A | A | A | A | A | Third monitor data |
| F9-10 | 3A8H | Monitor data item selection, at high-speed side 2 | 40 | 1 to 50 | | A | A | A | A | A | Fourth monitor data |
| F9-11 | 3A9H | Monitor data item selection, at low-speed side 1 | 15 | 1 to 50 | | A | A | A | A | A | 15th monitor data |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F9-12 | 3AAH | Monitor data item selection, at low-speed side 2 | 38 | 1 to 50 | | A | A | A | A | A | 16th monitor data |
| F9-13 | 3ABH | Trace sampling cycle | 0 | 0 to 60000 scan | | A | A | A | A | A | 0 Every scan |
| F9-14 | 3ACH | Transmission ASR proportional gain selection | 0 | 0/1 | | – | A | – | A | – | 0 The gain set by the constant is used<br>1 The gain sent from the master controller is used |
| F9-15 | 3ADH | Transmission regeneration side torque limit selection | 0 | 0/1 | | – | – | A | A | – | 0 The regeneration side torque limit set by the constant is used<br>1 The regeneration side torque limit sent from the master controller is used |
| F9-16 | 3AEH | Not used | – | – | – | – | – | – | – | – | |
| F9-17 | 3AFH | Not used | – | – | – | – | – | – | – | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| H1-01 | 400H | Multi-function input (terminal 9CN-19) | 0F | 00 to FF | | B | B | B | B | B | 0F: Through mode |
| H1-02 | 401H | Multi-function input (terminal 9CN-20) | 0F | 00 to FF | | B | B | B | B | B | 0F: Through mode |
| H1-03 | 402H | Multi-function input (terminal 9CN-21) | 0F | 00 to FF | | B | B | B | B | B | 0F. Through mode |
| H1-04 | 403H | Multi-function input (terminal 9CN-22) | 0F | 00 to FF | | B | B | B | B | B | 0F: Through mode |
| H1-05 | 404H | Multi-function input (terminal 9CN-23) | 0F | 00 to FF | | B | B | B | B | B | 0F Through mode |
| H1-06 | 405H | Multi-function input (terminal 9CN-24) | 0F | 00 to FF | | B | B | B | B | B | 0F. Through mode |
| H2-01 | 406H | Multi-function output (terminal TB2-4, 5) | 0F | 00 to FF | | B | B | B | B | B | 0F: Through mode |
| H2-02 | 407H | Multi-function output (terminal 10CN-10) | 0F | 00 to FF | | B | B | B | B | B | 0F Through mode |
| H2-03 | 408H | Multi-function output (terminal 10CN-12) | 0F | 00 to FF | | B | B | B | B | B | 0F. Through mode |
| H2-04 | 409H | Multi-function output (terminal 10CN-14) | 0F | 00 to FF | | B | B | B | B | B | 0F. Through mode |
| H2-05 | 40AH | Multi-function output (terminal 10CN-16) | 0F | 00 to FF | | B | B | B | B | B | 0F Through mode |
| H2-06 | 40BH | Multi-function output (terminal TB2-1, 2, 3) | 0E | 00 to FF | | B | B | B | B | B | 0E Error |
| H3-01 | 40CH | Signal level selection (terminal 9CN-4) | 0 | 0/1 | | B | B | B | B | B | 0 0 to 10 V<br>1 −10 V to +10V |
| H3-02 | 40DH | Gain (terminal 9CN-4) | 100 0 | 0 0 to 1000 0% | ○ | B | B | B | B | B | |
| H3-03 | 40EH | Bias (terminal 9CN-4) | 0 0 | −100 0 to 100 0% | ○ | B | B | B | B | B | |
| H3-04 | 40FH | Signal level selection (terminal 9CN-8) | 0 | 0/1 | | B | B | B | B | B | 0 0 to 10 V<br>1. −10 V to.+10V |
| H3-05 | 410H | Not used | – | – | – | – | – | – | – | – | |
| H3-06 | 411H | Gain (terminal 9CN-8) | 100 0 | 0 0 to 1000 0% | ○ | B | B | B | B | B | |
| H3-07 | 412H | Bias (terminal 9CN-8) | 0 0 | −100 0 to 100 0% | ○ | B | B | B | B | B | |
| H3-08 | 413H | Signal level selection (terminal 9CN-6) | 2 | 0 to 2 | | A | A | A | A | A | 0: 0 to 10 V<br>1. −10 V to +10V<br>2 4 to 20 mA |
| H3-09 | 414H | Not used | – | – | – | – | – | – | – | – | |
| H3-10 | 415H | Gain (terminal 9CN-6) | 100 0 | 0 0 to 1000 0% | ○ | A | A | A | A | A | |
| H3-11 | 416H | Bias (terminal 9CN-6) | 0 0 | −100 0 to 100 0% | ○ | A | A | A | A | A | |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| H3-12 | 417H | Analog input filter time constant | 0 00 | 0 00 to 2 00 sec | | A | A | A | A | A | |
| H4-01 | 418H | Multi-function AO (terminal 10CN-2) | 0 | 0 to 50 | ○ | B | B | B | B | B | 0. Through mode |
| H4-02 | 419H | Gain (terminal 10CN-2) | 1.00 | –300 00 to 300 00 | ○ | B | B | B | B | B | Digital operator setting range –99 99 ~ +99 99 |
| H4-03 | 41AH | Bias (terminal 10CN-2) | 0 | –32768 to 32767 | ○ | B | B | B | B | B | 30000/10V |
| H4-04 | 41BH | Multi-function AO (terminal 10CN-4) | 0 | 0 to 50 | ○ | B | B | B | B | B | 0 Through mode |
| H4-05 | 41CH | Gain (terminal 10CN-4) | 1.00 | –300 00 to 300 00 | ○ | B | B | B | B | B | Digital operator setting range –99 99 ~ +99 99 |
| H4-06 | 41DH | Bias (terminal 10CN-4) | 0 | –32768 to 32767 | ○ | B | B | B | B | B | 30000/10V |
| H4-07 | 41EH | Analog output signal polarity selection | 1 | 0/1 | | B | B | B | B | B | Also used for signal characteristics of AO-12/H<br>0: Unsigned<br>1. Signed |
| H5-01 | 41FH | Not used | – | – | – | – | – | – | – | – | |
| H5-02 | 420H | Not used | – | – | – | – | – | – | – | – | |
| H5-03 | 421H | Not used | – | – | – | – | – | – | – | – | |
| H5-04 | 422H | Not used | – | – | – | – | – | – | – | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L1-01 | 480H | Not used | – | – | – | – | – | – | – | – | |
| L1-02 | 481H | Motor OL operation time | 60.0 | 1.0 to 300.0 sec | | B | B | B | B | B | |
| L1-03 | 482H | Motor OL detection start current | 110 | 50 to 200% | | B | B | B | B | B | |
| L1-04 | 483H | Operation selection at motor overload | 1 | 0 to 3 | | B | B | B | B | B | 0. Ramp to stop at C1-02 setting time<br>1. Output stops (coast to stop) (major fault)<br>2. Ramp to stop at C1-09 setting time (major fault)<br>3. Operation continue (minor fault) |
| L2-01 | 484H | Momentary power loss detection | 0 | 0/1 | | B | B | B | B | – | 0. None<br>1. Operation continue |
| L2-02 | 485H | Momentary power loss ridethru time | 1.0 | 0.0 to 2.0 sec | | B | B | B | B | – | |
| L2-03 | 486H | Minimum base block time | * | 0.0 to 5.0 sec | ○ | B | B | B | B | – | Varies depending on inverter capacity |
| L2-04 | 487H | Voltage recovery time | 0.100 | 0.010 to 2.000 sec | ○ | A | A | A | A | – | For flux vector control, initial value is 0.300 |
| L2-05 | 488H | Undervoltage detection level | 190 | 150 to 210 V | ○ | A | A | A | A | A | For 400 V class, the value to be set is twice as that of 200 V class |
| L2-06 | 489H | Not used | – | – | – | – | – | – | – | – | |
| L2-07 | 48AH | Acceleration time at recovery from momentary power loss | 10.00 | 0.00 to 600.00 sec | ○ | A | A | A | A | – | |
| L3-01 | 48BH | Stall prevention selection during acceleration | 1 | 0 to 2 | | B | B | B | – | – | 0. Disabled<br>1. Enabled<br>2. Optimum acceleration |
| L3-02 | 48CH | Stall prevention level during acceleration | 150 | 0 to 200% | | B | B | B | – | – | |
| L3-03 | 48DH | Stall prevention limit during acceleration | 100 | 0 to 100% | | A | A | A | – | – | For V/f control and V/f with PG feedback, initial value is 50. |
| L3-04 | 48EH | Stall prevention selection during acceleration | 1 | 0 to 2 | | B | B | B | B | – | 0. Disabled<br>1. Enabled<br>2. Optimum deceleration (selection is not allowed for vector control) |
| L3-05 | 48FH | Stall prevention selection during running | 1 | 0 to 2 | | B | B | – | – | – | 0. Disabled<br>1. Enabled (deceleration time: C1-02)<br>2. Enabled (deceleration time: C1-04) |
| L3-06 | 490H | Stall prevention level during running | 160 | 30 to 200% | | B | B | – | – | – | |
| L3-07 | 491H | Not used | – | – | – | – | – | – | – | – | |
| L3-08 | 492H | Not used | – | – | – | – | – | – | – | – | |

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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L4-01 | 493H | Desired speed agree detection level | 0 00 | 0 00 to 100 00% | | B | B | B | B | B | The unit varies depending on the setting of O1-03<br>EMS Desired current detection level should be set<br>Minimum setting unit is fixed at 0 01% |
| L4-02 | 494H | Speed detection width | 2.00 | 0 00 to 100 00% | | B | B | B | B | B | The unit varies depending on the setting of O1-03<br>For V/f control and V/f with PG feedback, initial value is 1 20 Hz<br>EMS Current detection width should be set<br>Minimum setting unit is fixed at 0 01% |
| L4-03 | 495H | Not used | – | – | – | – | – | – | – | – | |
| L4-04 | 496H | Not used | – | – | – | – | – | – | – | – | |
| L4-05 | 497H | Not used | – | – | – | – | – | – | – | – | |
| L5-01 | 498H | Number of auto restart attempts | 0 | 0 to 10 | | B | B | B | B | – | |
| L5-02 | 499H | Auto restart operation selection | 0 | 0/1 | | B | B | B | B | – | 0 No fault retry<br>1 Fault retry active |
| L5-03 | 49AH | Not used | | | | | | | | | |
| L6-01 | 49BH | Torque detection selection | 0 | 0 to 4 | | B | B | B | B | – | 0 Disabled<br>1 Detects during constant-speed run (operation continue)<br>2 Detects during run (operation continue)<br>3 Detects during constant-speed run (operation stopped)<br>4 Detects during running (operation stopped) |
| L6-02 | 49CH | Torque detection level | 150 | 0 to 300% | | B | B | B | B | – | |
| L6-03 | 49DH | Torque detection time | 0.1 | 0 0 to 10 0 sec | | B | B | B | B | – | |
| L6-04 | 49EH | Torque detection selection 2 | 0 | 0 to 4 | | A | A | A | A | – | 0 Disabled<br>1 Detects during constant-speed run (operation continue)<br>2 Detects during run (operation continue)<br>3: Detects during constant-speed run (operation stopped)<br>4 Detects during running (operation stopped) |
| L6-05 | 49FH | Torque detection level 2 | 150 | 0 to 300% | | A | A | A | A | – | |
| L6-06 | 4A0H | Torque detection time 2 | 0.1 | 0.0 to 10.0 sec | | A | A | A | A | – | |



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| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L7-01 | 4A1H | Forward torque limit | 160 | 0 to 300% | | – | – | B | B | – | |
| L7-02 | 4A2H | Reverse torque limit | 160 | 0 to 300% | | – | – | B | B | – | |
| L7-03 | 4A3H | Forward regenerative torque limit | 160 | 0 to 300% | | – | – | B | B | – | |
| L7-04 | 4A4H | Reverse regenerative torque limit | 160 | 0 to 300% | | – | – | B | B | – | |
| L7-05 | 4A5H | Not used | – | – | – | – | – | – | – | – | |
| L7-06 | 4A6H | Not used | – | – | – | – | – | – | – | – | |
| L8-01 | 4A7H | Braking circuit protection selection | 2 | 0 to 2 | | B | B | B | B | – | 0 Braking transistor provided, braking resistor not provided<br>1 Braking transistor provided, braking resistor not provided<br>2. Braking transistor not provided |
| L8-02 | 4A8H | Inverter overheat pre-alarm level | 100 | 50 to 110 deg | | A | A | A | A | A | |
| L8-03 | 4A9H | Operation selection after inverter overheat pre-alarm | 3 | 0 to 3 | | A | A | A | A | A | 0 Ramp to stop<br>1 Emergency stop<br>2 Coast to stop<br>3. Operation continue |
| L8-04 | 4AAH | Not used | – | – | – | – | – | – | – | – | |
| L8-05 | 4ABH | Input open-phase protection selection | 0 | 0/1 | | A | A | A | A | A | 0. Input open-phase protection not provided<br>1 Input open-phase protection provided |
| L8-06 | 4ACH | Not used | – | – | – | – | – | – | – | – | |
| L8-07 | 4ADH | Output open-phase protection selection | 1 | 0/1 | | A | A | A | A | A | 0 Output open-phase protection not provided<br>1 Output open-phase protection provided |
| L8-08 | 4AEH | Not used | – | – | – | – | – | – | – | – | |
| L8-09 | 4AFH | Not used | – | – | – | – | – | – | – | – | |
| L8-10 | 4B0H | Not used | – | – | – | – | – | – | – | – | |
| L8-11 | 4B1H | Not used | – | – | – | – | – | – | – | – | |
| L8-12 | 4B2H | Not used | – | – | – | – | – | – | – | – | |
| L8-13 | 4B3H | Not used | – | – | – | – | – | – | – | – | |
| L9-01 | 4B4H | Thermistor provided/not provided selection | 1 | 0/1 | | B | B | B | B | – | For V/f control and V/f with PG feedback, initial value is 0<br>0 Not provided<br>1. Provided |
| L9-02 | 4B5H | Operation selection at thermistor open circuit | 3 | 0 to 3 | | B | B | B | B | – | |

for more: efesotomasyon - Yaskawa drive

| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L9-03 | 4B6H | Operation selection at motor overheat (OH3) | 1 | 0 to 3 | | B | B | B | B | – | |
| L9-04 | 4B7H | Motor 2 thermistor provided/not provided selection | 1 | 0/1 | | A | A | A | A | – | For V/f control and V/f with PG feedback, initial value is 0. |



for more: efesotomasyon - Yaskawa drive

| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| O1-01 | 500H | Monitor selection | 6 | 4 to 50 | ○ | B | B | B | B | B | |
| O1-02 | 501H | Monitor selection after power up | 1 | 1 to 4 | ○ | B | B | B | B | B | 1. Speed reference<br>2. Motor speed (equivalent to U1-05)<br>3 Output current<br>4. Monitor items set by O1-01 |
| O1-03 | 502H | Setting/display unit of speed reference/monitor | 1 | 0 to 39999 | | B | B | B | B | – | For V/f control and V/f with PG feedback, initial value is 0.<br>EMS Fixed to 0 |
| O1-04 | 503H | Setting unit of V/f patterns | 1 | 0/1 | | B | B | B | B | – | 0 Hz<br>1. r/min |
| O1-05 | 504H | Not used | – | – | – | – | – | – | – | – | |
| O2-01 | 505H | LOCAL/REMOTE key enable/disable | 1 | 0/1 | | B | B | B | B | B | 0: Disabled<br>1 Enabled |
| O2-02 | 506H | STOP key enable/disable during remote operation | 0 | 0/1 | | B | B | B | B | B | 0 Disabled<br>1· Enabled |
| O2-03 | 507H | Not used | – | – | – | – | – | – | – | – | |
| O2-04 | 508H | kVA selection | * | 00 to FF | | B | B | B | B | B | Depends on inverter capacity |
| O2-05 | 509H | Speed reference setting method selection | 0 | 0/1 | | A | A | A | A | A | 0· ENTER key operation is necessary<br>1 ENTER key operation is not necessary |
| O2-06 | 50AH | Digital operator disconnection detection enable/disable selection | 0 | 0/1 | | A | A | A | A | A | 0 Operation continues even when digital operator is disconnected<br>1. Inverter fault when digital operator is disconnected |
| O2-07 | 50BH | Cumulative operation time setting | – | 0 to 65535H | | A | A | A | A | A | |
| O2-08 | 50CH | Cumulative operation time selection | 0 | 0/1 | | A | A | A | A | A | 0 Power ON time<br>1· Running time |

for more: efesotomasyon - Yaskawa drive

| Constant No. | MEMOBUS Address | Constant Name | Initial Value | Setting Range | Change during Operation | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS Control | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T1-01 | F0H | Motor selection | 1* | 1/2 | | – | – | B | B | – | 1. No 1 motor<br>2 No 2 motor |
| T1-02 | F1H | Tuning mode | 0* | 0 to 4 | | – | – | B | B | – | 0 Normal operation mode<br>1 Tuning by inputting nameplate value (digital operator)<br>2. Tuning by inputting motor constant (digital operator)<br>3 Tuning by inputting nameplate value (master controller)<br>4 Tuning by inputting motor constant (master controller) |
| T2-01 | F2H | Motor base voltage | E1-13† (E4-13)‡ | 0 0 to 255 0 V | | – | – | B | B | – | Motor nameplate value should be input |
| T2-02 | F3H | Motor rated current | E2-01† (E5-01)‡ | 0 00 to 2000 0 A | | – | – | B | B | – | Motor nameplate value should be input<br>Input the base side value<br>For 7 5 kW model or smaller, minimum unit is 0 01A |
| T2-03 | F4H | Motor base frequency | *† | 0 00 to 400 00 Hz | | – | – | B | B | – | Motor nameplate value should be input<br>No 1 motor (E1-06) × (E2-04)/120<br>No. 2 motor (E4-03) × (E5-04)/120 |
| T2-04 | F5H | Motor base r/min | E1-06† (E4-03) | 0 to 24000 r/min | | – | – | B | B | – | Motor nameplate value should be input. |
| T2-05 | F6H | Number of motor poles | E2-04 (E5-04)‡ | 2 to 48 | | – | – | B | B | – | Motor nameplate value should be input |
| T2-06 | F7H | Motor insulation class | 0 | 0 to 4 | | – | – | B | B | – | Motor nameplate value should be input<br>Insulation class A (100°C) . . . 0<br>E (120°C) . 1<br>B (130°C) 2<br>F (155°C) 3<br>H (180°C) 4 |
| T2-07 | F8H | PG constant | F1-01† (E3-03)‡ | 0 to 10000 | | – | – | B | B | – | |

*When setting up, return to the initial value

†When setting up, or changing T1-01 setting, return to the initial value.

‡For No 2 motor (T1-01 = 2)



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Table A-11 Table of Multi-function Input/Output Terminal Setting

| Setting Value | Multi-function Input Terminal Functions (H1-01, 02, 03, 04, 05, 06) |
|---|---|
| 02 | Option/inverter selection |
| 08 | External base block (NO contact) |
| 09 | External base block (NC contact) |
| 0F | Through mode |
| 14 | Fault reset |
| 15 | Emergency stop |
| 20 | External fault |
| 21 - 2F | |

| Setting Value | Multi-function Output Terminal Functions (H2-01, 02, 03, 04, 05, 06) |
|---|---|
| 00 | During run |
| 01 | Zero speed |
| 02 | Frequency agree 1 |
| 03 | Desired frequency agree 1 |
| 06 | Inverter ready |
| 07 | Low voltage detected |
| 08 | Base block |
| 0E | Fault |
| 0F | Through mode |
| 11 | Fault reset |
| 1A | During reverse run |

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The following constants are changed when the set value of A1–02 is changed.

Table A-12 Constants for Which Factory-set Values Vary Depending on Control Mode

| Constant No. | Constant Name | Factory-set Values | | | | |
|---|---|---|---|---|---|---|
| | | V/f Control | V/f with PG Feedback | Open Loop Vector | Flux Vector | EMS |
| B3-01 | Speed search selection at start | 0 | 1 | 0 | 1 | – |
| C3-01 | Slip compensation gain | 0.0 | – | 1.0 | 0.0 | – |
| C3-02 | Slip compensation primary delay time | 2000 | – | 200 | – | – |
| C4-02 | Torque compensation time constant | 200 | 200 | 20 | – | – |
| C5-01 | ASR proportional (P) gain 1 | – | 0.20 | – | 20.00 | – |
| C5-02 | ASR integral (I) time 1 | – | 0.200 | – | 0.500 | – |
| C5-03 | ASR proportional (P) gain 2 | – | 0.02 | – | 20.00 | – |
| C5-04 | ASR integral (I) time 2 | – | 0.050 | – | 0.500 | – |
| C5-05 | ASR limit | – | 5.0 | – | – | – |
| C5-06 | ASR primary delay time | – | – | – | 0.000 | – |
| E1-04<br>E4-01 | Rated r/min | 1800 | | 1750 | | – |
| E1-06<br>E4-03 | Base speed | 1800 | | 1750 | | – |
| E1-08<br>E4-05 | Middle voltage | ① 15.0 *<br>② 14.0<br>③ 12.0 | | 11.0 | – | – |
| E1-09<br>E4-06 | Minimum speed | 45 | | 15 | 0 | – |
| E1-10<br>E4-07 | Minimum voltage | ① 9.0 *<br>② 7.0<br>③ 6.0 | | 2.0 | – | – |
| E1-13<br>E4-13 | Base voltage | 0.0 | | 180.0 | | – |
| F1-09 | Overspeed detection delay time | – | 1.0 | – | 0.0 | – |
| L2-04 | Voltage recovery time | 0.300 | 0.300 | 0.300 | 0.100 | – |
| L3-03 | Stall prevention limit during acceleration | 50 | 50 | 100 | – | – |
| L4-02 | Speed detection width | 1.20 Hz | 1.20 Hz | 2.00% | 2.00% | 2.00% |
| L9-01 | Thermistor provided/not provided selection | 0 | 0 | 1 | 1 | – |
| L9-04 | Motor 2 thermistor provided/not provided selection | 0 | 0 | 1 | 1 | – |
| O1-03 | Setting/display unit of speed reference/monitor | 0 | 0 | 1 | 1 | – |

*Constants that vary depending on kVA selection

① 0.4 to 1.5 kW
② 2.2 to 45 kW
③ 55 kW or larger

for more: efesotomasyon - Yaskawa drive

The following constants are changed when the set value of O2–04 is changed.

Table A-13 Constants for Which Factory-set Values Vary Depending on Inverter Output (O2-04)

200 V Class

| Constant No. | Constant Name | Unit | Factory-set Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| – | Inverter capacity | kW | 0 4 | 0 75 | 1 5 | 2 2 | 3 7 | 5 5 | 7 5 | 11 | 15 | 18 5 |
| O2-04 | kVA selection | 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| C6-01 | Carrier frequency upper limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| – | Upper limit range of carrier frequency | kHz | 15 0 | 15 0 | 15.0 | 15 0 | 15 0 | 15 0 | 15 0 | 15 0 | 15 0 | 15 0 |
| C6-02 | Carrier frequency lower limit | kHz | 2 0 | 2 0 | 2.0 | 2 0 | 2 0 | 2.0 | 2 0 | 2 0 | 2 0 | 2 0 |
| C6-03 | Carrier frequency proportional gain | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| – | Inverter rated current | A | 3.2 | 6 0 | 8 0 | 11 0 | 17 5 | 25 0 | 33 0 | 49 0 | 64 0 | 80 0 |
| E2-01 | Motor rated current | A | 1 90 | 3 30 | 6 20 | 8 50 | 14 00 | 19 60 | 26.60 | 39 7 | 53 0 | 65 8 |
| E2-02 | Motor rated slip | Hz | 2 90 | 2 50 | 2 60 | 2 90 | 2 73 | 1 50 | 1 30 | 1 70 | 1 60 | 1 67 |
| E2-03 | Motor no-load current | A | 1 20 | 1 80 | 2.80 | 3 00 | 4 50 | 5 10 | 8 00 | 11 2 | 15 2 | 15 7 |
| E2-05 | Motor line-to-line resistance | Ω | 9 842 | 5 156 | 1 997 | 1 601 | 0 771 | 0 399 | 0 288 | 0 230 | 0 138 | 0 101 |
| E2-06 | Motor leak inductance | % | 18 2 | 13 8 | 18 5 | 18 4 | 19 6 | 18 2 | 15 5 | 19.5 | 17.2 | 20 1 |
| L2-02 | Momentary power loss ridethru time | sec | 1 0 | 1 0 | 1 0 | 1.0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 |
| L2-03 | Minimum base block time | sec | 0 5 | 0 5 | 0 5 | 0.5 | 0.5 | 0.7 | 0 7 | 0 7 | 0 7 | 1 0 |

200 V Class

| Constant No. | Constant Name | Unit | Factory-set Values | | | | | |
|---|---|---|---|---|---|---|---|---|
| – | Inverter capacity | kW | 22 | 30 | 37 | 45 | 55 | 75 |
| O2-04 | kVA capacity selection | 1 | A | B | C | D | E | F |
| C6-01 | Carrier frequency upper limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| – | Upper limit range of carrier frequency | kHz | 10 0 | 10.0 | 10 0 | 10.0 | 10 0 | 10 0 |
| C6-02 | Carrier frequency lower limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| C6-03 | Carrier frequency proportional gain | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| – | Inverter rated current | A | 96.0 | 130 0 | 160 0 | 183.0 | 224 0 | 300 0 |
| E2-01 | Motor rated current | A | 77 2 | 105.0 | 131 0 | 160 0 | 190 0 | 260 0 |
| E2-02 | Motor rated slip | Hz | 1 70 | 1 80 | 1 33 | 1 60 | 1 43 | 1 39 |
| E2-03 | Motor no-load current | A | 18 5 | 21 9 | 38 2 | 44 0 | 45 6 | 72.0 |
| E2-05 | Motor line-to-line resistance | Ω | 0 079 | 0 064 | 0 039 | 0 030 | 0.022 | 0.023 |
| E2-06 | Motor leak inductance | % | 19 5 | 20 8 | 18 8 | 20 2 | 20 5 | 20 0 |
| L2-02 | Momentary power loss ridethru time | sec | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 |
| L2-03 | Minimum base block time | sec | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1.0 |

for more: efesotomasyon - Yaskawa drive

The following constants are changed when the set value of O2–04 is changed.

Table A-14 Constants for Which Factory-set Values Vary Depending on Inverter Output (O2-04)

400 V Class

| Constant No. | Constant Name | Unit | Factory-set Values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| – | Inverter capacity | kW | 0 4 | 0 75 | 1 5 | 2 2 | 3 7 | 4 0 | 5 5 | 7 5 | 11 | 15 | 18 5 |
| O2-04 | kVA selection | 1 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 2A |
| C6-01 | Carrier frequency upper limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| – | Upper limit range of carrier frequency | kHz | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 |
| C6-02 | Carrier frequency lower limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| C6-03 | Carrier frequency proportional gain | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| – | Inverter rated current | A | 1 8 | 3 4 | 4 8 | 6 2 | 8 0 | 11 0 | 14 0 | 18 0 | 27 0 | 34 0 | 41 0 |
| E2-01 | Motor rated current | A | 1 00 | 1 60 | 3 10 | 4 20 | 7 00 | 7 00 | 9 80 | 13 30 | 19 9 | 26 5 | 32 9 |
| E2-02 | Motor rated slip | Hz | 2 90 | 2 60 | 2 50 | 3 00 | 2 70 | 2 70 | 1 50 | 1 30 | 1 70 | 1 60 | 1 67 |
| E2-03 | Motor no-load current | A | 0 60 | 0 80 | 1 40 | 1 50 | 2 30 | 2 30 | 2 60 | 4 00 | 5 6 | 7 6 | 7 8 |
| E2-05 | Motor line-to-line resistance | Ω | 38 198 | 22 459 | 10 100 | 6 495 | 3 333 | 3 333 | 1 595 | 1 152 | 0 922 | 0 550 | 0 403 |
| E2-06 | Motor leak inductance | % | 18 2 | 14 3 | 18 3 | 18 7 | 19 3 | 19 3 | 18 2 | 15 5 | 19 6 | 17 2 | 20 1 |
| L2-02 | Momentary power loss ridethru time | sec | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 |
| L2-03 | Minimum base block time | sec | 0 5 | 0 5 | 0 5 | 0 5 | 0 5 | 0 7 | 0 7 | 0 7 | 0 7 | 0 7 | 1 0 |

400 V Class

| Constant No. | Constant Name | Unit | Factory-set Values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| – | Inverter capacity | kW | 22 | 30 | 37 | 45 | 55 | 75 | 110 | 160 | 185 | 220 | 300 |
| O2-04 | kVA selection | 1 | 2B | 2C | 2D | 2E | 2F | 30 | 32 | 34 | 35 | 36 | 37 |
| C6-01 | Carrier frequency upper limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| – | Upper limit range of carrier frequency | kHz | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 10 0 | 2 5 | 2 5 | 2 5 |
| C6-02 | Carrier frequency lower limit | kHz | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 | 2 0 |
| C6-03 | Carrier frequency proportional gain | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| – | Inverter rated current | A | 48 0 | 65 0 | 80 0 | 96 0 | 128 0 | 165 0 | 224 0 | 302 0 | 340 0 | 450 0 | 605.0 |
| E2-01 | Motor rated current | A | 38 6 | 52 3 | 65 6 | 79 7 | 95 0 | 130 0 | 190 0 | 270 0 | 310 0 | 370 0 | 500 0 |
| E2-02 | Motor rated slip | Hz | 1 70 | 1 80 | 1 33 | 1 60 | 1 46 | 1 39 | 1 40 | 1 35 | 1 30 | 1 30 | 1 25 |
| E2-03 | Motor no-load current | A | 9 2 | 10 9 | 19 1 | 22 0 | 24 0 | 36 0 | 49 0 | 70 0 | 81-0 | 96 0 | 130 0 |
| E2-05 | Motor line-to-line resistance | Ω | 0 316 | 0.269 | 0 155 | 0.122 | 0 088 | 0 092 | 0 046 | 0.029 | 0 025 | 0 020 | 0 014 |
| E2-06 | Motor leak inductance | % | 23 5 | 20 7 | 18 8 | 19 9 | 20 0 | 20 0 | 20 0 | 20 0 | 20 0 | 20 0 | 20 0 |
| L2-02 | Momentary power loss ridethru time | sec | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 |
| L2-03 | Minimum base block time | sec | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 1 0 | 4 0 | 4 0 | 4 0 | 4 0 | 4 0 |

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## Table A-15 Monitor Unit

| Constant No. | Constant Name | Digital Operator | MEMOBUS | Master Controller Control Response Level | Analog Output Level (At Gain=1.0) | Value at 100% |
|---|---|---|---|---|---|---|
| U1-01 | Speed reference | *1 | 0.1Hz | 30000/100% | 10V/100% | E1-04 *4 |
| U1-02 | Output frequency | 0.01Hz | 0.1Hz | 30000/100% | 10V/100% | E1-04 *4 |
| U1-03 | Output current | 0.1A *2 | 8192/100% | 10000/100% | 10V/100% | Inverter rated current |
| U1-04 | Control method | No | No | No | 0 | – |
| U1-05 | Motor speed | *1 | 0.1Hz | 30000/100% | 10V/100% | (E1-04)×(C9-01) *4 |
| U1-06 | Output voltage | 0.1V | 0.1V | 10000/100% | 10V/100% | Voltage class *7 |
| U1-07 | DC bus voltage | 1V | 1V | 10000/100% | 10V/100% | Voltage class×2 *7 |
| U1-08 | Output power | 0.1kW | 0.1kW | 0.1kW | 10V/100% | Motor rated output |
| U1-09 | Torque reference (internal) | 0.1% | 0.1% | 10000/100% | 10V/100% | Motor rated torque |
| U1-10 | Input terminal status | bit | bit | bit | 0 | – |
| U1-11 | Output terminal status | bit | bit | bit | 0 | – |
| U1-12 | Operation status | bit | bit | bit | 0 | – |
| U1-13 | Cumulative operation time | 1H | 1H | 1H | 0 | – |
| U1-14 | PROM No (at FLASH side) | No | No | 0 | 0 | – |
| U1-15 | Input voltage at 9CN-4 (AI-1) terminal | 0.1% | 0.1% | 0~4095/-10~10V | 10V/100% | 10V |
| U1-16 | Input voltage at 9CN-6 (AI-2) terminal | 0.1% | 0.1% | 2048~4095/ 4~20mA *5 | 10V/100% | 20mA |
| U1-17 | Input voltage at 9CN-8 (AI-3) terminal | 0.1% | 0.1% | 0~4095/-10~10V | 10V/100% | 10V |
| U1-18 | Motor secondary current (Iq) | 0.1% | 0.1% | 10000/100% | 10V/100% | E2-01 |
| U1-19 | Motor exciting current (Id) | 0.1% | 0.1% | 10000/100% | 10V/100% | E2-01 |
| U1-20 | Soft starter output | *1 | 0.1Hz | 30000/100% | 10V/100% | E1-04 *4 |
| U1-21 | ASR input (speed deviation) | *1 | 0.01% | 10000/100% | 10V/100% | (E1-04)×(C9-01) *4 |
| U1-22 | ASR output | 0.01% | 0.01% | 10000/100% | 10V/100% | *4 *6 |
| U1-23 | Current reference soft starter input | 0.01% | 0.01% | 10000/100% | 10V/100% | E2-01 |
| U1-24 | Current reference soft starter output | 0.01% | 0.01% | 10000/100% | 10V/100% | E2-01 |
| U1-25 | Current control deviation | 0.01% | 0.01% | 10000/100% | 10V/100% | E2-01 |
| U1-26 | Output voltage reference (Vq) | 0.1V | 0.1V | 10000/100% | 10V/100% | Voltage class *7 |
| U1-27 | Output voltage reference (Vd) | 0.1V | 0.1V | 10000/100% | 10V/100% | Voltage class *7 |
| U1-28 | PROM No (at CPU ROM side) | No | No | 0 | 0 | – |
| U1-29 | LED check (diagnosis) | – | 0 | 0 | 0 | – |
| U1-30 | Operation status 2 | bit | bit | bit | 0 | – |
| U1-31 | Master controller command 1 | bit | bit | bit | 0 | – |
| U1-32 | Master controller command 2 | bit | bit | bit | 0 | – |
| U1-33 | External torque reference | 0.01% | 0.01% | 10000/100% | 10V/100% | Motor rated torque |
| U1-34 | Torque compensation | 0.01% | 0.01% | 10000/100% | 10V/100% | Motor rated torque |
| U1-35 | Slip frequency reference | 0.01% | 0.01% | 10000/100% | 10V/100% | E1-04 *4 |
| U1-36 | Magnetic flux reference | 0.01% | 0.01% | 10000/100% | 10V/100% | – |
| U1-37 | DO-08/H output status | bit | bit | bit | 0 | – |
| U1-38 | Momentary power loss drop amount | *1 | 0.1Hz | 30000/100% | 10V/100% | (E1-04)×(C9-01) *4 |
| U1-39 | Motor temperature | 1°C | 1°C | 1°C | 10V/100% | 200°C |
| U1-40 | Speed detection PG counter value | Pulse | Pulse | Pulse | 10V/100% | 32768 |

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## Table A–15 Monitor Unit (Cont'd)

| Constant No. | Constant Name | Digital Operator | MEMOBUS | Master Controller Control Response Level | Analog Output Level (At Gain=1.0) | Value at 100% |
|---|---|---|---|---|---|---|
| U1–41 | Acceleration torque monitor (observer) | 0.1% | 0.1% | 10000/100% | 10V/100% | Motor rated torque |
| U1–42 | Acceleration torque reference (observer) | 0.1% | 0.1% | 10000/100% | 10V/100% | Motor rated torque |
| U1–43 | Torque observer control PI output | 0.1% | 0.1% | 10000/100% | 10V/100% | Motor rated torque |
| U1–44 | Torque observer control output | 0.1% | 0.1% | 10000/100% | 10V/100% | Motor rated torque |
| U1–45 | Synchronous phase difference | 0.1deg | 0.1deg | 0.1deg | 10V/100% | 360deg |
| U1–46 | Output voltage phase | 0.1deg | 0.1deg | 0.1deg | 10V/100% | 360deg |
| U1–47 | Zero-servo move pulse | Pulse | Pulse | Pulse | 10V/100% | 32768 |
| U1–48 | ACR (q) output | 0.1% | 0.1% | 10000/100% | 10V/100% | Voltage class *7 |
| U1–49 | ACRd output | 0.1% | 0.1% | 10000/100% | 10V/100% | Voltage class *7 |
| U1–50 | Setting Fault Data Address | *3 | ADDRESS | 0 | 0 | – |

## Table A–15 Monitor Unit (Cont'd)

| Constant No. | Constant Name | Digital Operator | MEMOBUS | Value at 100% |
|---|---|---|---|---|
| U2–01 | Current fault | – | – | – |
| U2–02 | Last fault | – | – | – |
| U2–03 | Speed reference (U1-01) at fault | *1 | 0.1Hz | – |
| U2–04 | Output frequency (U1-02) at fault | 0.01Hz | 0.1Hz | – |
| U2–05 | Inverter output current (U1-03) at fault | 0.1A *2 | 8192/100% | Motor rated current |
| U2–06 | Motor speed (U1-05) at fault | *1 | 0.1Hz | – |
| U2–07 | Output voltage reference (U1-06) at fault | 0.1V | 0.1V | – |
| U2–08 | DC bus voltage (U1-07) at fault | 1V | 1V | – |
| U2–09 | Output power (U1-08) at fault | 0.1kW | 0.1kW | – |
| U2–10 | Torque reference (U1-09) at fault | 0.1% | 0.1% | Motor rated torque |
| U2–11 | Input terminal status (U1-10) at fault | bit | bit | – |
| U2–12 | Output terminal status (U1-11) at fault | bit | bit | – |
| U2–13 | Operation status (U1-12) at fault | bit | bit | – |
| U2–14 | Cumulative operation time (U1-13) at fault | 1H | 1H | – |
| U2–15 | Speed controller (ASR) output (U1-22) at fault | 0.01% | 0.01% | *4 *6 |
| U2–16 | Current control deviation (U1-25) at fault | 0.01% | 0.01% | E2–01 |
| U2–17 | Operation status 2 (U1-30) at fault | bit | bit | – |
| U2–18 | Master controller command 1 (U1-31) at fault | bit | bit | – |
| U2–19 | Master controller command 2 (U1-32) at fault | bit | bit | – |
| U2–20 | External torque reference (U1-33) at fault | 0.01% | 0.01% | Motor rated torque |
| U2–21 | Torque compensation (U1-34) at fault | 0.01% | 0.01% | Motor rated torque |
| U2–22 | Magnetic flux reference (U1-36) at fault | 0.01% | 0.01% | – |
| U2–23 | Observer control output (U1-44) at fault | 0.1% | 0.1% | Motor rated torque |
| U2–24 | Output voltage phase (U1-46) at fault | 0.1deg | 0.1deg | – |

*1 The unit varies depending on the setting of O1–03

*2 For 7.5kW model or smaller, minimum unit is 0.01A

*3 The constant No. at setting fault is displayed

*4 E1–04 changes into E4–01 when selecting the No. 2 motor

*5 0 to 4095/–10V to 10V when H3–08=0

*6 For V/f control (E1–04) × (C9–01), For Vector control: $\sqrt{[(E2\text{–}01)^2\text{–}(E2\text{–}03)^2]}$

*7 Voltage class: 200V or 400V

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