VARISPEED-676H5
DESCRIPTIVE MANUAL FOR CONSTANTS

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)

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

REFERENCE

VARISPEED-676H5 INSTRUCTION MANUAL (TOEZ-S676-7)

YASKAWA

MANUAL NO. TOEZ-S676-7.1

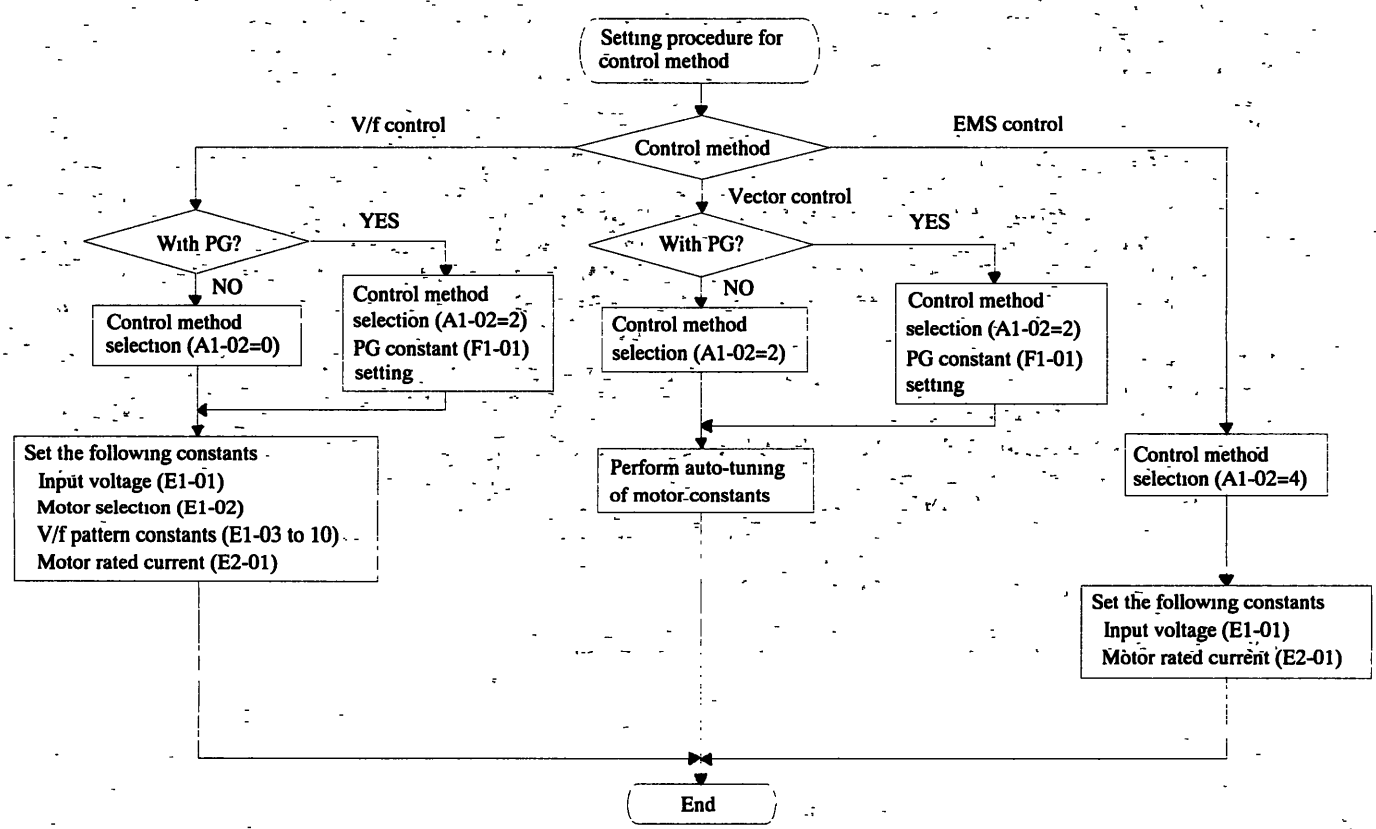
CONTENTS

1. CONTROL METHOD SELECTION

1.1 INTRODUCTION

The VS-676H5 is provided with five control methods: open loop vector, flux vector, V/f control with PG feedback, V/f control, and EMS control. The control method can be selected easily by using the operator according to the users' applications.

The method is set to open loop vector prior to shipment. Set the control method and motor-related constants according to the following procedures before using the VS-676H5.



1.2 FEATURES OF FIVE CONTROL METHODS

Control Method	V/f Control	V/f with PG Feedback	Open Loop Vector	Flux Vector	EMS Control
Basic control	Voltage/frequency control (open loop)	Voltage/frequency control with speed compensation	Current vector control without PG	Current vector control	Current/frequency control
Speed detector	Not needed	Needed (pulse generator)	Not needed	Needed (pulse generator)	Not needed
Speed detection option	Not needed	PG-A2/H	Not needed	PG-B2/H	Not needed (SP-A2/H for synchronous control)
Speed control range	1:40	1:40	1:100	1.1000	—
Starting torque	150%/3Hz	150%/3Hz	150%/1Hz	150%/0r/min	—
Speed control accuracy	±2 to ±3%	±0.03%	±0.2%	±0.01%	—
Torque limit	Not possible	Not possible	Possible	Possible	—
Torque control	Not possible	Not possible	Not possible	Possible	—
Application	Multiple motor drives Replacement of existing motors whose motor constants are not known	Application where pulse generator is provided to machine side Application requiring constant accuracy or constant speed	General-purpose variable speed applications which do not require high-accuracy or high-response.	Simplified servo drives High-accuracy speed control Torque control	Magnetic agitator

1.3 AUTO-TUNING

Notes:

(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.

1.3.1 Operation Procedure

(1) 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 instruction manual.

(2) 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).

(3) 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.

(4) 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 Input the base side value 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 Insulation class A (100°C) 0 E (120°C) 1 B (130°C) 2 F (155°C) 3 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.

(5) 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 2 No 2 motor
T1-02	Tuning mode	0 to 4	0 Normal operation mode 1 Tuning by inputting nameplate value (digital operator) 2. Tuning by inputting motor constants (digital operator) 3 Tuning by inputting nameplate value (master controller) 4· Tuning by inputting motor constants (master controller)

Note: No. 2 motor setting is valid for VSH701030 and later. 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

(6) 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

(7) Execute the auto-tuning.

Press the [RUN] key.

The following begins flashing and tuning starts.

CAL□■

(8) End of tuning

Ending normally: End is displayed.

Ending abnormally: Er-XX is displayed (see Table 1).

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

1.3.2 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 1 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.

Table 1 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 = Incorrect connection of PG (A- and B-phase) or inverter output (U-, V-, and W-phase)
Er-04	Motor speed error	With PG During acceleration, torque reference is 100% or larger and the signs of speed reference and detected speed value agree with each other = Motor overload, setting error of number of PG pulses Without PG During acceleration, torque reference is 100% or larger = Motor overload
Er-05	Line resistance error	· Voltage command exceeds 100%. · Feedback current is less than 1% of motor rated current even when the voltage reference exceeds 50% · Result of tuning is negative · 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 · The result of tuning is outside the setting range of a constant. 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 · 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

1.3.3 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 2 is given.

Table 2 Auto-tuning Warning Messages

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

1.4 SETTING THE INVERTER OPERATION ENVIRONMENT

Access level to set/read constants or control method (V/f control, vector control) can be set as indicated below. Make sure to set the environment constants before using the VS-676H5. The following table shows the major environment setting constants.

Constant No.	Name	Description
A1-01	Access level (can be changed during run)	0: Exclusive for monitoring 2: QUICK-START (To set/read the constants necessary for simplified operation) 3: BASIC (To set/read the basic constants) 4: ADVANCED (To set/read the application constants.)
A1-02	Control method selection	0: V/f control 1: V/f control with PG feedback 2: Open loop vector 3: Flux vector 4: EMS control
A1-03	Initialization	2220: 2-wire 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.)

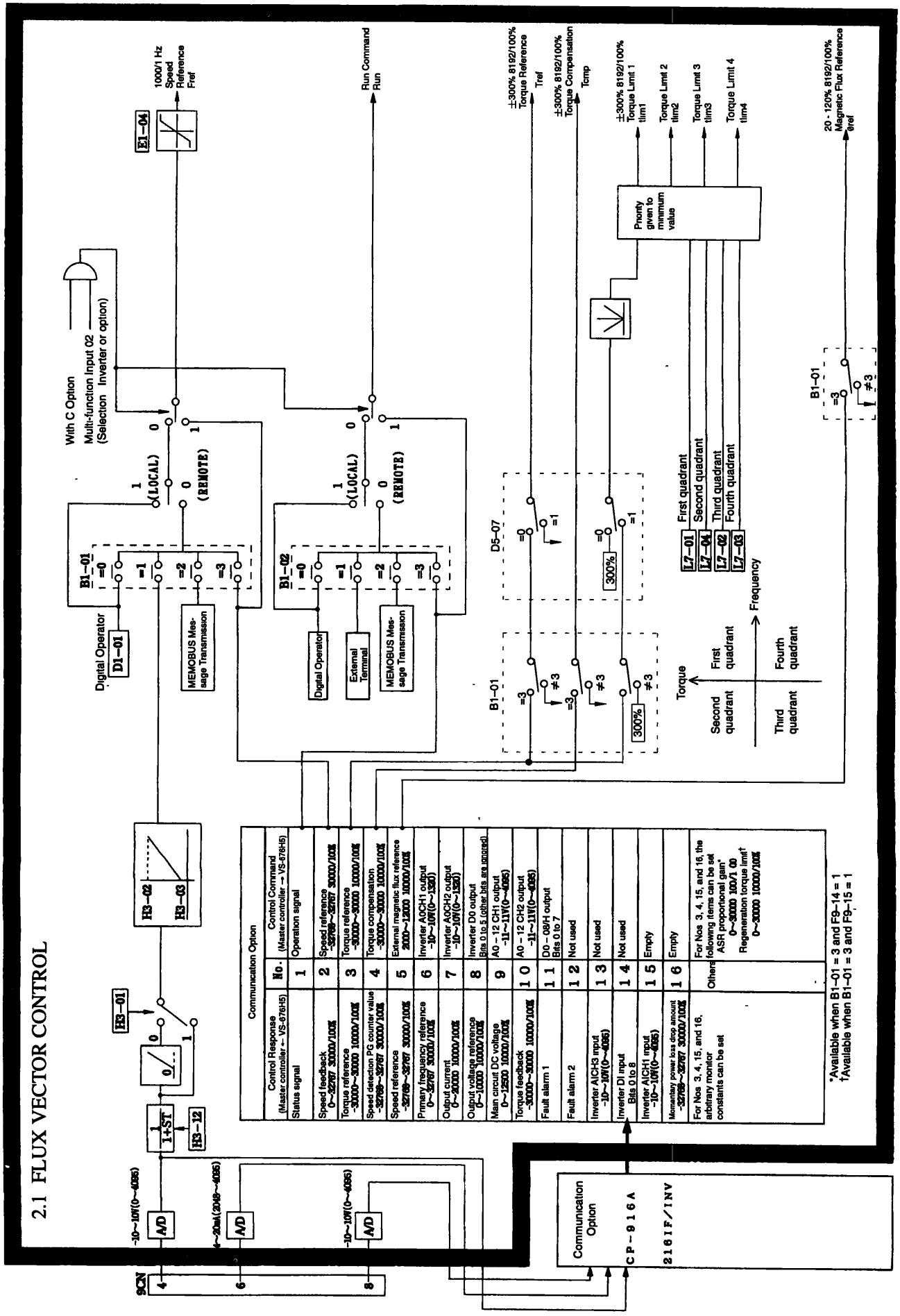
Note: If password 1 differs from password 2, setting is disabled for A1-01 to A1-03. For these constants, only reading is permitted and all constants of VS-676H5 are locked at the setting made by the user.

1.4.1 Constant Access Level

Constants to be set/read by digital operator can be selected by setting constant A1-01 as shown below. A1-01 = 2 (QUICK-START) is preset at the factory.

A1-01	Name	Description
0	Exclusive for monitoring	QUICK-START level for A1-01 and Ux-xx.
2	QUICK-START	Constants required for quick-start operation are set/read.
3	BASIC	Basic constants are set/read.
4	ADVANCED	Advanced constants are set/read.

2.1 FLUX VECTOR CONTROL



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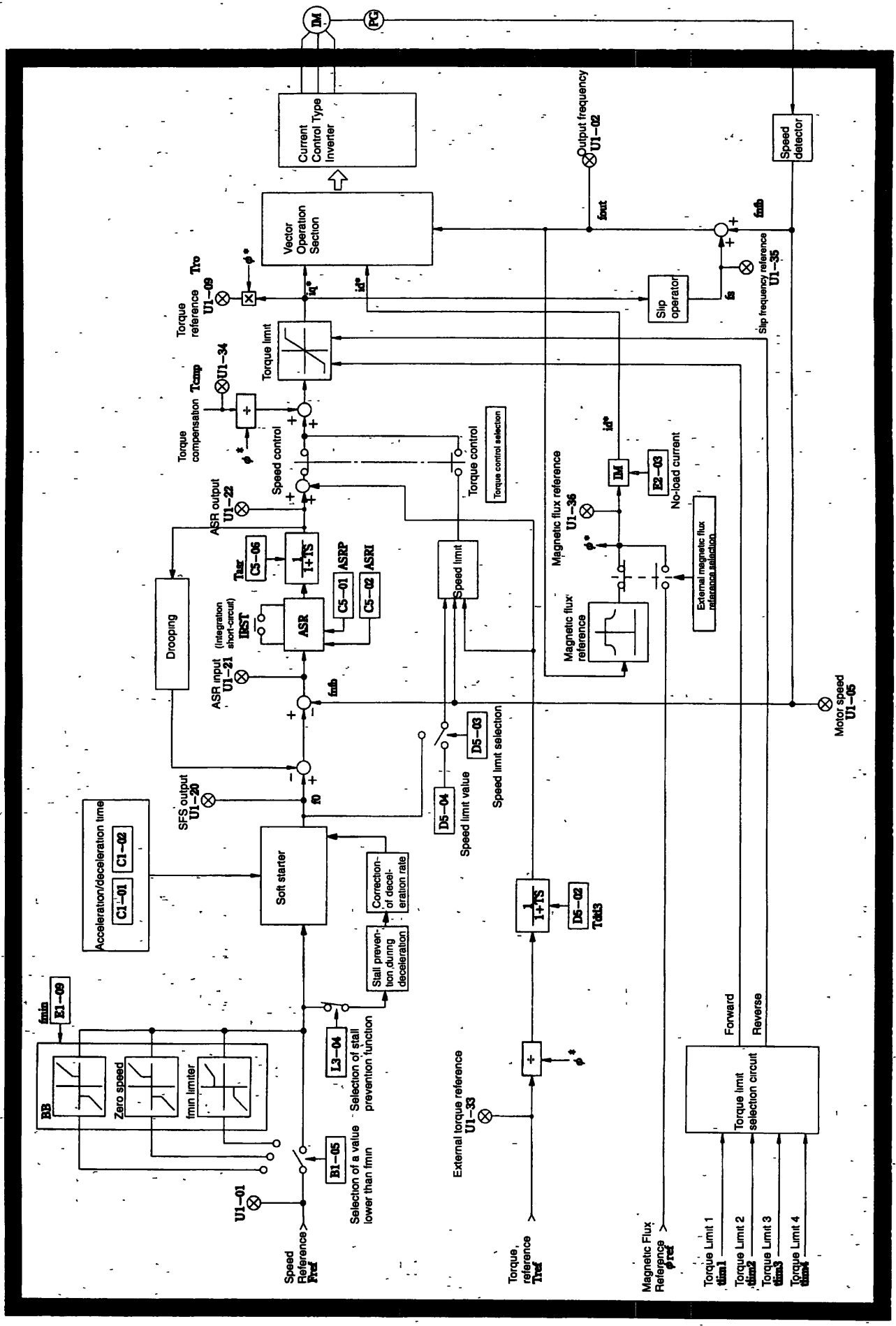
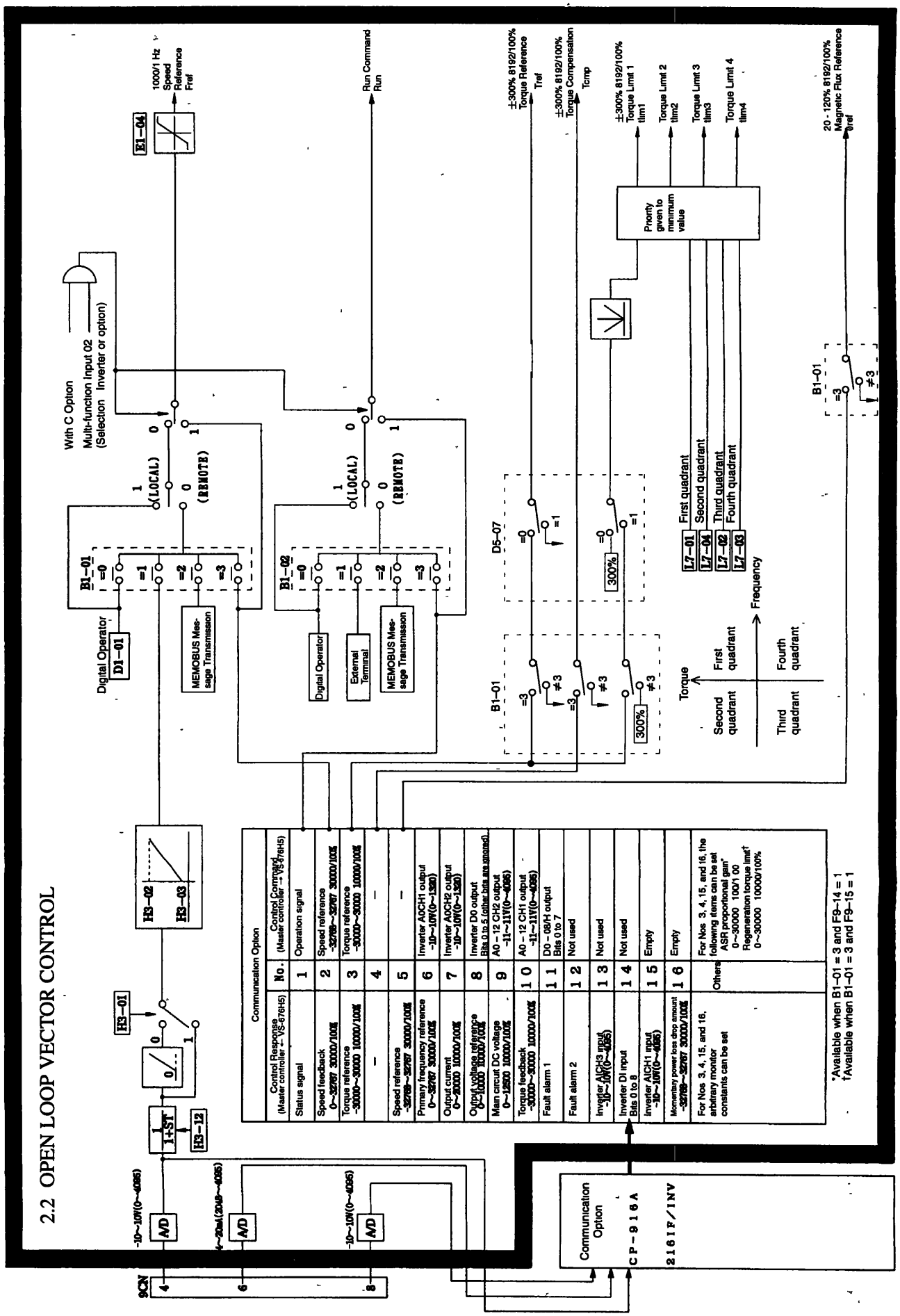


2.2 OPEN LOOP VECTOR CONTROL



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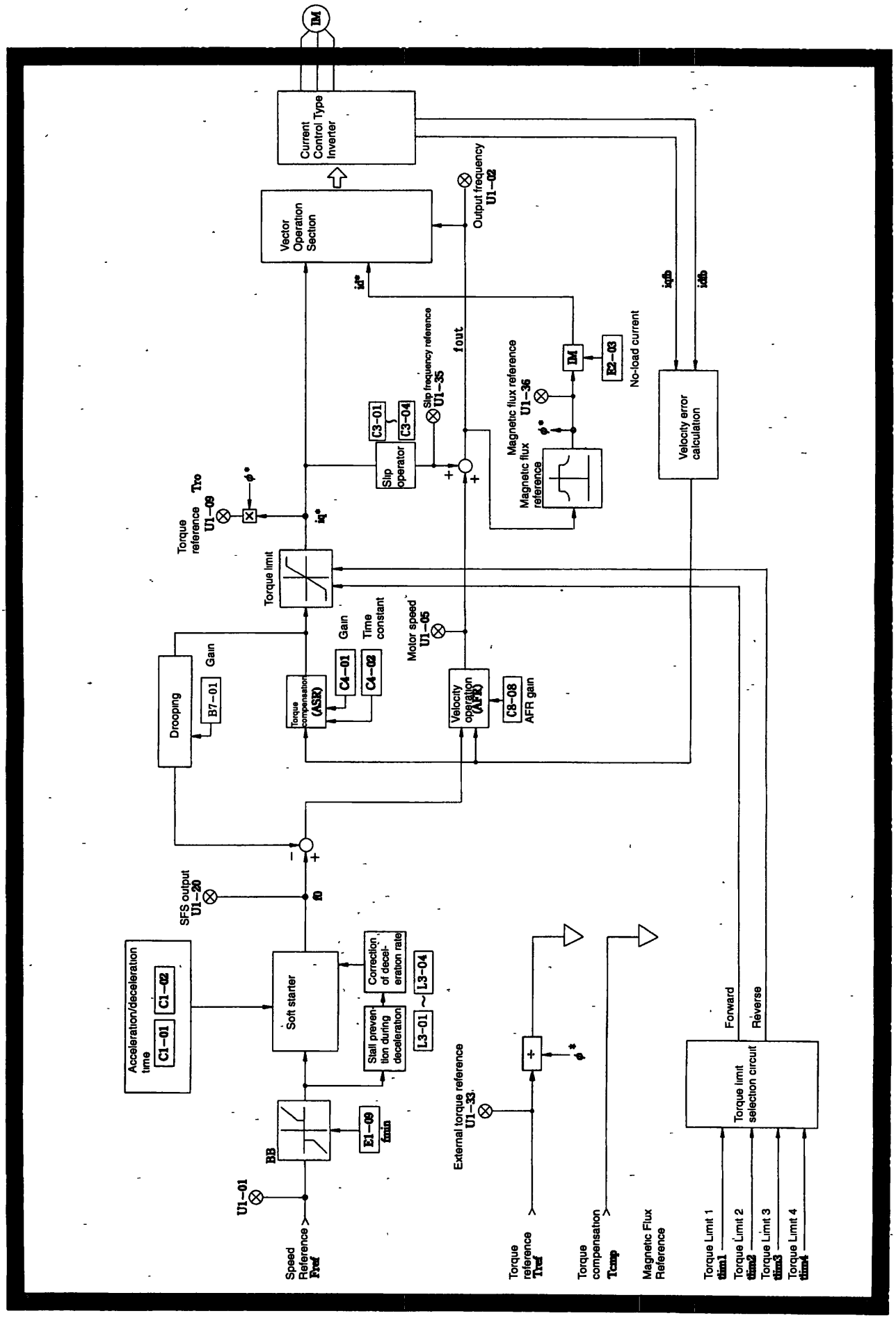
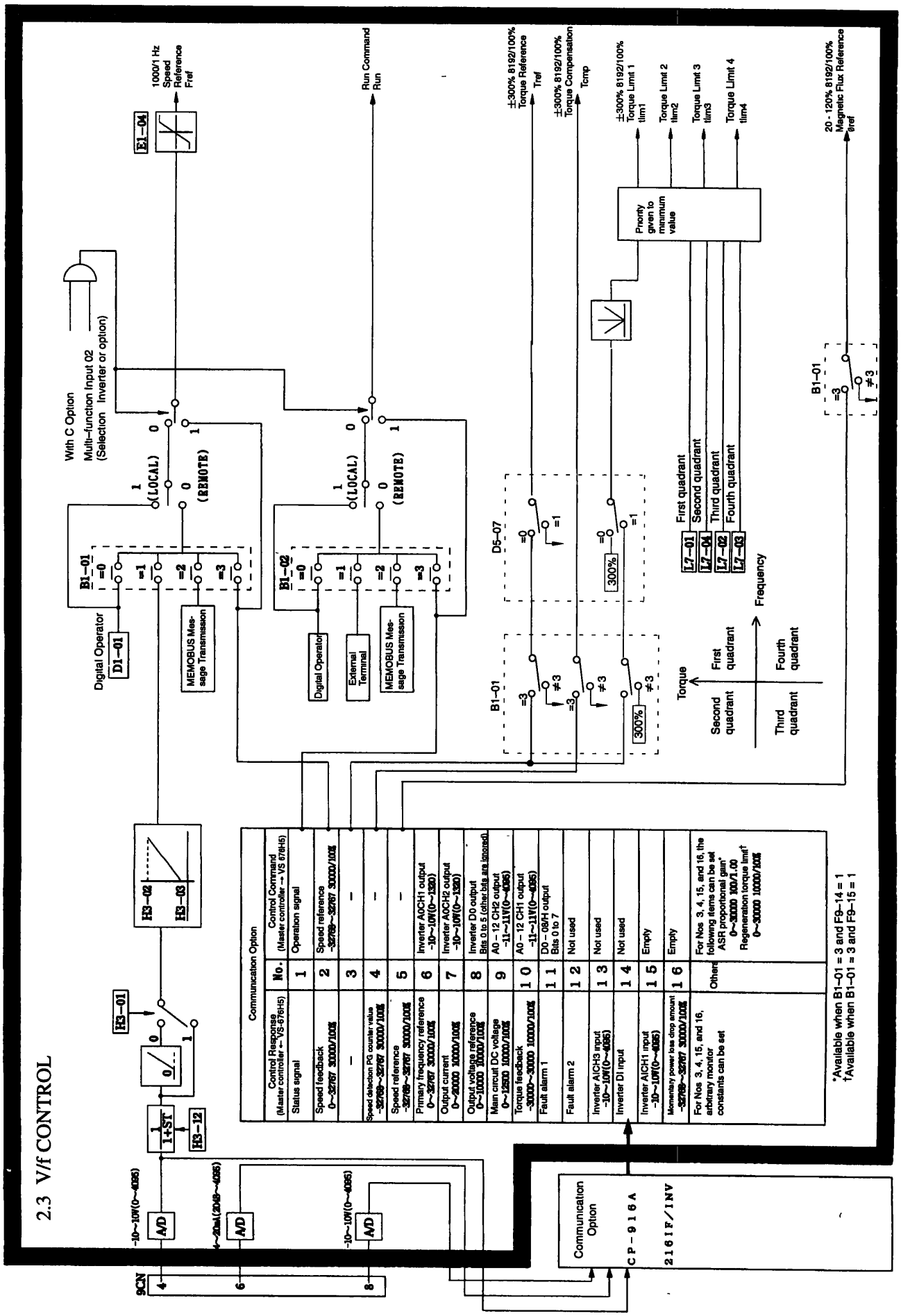


2.3 V/f CONTROL



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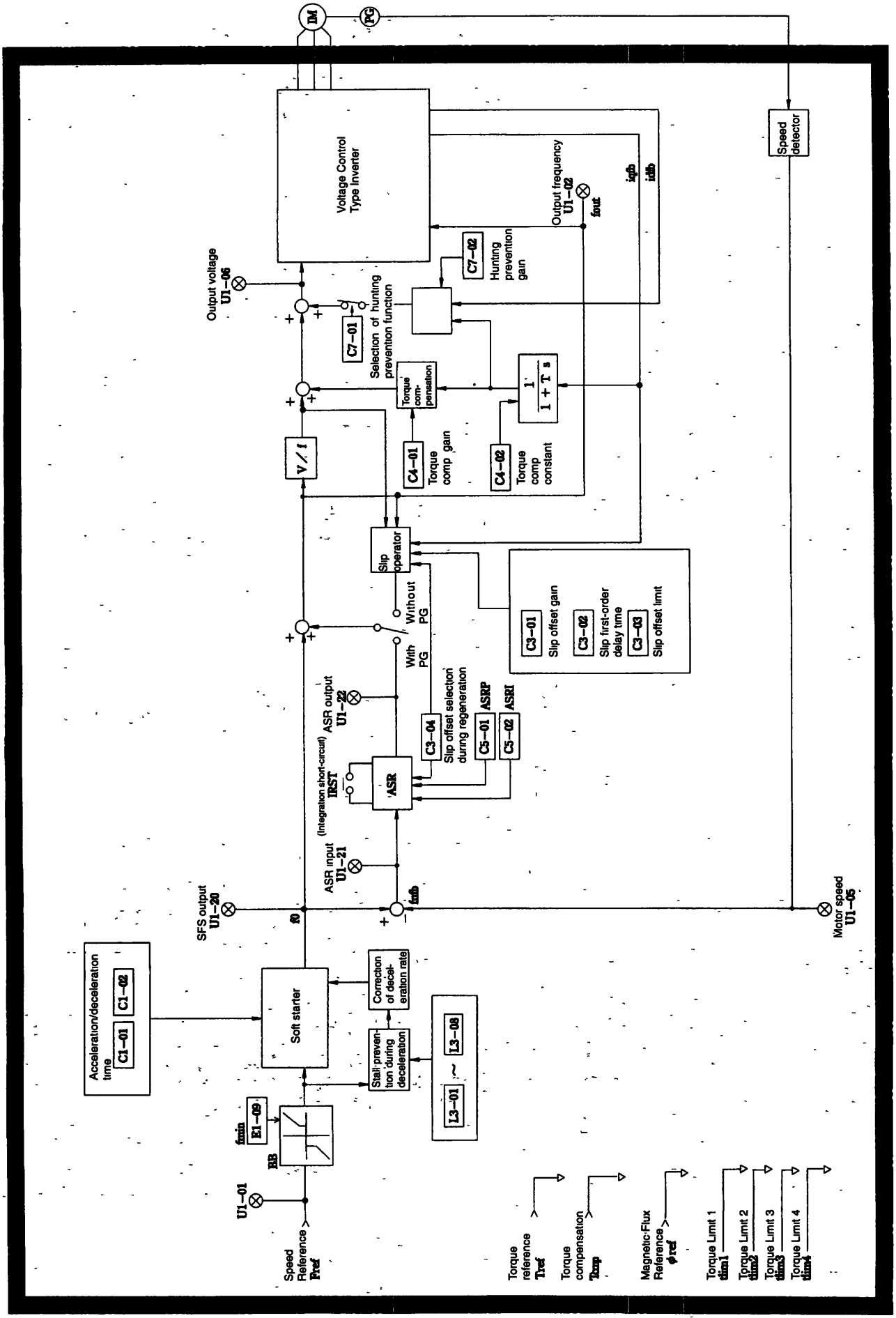

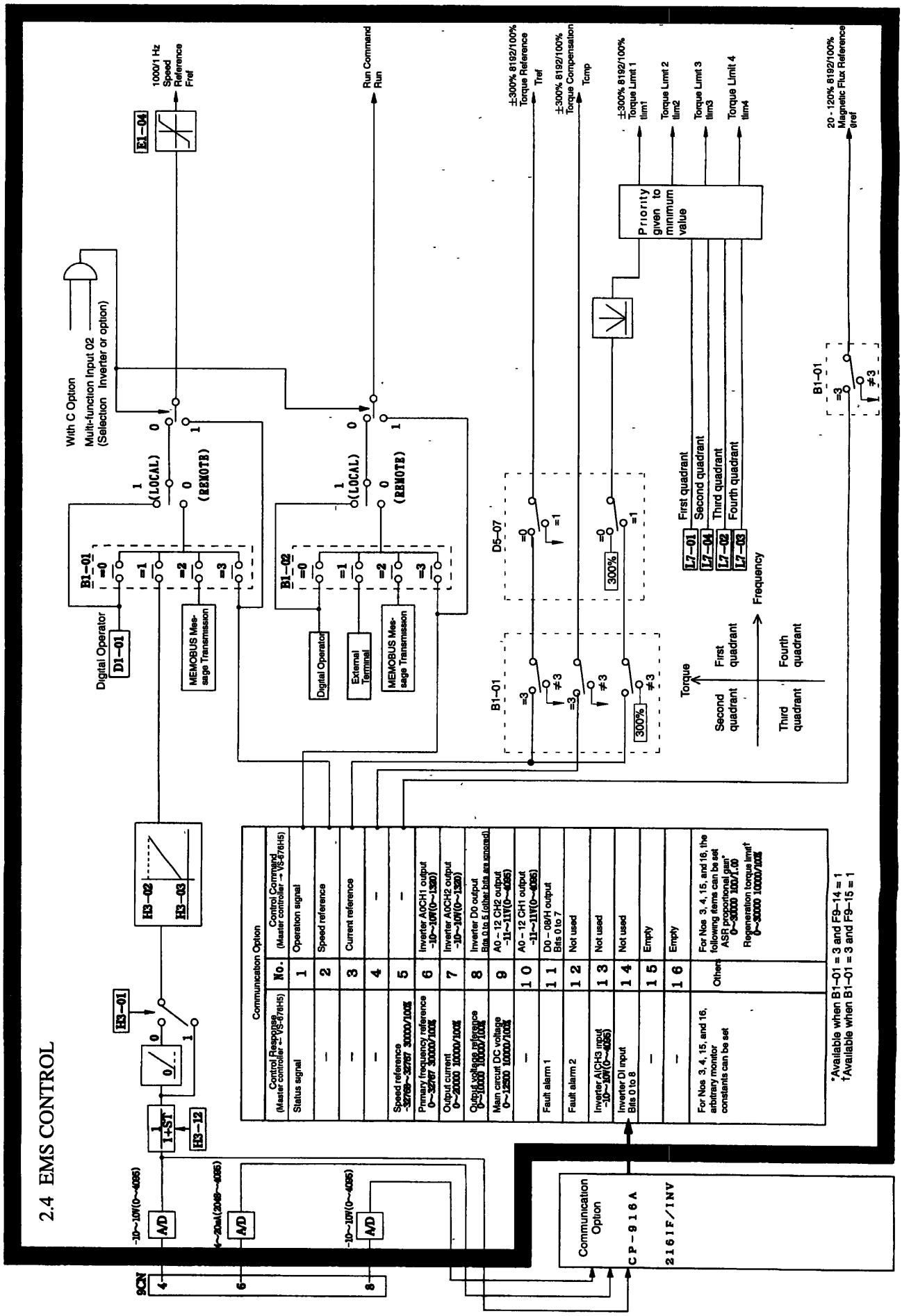

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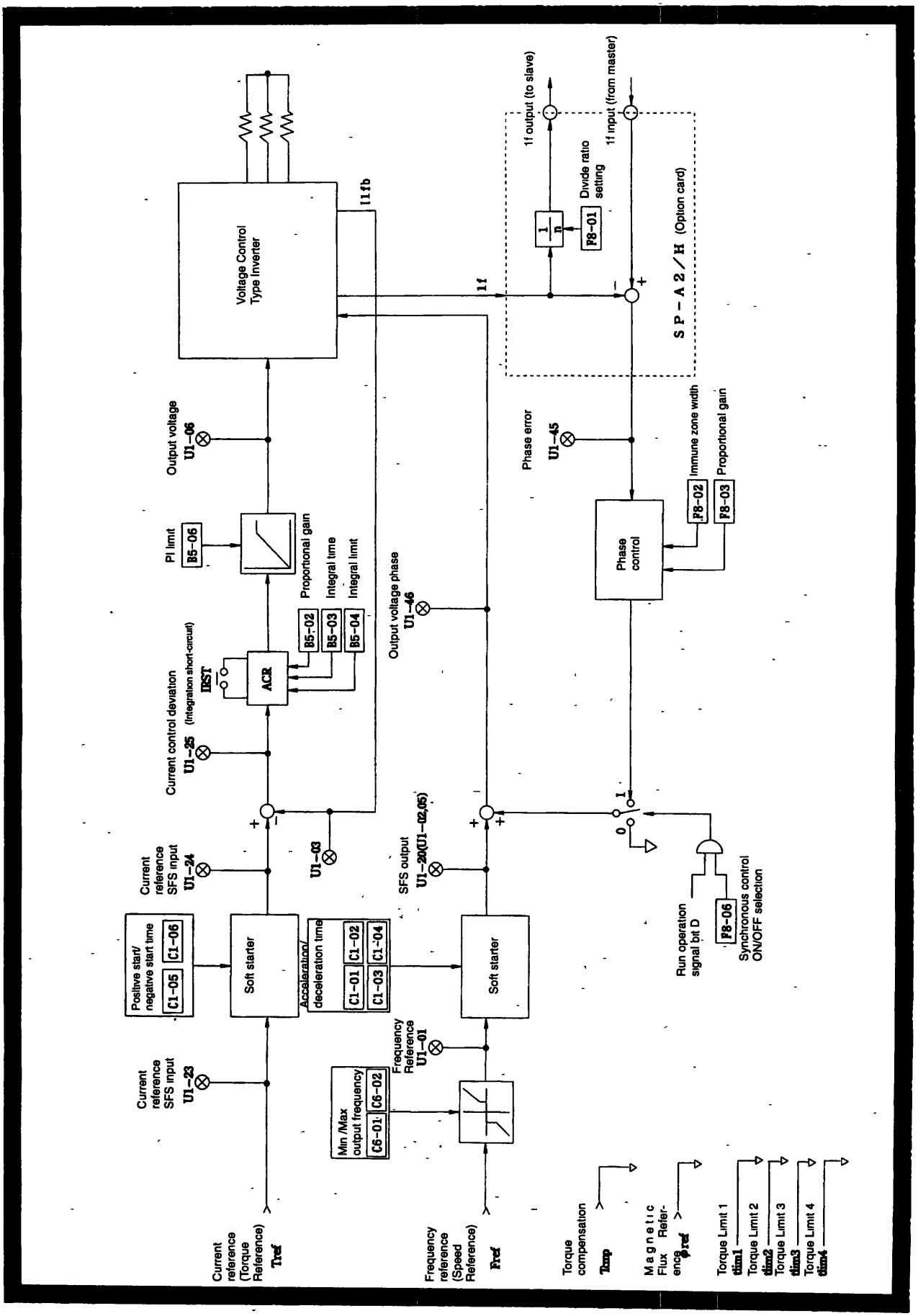
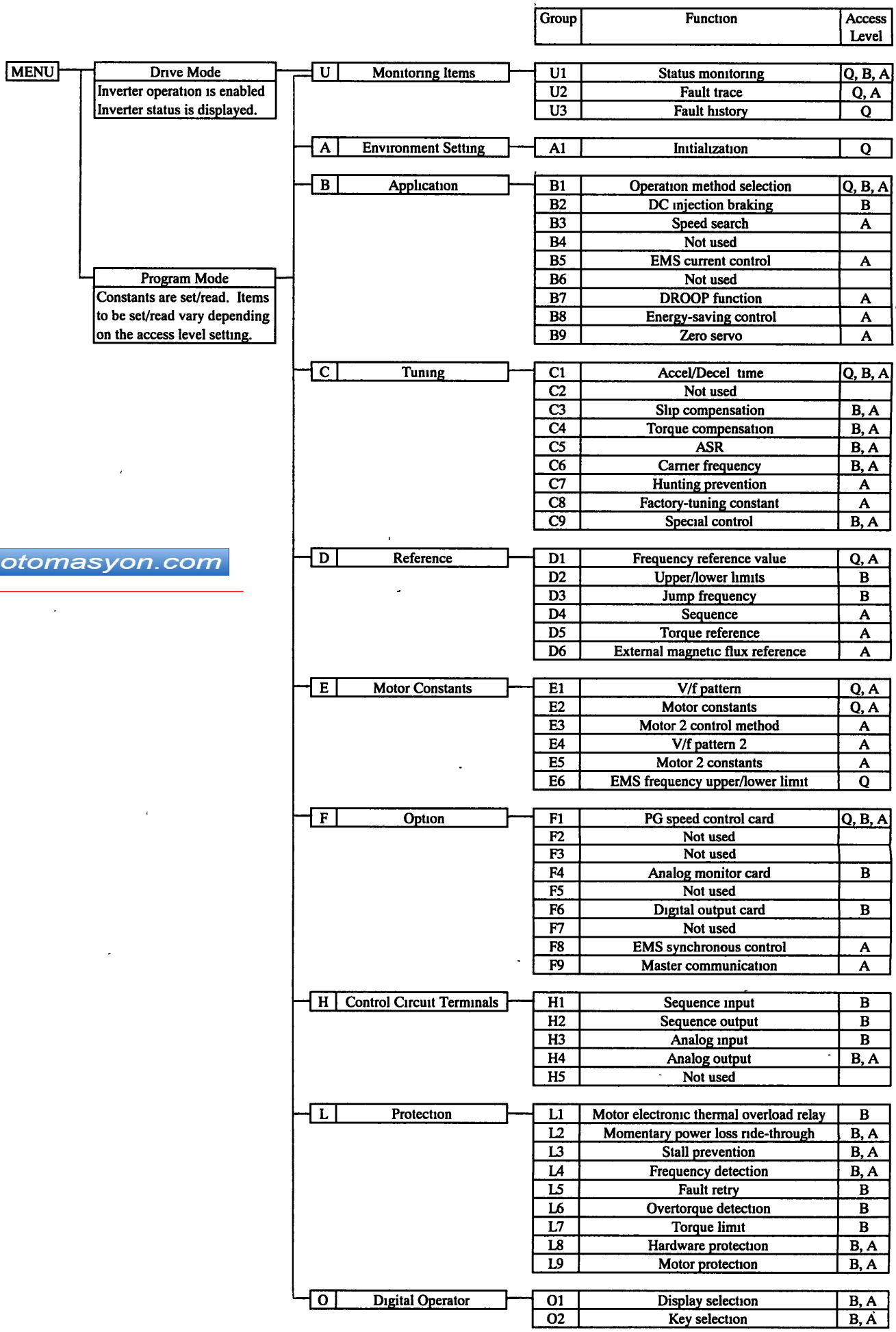


3. CONSTANT LIST

3.1 CONSTANTS ARRAY OF DIGITAL OPERATOR DISPLAY FUNCTIONS



Group	Function	Access Level
U	Monitoring Items	
U1	Status monitoring	Q, B, A
U2	Fault trace	Q, A
U3	Fault history	Q
A	Environment Setting	
A1	Initialization	Q
B	Application	
B1	Operation method selection	Q, B, A
B2	DC injection braking	B
B3	Speed search	A
B4	Not used	
B5	EMS current control	A
B6	Not used	
B7	DROOP function	A
B8	Energy-saving control	A
B9	Zero servo	A
C	Tuning	
C1	Accel/Decel time	Q, B, A
C2	Not used	
C3	Slip compensation	B, A
C4	Torque compensation	B, A
C5	ASR	B, A
C6	Carrier frequency	B, A
C7	Hunting prevention	A
C8	Factory-tuning constant	A
C9	Special control	B, A
D	Reference	
D1	Frequency reference value	Q, A
D2	Upper/lower limits	B
D3	Jump frequency	B
D4	Sequence	A
D5	Torque reference	A
D6	External magnetic flux reference	A
E	Motor Constants	
E1	V/f pattern	Q, A
E2	Motor constants	Q, A
E3	Motor 2 control method	A
E4	V/f pattern 2	A
E5	Motor 2 constants	A
E6	EMS frequency upper/lower limit	Q
F	Option	
F1	PG speed control card	Q, B, A
F2	Not used	
F3	Not used	
F4	Analog monitor card	B
F5	Not used	
F6	Digital output card	B
F7	Not used	
F8	EMS synchronous control	A
F9	Master communication	A
H	Control Circuit Terminals	
H1	Sequence input	B
H2	Sequence output	B
H3	Analog input	B
H4	Analog output	B, A
H5	Not used	
L	Protection	
L1	Motor electronic thermal overload relay	B
L2	Momentary power loss ride-through	B, A
L3	Stall prevention	B, A
L4	Frequency detection	B, A
L5	Fault retry	B
L6	Overtorque detection	B
L7	Torque limit	B
L8	Hardware protection	B, A
L9	Motor protection	B, A
O	Digital Operator	
O1	Display selection	B, A
O2	Key selection	B, A

3.2 TABLE OF 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 1: V/f with PG feedback 2: Open loop vector 3: Flux vector 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	–	

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	–	–	–	–	–	–	

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	–	

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	

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 2 Quick-start (Q) 3 Basic (B) 4 Advanced (A)
A1-02	102H	Control method selection	3	0 to 4		Q	Q	Q	Q	Q	0 V/f control 1 V/f with PG feedback 2 Open loop vector 3 Flux vector 4 EMS control
A1-03	103H	Initialize	0000	0000 to 9999		Q	Q	Q	Q	Q	0000, 1110, 3330 Setting permitted, no processing 2220 2-wire 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	–	–	–	–	–	–	–	–	

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 1 Control circuit terminal 2 Transmission 3 Option
B1-02	181H	Operation method selection	3	0 to 3		Q	Q	Q	Q	Q	0 Digital operator 1 Control circuit terminal 2 Transmission 3 Option
B1-03	182H	Stopping method selection (for stop command)	0	0 to 3		Q	Q	Q	Q	Q	0 Deceleration to stop 1 Coast to stop 2 DC injection braking to stop 3 Timer controlled coast to stop Note For flux vector control, selection is possible only from 0 and 1
B1-04	183H	Prohibition of reverse operation	0	0/1		B	B	B	B	–	0 Reverse run enabled 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 1 Stop 2 Run at E1-09 3 Zero-speed run
B1-06	185H	Read sequence input twice	1	0/1		A	A	A	A	A	0 1 ms - 2 scans 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. 0 Disabled 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	–	–	–	–	–	–	–	–	

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	–	

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 rising time (EMS)	10 0			–	–	–	–	Q	
C1-06	205H	Current reference falling 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 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 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 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 For flux vector control, lower limit is 1.00

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	Switching speed of ASR constants	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
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
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 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	–	–	–	–	–	–	–	–	
C8-18	234H	Not used	–	–	–	–	–	–	–	–	
C8-19	235H	Not used	–	–	–	–	–	–	–	–	

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
C8-20	236H	Test (simulation) mode	0	0 to 3		A	A	A	A	A	0 Normal operation 1 Simulation mode 2 Base test mode (only when individual control power supplies are used) 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 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	–	–	–	
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	–	–	–	

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
C9-11	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 1 Control ON
C9-15	254H	Speed/torque control switching	0	0/1		–	–	–	A	–	0 Speed control 1 Torque control Valid only when C9-14=1
C9-16	255H	Droop control selection	0	0/1		–	–	–	A	–	0 Speed control 1 Droop speed control 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	–	

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 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 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 1 Magnetic flux reference input from master controller is valid.

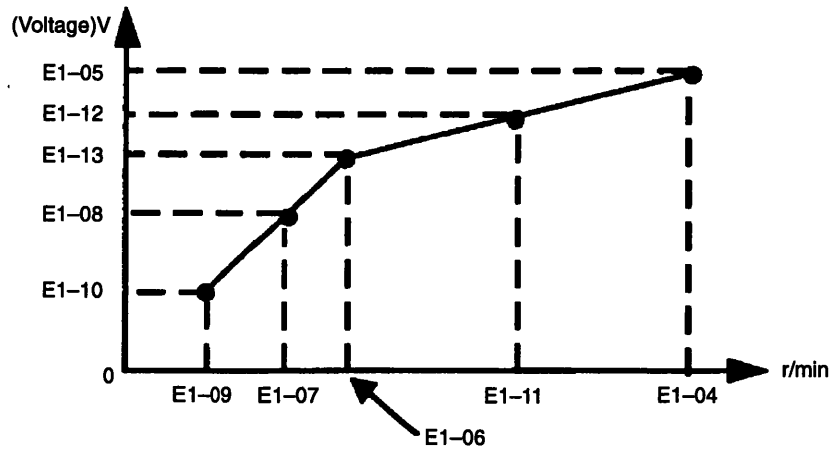
Constant No.	MEMOBUS Address	Constant Name	Initial Value	Setting Range	Change during Operation	V/f Control	V/f with PG Feedback	Open Loop Vector	Flux Vector	EMS Control	Remarks
E1-01	300H	Input voltage setting	200	180 to 230 V		Q	Q	Q	Q	Q	For 400 V class, the value to be set is twice as that of 200 V class
E1-02	301H	Motor selection (V/f or vector)	2	0 to 2		Q	Q	Q	Q	–	0 General-purpose motor 1. V/f control motor 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) 0F Custom V/f pattern 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 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 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 11 0 Open loop vector 15 0 V/f control, 0 4 to 1 5 kW 14 0 V/f control, 2 2 to 45 kW 12 0 V/f control, 55 kW or more 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 15 Open loop vector 45 V/f control 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 2 0 Open loop vector 9 0 V/f control, 0 4 to 1 5 kW 7 0 V/f control, 2 2 to 45 kW 6 0 V/f control, 55 kW or more 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

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 **. 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 1 V/f with PG feedback 2 Open loop vector 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 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 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

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 11 0 Open loop vector 15 0 V/f control, 0 4 to 1 5 kW 14 0 V/f control, 2 2 to 45 kW 12 0 V/f control, 55 kW or more 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 15 Open loop vector 45 V/f control 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 2 0 Open loop vector 9 0 V/f control, 0 4 to 1 5 kW 7 0 V/f control, 2 2 to 45 kW 6 0 V/f control, 55 kW or more 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 1 V/f control motor 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) 0F. Custom V/f pattern 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 number of poles	180 0	0 0 to 255 0 V		A	A	A	A	–	The unit varies depending on the setting of O1-04 With V/f control and V/f with PG feedback, initial value is 0 0
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 ** 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	–	

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

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 0 Ramp to stop 1. Coast to stop 2 Emergency stop 3. Operation continue
F1-03	382H	Operation selection at overspeed detection	1	0 to 3		–	B	–	B	–	0. Ramp to stop 1: Coast to stop 2 Emergency stop 3 Operation continue
F1-04	383H	Operation selection at excessive speed deviation detection	3	0 to 3		–	B	–	B	–	0 Ramp to stop 1. Coast to stop 2 Emergency stop 3 Operation continue
F1-05	384H	PG rotation	0	0/1		–	B	–	B	–	0 Forward direction 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 selection	0	0/1		–	B	–	–	–	0 Disabled 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 –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 –99 99 ~ +99 99
F4-05	393H	AO-12/H channel 1 bias	0	–32768 to 32767	○	B	B	B	B	B	30000/10V
F4-06	394H	AO-12/H channel 2 bias	0	–32768 to 32767	○	B	B	B	B	B	

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
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 1. Code output 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 1 ON
F9-01	39FH	External fault bit selection	0	0/1		A	A	A	A	A	0 Fault at "1" 1 Fault at "0"
F9-02	3A0H	External fault detection mode	0	0/1		A	A	A	A	A	0 Detected always 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 1 Coast to stop 2 Emergency stop 3: Operation continue
F9-04	3A2H	Operation selection at bus error	1	0 to 3		A	A	A	A	A	0 Ramp to stop 1 Coast to stop 2 Emergency stop 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
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

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
F9-14	3ACH	Transmission ASR proportional gain selection	0	0/1		–	A	–	A	–	0 The gain set by the constant is used 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 1 The regeneration side torque limit sent from the master controller is used
F9-16	3AEH	Not used	–	–	–	–	–	–	–	–	
F9-17	3AFH	Not used	–	–	–	–	–	–	–	–	

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 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 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 1. −10 V to +10V 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	

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	
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	
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 0: Unsigned 1: Signed
H5-01	41FH	Not used	–	–	–	–	–	–	–	–	
H5-02	420H	Not used	–	–	–	–	–	–	–	–	
H5-03	421H	Not used	–	–	–	–	–	–	–	–	
H5-04	422H	Not used	–	–	–	–	–	–	–	–	

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 (major fault) 1 Output stops (coast to stop) (major fault) 2 Ramp to stop at C1–09 setting time (major fault) 3 Operation continue (minor fault)
L2-01	484H	Momentary power loss detection	0	0/1		B	B	B	B	–	0 None 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 1 Enabled 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 1 Enabled 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 1. Enabled (deceleration time C1-02) 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	–	–	–	–	–	–	–	–	

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
L3-08	492H	Not used	–	–	–	–	–	–	–	–	
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 EMS Desired current detection level should be set 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 For V/f control and V/f with PG feedback, initial value is 1 20 Hz EMS Current detection width should be set 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 1 Fault retry active
L5-03	49AH	Not used									
L6-01	49BH	Overtorque detection selection	0	0 to 4		B	B	B	B	–	0 Disabled 1 Detects during constant-speed run (operation continue) 2 Detects during run (operation continue) 3 Detects during constant-speed run (operation stopped) 4 Detects during running (operation stopped)
L6-02	49CH	Overtorque detection level	150	0 to 300%		B	B	B	B	–	
L6-03	49DH	Overtorque detection time	0 1	0 0 to 10 0 sec		B	B	B	B	–	
L6-04	49EH	Overtorque detection selection 2	0	0 to 4		A	A	A	A	–	0 Disabled 1 Detects during constant-speed run (operation continue) 2 Detects during run (operation continue) 3 Detects during constant-speed run (operation stopped) 4 Detects during running (operation stopped)
L6-05	49FH	Overtorque detection level 2	150	0 to 300%		A	A	A	A	–	

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
L6-06	4A0H	Overtorque detection time 2	0.1	0.0 to 10.0 sec		A	A	A	A	–	
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 1 Braking transistor provided, braking resistor not provided 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 1 Coast to stop 2 Emergency stop 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 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 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 0. Not provided 1 Provided
L9-02	4B5H	Operation selection at thermistor open circuit	3	0 to 3		B	B	B	B	–	

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

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 2 Motor speed (equivalent to U1-05) 3 Output current 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 EMS Fixed to 0
O1-04	503H	Setting unit of V/f patterns	1	0/1		B	B	B	B	–	0 Hz 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 1 Enabled
O2-02	506H	STOP key enable/disable during remote operation	0	0/1		B	B	B	B	B	0 Disabled 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 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 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 1: Running time

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 2 No 2 motor
T1-02	F1H	Tuning mode	0	0 to 4		–	–	B	B	–	0 Normal operation mode 1 Tuning by inputting nameplate value (digital operator) 2 Tuning by inputting motor constant (digital operator) 3. Tuning by inputting nameplate value (master controller) 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 Input the base side value 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 No 1 motor (E1-06) * (E2-04)/120 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 Insulation class A (100°C) 0 E (120°C) 1 B (130°C) 2 F (155°C) 3 H (180°C) 4
T2-07	F8H	PG constant	F1-01 (E3-03)	0 to 10000		–	–	B	B	–	

( ) For No 2 motor (T1-01 = 2)

3.3 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

3.4 CONSTANTS FOR WHICH FACTORY SET VALUES VARY DEPENDING ON CONTROL MODE

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

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 E4-01	Rated r/min	1800		1750		–
E1-06 E4-03	Base speed	1800		1750		–
E1-08 E4-05	Middle voltage	① 15.0 *1 ② 14.0 ③ 12.0		11.0	–	–
E1-09 E4-06	Minimum speed	45		15	0	–
E1-10 E4-07	Minimum voltage	① 9.0 *1 ② 7.0 ③ 6.0		2.0	–	–
E1-13 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	–

Note: *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

3.5 CONSTANTS FOR WHICH FACTORY–SET VALUES VARY DEPENDING ON INVERTER OUTPUT (O2-04) (1)

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

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

CONSTANTS FOR WHICH FACTORY-SET VALUES VARY DEPENDING ON INVERTER OUTPUT (O2-04) (2)

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

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	15.0	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	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

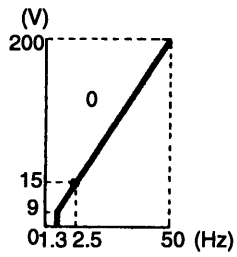
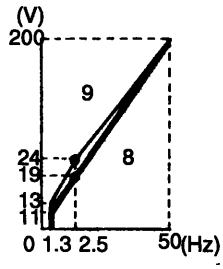
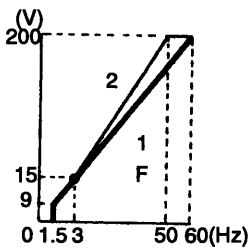
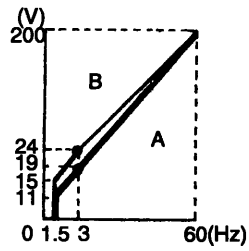
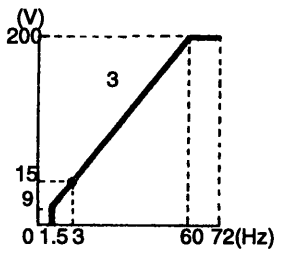
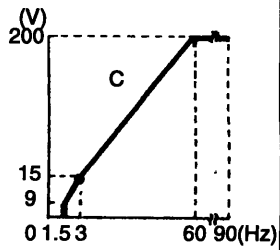
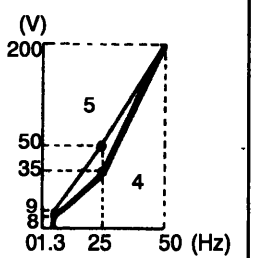
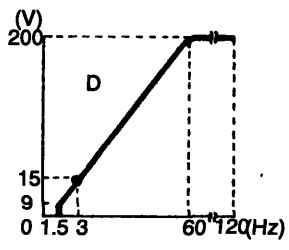
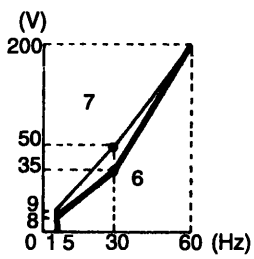
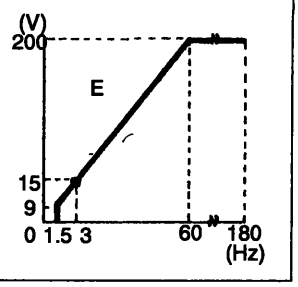
400 V Class

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	15.0	15.0	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

3.6 CONSTANTS THAT CAN BE CHANGED BY SETTING V/f PATTERN (E1–03)

(ENABLED ONLY IN V/f CONTROL)

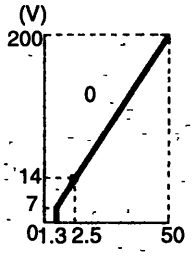
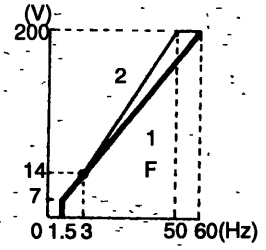
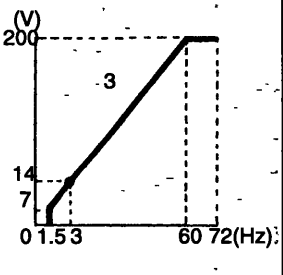
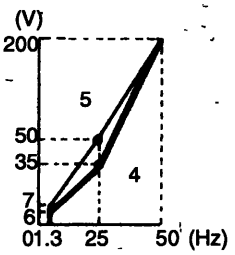
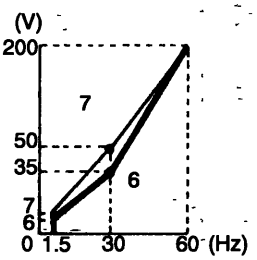
200V Class (0.4 to 1.5kW) (For 400V class, the voltage is doubled.)

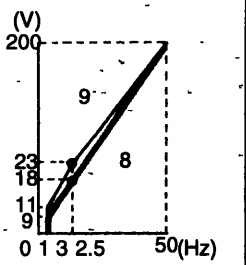
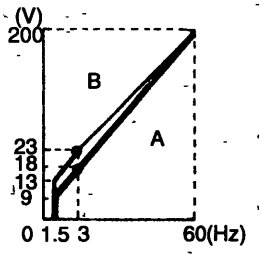
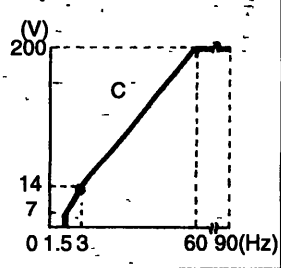
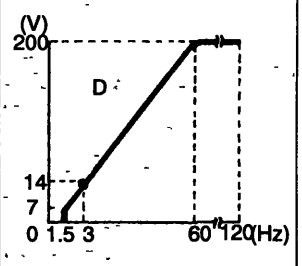
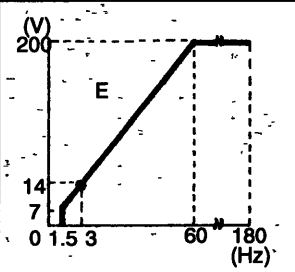
	Specifications		E1–03	V/f Pattern*1		Specifications		E1–03	V/f Pattern*1
General-purpose	50 Hz		0		High Starting Torque *2	50 Hz	Low starting torque	8	
							High starting torque	9	
	60 Hz	60 Hz Saturation	1 F			60 Hz	Low starting torque	A	
		50 Hz Saturation	2				High starting torque	B	
	72 Hz		3		Rated Output Operation (Machine Tools)	90 Hz		C	
Variable Torque Characteristics (Fans, Pumps)	50 Hz	Variable torque 1	4			120 Hz		D	
		Variable torque 2	5						
	60 Hz	Variable torque 3	6			180 Hz		E	
		Variable torque 4	7						

*1 Consider the following items as the conditions for selecting a V/f pattern. They must be suitable for:
- The voltage and frequency characteristics of motor
- The maximum rotation speed of motor

*2 Select high starting torque only in the following conditions. Normally, this selection is not required.
- The wiring distance is long (150 m and above).
- Voltage drop at startup is large.
- AC reactor is inserted in the input or output of the inverter.
- A motor smaller than the nominal output of the inverter is used.

200V Class (2.2 to 45kW) (For 400V class, the voltage is doubled.)

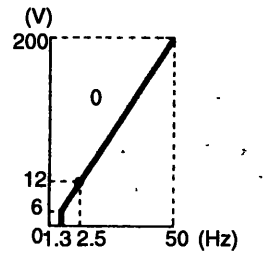
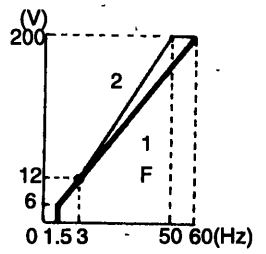
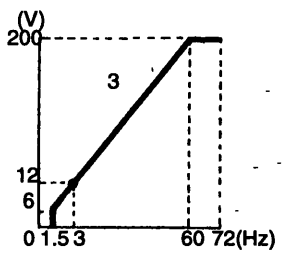
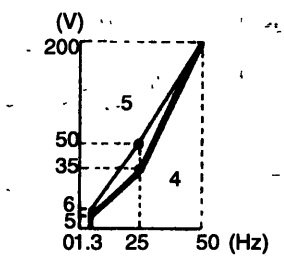
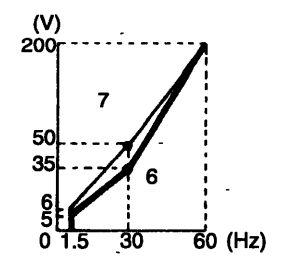
	Specifications		E1-03	V/f Pattern*1
General-purpose	50 Hz		0	
	60 Hz	60 Hz Saturation	1 F	
		50 Hz Saturation	2	
	72 Hz		3	
Variable Torque Characteristics (Fans, Pumps)	50 Hz	Variable torque 1	4	
		Variable torque 2	5	
	60 Hz	Variable torque 3	6	
		Variable torque 4	7	

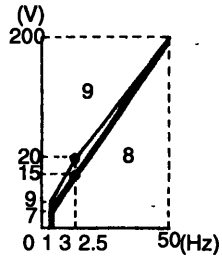
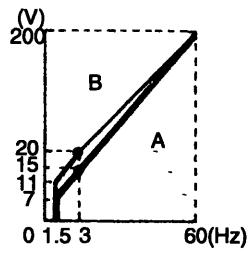
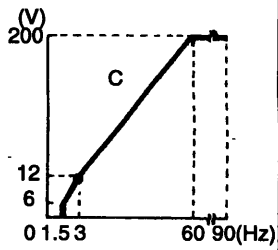
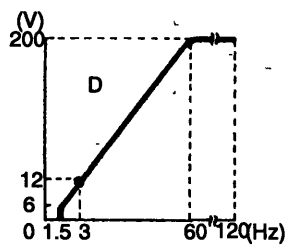
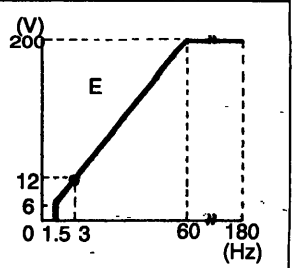
	Specifications		E1-03	V/f Pattern*1
High Starting Torque *2	50 Hz	Low starting torque	8	
		High starting torque	9	
	60 Hz	Low starting torque	A	
		High starting torque	B	
Rated Output Operation (Machine Tools)	90 Hz		C	
	120 Hz		D	
	180 Hz		E	

*1 Consider the following items as the conditions for selecting a V/f pattern. They must be suitable for:
- The voltage and frequency characteristics of motor
- The maximum rotation speed of motor

*2 Select high starting torque only in the following conditions. Normally, this selection is not required.
- The wiring distance is long (150 m and above).
- Voltage drop at startup is large.
- AC reactor is inserted in the input or output of the inverter.
- A motor smaller than the nominal output of the inverter is used.

200V Class (55kW and above) (For 400V class, the voltage is doubled.)

	Specifications		E1-03	V/f Pattern*1
General-purpose	50 Hz		0	
	60 Hz	60 Hz Saturation	1 F	
		50 Hz Saturation	2	
	72 Hz		3	
Variable Torque Characteristics (Fans, Pumps)	50 Hz	Variable torque 1	4	
		Variable torque 2	5	
	60 Hz	Variable torque 3	6	
		Variable torque 4	7	

	Specifications		E1-03	V/f Pattern*1
High Starting Torque *2	50 Hz	Low starting torque	8	
		High starting torque	9	
	60 Hz	Low starting torque	A	
		High starting torque	B	
Rated Output Operation (machine Tools)	90 Hz		C	
	120 Hz		D	
	180 Hz		E	

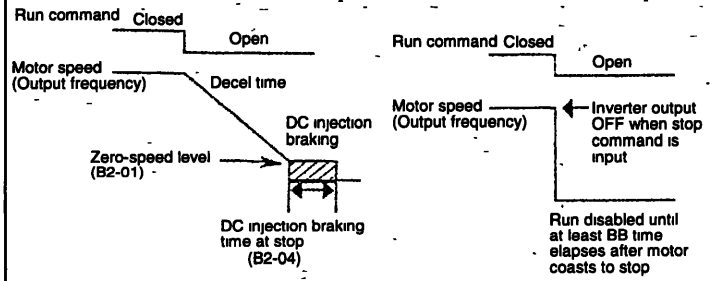
*1 Consider the following items as the conditions for selecting a V/f pattern. They must be suitable for:
- The voltage and frequency characteristics of motor
- The maximum rotation speed of motor

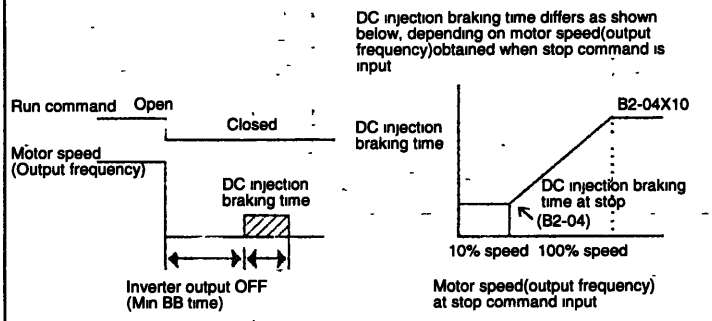
*2 Select high starting torque only in the following conditions. Normally, this selection is not required.
- The wiring distance is long (150 m and above).
- Voltage drop at startup is large.
- AC reactor is inserted in the input or output of the inverter.
- A motor smaller than the nominal output of the inverter is used.

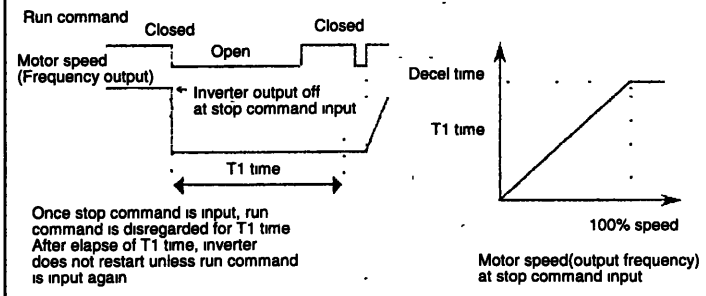
B APPLICATION-RELATED CONSTANTS

<table>
<tr><th>Constant No.</th><th>Name</th><th>Description</th><th>Remarks</th></tr>
<tr><td>B1-01</td><td>Reference selection</td><td>Speed reference and run command can be set independently as shown below.</td><td></td></tr>
<tr><td>B1-02</td><td>Operation method selection</td><td>Set Value Description
0: Run by digital operator reference
1: Run by control circuit terminal reference (9CN-4)
2: Run by MEMOBUS serial communication reference
3: Run by master controller

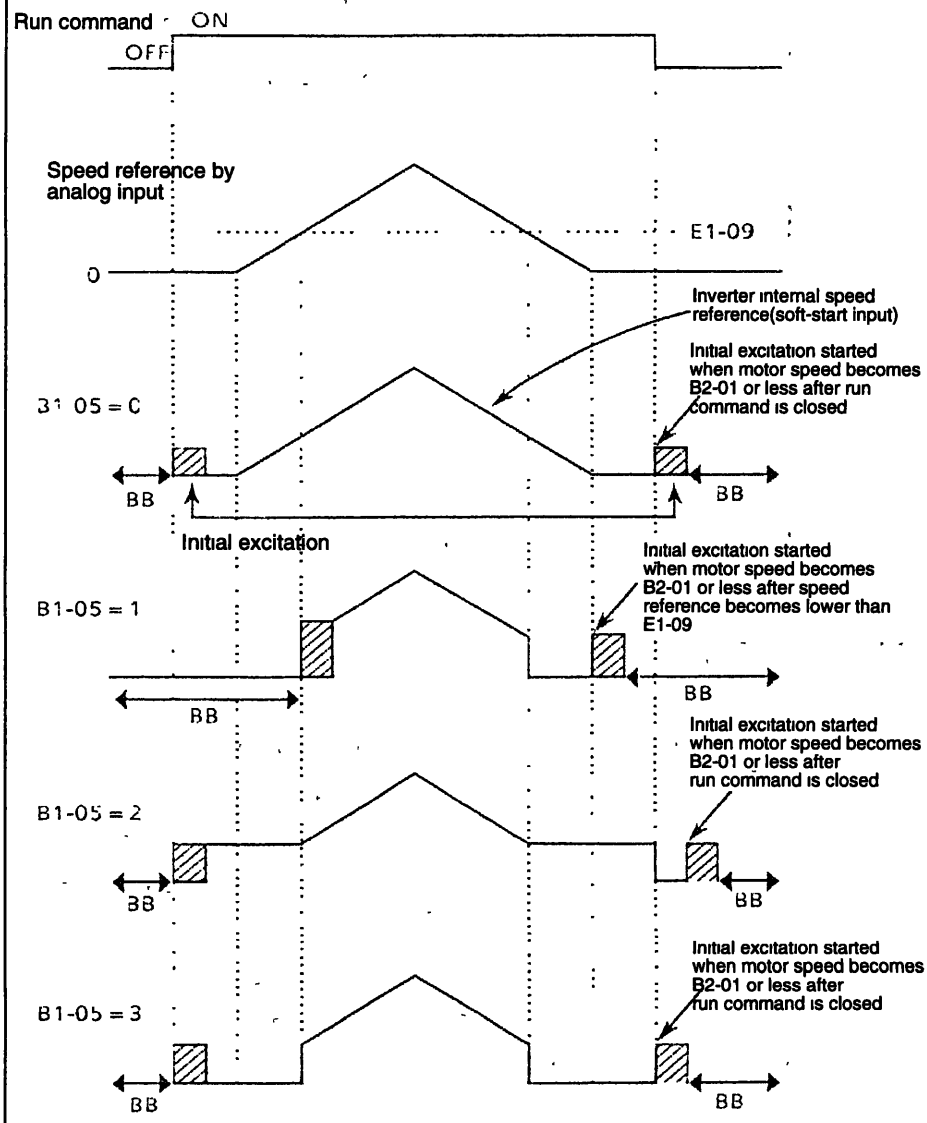
By using the digital operator LOCAL/REMOTE key, operation mode can be selected during stop as shown below.
LOCAL : Run by speed reference and run command from digital operator
REMOTE: Run by speed reference and run command set by B1-01 and B1-02, respectively.
Note: REMOTE is set when the power supply is turned ON.</td><td></td></tr>
<tr><td>B1-03</td><td>Stopping method selection</td><td>The stopping method can be set as shown below.

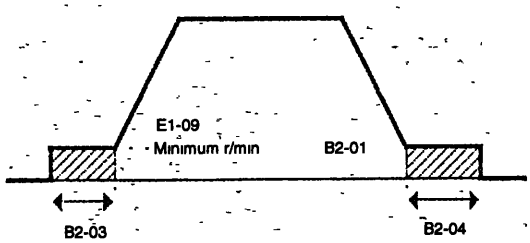
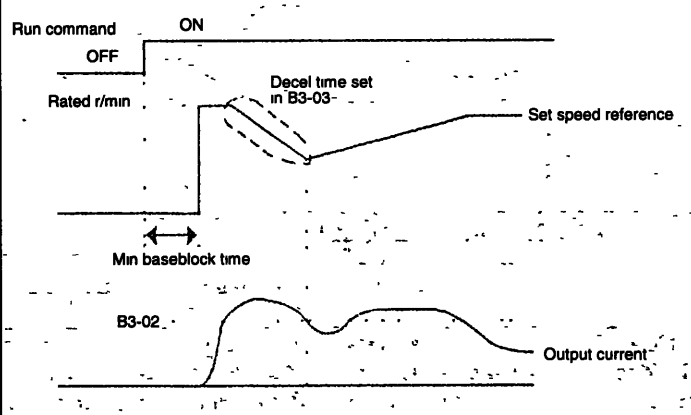
1. B1-03 = 00 Deceleration to stop 2. B1-03 = 01 Coast to stop
 

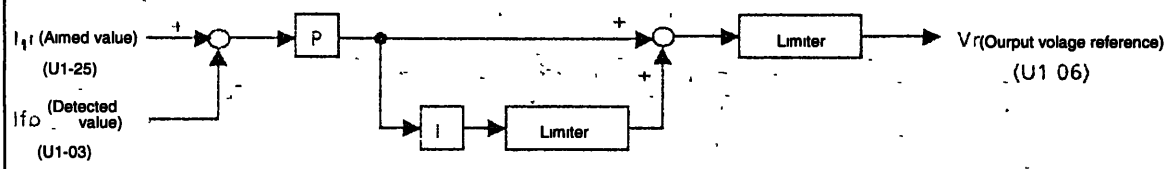
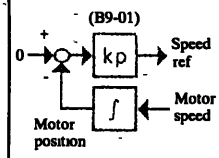
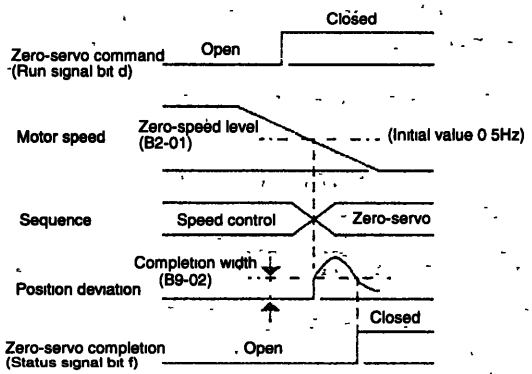
3. B1-03 = 02 Full-range DC injection braking stop
 

4. B1-03 = 03 Coast to stop (with timer function)
 
</td><td>Only 00 and 01 can be selected when A1-02 = 3 (flux vector control).

Deceleration time is selected among C1-02 and C1-04.</td></tr>
<tr><td>B1-04</td><td>Prohibition of reverse operation</td><td>Selection Description
0: REV run enabled
1: REV run prohibited (REV run command and minus speed reference are not accepted.)</td><td></td></tr>
</table>

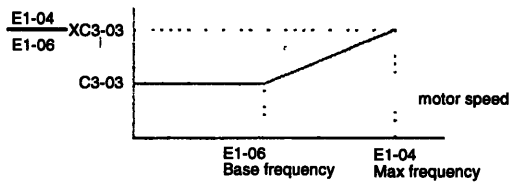
Constant No.	Name	Description	Remarks
B1-05	Operation selection at a speed lower than minimum r/min. (E1-09)	When flux vector control is set, select operation mode for speed reference less than E1-09. Selection Description 0: Run according to speed reference (E1-09 disabled) 1: Baseblock 2: Run with the setting of E1-09 3: Zero-speed operation (Internal speed reference is set to zero.) The following shows the time chart of inverter internal speed reference and initial excitation when initial excitation time is set at start and stop.  	This setting is disabled when E1-09 is set to " 0". When speed reference is less than the min. speed reference at A1-02 =0, 1 or 2, baseblock is applied.
B1-06	Read sequence input twice	Selection Description 0: 2 scans of control circuit terminal input signal for 1 ms 1: 2 scans of control circuit terminal input signal for 5 ms	Set "0" when control circuit terminal response is needed.
B2-01	Zero-speed level (DC injection braking starting speed)	Sets speed which starts DC injection braking (initial excitation for flux vector control) in units of 0.01% when deceleration to stop is selected. When B2-01 < E1-09, DC injection braking is started from E1-09.	The unit can be changed by O1-03.

Constant No.	Name	Description	Remarks
B2-02	DC injection braking current	Sets DC injection braking current in units of 1%. Inverter rated current becomes 100%.	Initial excitation is performed with current value set in E2-03 when A1-02 = 3 (flux vector control).
B2-03	Initial excitation (DC injection braking) time at start	When the motor rotating direction is not defined, DC injection braking at start is used in order to stop the coasting motor temporarily and start it again without tripping. Set the time to perform initial excitation (DC injection braking except for flux vector control) at start in units of 0.1 second.	When the set value is 0, initial excitation at start is not performed.
B2-04	DC injection braking time at stop	Used to prevent coasting after stop command is input. Set the time to perform DC injection braking (initial excitation for flux vector control) at stop in units of 0.1 second. DC injection braking time chart (initial excitation) 	When the set value is 0, DC injection braking at stop is not performed.
B3-01	Speed search selection at start	Set Value Description 0: When run command is input, the motor accelerates to the set speed from 0. 1: When run command is input, speed search is performed from the rated r/min for a control method without PG. For a control method with PG, the motor accelerates/decelerates to the set speed from the motor speed.	Factory setting of B3-01 is 01 for control with PG.
B3-02	Speed search operating current at start	Sets speed search operating level in the ratio (%) for the inverter rated current.	
B3-03	Speed search deceleration time	Sets deceleration time during speed search in units of 0.1 second. [Speed search time chart at start with V/f control] When inverter output current is larger than B3-02, the motor decelerates in the deceleration time of B3-03. When output current becomes lower than B3-02, speed search is completed and the motor accelerates or decelerates to the set speed in the set accel/decel time. 	

Constant No.	Name	Description	Remarks
B5-02	EMS current control proportional gain	Sets proportional gain of EMS current control in units of 0.01.	
B5-03	EMS current control integral time	Sets integral time of EMS current control in units of 10ms.	
B5-04	EMS current control integral limit	Sets integral limit in the ratio for the maximum voltage reference (8192/100%).	
B5-06	PI limit	Sets PI output limiter of EMS current control in the ratio for the maximum voltage reference.	
			
B7-01	Droop amount	This is a function to provide speed drooping characteristics in proportion to load torque. Set speed reduction amount under rated (100%) load status to B7-01 in the ratio (%) for maximum r/min (E1-04).	This function is enabled only at A1-02 = 2 or 3 (vector control).
		Zero servo function is to perform position control at a position where the motor speed becomes less than the zero-speed level.	
B9-01	Zero-servo gain	Sets zero-servo gain.	
B9-02	Zero-servo completion width	Sets zero-servo completion width in value of four multiplication of PG pulse.	
			This function is enabled only at A1-02 = 3 (flux vector control).

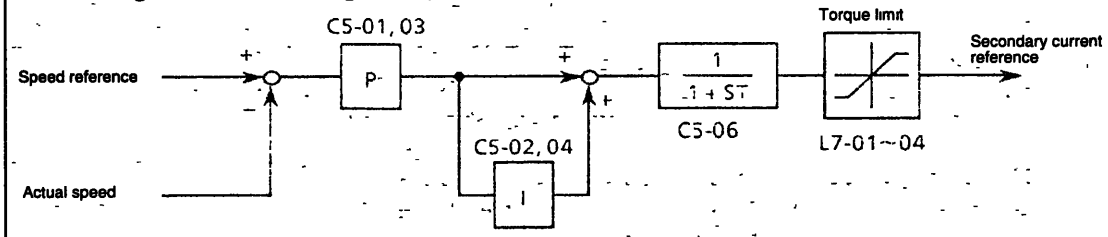
C CONSTANTS FOR ADJUSTMENT

Constant No.	Name	Description	Remarks
C1-01 C1-02 C1-03 C1-04	Acceleration time 1 Deceleration time 1 Acceleration time 2 Deceleration time 2	Sets acceleration time 1 or 2 to accelerate from 0r/min to the rated r/min. (E1-04), and deceleration time 1 or 2 to decelerate from the rated r/min. to 0r/min. Accel/decel time can be changed in two steps by run operation signal bit 6. (Can be changed during running.) Accel/decel time selection run operation signal bit 6 — Accel time — Decel time OFF — C1-01 — C1-02 ON — C1-03 — C1-04	
C1-05 C1-06	Current reference rising time (EMS) Current reference falling time (EMS)	In EMS control mode, sets rising time from 0A to rated current (E2-01) to C1-05 and falling time from rated current to 0A to C1-06.	
C1-09	Emergency stop time	Emergency stop time becomes enabled in the following cases. • Multi-function input emergency stop command (set value = 15) is closed. • Selection at fault detection is set to emergency stop.	
C1-10	Accel/decel time setting unit	Set Value — Description 0: Accel/decel time (C1-01 to 09) setting range is in units of 0.01 second. Setting range: 0 to 600.00 seconds 1: Accel/decel time (C1-01 to 09) setting range is in units of 0.1 second. Setting range: 0 to 6000.0 seconds When C1-10 is changed, the setting unit of accel/decel time (C1-01 to 09) stored in the inverter is changed automatically as follows. When C1-10 is changed from 0 to 1 at C1-01 = 12.4 seconds, 12.40 seconds is automatically set to C1-01. If either of C1-01 to 09 is set to 600.1 seconds or more, C1-10 cannot be changed from 0 to 1.	
C3-01	Slip compensation gain	Meaning of slip compensation gain differs depending on the control method. • V/f control, open loop vector control Calculates motor torque according to output current and sets gain to compensate for motor speed in units of 0.1. Adjust when speed accuracy is reduced at operation with a load. Run Status — C3-01 Adjustment * When actual speed is low: Increase the set value. When actual speed is high: Decrease the set value. *Adjust the value by 0.1. • Flux vector control Gain to compensate for slip caused by temperature variation. Normally, this setting does not have to be modified.	

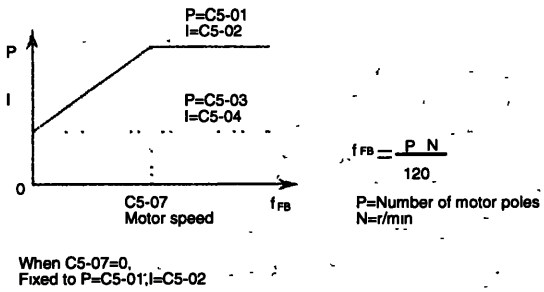
Constant No.	Name	Description	Remarks
C3-02	Slip compensation primary delay time	Adjust the value when speed is not stabilized or speed response is slow when operating with a load in V/f control or open loop vector control. Run Status — C3-02 Adjustment * When actual speed response is slow: Increase the set value. When actual speed is unstable: Decrease the set value. *Adjust the value by 10 ms.	
C3-03	Slip compensation limit	Sets slip compensation limit in the ratio (%) for motor rated slip (E2-02). The limit is as shown below in the constant torque area and constant output area.  	
C3-04	Slip compensation selection during regeneration	Set Value — Description 0: Slip compensation disabled during regeneration 1: Slip compensation enabled during regeneration	
C4-01	Torque compensation gain	Torque compensation is a function to calculate load torque according to output current and to compensate for output voltage required to obtain torque characteristics. In open loop vector, torque compensation gain does not have to be adjusted. The following outlines the adjusting method in V/f control. Run Status — C4-01 Adjustment * When sufficient torque is not obtained at low-speed operation: Increase the set value. When motor current value is not stable, or motor current value is excessively large at light loads operation: Decrease the set value. *If torque compensation is increased excessively, the following faults may occur; • Excessive motor current is applied to cause the inverter to malfunction. • Motor generates excessive heat or vibration. Therefore, adjust this value gradually, checking the motor current.	
C4-02	Torque compensation time constant	Adjusted when motor output current is not stabilized or speed response is slow. In open loop vector, torque compensation time constant does not have to be adjusted. Run Status — C4-02 Adjustment * When motor current value is not stable: Increase the set value. When speed response is slow: Decrease the set value. *Adjust the value by 10 ms.	

Constant No.	Name	Description	Remarks
C5-01	ASR proportional (P) gain 1	Sets ASR proportional gain 1 in units of 0.01.	
C5-02	ASR integral (I) time 1	Sets ASR integral time 1 in units of 1 ms.	
C5-03	ASR proportional (P) gain 2	Sets ASR proportional gain 2 in units of 0.01.	
C5-04	ASR integral (I) time 2	Sets ASR integral time 2 in units of 1 ms.	
C5-05	ASR limit	Sets the limit of frequency to be compensated for by ASR in units of 1% when V/f control with PG feedback is selected. Rated r/min. (E1-04) is regarded as 100%.	
C5-06	ASR primary delay time	Sets primary delay time constant to control secondary current reference variation in units of 1 ms when flux vector control is selected.	
C5-07	Switching speed of ASR constants	Sets speed to change ASR proportional gain and integral time constant in units of 0.01% when flux vector control is selected.	Can be changed by O1-03.

• ASR of flux vector control
The following shows the block diagram.

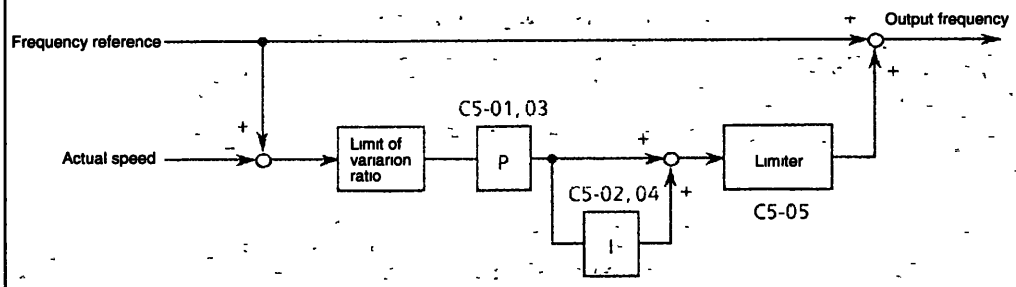


Proportional gain and integral time are approximated in a straight line by motor speed as shown below.

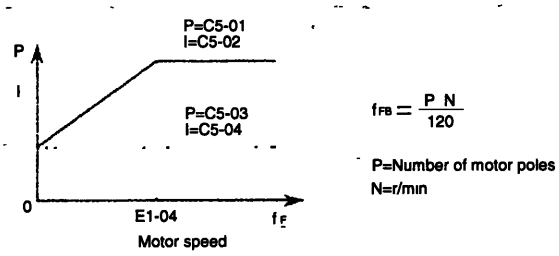


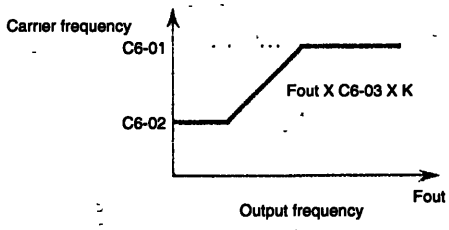
When C5-07=0,
Fixed to P=C5-01;I=C5-02

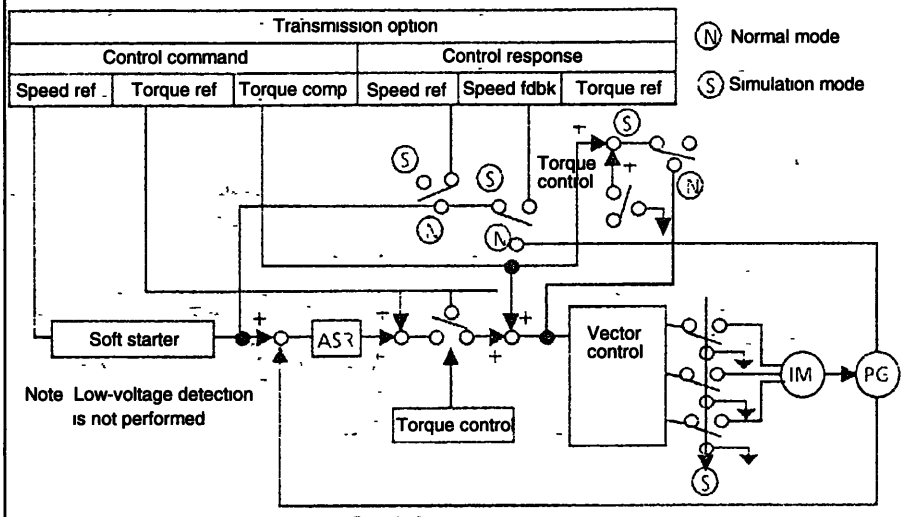
• ASR of V/f control with PG feedback
The following shows the block diagram.

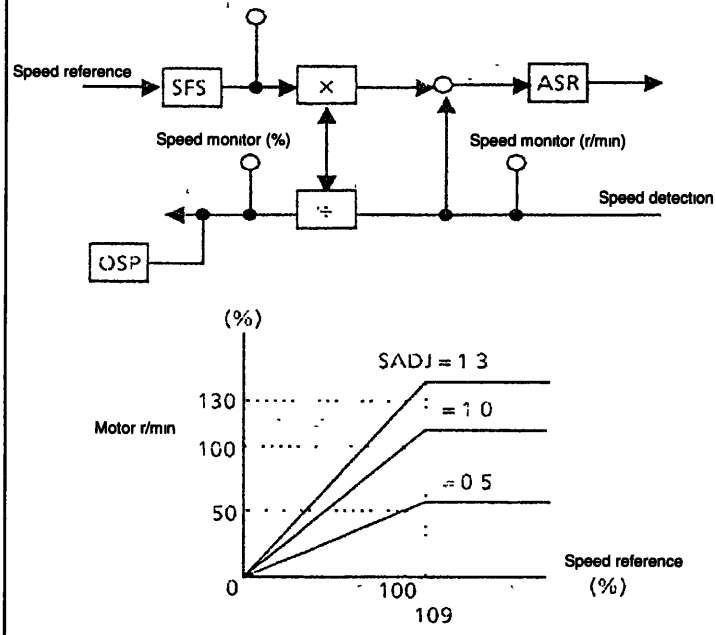


Proportional gain and integral time are approximated in a straight line by motor speed as shown below.

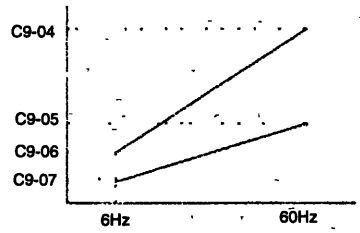
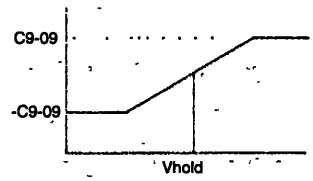
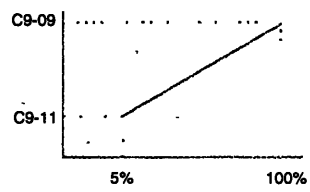


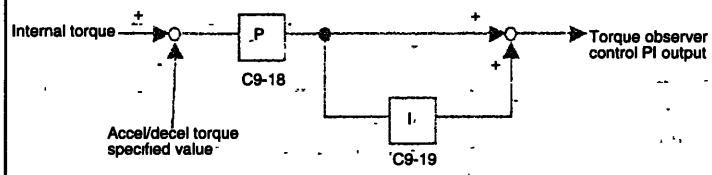
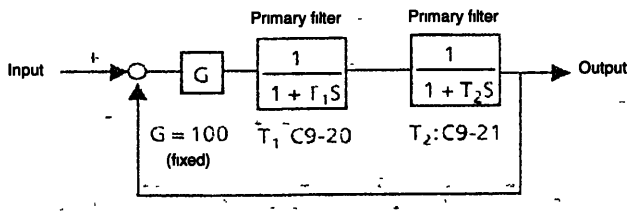
Constant No.	Name	Description	Remarks
C6-01 C6-02 C6-03	Carrier frequency upper limit Carrier frequency lower limit Carrier frequency proportional gain	The following shows the relation between carrier frequency and output frequency according to the set values of C6-01 to 03. Only C6-01 is effective in vector control. For constant carrier frequency (C6-01 set value); Set C6-03 to 0 and C6-01 and C6-02 to the same value.  Note: Value K varies depending on the upper limit of carrier frequency as described below. C6-01≧10.0kHz: K=3 10.0kHz>C6-01≧5.0kHz: K=2 C6-01<5.0kHz: K=1 In the following cases, a setting error (OPE11) occurs: 1. C6-03>6 and C6-02>C6-01 2. C6-01>5kHz and C6-02≦5kHz	
C7-01	Hunting prevention selection	Current amplitude is varied or the machine vibrates because of frequency of 10 to 30Hz under a light load, which is called hunting. Selects the hunting prevention function in V/f control mode. Set Value Description 0: Disabled 1: Enabled	
C7-02	Hunting prevention gain	Sets hunting prevention gain in units of 0.1. The following shows how to adjust hunting prevention gain. Run Status — C7-02 Adjustment * Hunting under light load: Increase the set value. Machine vibration or stepout under heavy load: Decrease the set value. *Adjust the value by 0.1.	
C8-08	AFR gain	In open loop vector, adjust the value as shown below when the motor is hunting or in order to increase response. Run Status — C8-08 Adjustment * Torque or speed response is slow: K=2 Hunting: K=1 *Adjust the value by 0.1.	

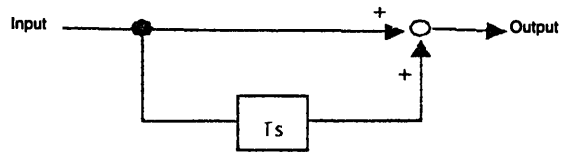
Constant No.	Name	Description
C8-20	Test (simulation) mode	Selection Description 0: Normal operation 1: Simulation mode 2: Base test mode 3: V/f test mode Note: When any of 1 to 3 is selected, the digital operator REMOTE (SEQ, REF) LEDs blink alternately to inform that operation is under the test mode. [Features of each mode] 1. Simulation mode Simulates running procedure at communication (current is not output even when running.)  2. Base test mode A test mode for hardware check. Used with main circuit DC voltage less than 20V. • If main circuit DC voltage exceeds 20V, the digital operator displays "bASE" to interrupt running. • V/f control is performed disregarding the control mode setting. • Undervoltage is not detected. • Contents that are set in the V/f test mode are not stored. 3. V/f test mode A mode where the motor is rotated merely to check the machine system. • V/f control is performed disregarding the control mode setting. • When PG detecting option is mounted, detected speed can be monitored. • Contents that are set in the V/f test mode are not stored.

Constant No.	Name	Description	Remarks
C9-01	Rated speed adjustment	Fine-adjust motor rotating speed for speed reference. 	Used for fine adjustment of difference of rotating speed caused by gears.

Constant No.	Name	Description	Remarks
C9-02	Energy-saving control selection	By setting this constant to 1, the energy-saving mode is entered. Setting this constant to 0 enters the normal mode.	
C9-03	Energy-saving coefficient K2	Sets energy-saving coefficient K2. Calculate the value according to the following equations by using motor constants R1, R2, L, Rm and Lm. R1: primary resistance (Ω) R2: secondary resistance of primary calculation (Ω) L: sum of primary and secondary leak inductances (mH) Rm: iron loss resistance (mΩ/W) Lm: primary winding inductance (mH) $x_m = 2\pi f L_m \quad f = 60\,[Hz]$ $r_{mm} = 2\pi f R_m$ $b_m = \frac{x_m}{x_m^2 + r_{mm}^2}$ $g_m = \frac{r_{mm}}{x_m^2 + r_{mm}^2}$ $t_1 = b_m^2 R_1 + g_m$ $t_2 = 1 + 2R_1 g_m$ $t_3 = R_2^2 t_1$ $t_4 = R_2 t_2$ $sqrt = \sqrt{t_1(R_1 + t_3 + t_4)}$ $S_{\eta max} = \frac{-t_3 + R_2 sqrt}{R_1 + t_4}$ $x_1 = \pi f L$ $b_1 = g_m + \frac{S_{\eta max}}{R_2}$ $b_2 = b_m + \frac{x_1 S_{\eta max}^2}{R_2^2}$ $c_1 = 1 + R_1 b_1 + x_1 b_2$ $c_2 = R_1 b_2 - x_1 b_1$ $K_2 = \sqrt{\frac{1000(c_1^2 + c_2^2)}{b_1 c_1 + b_2 c_2}}$	

Constant No.	Name	Description	Remarks
C9-04 C9-05 C9-06 C9-07	Energy-saving voltage upper limit (at 60Hz) Energy-saving voltage upper limit (at 6Hz) Energy-saving voltage lower limit (at 60Hz) Energy-saving voltage lower limit (at 6Hz)	Sets the upper and lower limits of output voltage. When voltage reference value calculated in the energy-saving mode exceeds the upper or lower limit, this upper or lower limit value is output as voltage reference value. In order to prevent over-excitation at low frequency. The upper limit value is set. The lower limit is set to prevent stall at light load. The values at 6Hz and 60Hz are set for the limit voltage. For any limit value other than at 6Hz and 60Hz, the value obtained by linear interpolation of these values is set. Setting is made in the percent of rated voltage. 	
C9-08	Power average time	Averages power used for energy-saving control by set time.	
C9-09 C9-10 C9-11	Probing operation voltage limit Probing operation voltage step (at Vout 100%) Probing operation voltage step (at Vout 5%)	Energy-saving probing operation In the energy-saving mode, the optimum voltage is calculated according to the load power to supply the voltage to the load. However, since set motor constants differ depending on temperature variations or use of other manufacturers' motors, the optimum voltage is not always output. In probing operation, voltage is varied finely to control inverter for the optimum operating conditions. Limits the range to control voltage at probing operation. Setting is made in the percent of rated voltage. Setting this value to 0 does not perform probing operation.  Sets voltage variation width in one probing operation cycle. Setting is made in percent of rated voltage. Since voltage variation is increased by increasing this value, variation in rotating speed is also increased. This voltage variation width is set at 100% and 5% of probing starting voltage. For any voltage other than at 100% and 5%, voltage variation width obtained by linear interpolation is set. 	
C9-12	Power detection filter time constant	Sets power detection filter time constant. Although response becomes better at load variation by decreasing this value, rotation with a light load at a low frequency may be unstable.	
C9-13	Power detection filter switching width	When power variation is smaller than this value, output voltage is held. If this status lasts more than 3 seconds, the probing operation mode is entered. Since output voltage cannot be held by setting switching width to 0, probing operation mode is not entered. This switching width is set in percent of power that is currently held.	

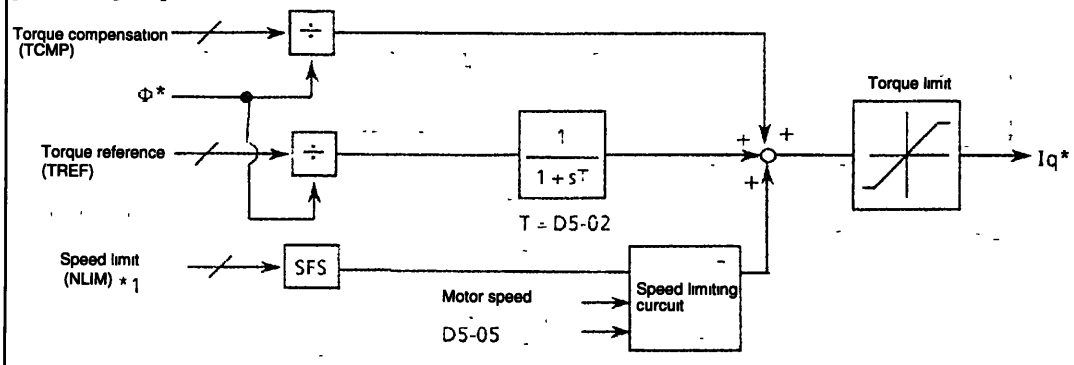
Constant No.	Name	Description	Remarks
C9-14	Torque observer selection	Sets whether torque observer control is enabled. Set value Description 0: Disabled 1: Enabled	
C9-15	Speed/torque control switching	A constant to prevent overrun of integral control at torque control or droop control. 1 is selected when the observer control section is set to PI control. Set value Description 0: Normal 1: Prevents overrun of integral control	
C9-16	Droop control selection	Changes an input to observer at droop control. 1 is selected at droop control. Set value Description 0: Normal 1: At droop control	
C9-17	Motor mechanical time constant	Sets motor mechanical time constant (τ M) that is obtained by the following equation. $\tau_M = \frac{GD^2 \times N_{100}}{375 \times T_{100}}$ [sec] GD^2 : Moment of inertia [kg • m^2] N100: Rated revolutions per minute [r/min] T100: Rated torque [kg • m]	
C9-18 C9-19	Torque observer proportional gain Torque observer integral time	Sets torque observer proportional gain. Sets torque observer integral time. The following shows the block diagram. 	
C9-20 C9-21	Torque observer secondary filter time constant 1 Torque observer secondary filter time constant 2	Sets secondary filter time constant that cuts observer control output harmonic components (100Hz or more). Set crossover frequency to 50 to 100Hz, considering shaft vibration frequency to be controlled; and damping coefficient to 0.5. The following shows the block diagram.  By setting time constant to 0, the primary filter is bypassed.	

Constant No.	Name	Description	Remarks
C9-22	Torque observer output leading time	Compensates for motor torque control lag time by phase leading. However, increasing gain excessively, operation becomes unstable. Therefore, normally set it to 0. The following shows the block diagram.  T:C9-22	
C9-23	Filter time constant for torque observer acceleration torque monitor	Sets primary filter time constant for acceleration torque monitor. Used to cut harmonic components caused by motor speed detection error, etc. and to output average torque. Setting this constant to 0, filter is disabled.	
C9-24	Torque observer control integral hold	Sets hold value of torque observer control integral component. Intégral component is held when the absolute value of speed reference is less than this set value. Used to eliminate torque observer control integral component since speed detection is disabled at zero-speed; normally, the zero-speed level is set.	

D FREQUENCY REFERENCE-RELATED CONSTANTS

Constant No.	Name	Description	Remarks
D1-01	Speed reference	Sets speed reference. Setting unit of speed reference can be changed by speed reference/ monitor setting/displaying unit (O1-03). This reference is enabled by reference selection (B1-01 = 0).	
D1-02	Current reference (EMS)	Sets current reference at EMS control. This reference is enabled by reference selection (B1-01 = 0).	
D1-09	Jog speed reference	Sets speed reference at jog operation. Setting unit of speed reference can be changed by speed reference/ monitor setting/displaying unit (O1-03).	
D5-02	Torque reference delay time	Sets primary delay time constant for torque reference input in units of 1ms.	
D5-03	Speed limit selection	Selects speed limit value in the torque control mode. Set value Description 0: Speed limit: master controller speed reference 1: Speed limit value: Set value of constant	
D5-04	Speed limit	Sets speed limit in the torque control mode in the ratio (%) for rated r/min (E1-04) when D5-03 is set to 2.	
D5-05	Speed limit bias	Sets bias for speed limit input in the torque control mode in the ratio (%) for rated r/min (E1-04) when D5-03 is set to 2.	
D5-06	Speed/torque control switching timer	Sets time from when speed/torque control switching command input to the actual control mode change in units of 1ms.	Speed/torque control is alternated by run operation signal bit E.
D5-07	Torque reference function selection	Selects torque reference (communication control command) function. Set value Description 0: Functions as torque reference (10000/100%). 1: Functions as torque limit (10000/100%). Enabled in all quadrants by converting an input value to an absolute value.	
D6-01	External magnetic flux reference selection	Selects how to give magnetic flux reference. Set value Description 0: Internal magnetic flux reference is used. 1: External magnetic flux reference from master controller is used.	

Function	Description
Torque control operation	Torque control is enabled when A1-02 = 03 (flux vector). To select torque control, set run operation signal bit E to "1". [Block diagram]

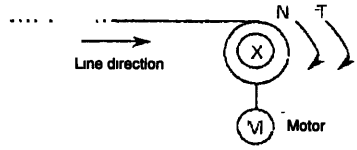
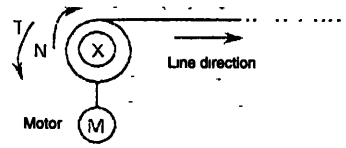
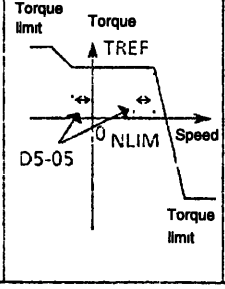
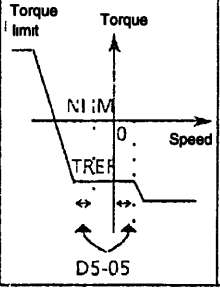
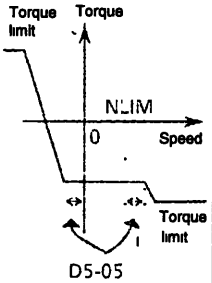
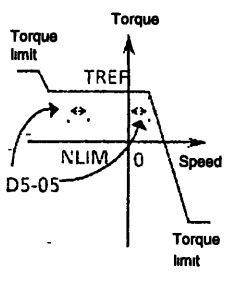


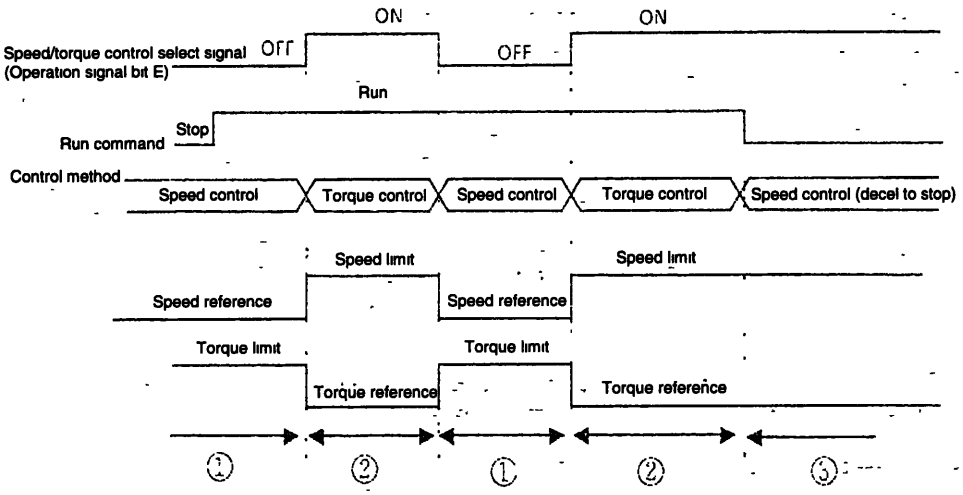
*1: Speed reference from the master controller becomes speed limit when speed limit selection (D5-03) = 1, and set constant value (D5-04) becomes speed limit when D5-03 = 2.

[Description of operation]

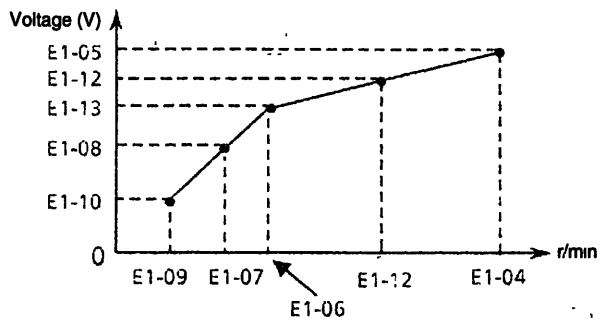
When both torque reference and speed limit are more than 0 (winder operation), the following procedures are taken:
- When -1 × speed limit bias (D5-05) < motor speed < "speed limit + D5-05" torque is controlled according to the set torque reference.
- When motor speed > "speed limit + D5-05", the speed limiting circuit outputs negative torque reference to prevent motor speed from increasing.
- When motor speed < "-1 × + D5-05", the speed limiting circuit outputs positive torque reference to prevent motor speed from increasing at the reverse run side.

Therefore, The range where torque control is enabled when both torque reference and speed limit are more than 0 is "-1 × D5-05" < motor speed < "speed limit + D5-05".
For detailed relation between torque reference, speed limit and motor speed, refer to the following table.

		Winder operation		Rewinder operation	
Configuration					
Rotating direction under normal operation		Forward run	Reverse run	Forward run	Reverse run
Ref polarity	Torque reference (TREF)	⊕	⊖	⊖	⊕
	Speed limit (SLIM)	⊕	⊖	⊕	⊖
Generating torque					

Function	Description
Speed/Torque Control Switching	When A1-03 = 3 (flux vector control), speed control or torque control can be selected during run. The following shows an example of selection. [Time Chart]  [Sequence] 1. When torque/speed control select command is OFF, speed control is performed. • Speed reference at speed control depends on speed reference selection (B1-01) setting. 2. When torque/speed control select command is ON, torque control is performed. • Speed limit under torque control uses master controller speed reference when speed limit selection (D5-03) = 1 and uses constant set value (D5-04) when D5-03 = 2. 3. By inputting a stop command during torque control, it is changed to speed control automatically, and the motor decelerates to a stop. Torque limit during deceleration to a stop becomes constant set value (L7-01 to 04). Note: Actual control mode is changed after the torque/speed control select command is changed and the speed/torque select timer (D5-06) elapses. Speed reference/speed limit are held in the inverter until the time set to D5-06 elapses.

E MOTOR-RELATED CONSTANTS

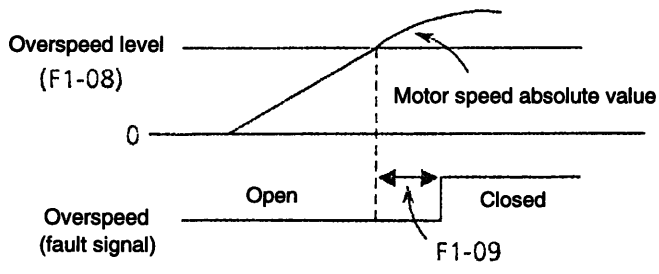
Constant No.	Name	Description	Remarks
E1-01	Input voltage setting	Sets inverter input voltage in units of 1V.	
E1-02	Motor selection (V/f or vector)	Motor protective characteristics are changed by this setting. Set Value Description 0: General-purpose motor 1: V/f control motor 2: Vector control motor (not available now)	
E1-03	V/f pattern selection	Selects a V/f pattern in the V/f control mode. Set Value Description 0 to E, 00 to 0E: Preset V/f pattern can be selected. (For details, refer to Par. 3.6.) 0F: Custom V/f pattern can be set. This setting is fixed to 0F in vector control mode.	
E1-04 E1-05 E1-06 E1-07 E1-08 E1-09 E1-10 E1-11 E1-12 E1-13	Rated r/min Rated voltage Base r/min Mid. r/min Mid. voltage Minimum r/min Minimum voltage Mid. r/min 2 Mid.voltage 2 Base voltage	When E1-03 = 0F, V/f pattern setting can be adjusted by E1-04 to 10.  Set speed so that E1-09≦E1-07＜E1-06≦E1-13≦ E1-04 will be obtained. Notes: 1. If V of the V/f pattern is increased excessively, motor torque can be obtained but the following faults may occur. • Excessive motor current may cause the inverter malfunction. • Motor generates heat and vibrates. Therefore, increase the value of V little by little, checking motor current each time. 2. In flux vector control, the V/f pattern becomes a straight line connecting the origin and the values of constants E1-05 and E1-06.	The units of the following constants can be changed by O1-04: E1-04 E1-06 E1-07 E1-09 E1-11

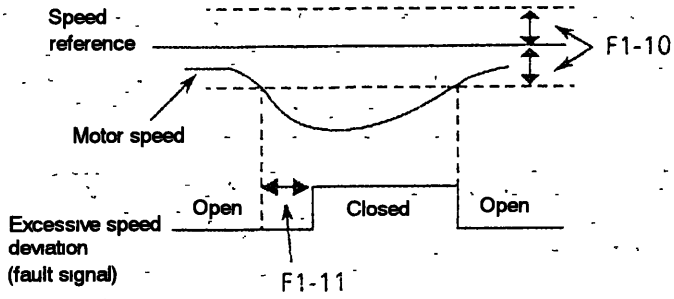
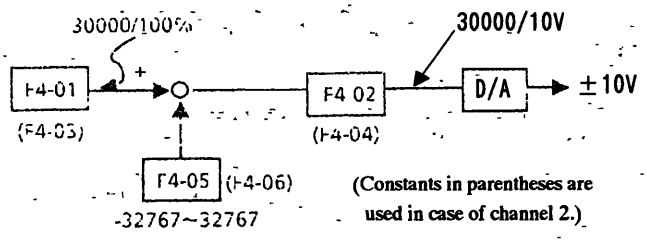
Constant No.	Name	Description	Remarks
E2-01	Motor rated current	Sets motor rated current in units of 0.01A for 7.5kW or less; 0.1A for 11kW or more.	
E2-02	Motor rated slip	Sets motor rated slip in units of 0.01Hz. To convert (r/min) to (Hz), use the following equation; fs [rated slip(Hz)] = [rated frequency(Hz)] − (rated r/min)(number of poles) / 120	
E2-03	Motor no-load current	Sets motor no-load current in units of 0.01A for 7.5kW or less; 0.1A for 11kW or more.	
E2-04	Number of motor poles	Sets the number of motor poles.	
E2-05	Motor line-to-line resistance	Sets motor line-to-line resistance value in units of 0.01Ω. Motor line-to-line resistance = (Line-to-line resistance at insulation class temperature) × (234.5+(25℃ + insulation class)/2) / (234.5 + insulation class temperature)	
E2-06	Motor leak inductance	Set motor leakage inductance in units of 0.1%.	
E2-07	Motor iron-core saturation coefficient 1	Sets motor iron-core saturation coefficient at 50% of magnetic flux. This constant does not have to be set since it is set automatically by auto-tuning.	
E2-08	Motor iron-core saturation coefficient 2	Sets motor iron-core saturation coefficient at 75% of magnetic flux. This constant does not have to be set since it is set automatically by auto-tuning.	
E2-09	Motor mechanical loss	Sets motor mechanical loss in units of 0.1%. 100% of this value is motor rated output.	
E2-10	Motor overheat temperature	Sets operating temperature of motor overheat (OH3) only when the motor is provided with a thermistor. Operation mode at OH3 occurrence is selected by L9-03. Set Value / Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF outputting. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	
E2-11	Motor feeder resistance	Sets wiring resistance between the inverter and the motor in percent of inverter rated voltage. Rfeed% = (Rf × Im) / (Vb/√3) × 100 (Im: rated current, Vb: base voltage)	

Constant No.	Name	Description	Remarks
		Constants related to motor 2 (E3-01 to E5-11) correspond to the following constants related to motor 1. For details, refer to the description of the constants related to motor 1.	
E3-01	Motor 2 control method selection	→ A1-02 ("4: EMS control" is not available.)	
E3-03	Motor 2 PG constant	→ F1-01	
E4-01	Motor 2 rated r/min	→ E1-04	
E4-02	Motor 2 rated voltage	→ E1-05	
E4-03	Motor 2 base r/min	→ E1-06	
E4-04	Motor 2 mid. r/min	→ E1-07	
E4-05	Motor 2 mid. voltage	→ E1-08	
E4-06	Motor 2 minimum r/min	→ E1-09	
E4-07	Motor 2 minimum voltage	→ E1-10	
E4-08	Motor 2 input voltage selection	→ E1-01	
E4-09	Motor 2 motor selection (V/f or vector)	→ E1-02	
E4-10	Motor 2 V/f pattern	→ E1-03	
E4-11	Motor 2 mid.r/min 2	→ E1-11	
E4-12	Motor 2 mid.voltage 2	→ E1-12	
E4-13	Motor 2 base voltage	→ E1-13	
E5-01	Motor 2 rated current	→ E2-01	
E5-02	Motor 2 rated slip	→ E2-02	
E5-03	Motor 2 no-load current	→ E2-03	
E5-04	Motor 2 number of poles	→ E2-04	
E5-05	Motor 2 line-to-line resistance	→ E2-05	
E5-06	Motor 2 leak inductance	→ E2-06	
E5-07	Motor 2 iron-core saturation coefficient 1	→ E2-07	
E5-08	Motor 2 iron-core saturation coefficient 2	→ E2-08	
E5-09	Motor 2 mechanical loss	→ E2-09	

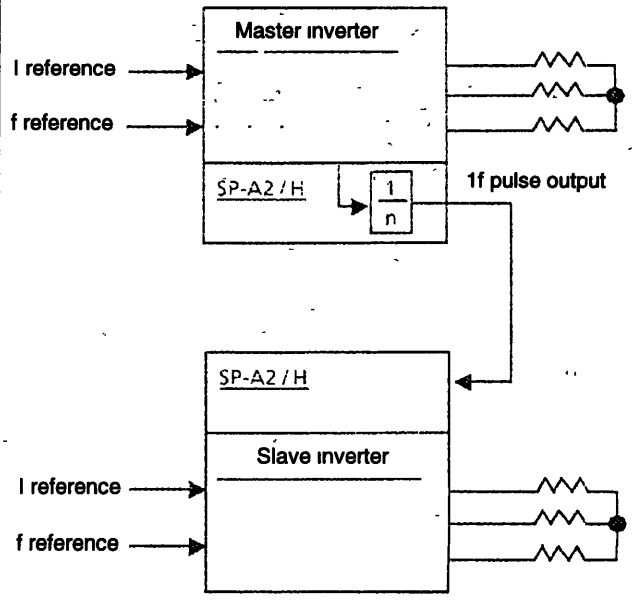
Constant No.	Name	Description	Remarks
E5-10	Motor 2 overheat temperature	→ E2-10	
E5-11	Motor 2 feeder resistance	→ E2-11	
E6-01	Maximum output frequency (EMS)	Limits of frequency reference at EMS control (A1-02 = 04). Set values which make E6-01 ≧ E6-02.	
E6-02	Minimum output frequency (EMS)		

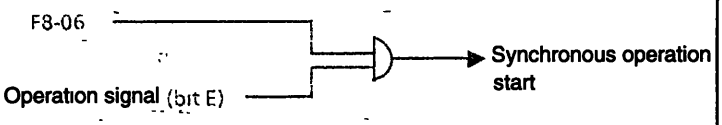
F OPTION-RELATED CONSTANTS

Constant No.	Name	Description	Remarks
F1-01	PG constant	Sets the number of pulses of PG (pulse generator) to be used. The set value is the number of pulses per motor revolution (pulses/rev).	
F1-02	Operation selection at PG open circuit	Sets the stopping method at PG disconnected detection. 0: Deceleration to stop (deceleration time: C1-02) 1: Coasting to stop 2: Emergency stop (deceleration time: C1-09) 3: Continuous operation (displayed only) (Setting disabled when A1- 01 = 3: flux vector control.)	If 0 or 3 is set when the mode is changed to flux vector control, the value is changed to 1.
F1-03	Operation selection at overspeed detection.	Sets the stopping method at 0verspeed detected. 0: Deceleration to stop (deceleration time: C1-02) 1: Coasting to stop 2: Emergency stop (deceleration time: C1-09) 3: Continuous operation (displayed only) (Setting disabled when A1-01 = 3: flux vector control.)	
F1-04	Operation selection at excessive speed deviation detection	Sets the stopping method at excessive speed deviation detected. 0: Deceleration to stop (deceleration time: C1-02) 1: Coasting to stop 2: Emergency stop (deceleration time: C1-09) 3: Continuous operation (displayed only)	
F1-05	PG rotation	Sets the relation between the motor rotating direction and PG polarity. 0: Phase A advanced in motor FWD rotation 1: Phase A advanced in motor REV rotation When option card PG-A2/H is connected, this constant becomes disabled.	Motor FWD rotation is in the counter-clockwise (CCW) direction viewed from the load side.
F1-06	PG division rate (PG pulse monitor output)	Sets the division rate when pulse signals from PG are monitored. [Setting of division rate] Division rate $= \frac{n+1}{m}$ (setting range $\frac{1}{1} \sim \frac{1}{32}$) Data m: 1~32 n: 0, 1	Division is only for pulse monitoring and has nothing to do with control. Enabled only when PG-B2/H card is mounted.
F1-07	Integral value during accel/decel enable/disable selection	Sets whether speed control section (ASR) integral operation is performed during accel/decel in V/f control with PG feedback. 0: Disabled 1: Enabled	
F1-08 F1-09	Overspeed detection level Overspeed detection delay time	Sets the motor overspeed detection level in the ratio (%) for E1-04 (rated r/min.). Sets the time from when overspeed is detected to when it is regarded as a fault. A fault signal is output to stop operation after the absolute value of motor speed exceeds the set value of F1-08 and the time set to F1-09 elapses.  	Stopping method at overspeed detection depends on the setting of F1-03.

Constant No.	Name	Description	Remarks
F1-10	Excessive speed deviation detection level	Sets the excessive speed deviation detection level in the ratio (%) for E1-04 (rated r/min).	Stopping method at excessive speed deviation detection depends on the setting of F1-04. This is not detected during accel/decel or torque control
F1-11	Excessive speed deviation detection delay time	Sets the time from when excessive speed deviation is detected to when it is regarded as a fault. A fault signal is output to stop operation after deviation between speed reference and motor speed exceeds the set value of F1-10 and the time set to F1-11 elapses. 	
F1-12 F1-13	Number of PG gear teeth 1 Number of PG gear teeth 2	Sets the number of gear teeth when there are gears between the motor and the PG. When the number of gear teeth is set, the motor r/min is calculated in the inverter as shown below. Motor r/min $= \frac{\text{No of PG output pulses} \times 60}{\text{PG constant (F1-01)}} \times \frac{\text{No of gear teeth 2 (F1-13)}}{\text{No of gear teeth 1(F1-12)}}$	This function is disabled when F1-12 = 0 or F1-13 = 0.
F4-01 F4-02 F4-03 F4-04 F4-05 F4-06	AO-12/H Channel 1 monitor selection Channel 1 gain Channel 2 monitor selection Channel 2 gain Channel 1 bias Channel 2 bias	Selects item to be output to AO-12 /H(option), and sets output gain and output bias. For output item, set the monitor number (U1-XX) to be output. Output level and output bias are calculated by converting monitor item output level to 30000/100%; subtracting the set value of output bias from the above value and multiplying it by output gain. The result of this calculation is output to AO-12/H channel as 10V/30000. The following shows the procedure.  F4-02 and 04 can be set from the digital operator only in the range of -99.99 to 99.99; F4-05 and 06 can be set in the range of -9999 to 9999. To set any value other than these ranges, setting must be made by the master controller or MEMOBUS.	

<table>
<tr><th>Constant No.</th><th>Name</th><th>Description</th><th>Remarks</th></tr>
<tr><td>F6-01</td><td>DO-08/H
Output mode selection</td><td>The following table outlines items to be output from DO-08/H (option) according to F6-01 setting.
<table>
<tr><th>Set Value</th><th>Output Contents</th></tr>
<tr><td>0</td><td>Terminal No. Output Contents
TD5-TD11: Overcurrent (SC, OC, GF)
TD6-TD11: Overvoltage (OV)
TD7-TD11: Inverter overload (OL2)
TD8-TD11: Fuse blown (FU)
TD9-TD11: Not used
TD10-TD11: Inverter overheat (OH)
TD1-TD2: During zero-speed detection
TD3-TD4: During speed agree</td></tr>
<tr><td>1</td><td>Terminal No. Output Contents
TD5-TD11: Bit 0 Sign output (See below.)
TD6-TD11: Bit 1 Sign output (See below.)
TD7-TD11: Bit 2 Sign output (See below.)
TD8-TD11: Bit 3 Sign output (See below.)
TD9-TD11: During zero-speed detection
TD10-TD11: During speed agree
TD1-TD2: During run
TD3-TD4: Minor fault

Bit 3210 Output Contents Bit 3210 Output Contents
0000: No fault 1000: External fault
0001: Overcurrent 1001: Controller fault
0010: Overvoltage 1010: Motor overload
0010: Inverter overload 1010: Not used
0011: Inverter overheat 1011: Power loss
0100: Not used 1100: Not used
0101: Fuse blown 1101: Not used
0110: Not used 1110: Not used</td></tr>
<tr><td>2</td><td>Universal individual output
(Output from master controller is output without being changed.)</td></tr>
</table></td><td></td></tr>
<tr><td>F8-01</td><td>Division rate setting (EMS)</td><td>Set when synchronous operation is performed in EMS control (A1-02 = 04). Sets the division ratio of master inverter 1f pulse output.
 
</td><td>For synchronous operation, SP-A2/H (option card) is needed.</td></tr>
</table>

Constant No.	Name	Description	Remarks
F8-06	Synchronous control ON/OFF selection (EMS)	Set when synchronous operation is performed in EMS control (A1-02 = 04). Synchronous operation is actually performed when both this constant and run operation signal (master controller) bit E are set to "1".  	
F9-01	External fault bit selection	Selects run operation signal (bit No. 4) operation from the master controller. Set value Description 0: Fault at bit "1" 1: Fault at bit "0"	
F9-02	External fault detection mode	Determines the effective range of external fault signal. Set value Description 0: Always detected. 1: Detected during running.	
F9-03	Operation selection at external fault detection	Set value Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF output. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	
F9-04	Operation selection at bus error	Selects stop procedure when an error occurs in communication with the master controller. Set value Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF output. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	
F9-05 F9-06 F9-07 F9-08	Control data item selection at high-speed side 1 Control data item selection at high-speed side 2 Control data item selection at low-speed side 1 Control data item selection at low-speed side 2	Sending data item can be selected among control data from the master controller by the parameters described in the following table. Constant Data area to be controlled F9-05: Third F9-06: Fourth F9-07: Fifteenth F9-08: Sixteenth	

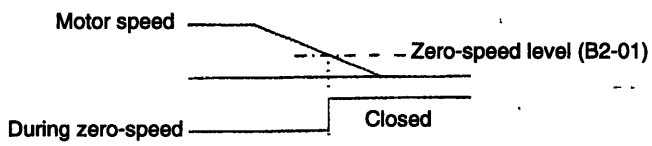
Constant No.	Name	Description	Remarks
F9-09 F9-10 F9-11 F9-12	Monitor data item selection at high-speed side 1 Monitor data item selection at high-speed side 2 Monitor data item selection at low-speed side 1 Monitor data item selection at low-speed side 2	U1 variable item can be selected among control response data to the master controller by the parameters in the following table. U1 variable number is set by the parameters shown below. Constant — Response data area to be controlled F9-09: Third F9-10: Fourth F9-11: Fifteenth F9-12: Sixteenth	
F9-13	Trace sampling cycle	Number of trace sampling times in C-option inverter trace function. *1 Set value — Description 0: Trace at every scan *2 1 to 60000: Number of sampling times Example: Inverter trace is executed once every 5 scans *2 when "5" is set. *1: Control response data sent from inverter are traced. The upper 4 words are traced at high-speed scan and the remaining 12 words at low-speed scan; the result of tracing can be seen by using the programming panel. *2: "scan" means C-option scan. Both CP-916A and CP-216IF/INV are provided with two types of scans (high-/low-speed), which are variable for CP-916A and fixed for CP-216IF/INV.	
F9-14	Transmission ASR proportional gain selection	Selected when ASR proportional gain is sent in control data from the master controller. Set value — Description 0: Inverter constant (C5-01) is used. 1: Control data from master controller is used.	
F9-15	Transmission regeneration side torque limit selection	Selected when regeneration side torque limit is sent in control data from the master controller. Set value — Description 0: Inverter internal constant (L07-03 or L07-04) is used. 1: Control data from master controller is used. Common in forward and reverse run.	

H CONTROL CIRCUIT TERMINAL-RELATED CONSTANTS

Constant No.	Name	Description
H1-01 H1-02 H1-03 H1-04 H1-05 H1-06	Multi-function input terminal function selection Multi-function input (terminal 9CN-19) Multi-function input (terminal 9CN-20) Multi-function input (terminal 9CN-21) Multi-function input (terminal 9CN-22) Multi-function input (terminal 9CN-23) Multi-function input (terminal 9CN-24)	Selects the function of a signal input form control circuit terminals 9CN-19 to 24. Set Value — Function 02: Option/inverter selection 08: External baseblock/NO contact 09: External baseblock/NC contact 14: Fault reset 15: Emergency stop 0F: Through mode 20, 21 to 2F: External fault

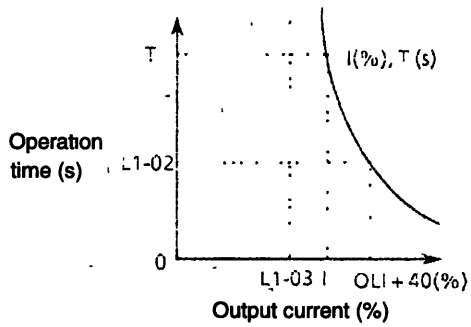
Set Value	Description
02	• Option/inverter selection Selects whether operation is performed with option card reference or inverter reference. Option/inverter selection is effective only during stop. Open : Runs by speed reference and run command from inverter control circuit terminal or digital operator Closed: Runs by speed reference and run command from master controller.
08	• External baseblock Baseblock operation is performed at "closed". External baseblock operation differs as described below, depending on the run command input status. - When an external baseblock signal is input during run, BB blinks on the digital operator to shut OFF inverter output. When the external baseblock signal is gone, operation restarts with the speed reference obtained before baseblock. At this time, voltage recovers up to the set value in the voltage recovery time (L2-04). - When a stop signal is input and an external baseblock signal is input while the inverter is decelerating, BB blinks on the digital operator to shut OFF inverter output and stop the operation.
09	• External baseblock Baseblock is performed at "open". The other sequence is the same as that of set value = 08.
14	• Fault reset Closed: Resets a fault.
15	• Emergency stop Closed: Emergency stop (Deceleration time: C1-01)
0F	• Through mode
20 to 2F	• External fault

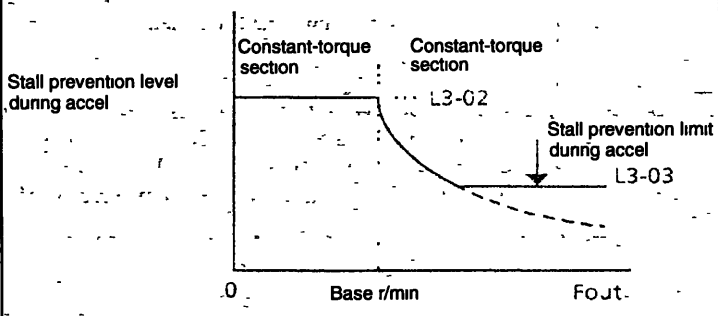
Constant No.	Name	Description
H2-01 H2-02 H2-03 H2-04 H2-05 H2-06	Multi-function output terminal function selection Multi-function output (terminal TB2-4, 5) Multi-function output (terminal 10CN-10) Multi-function output (terminal 10CN-12) Multi-function output (terminal 10CN-14) Multi-function output (terminal 10CN-16) Multi-function output (terminal TB2-1, 2, 3)	Selects the functions of signals output from the control circuit terminals. Set Value Function 00: During run 01: During zero-speed 02: Speed agree 1 03: Desired speed agree 1 06: Inverter operation ready 07: During undervoltage detection 08: During baseblock 0E: Fault 0F: Through mode 11: During fault reset 12: During REV run Note: TB2-1, 2 and 3 terminals become fault output signals when the hardware malfunctions.

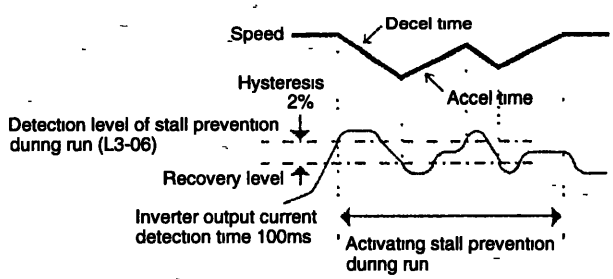
Set Value	Description
00	• During run Closed when the inverter is outputting voltage or a run command is input.
01	• During zero-speed Closed when the inverter output frequency is less than the minimum r/min. (E1-09) in V/f control with PG feedback. Closed when the motor speed is less than the zero-speed level (B2-01) in flux vector control. 
02	• Speed agree 1 Closed when motor speed is within the detection range shown below. Speed reference - L4-02 ≦ SFS output ≦ speed reference + L4-02
03	• Desired speed agree 1 Closed when the set value = 02 (speed agree status) and motor speed is within the detection range shown below. L4-01 - L4-02 ≦ SFS output (without a sign) ≦ L4-01 + L4-02
06	• Inverter operation ready Closed when inverter operation is ready.
07	• During undervoltage detection Closed when the main circuit or control circuit power supply is reduced or the main circuit MC is turned OFF.
08	• During baseblock Closed during inverter output baseblock. (NO contact output)
OE	• Fault Closed during a fault excluding CPF00 and CPF01.
OF	• Through mode
11	• During fault reset Closed while a fault is being reset.
1A	• During REV run Closed during REV run.

Constant No.	Name	Description	Remarks
H3-01	Signal level selection (terminal 9CN-4)	Set Value Description 0: 0 to 10V input 1: -10 to +10V input	Resolution [11 bits + sign input]
H3-02	Gain (terminal 9CN-4)	Sets the input gain (level) when speed reference voltage is 10V.	
H3-03	Bias (terminal 9CN-4)	Sets the input gain (level) when speed reference voltage is 0V.	
H3-04	Signal level selection (terminal 9CN-8)	Set Value Description 0: 0 to 10V input 1: -10 to +10V input	Resolution [11 bits + sign input]
H3-06	Gain (terminal 9CN-8)	Sets the input gain (level) when terminal 9CN-8 is 10V.	
H3-07	Bias (terminal 9CN-8)	Sets the input gain (level) when terminal 9CN-8 is 0V.	
H3-08	Signal level selection (terminal 9CN-8)	Set Value Description 0: 0 to 10V input 1: -10 to +10V input 2: 4 to 20mA input Note: Inputs the set value of multi-function analog reference. (Refer to H3-05.)	Resolution [10-bit input]
H3-10	Gain (terminal 9CN-6)	Sets the input gain (level) when terminal 9CN-6 is 10V.	
H3-11	Bias (terminal 9CN-6)	Sets the input bias (level) when terminal 9CN-6 is 0V.	
H3-12	Analog input filter time constant	Sets terminals 9CN-4,6,8 to primary delay filter time constant.	
H4-01	Multi-function AO (terminal 10CN-2)	Selects control circuit terminals 10CN-2 (multi-function analog monitor) items to be output. Sets a monitor No. (U1-XX) to be output to an output item.	Resolution [9 bits + sign]
H4-02	Gain (terminal 10CN-2)	Multiplies the value obtained by subtracing H4-03 set value from monitor constant output level by H4-02 set value.	
H4-03	Bias (terminal 10CN-2)	Subtracts the H4-03 set value from the monitor constant output level.	
H4-04	Multi-function AO (terminal 10CN-4)	Selects control circuit terminals 10CN-4 (multi-function analog monitor) to items to be output. Sets a monitor No. (U1-XX) to be output to an output item.	Resolution [9 bits + sign]
H4-05	Gain (terminal 10CN-4)	Multiplies the value obtained by subtracting H4-06 set value from the monitor constant output level by H4-05 set value.	
H4-06	Bias (terminal 10CN-4)	Subtracts the H4-06 set value from the monitor constant output level by H4-05 set value.	
H4-07	Analog output signal level selection	Set Value Description 0: 0 to 10V input 1: -10 to +10V input	Enabled for inverter AO and AO-12/H.

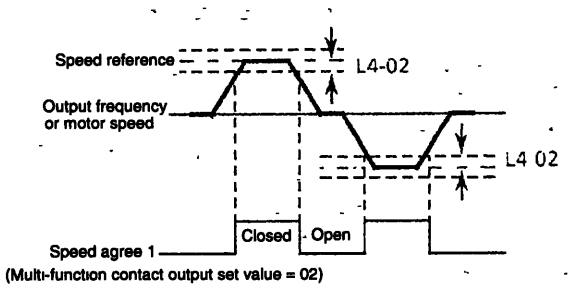
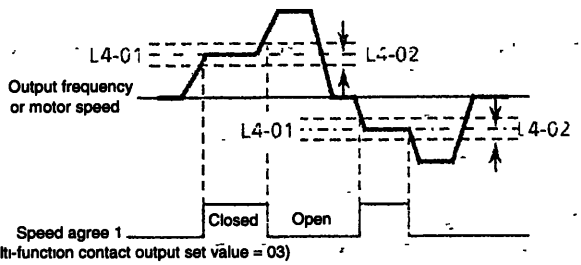
L PROTECTION-RELATED CONSTANTS

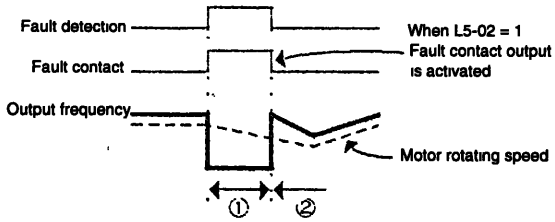
Constant No.	Name	Description	Remarks
L1-02	Motor OL operation time	• Sets motor OL protective operation range.	
L1-03	Motor OL detection starting current	• OLI: Setting of motor OL operation point. Set in the percent for motor rated current (IM). • Motor OL time (T) for output current I (percent of motor rated current) is expressed by the following equation. $T(s) = \frac{40(\%)}{I(\%) - L1\text{-}03(\%)} \times L1\text{-}02(s)$ 	
L1-04	Operation selection at motor overload	Selects an operation mode when motor overload is detected. Set Value — Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF output. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	
L2-01	Momentary power loss detection	Selects whether the inverter is stopped at momentary power loss detection or operation restarts after recovery if a momentary power loss occurs. Set Value — Description 0: Operation does not restart after recovery. A fault contact is output to stop the inverter when a momentary power loss is detected. 1: Operation restarts after recovery. Operation restarts at recovery within the time set to L2-02. In this case, a fault contact output is not activated. If it does not restart within the L2-02 set time, a fault contact output is activated to stop the inverter after elapse of the L2-02 set time. 2: Operation restarts after recovery. Regardless of L2-02 set time, when the power supply can be recovered while the inverter control power supply can be held, a mode to restart operation is entered. A fault contact output is not activated. The control power supply holding time differs depending on the inverter capacity.	
L2-02	Momentary power loss ridethru time	Sets the allowable value of power supply recovery time for a process at momentary power loss occurrence. If the power supply recovers within this time, operation restarts. if not, a fault contact output is not activated to stop the inverter after this set value from detection of a power loss.	

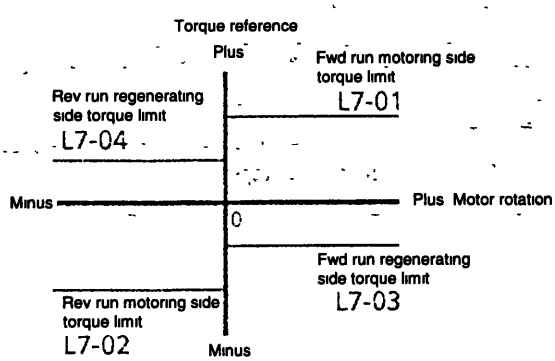
Constant No.	Name	Description	Remarks
L2-03	Min. baseblock time	To restart operation after detecting a momentary power loss, (if the motor has residual voltage) excessive current is applied to the motor at the moment of startup and the inverter may detect a fault. The minimum baseblock time is the time to wait for restart until the motor residual voltage is almost dissipated. Effective when L2-01 = 1 is selected. • When "min. baseblock time ≧ recovery time" Operation restarts after elapse of the min. baseblock time from a momentary power loss. • When "min. baseblock time < recovery time" Operation restarts after recovery.	
L2-04	Voltage recovery time	At restart after recovery from a momentary power loss, the inverter performs speed search operation in order to detect the motor speed. After completion of speed search, the time to start-up output voltage to normal V/f pattern is set. It is defined as follows: 200V class: Time to increase output voltage from 0 to 200V. 400V class: Time to increase output voltage from 0 to 400V.	
L2-05	Undervoltage detection level	Sets inverter main circuit DC bus bar voltage value to detect undervoltage. To set the value less than the standard set value (200V class: 190VDC, 400V class: 380VDC), it may be necessary to insert an AC reactor at the input side.	
L3-01	Stall prevention selection during accel	Sets a function to prevent the motor from stalling at acceleration. Set Value - Contents 0: Motor stall prevention during acceleration disabled. Regardless of the motor status, the inverter increases output frequency at the set acceleration rate. With a large load, the motor may stall. 1: Motor stall prevention during acceleration enabled. Acceleration rate is automatically reduced according to motor current to prevent the motor from stalling during acceleration. Acceleration time may be longer than the set value according to the load. 2: Optimum acceleration mode By monitoring motor current, acceleration rate is automatically adjusted so that acceleration can be accomplished in the shortest time disregarding the setting of acceleration time.	
L3-02	Stall prevention level during accel	When motor stall prevention during acceleration (L3-01 = 1) or optimum acceleration function (L3-01 = 2) is selected, the inverter adjusts the acceleration rate automatically so that motor current at acceleration will not exceed the set value.	
L3-03	Stall prevention limit during accel	When a motor is used in a constant output area, the stall prevention level during acceleration is automatically reduced for smoother acceleration. This constant is a limiting value to control the stall prevention level during acceleration in the constant output section so that it will not be reduced unnecessarily. 	

Constant No.	Name	Description	Remarks
L3-04	Stall prevention selection during decel	Sets a function to prevent inverter DC bus bar overvoltage during deceleration. Set Value Description 0: Stall prevention during deceleration disabled. Inverter decelerates at the set deceleration time. Excessively short deceleration time detects overvoltage fault (OV) to stop the inverter. 1: Stall prevention during deceleration enabled. By monitoring DC bus bar voltage status, the deceleration rate is automatically reduced to prevent overvoltage. Deceleration time may be longer than the set value. 2: Optimum deceleration mode Deceleration rate is automatically adjusted so that the inverter can decelerate in the shortest time. • For deceleration using a braking unit or braking resistor, set the value to 0 (stall prevention during deceleration disabled). The motor may hunt. • Optimum deceleration function (L3-04 = 2) cannot be set in the vector control mode.	
L3-05	Stall prevention selection during running	Sets a function to prevent motor stalling status at a overload during constant speed operation. Set Value Description 0: Stall prevention during run disabled. The motor may continue stalling even if the load is reduced after a load exceeding the inverter overload resistance is applied during speed agree. 1: Stall prevention during run enabled. When inverter output current exceeds the value set to L3-06 and it continues more than 100ms during speed agree, speed is decreased (deceleration time: C1-02) to control the motor stalling. When the load returns to the normal state, acceleration restarts to continue operation at the former speed. 2: Stall prevention during run enabled. Stall prevention during run enabled. The basic operation is the same as that of set value 1 except that the deceleration time to decrease speed is the value set to C1-04.	
L3-06	Stall prevention level during running	Sets the inverter output current level to start stall prevention during run (preventing the continuous stalling status by decreasing speed).  	
L4-01	Desired speed agree detection level	This constant is used to detect speed agree, etc. Output speed to be detected is set. This detection is performed both for FWD and REV run. When A1-02 is set to 04 (EMS control), set the current to be detected, in units of 0.01% (fixed).	Refer to next page. Unit can be changed by O1-03 setting.
L4-02	Speed detection width	Set detection width at L4-01 speed detection. When A1-02 is set to 04 (EMS control), set the detection width for L4-01 current detection in units of 0.01% (fixed).	Refer to next page. Unit can be changed by O1-03 setting.

DESCRIPTION OF SPEED DETECTION OPERATION

Related Constants	L4-01 (Speed Detection Level) L4-02 (Speed Detection Width)
Speed Agree	Speed Agree 1  (Multi-function contact output set value = 02)
Desired Speed Agree	Desired Speed Agree 2  (Multi-function contact output set value = 03)

Constant No.	Name	Description	Remarks
L5-01	Number of auto restart attempts	Fault retry is a function to reset the fault in the inverter and restart automatically to continue operation if a fault occurs. This constant sets the number of fault retry times. By setting 0, fault retry operation is not performed. [Fault retry operation] 1. When a fault is detected, the inverter output is shut OFF for the min. baseblock time (L2-03). The digital operator displays the fault while the inverter output is shut OFF. 2. When the min. baseblock time (L2-03) elapses, a fault is reset automatically and speed search operation is performed from the output frequency obtained at fault occurrence. 3. When the total number of faults exceeds the number of fault retry times (L5-01), the faults are not reset automatically and the inverter output remains OFF. At this time, a fault contact output is activated.  [Clearing the number of retry times] The number of retry times is cleared to 0 in the following cases: 1. A fault does not occur for more than 10 minutes. 2. A fault reset signal is input from the control circuit terminal or digital operator. 3. The power supply is shut OFF and the control power supply has dissipated; and then the power supply is turned ON again. However, fault retry is disabled for the following faults. UV2 (Control circuit undervoltage) UV3 (MC answer fault) SC (Load short-circuit) OH (Heatsink overheat) EF (Run command fault) OS (Overspeed) DEV (Excessive speed deviation) PGO (PG disconnection) OPR (Constant setting error) CE (Transmission error) EF3 to 8 (External fault)	
L5-02	Auto restart operation selection	Sets whether a fault contact output is activated during fault retry. Set Value Description 0: A fault contact output is not activated during fault retry. 1: A fault contact output is activated during fault retry.	

Constant No.	Name	Description	Remarks
L6-01	Overtorque detection selection 1	Sets a function to detect overtorque. Overtorque is detected according to output current value in the V/f control mode and using the inverter internal torque reference in the vector control mode. Set Value Description 0: Overtorque detection disabled (factory setting) 1: Overtorque detection enabled Overtorque detection is performed only during constant-speed run and "OL3" is displayed, blinking, to continue operation after detection. 2: Overtorque detection enabled Overtorque detection is performed during run and "OL3" is displayed, blinking, to continue operation after detection. 3: Overtorque detection enabled Overtorque detection is performed only during constant-speed run and "OL3" is displayed, lighting at overtorque detection, and a fault contact is output to stop operation. 4: Overtorque detection enabled Overtorque detection is performed during run. "OL3" is displayed, lighting at overtorque detection, and a fault contact output is activated to stop operation.	
L6-02	Overtorque detection level	Sets the overtorque detection level. V/f control mode: Inverter rated current becomes 100%. Vector control mode: Motor-rated torque becomes 100%.	
L6-03	Overtorque detection time	Overtorque is detected if the time when motor current or torque exceeds the value set to L6-02 is longer than the time set by this constant. Digital operator displays "OL3".	
L6-04	Overtorque detection selection 2	The functions are the same as those described for constants L6-01 to L6-03.	
L6-05	Overtorque detection level 2	Used when two types of overtorque detection are output to multi-function outputs. Digital operator displays "OL4".	
L6-06	Overtorque detection time 2		
L7-01	Forward torque limit	Sets motoring side torque limit value during FWD run.	Refer to the figure below.
L7-02	Reverse torque limit	Sets motoring side torque limit value during REV run.	Refer to the figure below.
L7-03	Forward regenerative torque limit	Sets regenerating side torque limit value during FWD run.	Refer to the figure below.
L7-04	Reverse regenerative torque limit	Sets regenerating side torque limit value during REV run. 	

Constant No.	Name	Description	Remarks
L8-01	Braking circuit protection selection	When a braking resistor that can be built in the inverter is used, overheat protection is enabled by using this function. (Overheat is detected at operating duty 3% of braking resistor.) Set Value — Built-in braking transistor fault detection — Built-in braking resistor overheat protection 0: Provided — Not provided 1: Provided — Provided 2: Not provided — Not provided	
L8-02	Inverter overheat pre-alarm level	Sets the heatsink temperature to predict heatsink overheat.	
L8-03	Operation selection after inverter overheat pre-alarm	Selects the operation mode when the inverter detects heatsink overheat prediction. Set Value — Description 0: Deceleration to stop at value set to C1-02 1: Inverter output OFF (Coasting to stop) 2: Deceleration to stop at value set to C1-09 (Quick deceleration to stop) 3: Continuous operation	
L8-05	Input open-phase protection selection	If power supply open-phase, excessive power supply voltage imbalance or main circuit electrolytic capacitor deterioration occurs, excessive inverter DC bus bar ripple voltage is detected to stop the inverter. Set Value — Description 0: Excessive ripple detection disabled 1: Excessive ripple detection enabled	
L8-07	Output open-phase protection selection	A function to detect inverter output open-phase. Set Value — Description 0: Inverter output open-phase detection disabled 1: Inverter output open-phase detection enabled Output open-phase may be detected inadvertently when applied motor capacity is small for inverter capacity, etc.	
L9-01	Thermistor provided/not provided selection	Sets whether the first motor is provided with thermistor. Set Value — Description 0: Not provided 1: Provided When "provided" is selected, the following procedures are taken: • Motor overload is detected in both aspects of current and temperature. • Motor overheat is detected. • Thermistor disconnection is detected. • Motor temperature is displayed (U1-39).	
L9-02	Operation selection at thermistor open circuit	Selects an operation mode when thermistor disconnection is detected. Set Value — Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF output. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	

Constant No.	Name	Description	Remarks
L9-03	Operation selection at motor overheat (OH3)	Selects an operation mode when motor overheat is detected. Set Value Description 0: Motor decelerates to stop at the value set by C1-02. 1: Inverter shuts OFF output. (Motor coasts to stop.) 2: Motor decelerates to stop at the value set by C1-09. (Quick deceleration to stop) 3: Operation continues.	
L9-04	Motor 2 thermistor provided/not provided selection	Sets whether the second motor is provided with thermistor. Set Value Description 0: Not provided 1: Provided When "provided" is selected, the following procedures are taken: • Motor overload is detected in both aspects of current and temperature. • Motor overheat is detected. • Thermistor disconnection is detected. • Motor temperature is displayed (U1-39).	

O DIGITAL OPERATOR-RELATED CONSTANTS

Constant No.	Name	Description	Remarks
O1-01	Monitor selection	4 items can be monitored in operation. This constant can select an item to be monitored instead of output voltage. Set O1-01 to □□ in monitor constant U1-□□.	
O1-02	Monitor selection after power up	Set an item to be monitored immediately after the power supply is turned ON. Digital operator displays the item set by this constant after the power supply is turned ON. Set Value Description 1: Displays speed reference. 2: Displays motor speed or output frequency 3: Displays output current. 4: Displays a monitor item selected by O1-01. (factory setting: output voltage)	
O1-03	Setting/display units of speed reference/ monitor	Units for speed-related reference or monitor can be selected as shown below. Set Value Description 0: Unit: 0.01Hz Displayed as F□□. □□ 1: Unit: 0.01% Displayed as P□□. □□ 2 to 39: Unit: r/min (0 to 3999) r/min = 120 × frequency reference (Hz) / E2-04(E5-04) Displayed as n□□□□ 40 to 3999: Decimal point position set with 5th digit value of O1-03. 5th digit value= 0: Displayed as v□□□□ 5th digit value= 1: Displayed as v□□□. □ 5th digit value= 2: Displayed as v□□. □□ 5th digit value= 3: Displayed as v□. □□□ O1-03 4th to 1st digits determine the set value of 100% speed. (Example 1) Assuming that 100% speed set value is 200.0, set O1-03 = 12000. When 01-03 = 12000 is set, 100% frequency is displayed as 200.0 and 60% speed is displayed as 120.0. (Example 2) Assuming that 100% frequency set value is 65.00, set O1-03 = 26500. When 01-03 = 26500 is set, 60% frequency is displayed as 39.00.	
O1-04	Setting unit of V/f pattern	Setting unit of V/f pattern constants can be changed to Hz. Set Value Description 0: Setting monitor unit: Hz 1: Setting monitor unit: r/min.	V/f pattern constants: E1-04 E1-06 E1-07 E1-09 E1-11 E4-01 E4-03 E4-04 E4-06 E4-11
O2-01	LOCAL/REMOTE key enable/disable	Sets digital operator LOCAL/REMOTE key enabled/disabled. Set Value Description 0: Digital operator LOCAL/REMOTE key disabled. 1: Digital operator LOCAL/REMOTE key enabled. Priority of speed reference and run command is alternated with priority set by digital operator or by B1-01 and B1-02.	

Constant No.	Name	Description	Remarks
O2-02	STOP key enable/disable selection during REMOTE operation	Sets digital operator STOP key enabled/disabled during REMOTE operation. Set Value Description 0: Digital operator STOP key disabled. Digital operator STOP key is disabled during run by run command other than that given from the digital operator. 1: Digital operator STOP key enabled. Digital operator STOP key is enabled even during run by run command other than that given from the digital operator. When the set value is "1 (factory setting)" and operation is stopped by a stop command other than that given from the digital operator, it is necessary to turn OFF the run command once.	
O2-04	kVA selection	Sets inverter capacity. By this constant setting, control constants peculiar to the inverter can be set automatically.	Refer to para. 3.5.
O2-05	Speed reference setting method selection	Whether ENTER key operation is needed can be set when speed reference is set by digital operator. Set Value Description 0: Digital operator ENTER key needed To set speed reference by digital operator, the inverter accepts speed reference at the time when the digital operator ENTER key is depressed. 1: Digital operator ENTER key not needed. Inverter accepts speed reference displayed on the digital operator speed reference without ENTER key operation.	
O2-06	Digital operator disconnection detection enable/ disable selection	When running by digital operator, inverter operation selection at communication fault occurrence between the digital operator and the inverter (cable disconnection, removal of digital operator, etc.) is set. Set Value Description 0: Operation continues. 1: Coasting to stop and an error message "OPR" is indicated on the digital operator.	
O2-07	Cumulative operation time setting	Sets an initial value of cumulative operation time. Accumulation of operation time starts from this set value.	
O2-08	Cumulative operation time selection	Defines the operation time. Set Value Description 0: All time while the inverter power supply is turned ON is accumulated as operation time. 1: Only the time while the inverter is running is accumulated as operation time.	

5 TABLE OF COMMUNICATION DATA

Table 5–1 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%	–	–30000 to 30000 10000/100%
5	–		–		–		External magnetic flux reference	–2000 to 12000 10000/100%	–	–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 disregared)	Inverter DO output	Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregared)	Inverter DO output	Bits 0 to 5 are used 0 to FFFFH (7 bits or more are disregared)
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. 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)
   - Regeneration torque limit (No 18)

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

Table 5–2 Control Response (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	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 30000/100%	–		Speed detection PG count value	–32768 to 32767 30000/100%	–	
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	±10 V/4095	Inverter AI CH3 input	±10 V/4095	Inverter AI CH3 input	±10 V/4095	Inverter AI CH3 input	±10 V/4095	Inverter AI CH3 input	±10 V/4095
14	Inverter DI input		Inverter DI input		Inverter DI input		Inverter DI input		Inverter DI input	
15	Inverter AI CH1 input	±10 V/4095	Inverter AI CH1 input	±10 V/4095	Inverter AI CH1 input	±10 V/4095	Inverter AI CH1 input	±10 V/4095	Inverter AI CH1 input	±10 V/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

Table 5–3 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

Table 5–4 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 ON/OFF
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	–

Table 5–5 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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