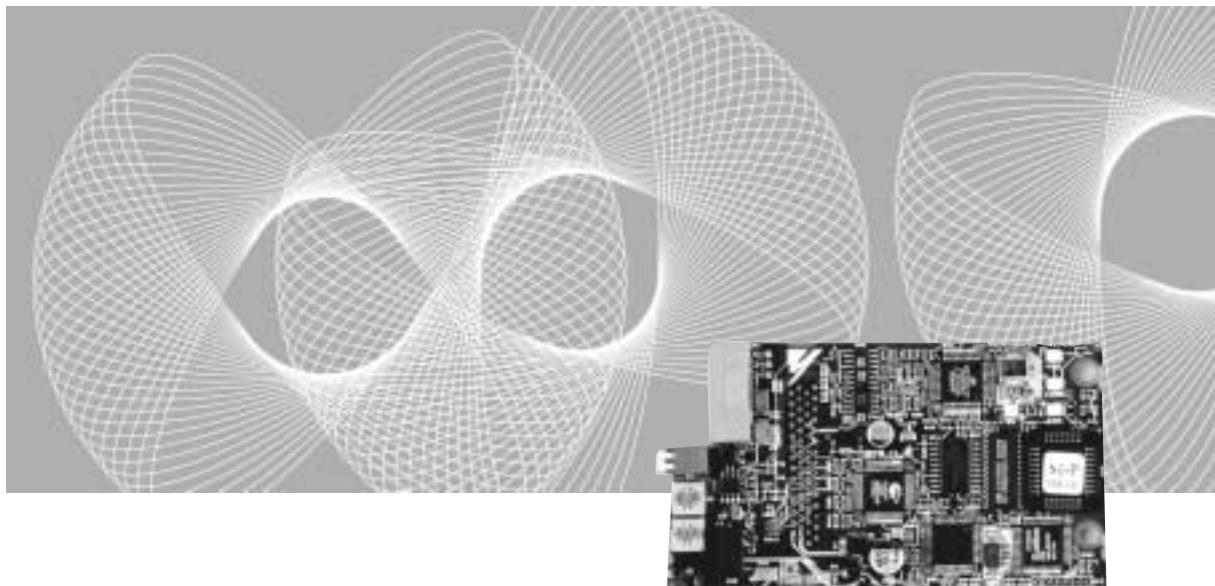Varispeed SERIES OPTION CARD
PROFIBUS-DP COMMUNICATIONS INTERFACE CARD
USER'S MANUAL

Model: SI-P1

YASKAWA

MANUAL NO. SIBZ-C736-70.9B

INTRODUCTION

This User's Manual describes the operations and specifications of the PROFIBUS Communications Interface Card (hereafter called the SI-P1 card).   The SI-P1 card transfers the data between the Varispeed series Inverters and the PROFIBUS-DP open-field network (hereafter called the PROFIBUS-DP).   Read this manual carefully and be sure you understand the information provided before attempting any operations.

For the operation of the Inverter, refer to the instructions of the Varispeed Series Inverters.

Safety Information

Read this instruction manual thoroughly before installation, operation, maintenance or inspection of the PROFIBUS Communications Interface Card SI-P1.   In this manual, NOTES FOR SAFE OPERATION are classified as "WARNING" and "CAUTION."

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

⚠ CAUTION — Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.

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

Receiving

⚠ CAUTION

・ Do not use any option card which is damaged or has missing parts.
   Failure to observe this caution may result in injury.

Installation and Wiring

⚠ WARNING

・ Never touch the inside of the Inverter.
   Failure to observe this warning may result in electric shock.

・ Disconnect all power before mounting or removing the option card or wiring.   Then wait at least the specified time (specified on the front cover) after the power supply is disconnected and all LEDs and CHARGE LED are extinguished.
   Failure to observe this warning may result in electric shock.

・ Do not damage or apply excessive stress to the cables.   Do not place heavy objects on the cables or place the cables between other objects.
   Failure to observe this warning may result in electric shock, malfunction or damage of the equipment.

⚠ CAUTION

・ Do not touch the elements of the option card with bare hands.
   Failure to observe this caution may result in equipment damage caused by static electricity.
・ Insert the connectors firmly.
   Failure to observe this caution may result in malfunction or damage of the equipment.

Setting

⚠ CAUTION
・ Be careful when changing Inverter settings. The Inverter is factory set to suitable settings. Failure to observe this caution may result in damage of the equipment.

CONTENTS

1. OUTLINE

The SI-P1 card is an interface card to achieve data communications with the PROFIBUS-DP master for connecting the Varispeed series Inverters to the PROFIBUS-DP open field network.

Mounting the SI-P1 card on the Varispeed series Inverter can monitor operation status including running or stopping; or change or read the settings of the Inverter constants from the PROFIBUS-DP master, which can be utilised for various types of applications.

The following are the Inverter series on which the SI-P1 card can be mounted.

        ・Varispeed F7: Standard series, applicable with Inverter software No. S1013 and later

        ・Varispeed G7: Standard series, applicable with Inverter software No. S1010 and later

2. RECEIVING

Check the following items as soon as the product is delivered.

Item	Method
Has the correct model of the SI-P1 card been delivered?	Compare the model number on your order to the number printed in the lower right corner of the SI-P1 card. (Refer to 3.1.)
Is the SI-P1 card damaged in any way?	Inspect the entire exterior of the SI-P1 card to see if there are any scratches or any other damage resulting from shipping.

A GSD file is needed for using the SI-P1 card as a PROFIBUS-DP slave. Use the GSD file to register the SI-P1 card as a slave to a PROFIBUS-DP master. Contact your Yaskawa representative for more information how to get a GSD file.

If you find any irregularities, contact the agency from which you purchased the Inverter or your Yaskawa representative immediately.

3. NOMENCLATURE AND SETTING

3.1 Components

The names of components on the SI-P1 card are shown in Fig. 1.
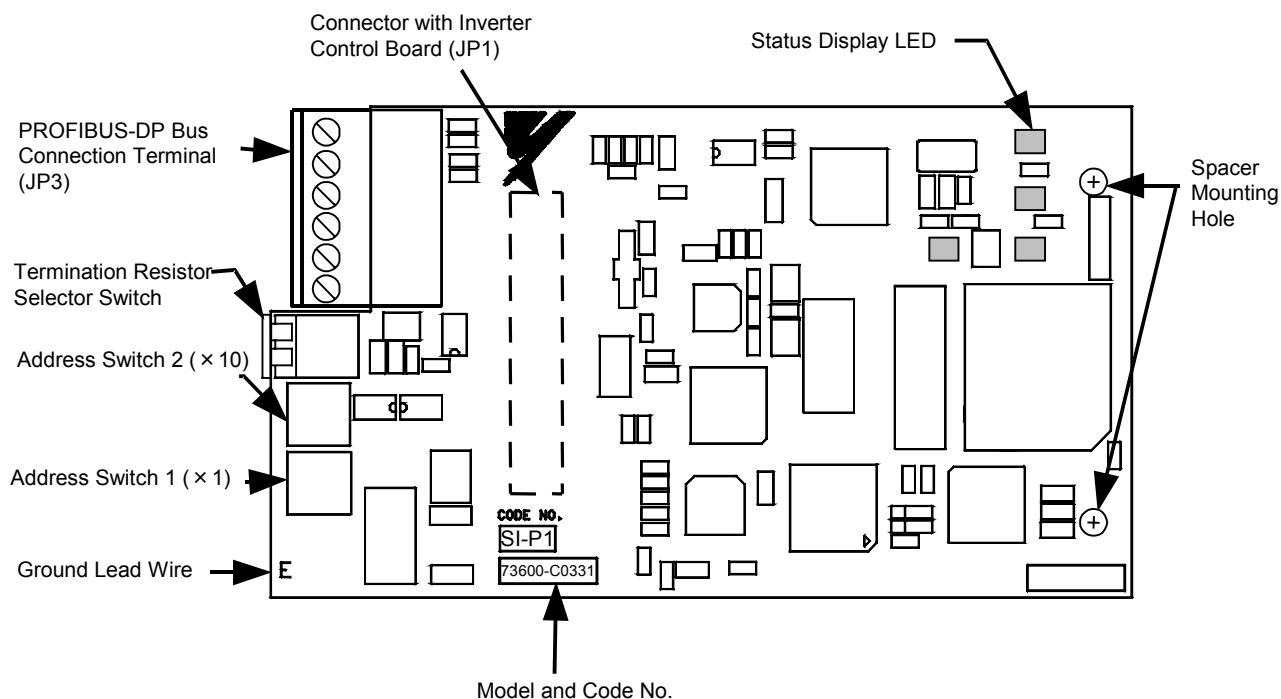
Fig. 1 PROFIBUS-DP Communication Interface Card SI-P1

3.2 Terminal Block

This terminal block connects the SI-P1 card to the PROFIBUS-DP communications line.

Terminal No.	Name	Meaning
1	+5V BUS	Not available
2	GND BUS	Not available
3	A-Line	Minus RxD/TxD according to RS-485 specifications
4	B-Line	Plus RxD/TxD according to RS-485 specifications
5	Shield	Shielded connection terminal of bus cable
6	RTS	Not available
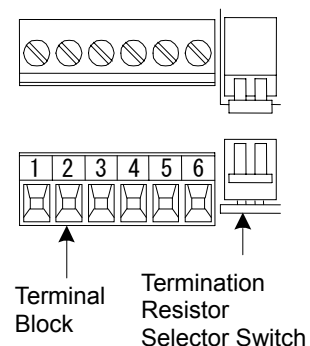
3.3　LEDs

These LED indicator lamps indicate the status of the PROFIBUS-DP or the SI-P1 card.
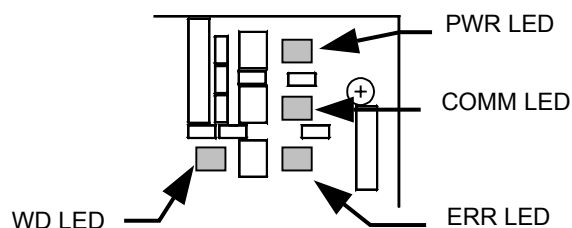
LED Name	Display		Operation Status	Meaning
	Color	Status		
PWR	Green	Lit	Power supply ON	Power is supplied to the SI-P1 card from the Inverter.
	—	Not lit	Power supply OFF	•Power is not being supplied to the Inverter. •Incorrect connection of the SI-P1 card does not supply power to the SI-P1 card.
COMM	Green	Lit	During communications connected	Normal communications are being carried out between the SI-P1 card and the PROFIBUS-DP master.
	—	Not lit	Communications error/ power supply OFF	•Normal communications are not being carried out between the SI-P1 card and the PROFIBUS-DP master. •Power is not being supplied.
ERR	Red	Lit	Communications error	An error occurred which disabled PROPFIBUS-DP communications. •An SI-P1 card address No. is overlapped. •The address No. specified by the SI-P1 card is not the same as that specified by the PROFIBUS-DP master.
	—	Not lit	During communications connected/ power supply OFF	•Normal communications are being carried out between the SI-P1 card and the PROFIBUS-DP master. •Power is not supplied.
WD	Green	Lit	During CPU run	SI-P1 card is being initialized.
		Blink-ing	During CPU run	SI-P1 card is operating normally.
	Red	Lit	CPU error	An error occurred in the SI-P1 card.
		Blink-ing	CPU error	An error occurred in the Inverter.
	—	Not lit	Power supply OFF	Power is not being supplied to the SI-P1 card.　The SI-P1 card's CPU is not operating normally.

3.4　Address Switch

Rotary address switches to set the slave address on the PROFIBUS-DP are provided.

Use setting address switches 1 and 2 on the SI-P1 card to set the Inverter address on the PROFIBUS-DP.

Address = (address switch 2 setting) $\times$ 10 + (address switch 1 setting) $\times$ 1

Example) Set the address 15 in using the following procedure.

Set Address switch 2 to 1.

Set Address switch 1 to 5.

Address switch 2	Address switch 1

Set to 1.	Set to 5.
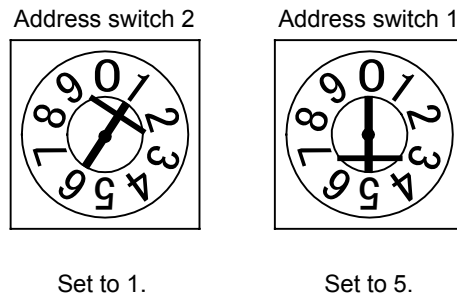
3.5　Termination Resistor Selector Switches

Attach a termination resistor on the final stage of the transmission line to reduce the reflection of the signal and stabilise the communications.　When the SI-P1 card is connected as the last unit for the communications line, turn ON the termination resistor selector switch of the SI-P1 card to connect the termination resistor.　No termination resistor has to be attached externally.

Provided （Switch is ON）	Not provided （Switch is OFF）
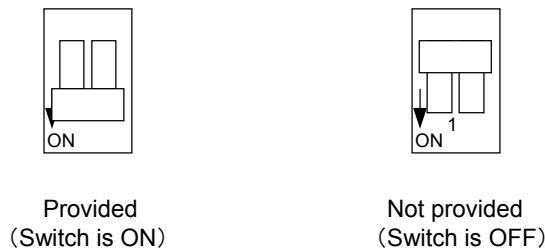
3.6　Transmission Speed Settings

Setting the transmission speed on the PROFIBUS-DP master automatically sets the same transmission speed on the SI-P1 card.

4. INSTALLATION AND WIRING

4.1 Installing the SI-P1 Card

Install the SI-P1 card is where the digital operator and the front cover of the Inverter are removed.

Use the following procedure to install the SI-P1 card.

(1) Turn off the main-circuit power supply.

(2) Wait at least the specified time (specified on the front cover) before removing the front cover of the Inverter. Check to be sure that the CHARGE indicator is OFF.

(3) Remove the option clip to prevent C and D option and from rising. The option clip can be easily removed by holding onto the protruding portion of the clip and pulling it out.

(4) Insert the spacer, which is provided on the Inverter's control board, into the spacer hole of SI-P1 card.

(5) Fit the connector (JP1) on the SI-P1 card precisely to the Option-C connector.

(6) Pass the spacer through the spacer hole on the card. Check to be sure that it is precisely aligned with the 2CN position, and snap it into the proper position. Be sure to press it in firmly until you hear it snap into place.

(7) Insert the option clip to prevent the side with connector from rising.

(8) Connect the ground lead cable of the SI-P1 card to the control circuit terminal 12 on the Inverter control board.

(9) Select the termination resistor, set the address switches 1 and 2 to the correct setting, and connect the card to the peripheral devices.

(10) Reattach the front cover of the Inverter.
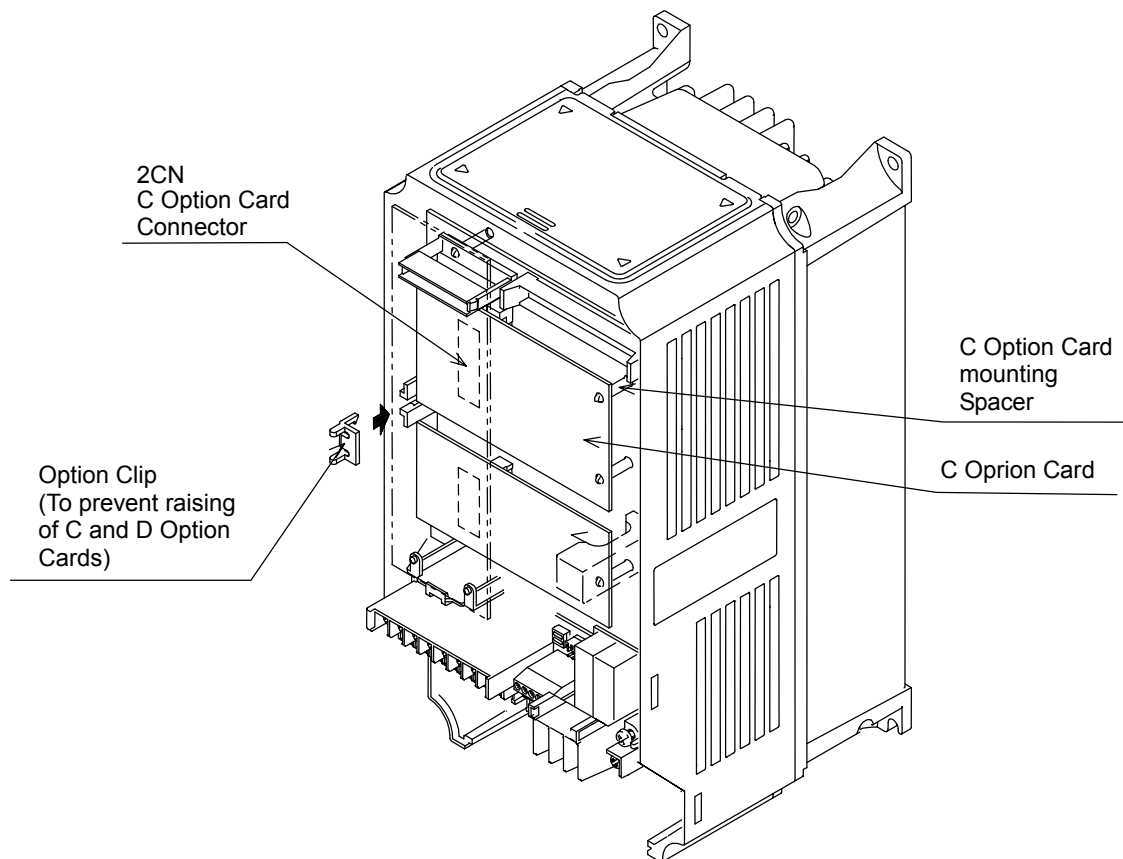
Fig. 2 Installing the SI-P1 Card

4.2   Wiring of the Communications Cable

Use the following procedure to wire the PROFIBUS-DP master to the terminal block of the SI-P1 card. Use a shielded twisted-pair cable in conformance with the PROFIBUS specifications for the communications cable.

1)   The following table shows the applicable cable sizes for the terminal block (JP3).

[Terminal: MINI COMBICON series, manufactured by Phoenix Contact Co., Ltd.]

	[mm^2]	AWG	I [A]	VAC [V]
Standard wire	0.14 to 1.5	28 to 16	8	160
Single wire	0.14 to 1.5	28 to 16	8	160
UL	—	30 to 14	8	300
CSA	—	28 to 16	8	300

2)   Refer to Fig. 4.2 for the connection cable termination of the bus connection terminal on the SI-P1 card's side.

3)   Use a thin screwdriver that is less than 2.5 mm wide and less than 0.4 mm thick to loosen the terminal screw.

4)   Connect the No.3 pin on the bus connection terminal block on the SI-P1 card's side to the No. 8 pin on the PROFIBUS-DP master D-SUB's side and connect the No.4 pin on the terminal block on the SI-P1 card's side to the No. 3 pin on the PROFIBUS-DP master D-SUB's side.   (Refer to Fig. 4.)

5)   Insert the wires from under the terminal block.

6)   Tighten the terminal screws firmly.
(Tightening torque: 0.22 to 0.25 [N ・ m])

Stripped wire:
approx. 5.5 mm long

Wire
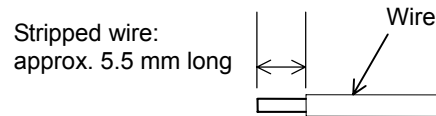
Fig. 3 End of Connection Cable
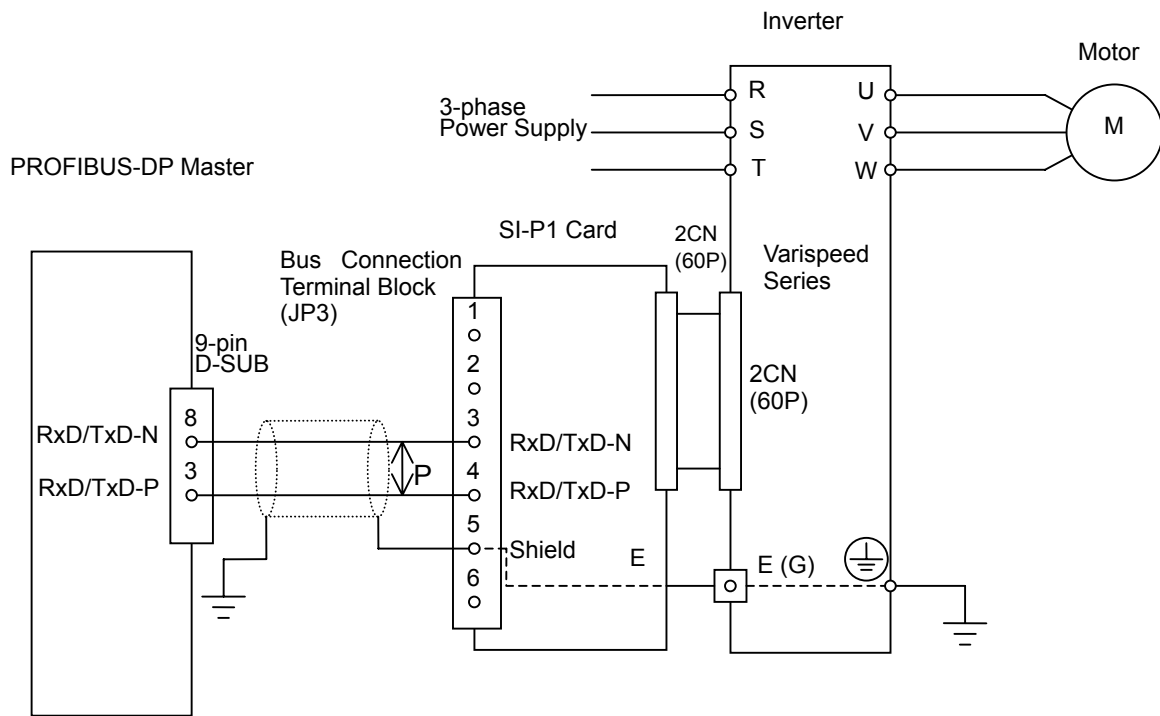
Notes: 1 A PROFIBUS cable is recommended for the shielded twisted-pair cable.

  2 Separate the communications cables from the main circuit wiring or other power cables.

Fig. 4 Interconnection (when One Inverter Used)
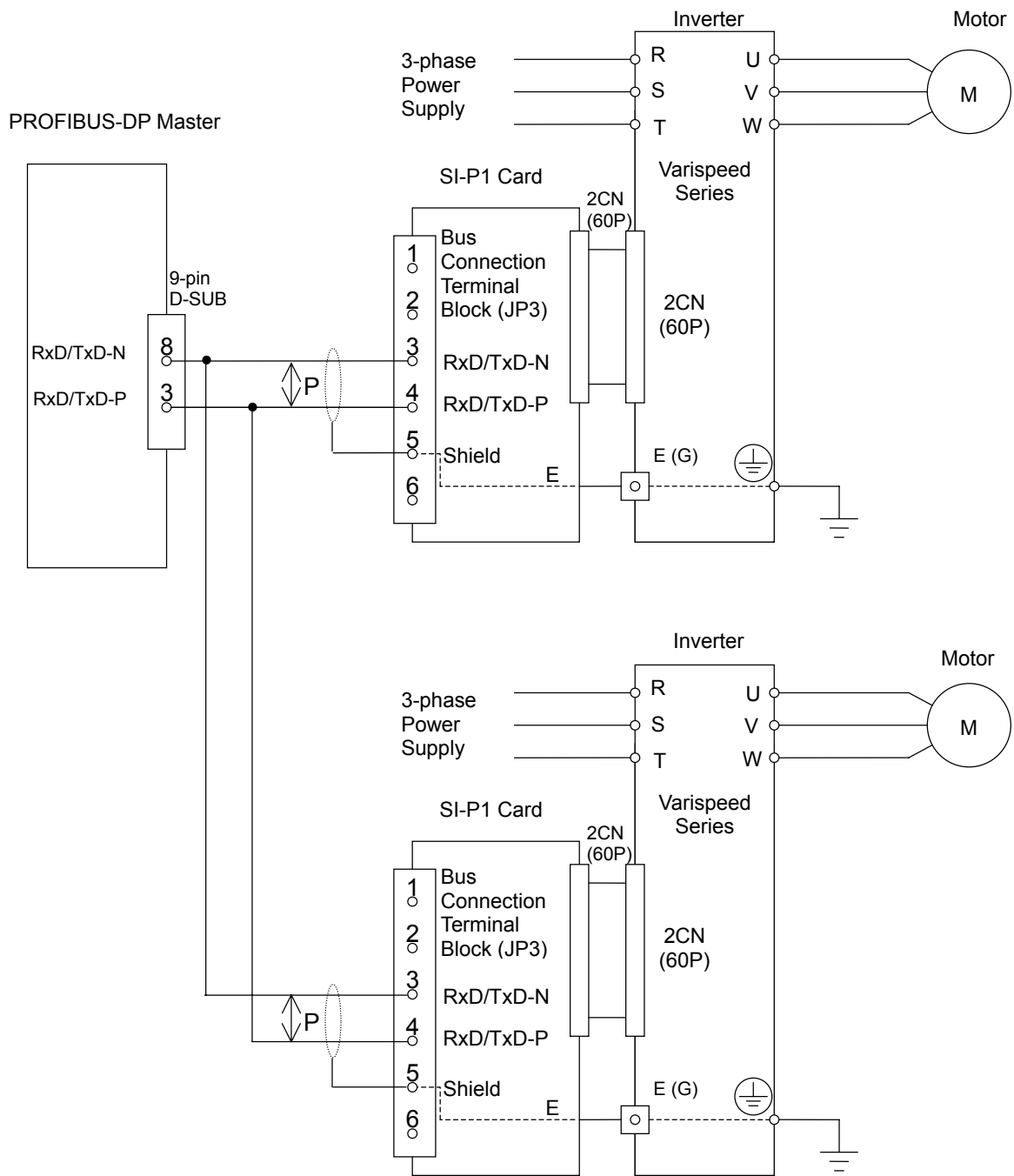
Fig. 5 Interconnection (when Two Inverters Used)

5. FUNCTIONS

5.1 Initial Settings

5.1.1 Inverter Settings

Set the following constants, whenever necessary, before starting communications between the Inverter and the PROFIBUS-DP master.

Constant No.	Name / Display	Description	Factory Setting	Inverter F7	Inverter G7
b1-01	Reference selection *1 / Reference Source	Set the inputting method for frequency reference. 0: Digital Operator 1: Control circuit terminals (analog inputs) 2: MEMOBUS communication (using SI-K2) 3: Option Card 4: MEMOBUS communication (for CP-717)	1	○	○
b1-02	Operation method selection *1 / Run Source	Set the operation method. 0: Digital Operator 1: Control circuit terminals (sequence inputs) 2: MEMOBUS communication (using SI-K2) 3: Option Card 4: MEMOBUS communication (for CP-717)	1	○	○
F6-01	Operation selection after communications error / BUS Fault Sel	Set the stopping method for communication errors. 0: Deceleration stop using deceleration time in C1-02 1: Coast to stop 2: Emergency stop using deceleration time in C1-09 3: Continue operation *2	1	○	○
F6-02	Input level of external fault from Communications Option Card / EF0 Detection	0: Always detect 1: Detect during operation	0	○	○
F6-03	Stopping method for external fault from Communications Option Card / EF0 Fault Action	0: Deceleration stop using deceleration time in C1-02. 1: Coast to stop 2: Emergency stop using deceleration C1-09. 3: Continue operation *2	1	○	○
F6-06	Torque reference/torque limit selection from optical option / Torque Ref/Lmt Sel	0: Torque reference/torque limit from transmission disabled 1: Torque reference/torque limit from transmission enabled.	1	×	○

*1: Set b1-02 to 3 to run/stop through the PROFIBUS-DP communications.   Set b1-01 to 3 to specify the frequency.

*2: Selecting "Continue operation" will allow the operation with the Inverter to continue when a fault occurs.
   Provide other measures such as an emergency stop switch for safe operation.

*3: Enabled when A1-02 (Control method selection) is set to 3 (Flux vector) or 4 (open loop vector).   In this case, the d5-01 (Torque control selection) setting can be used to select the torque reference or the torque limit.
   d5-01 = 0 (Speed control): Torque limit setting
   d5-01 = 1 (Torque control): Torque reference setting

*4: When F1-06 is set to 1 (factory setting), the motor may not turns unless the torque reference or the torque limit is set from the PROFIBUS-DP master.

5.1.2 How to Get GSD Files

A GSD file is needed for using the SI-P1 card as a PROFIBUS-DP slave.   Use the GSD file to register the SI-P1 card as a slave to a PROFIBUS-DP master.   Contact your Yaskawa representative for more information how to get a GSD file.

5.2   PROFIBUS-DP Data and I/O Map

Input and output data length of SI-P1 card can be chosen from among Extended data 1 (32 bytes), Extended data 2 (12 bytes) and Basic data (6 bytes).   Data length is set by the configuration tool of PROFIBUS-DP master.

(1) Extended data 1 (data length: 32 bytes)
●   High-speed I/O data – Bytes 0 to 15

This data is directly transferred to the Inverter or from the Inverter.   Using this high-speed I/O can control running or stopping of the Inverter.

●   MEMOBUS message – Bytes 16 to 31

This data is transferred to the Inverter using MEMOBUS messages.   All the Inverter constants and data can be accessed by this data.   Because the data in this area is transferred to the Inverter after the SI-P1 card receives and edits it, time is required to return the data.   The master must synchronize the timing of sending and receiving the data by the handshaking.

Also the run command or the frequency reference changes immediately by high-speed I/O even if it is commanded by MEMOBUS messages.

The following memory map shows the I/O data bytes and their designated functions.

	Output Data
	PROFIBUS-DP Master ⇒ Inverter

Byte	Function
0	Run Command
1	
2	Frequency Reference
3	
4	Torque Reference / Torque Limit
5	
6	Torque Compensation
7	
8	Not used
9	
10	Multi-function Analog Output 1 (Terminal FM) Output
11	
12	Multi-function Analog Output 2 (Terminal AM) Output
13	
14	Multi-function Output
15	
16	Function Code (Reference)
17	Starting Register No.
18	
19	Number of Data Items
20	Data 1
21	
22	Data 2
23	
24	Data 3
25	
26	Data 4
27	
28	Not used
29	
30	
31	Handshaking Register

	Input Data
	Inverter ⇒ PROFIBUS-DP Master

Byte	Function
0	Inverter Status
1	
2	Motor Speed
3	
4	Torque Reference
5	
6	Speed Detection PG Count Value
7	
8	Frequency Reference
9	
10	Output Frequency
11	
12	Output Current
13	
14	Main Speed Frequency Reference (Terminal A2) Input
15	
16	Function Code (Return)
17	Starting Register No.
18	
19	Number of Data Items
20	Data 1
21	
22	Data 2
23	
24	Data 3
25	
26	Data 4
27	
28	Not used
29	
30	
31	Handshaking Register

(2) Extended data 2 (data length: 12 bytes)

- High-speed I/O data – Bytes 0 to 3

- MEMOBUS Message – Bytes 4 to 11

<table>
<tr><td colspan="2" align="center">Output Data
PROFIBUS-DP Master ⇒ Inverter</td></tr>
</table>

Byte	Function
0	Run Command
1	
2	Frequency Reference
3	
4	Function Code (Reference)
5	Starting Register No.
6	
7	Number of Data Items
8	Data 1
9	
10	Not used
11	Handshaking Register

<table>
<tr><td colspan="2" align="center">Input Data
Inverter ⇒ PROFIBUS-DP Master</td></tr>
</table>

Byte	Function
0	Inverter Status
1	
2	Motor Speed
3	
4	Function Code (Return)
5	Starting Register No.
6	
7	Number of Data Items
8	Data 1
9	
10	Not used
11	Handshaking Register

(3) Basic data (data length: 6 bytes)

- High-speed I/O data – Bytes 0 to 5

<table>
<tr><td colspan="2" align="center">Output Data
PROFIBUS-DP Master ⇒ Inverter</td></tr>
</table>

Byte	Function
0	Run Command
1	
2	Frequency Reference
3	
4	Torque Reference/Torque Limit
5	

<table>
<tr><td colspan="2" align="center">Input Data
Inverter ⇒ PROFIBUS-DP Master</td></tr>
</table>

Byte	Function
0	Inverter Status
1	
2	Motor Speed
3	
4	Output Current
5	

5.3 High-speed I/O Data

The data in this area is directly transferred to the Inverter.

PROFIBUS-DP Master $\Rightarrow$ Inverter

For Extended data 1:

Byte	Function	Meaning		Remarks
0 1	Run Command	Run Command	Upper byte Lower byte	Refer to the table5.1.
2 3	Frequency reference	Frequency reference	Upper byte Lower byte	1 = 0.01 Hz (Unit depends on the o1-03 setting.) Setting range: zero to maximum frequency
4 5	Torque reference /Torque limit *1, *2	Torque reference/ torque limit value	Upper byte Lower byte	1 = 0.1% Setting range: F448H (-300.0) to 0BB8H (300.0%)
6 7	Torque compensation *1	Torque compensation	Upper byte Lower byte	1 = 0.1% Setting range: F448H (-300.0) to 0BB8H (300.0%)
8 9	Not used	Set to "00H".		
10 11	Multi-function Analog Output 1 (Terminal FM) *3	Analog output value	Upper byte Lower byte	F9FCH (-11V) to 0604H (11V)
12 13	Multi-function Analog Output 2 (Terminal AM) *3	Analog output value	Upper byte Lower byte	F9FCH (-11V) to 0604H (11V)
14	Not used	Set to "00H".		
15	Multi-function Output *4	Bit 0: Multi-function contact output terminals M1 and M2 Bit 1: Multi-function output 1 – terminals P1 and PC Bit 2: Multi-function output 2 - terminals P2 and PC Bit 3 to 7: Set to "0".		0: Open 1: Closed

*1: Can be used when setting A1-02 (Control method selection) to 3 (Flux vector) or 4 (Open loop vector 2) for Varispeed G7 series.

*2: Can be used when F6-06 (Torque reference/torque limit selection from optical option) is set to 1. In this case, the setting of d5-01 (Torque control selection) can be used to select the torque reference or the torque limit.

    d5-01 = 0 (Speed control): torque limit value

    d5-01 = 1 (Torque control): torque reference value

*3: To select inverter multi-function analog output for communications, set H4-01 [Monitor selection (terminal FM)] and H4-04 [Monitor selection (terminal AM)] to 31 (Not used).

*4: Inverter multi-function output ON/OFF during communications, set H2-01 [Multi-function input (terminal M1-M2)], H2-02 [Multi-function output 1 (terminal P1)], and H2-03 [Multi-function output 2 (terminal P2)] to F.

Run Command (common to each data length)

Bit No.	Description	Remarks
0	FWD run/stop	Enabled when setting b1-02 (Operation method selection) to 3 (Option card).
1	REV run/stop	
2	Terminal S3 function	Depends on H1-01 (multi-function selection 1: terminal S3 function selection) setting.
3	Terminal S4 function	Depends on H1-02 (multi-function selection 2: terminal S4 function selection) setting.
4	Terminal S5 function	Depends on H1-03 (multi-function selection 3: terminal S5 function selection) setting.
5	Terminal S6 function	Depends on H1-04 (multi-function selection 4: terminal S6 function selection) setting.
6	Terminal S7 function	Depends on H1-05 (multi-function selection 5: terminal S7 function selection) setting.
7	Terminal S8 function *	Depends on H1-06 (multi-function selection 6: terminal S8 function selection) setting.
8	External fault	1: External fault
9	Fault reset	1: Fault reset
A	Terminal S9 function *	Depends on H1-07 (multi-function selection 7: terminal S9 function selection) setting.
B	Terminal S10 function *	Depends on H1-08 (multi-function selection 8: terminal S10 function selection) setting.
C	Terminal S11 function *	Depends on H1-09 (multi-function selection 9: terminal S11 function selection) setting.
D	Terminal S12 function *	Depends on H1-10 (multi-function selection 10: terminal S12 function selection) setting.
E	Fault history trace clear	1: Clears the fault history.
F	External BB command	1: External Baseblock

*: Not used with Varispeed F7 series inverters since they do not have terminals S8 to S12.

Inverter $\Rightarrow$ PROFIBUS-DP Master

For Extended data 1:

Byte	Function	Description		Description
0 1	Inverter status	Inverter status	upper byte lower byte	Refer to the table 5.2.
2 3	Motor speed *1	16-bit hexadecimal data	upper byte lower byte	1 = 0.01 Hz *4
4 5	Torque reference *2	16-bit hexadecimal data	upper byte lower byte	1 = 0.1%
6 7	Speed Detection PG Count Value *3	16-bit hexadecimal data	upper byte lower byte	1 = 1 pulse
8 9	Frequency reference	16-bit hexadecimal data	upper byte lower byte	1 = 0.01 Hz *4
10 11	Output frequency	16-bit hexadecimal data	upper byte lower byte	1 = 0.01 Hz *4
12 13	Output current	16-bit hexadecimal data	upper byte lower byte	1 = 0.01 A *5
14 15	Main Speed Frequency Reference (Terminal A2) input *6	16-bit hexadecimal data	upper byte lower byte	1=0.1%

*1: Cannot be used when setting A1-02 (Control method selection) to 0 (V/f control).

*2: Cannot be used when setting A1-02 (Control method selection) to 0 (V/f control) or 1 (V/f with PG feedback).

*3: Can be used when setting A1-02 (Control method selection) to 1 (V/f with PG feed back) or 3 (Flux vector).

*4: Unit depends on the setting of o1-03 (Frequency units of reference setting and monitor).

*5: 1 is 0.1 A for Inverters with a capacity of more than 11 kW.

*6: Inverter analog input status (terminal A2) can be seen.

Inverter Status (common to each data length)

Bit No.	Name	Meaning
0	Running	1: Running (run command ON or voltage output)
1	Zero Speed	1: Zero speed
2	Reverse Running	1: Reverse running
3	Reset Signal Being Input	1: Reset signal being input.
4	Frequency (Speed) Agree	1: Frequency (speed) agreed
5	Inverter Operation Ready	1: Inverter operation ready.
6	Minor Fault	1: Displayed at warning
7	Major Fault	1: Alarm
8	OPE Error	1: Operation error (constant setting error)
9	Recovery From Momentary Power Loss Enabled/Disabled	0: No recovery after momentary power loss 1: Running after momentary power loss
A	LOCAL/REMOTE Selection	1: REMOTE selected
B	Multi-function Output Selection 1 Terminals M1-M2 Output	1: Closed
C	Multifunction Output Selection 2 Terminals P1-PC Output	1: Closed
D	Multifunction Output Selection 3 Terminals P1-PC Output	1: Closed
E	Motor Selection (1/2)	1: Motor 2 selected.
F	Zero Servo Completed*	1: Zero servo is completed.

*: Can be used when setting A1-02 (Control method selection) to 3 (Flux vector) for Varispeed G7 Series.

5.4　MEMOBUS Message Area

In this area, a MEMOBUS message is transferred to the SI-P1 card, and the constants in the Inverter can be set, read, and monitored.　Up to four data items can be written or read at one time.

Because the SI-P1 card edits the MEMOBUS message internally and transfers it to the Inverter after receiving the message, time is required to return it.　It is necessary to synchronize sending or receiving of the data between the PROFIBUS-DP master and the SI-P1 card.　Use the handshaking register for sychronization.　For details on the handshaking register, refer to *5.4.4 "Handshaking Register."*

To write a constant to the inverter, be sure to execute an ENTER command.　The written data becomes valid by executing the ENTER command.　For the details of the ENTER command, refer to *8.1.1 "Enter Command."*

5.4.1　Configuration of MEMOBUS Command Message

The following table shows the configuration of MEMOBUS command messages when the Extended data 1 is selected.

Byte	Name	Function		
16	Function code	MEMOBUS command code: 03H: Read command (reading Inverter internal data) 10H: Write command (writing data into the inverter) Other codes: Not supported.		
17	Starting Resistor No.	Starting resistor No.		upper byte
18				lower byte
19	Number of Data Items	Write: Set doubled number of written data items (2 to 8). Read: Set doubled number of read data items (2 to 8).		
20	Data 1*	Data word 1		upper byte
21				lower byte
22	Data 2*	Data word 2		upper byte
23				lower byte
24	Data 3*	Data word 3		upper byte
25				lower byte
26	Data 4*	Data word 4		upper byte
27				lower byte
28	Not used	-		
29				
30				
31	Handshaking Resistor	Refer to *5.4.4 "Handshaking Register."*		

*: Setting is needed only for the write command.　Always select 00H for the read command.

5.4.2 Configuration of MEMOBUS Response Messages

The following table shows the configuration of MEMOBUS response messages when the Extended data 1 is selected.

Byte	Name	Function	
16	Function code	MEMOBUS response codes 00H: Waiting for response from inverter 03H: Response to read operation 10H: Response to write operation 83H: Read command error 90H: Write command error Other codes: Not supported.	
17	Starting resistor No.	Starting resistor No.	upper byte
18			lower byte
19	Number of data items	Write: Set double number of written data items Read: Set double number of read data items	
20	Data 1*	Data word 1	upper byte
21			lower byte
22	Data 2*	Data word 2	upper byte
23			lower byte
24	Data 3*	Data word 3	upper byte
25			lower byte
26	Data 4*	Data word 4	upper byte
27			lower byte
28	Not used		
29			
30			
31	Handshaking register	Refer to *5.4.4 "Handshaking Register."*	

*: Data is returned only for the read command.

If an error occurs, the SI-P1 card sets MSB (Most Significant Bit) in the MEMOBUS response code to 1 and returns the error response.   The number of data items is set to 02H and the following error codes are set to the lower bytes of Data 1.

Error Name	Error Code	Description
Function Code Error	01H	Something other than 03H or 10H is specified for the function code.
Incorrect Register No.	02H	Start register No. is greater than the setting of 600H. Unused register No. is specified.
Improper Number of Data Items	03H	The number of data items at write-in or read-out is outside the acceptable range setting of the constant for writing in 2 to 8.
Incorrect Data Contents	21H	The setting of the constant for writing in is beyond the upper or lower limit of the constant. Constant is incorrectly set at constant write-in.
Incrorrect Write-in	22H	A constant is written during running. ENTER command is written during running. Read-only data is written.
	23H	A constant is written when the Inverter is undervoltage (UV). ENTER command is written when the Inverter is undervoltage (UV).
	24H	A constant is written while data is being stored.

5.4.3 Constant Settings Using MEMOBUS Commands

The written or read data of each constant is transferred in a hexadecimal value.

Negative values are expressed as a two's complement.

Example 1) The frequency reference is 30Hz.

$$30 \text{ Hz}/0.01 \text{ Hz} = 3000 \rightarrow \text{bb8H}$$

Example 2) -5% is assigned as the bias for terminal FM of multi-function analog output 1.

$$5/0.1 = 50 \rightarrow 32\text{H}$$

Converted into a two's complement $\rightarrow$ FFCEH

Example 3) 60.00 Hz is assigned for d1-01 (register No.: 0280H).

$$60.00\text{Hz}/0.01\text{Hz} = 6000 \rightarrow 1770\text{H}$$

Byte	Name		Data		
			Command Message	Response Message	Response Message (at Fault) *2
16	Function code		10H	10H	90H
17	Starting Register No.	Upper	02H	02H	00H
18		Lower	80H	80H	00H
19	Number of Data Items		02H	02H	02H
20	Data 1	Upper	17H	00H	00H
21		Lower	70H	00H	02H
22	Data 2	Upper	00H	00H	00H
23		Lower	00H	00H	00H
24	Data 3	Upper	00H	00H	00H
25		Lower	00H	00H	00H
26	Data 4	Upper	00H	00H	00H
27		Lower	00H	00H	00H
28	Not used		00H	00H	00H
29			00H	00H	00H
30			00H	00H	00H
31	Handshaking Resistor *1		01H	01H	01H

*1: Depends on the status of the previous data.

*2 : Depends on the status of the fault.

5.4.4 Handshaking Register

Handshaking is used to synchronize the timing of the sending or receiving of MEMOBUS message data between the SI-P1 card and the PROFIBUS-DP master. Use byte 31 in the PROFIBUS-DP master input area (from the SI-P1 card to the PROFIBUS-DP master) and in the output area (from the PROFIBUS-DP master to the SI-P1 card). When the status of byte 31 bit 7 changes, the data set to the output area on the PROFIBUS master's side becomes valid on the SI-P1 card. When the status obtained after changing byte 31 bit 7 in the output area coincides with the bit 7 status in the input area, the data in the input area on the PROFIBUS-DP master's side must be valid.

Handshaking Output Register
PROFIBUS-DP Master ⇒ SI-P1 Card

```
 b7                              b0
┌────┬───┬───┬───┬───┬───┬───┬──────┐
│ HS │ — │ — │ — │ — │ — │ — │ INIT │
└────┴───┴───┴───┴───┴───┴───┴──────┘
```

Bit	Name	Function
7	HS	Handshaking bit. Used to synchronize the timing for sending or receiving data. Changes the status when a new command is transmitted. Note: Be sure to clear this bit to 0 when turning ON the power supply or setting bit 0 (INIT) to 1 to initialize the handshaking bit for the SI-P1 card.
1 to 6	-	Not used
0	INIT	Clears the handshaking bit for the SI-P1 card to 0

<u>Handshaking Input Register</u>

SI-P1 Card $\Rightarrow$　PROFIBUS-DP Master

b7			b0
HS	STATUS	WD	—

Bit	Name	Function
7	HS	Handshaking bit.　Used to synchronize the timing for sending or receiving data.　Changes the status when a new response is transmitted. Note: This bit is cleared to 0 when the power supply is turned ON or by setting the handshaking initialization bit (INIT) on the output register on the PROFIBUS-DP master's side) to 1.
5 to 6	STATUS *	Status of the data exchange between the PROFIBUS-DP master and the Inverter. 00H: Idle 01H: Sends a MEMOBUS command to the Inverter. 10H: Waits for a MEMOBUS command from the Inverter. 11H: Receives a response.
1 to 4	WD *	Counter increases every 64 ms.
0	-	Not used

* STATUS and WD are information for your reference.

5.4.5 Example of Handshaking

Clear the handshaking register HS bit (bit 7) to 0 for the PLC program after turning ON the power supply or re-initialization.   The following drawing describes how to perform handshaking.   The arrow marks indicate whether the PROFIBUS-DP master or the SI-P1 card has the control for the protocol.

	PROFIBUS-DP Master Handshaking Output Register		SI-P1 Card Handshaking Input Register	
Initial Setting	0		0	Initial Setting
	⇓			
Creation of Command	0		0	
	⇓			
Command Valid	1	⇒	0	New MEMOBUS Command for SI-P1 Card
			⇓	
	1		0	Processing of Command
			⇓	
	1	⇐	1	Response Valid
	⇓			
Creation of Command	1		1	Idle
	⇓			
Command Valid	0	⇒	1	New MEMOBUS Command to SI-P1 Card
			⇓	
	0		1	Processing of Command
			⇓	
	0	⇐	0	Response Valid
	⇓			
Creation of Command	0		0	Idle
	⇓			
Command Valid	1	⇒	0	New MEMOBUS Command to SI-P1 Card
			⇓	
			etc.	

5.4.6   Flow Chart

The following flow chart shows how handshaking works when a MEMOBUS message is used.

PROFIBUS-DP DP Master | SI-P1 Card

Power ON or re-initialization — START

Clears the handshaking register HS bit to "0".

Sends a new message. NO / YES

Creates a command message.

Toggles handshaking register HS bit.*

Sends to slave.

INDATA HS = NO / YES

Handles the response.

Initialization — START

Clears handshaking register HS bit to "0".

*: Toggle means to change the HS bit status from 0 to 1 or from 1 to 0.

Receives for the master.

Transfers to dual port RAM.

Command message Normal / Abnormal

Command executed.

Command not executed.

Creates a response message.

Creates a response message of a fault.

Transfers to dual port RAM.

Toggles hand-haking register HS bit.*

Sends to master.

6. TROUBLESHOOTING

6.1 Inverter Errors

The following table outlines the faults displayed in the Inverter's operator and their causes and corrective actions.

Refer to the Instruction Manuals for any faults displayed in the operator other than those described below.

Display	Meaning	Cause	Corrective Action
OPE05 Sequence Select	Option card selection error	The Option card was selected as the frequency reference source by setting b1-01 to 3, but an Option card is not connected.	Connect the Option card to the 2CN connector on the inverter control board.
BUS Option Com Err	Option Communications Error	Communications are not established between the PROFIBUS-DP master and the inverter.	Confirm the PROFIBUS-DP communications LED display.
EF0 Opt External Flt	External fault input from communications option card	External fault is input from the PROFIBUS-DP master.	Turn OFF the external fault input.
CPF06 Option Error	Option card connection error	The Inverter and the Option card are not connected properly.	Turn OFF the inverter power supply and confirm the Option card and Inverter connection. Then turn ON the power supply again. Replace the Option card if the fault occurs again.
CPF20 Option A/D Error	Option card A/D converter error	The Inverter and the Option card are not connected properly. The option card's A/D converter is faulty.	Turn OFF the inverter power supply and confirm the Option card and Inverter connection. Then turn ON the power supply again. Replace the Option card if the fault occurs again.
CPF21 Option CPU down	Communications Option card self diagnostic error	Option card fault	Turn ON the inverter power supply again. Replace the Option card if the fault occurs again.
CPF22 Option Type Err	Communications Option card model code error		
CPF23 Option DPRAM Err	Communications Option card DPRAM error		

6.2 Faults of PROFIBUS-DP Communications LED

The following table shows the faults, causes and corrective actions to be displayed in the LED on the SI-P1 card.

LED Display				Meaning	Cause	Corrective Action
PWR	COMM	ERR	WD			
●	●	●	●	Power OFF	Power is not supplied to the inverter.	Check the inverter main circuit wiring and turn ON the power supply.
					SI-P1 card is not connected properly so that power is not supplied to the SI-P1 card.	Turn OFF the inverter power supply and check the SI-P1 card and Inverter connection. Then turn ON the power supply again.
☼ Green	●	☼ Red	☼ Red	CPU error	SI-P1 card CPU is defective.	Turn ON the inverter power supply again. If the fault occurs again, replace the SI-P1 card.
☼ Green	●	☼ Red	✹ Red	Inverter error	Inverter is defective.	Turn ON the inverter power supply again. If the fault occurs again, replace the Inverter.
☼ Green	●	☼ Red	✹ Green	Communications error	An error occurred and disabled communications.	Confirm that the address specified by the PROFIBUS-DP master coincides with the SI-P1 card address. Confirm that the PROFIBUS-DP master is operating normally. Confirm that the termination resistor is connected correctly to the communications line. Confirm that the communications line is connected correctly. Confirm that the communications line is separated from the main circuit wiring.
☼ Green	☼ Green	☼ Red	✹ Green	Communications error	An error occurred and disabled communications.	Confirm that the same address is not used for other devices in the PROFIBUS-DP.
☼ reen	☼ Green	●	☼ Green	CPU Initialization	SI-P1 card is being initialized.	
☼ Green	☼ Green	●	✹ Green	Normal	Normal communications are enabled.	

Note: LED Status

☼ : Lights   ✹ : Blinks   ● : Not lit

7. SPECIFICATIONS

Item	Specifications
Model	SI-P1
PROFIBUS Data	Extended data 1 High-speed I/O data (inputs: 16 bytes, outputs: 16 bytes) MEMOBUS message (inputs: 16 bytes, outputs: 16 bytes) Extended data 2 High-speed I/O data (inputs: 4 bytes, outputs: 4 bytes) MEMOBUS message (inputs: 8 bytes, outputs: 8 bytes) Basic data High-speed I/O data (inputs: 6 bytes, outputs: 6 bytes)
Operating Power Supply	4.75V to 5.25VDC (supplied from inverter)
Ambient Operating Temperature	-10℃ to +45℃
Ambient Operation Humidity	95%RH max. (no condensation)
Storage Temperature	-20℃ to +60℃
Application Site	Indoors (no corrosive gases, dust, or dirt)
Altitude	1000 m max.
Communications Speed	9.6k bps to 12M bps

8. APPENDIX

8.1 List of MEMOBUS Registers

8.1.1 Command Data (Read and Write)

Register No.	BIT		Meaning	Inverter F7	G7
0000H			Reserved	○	○
0001H			Run Command	○	○
	0		Forward run/Stop 1: Forward run 0: Stop	○	○
	1		Reverse run/Stop 1: Reverse run 0: Stop	○	○
	2		External fault 1: Fault (EF0)	○	○
	3		Fault reset 1: Fault reset	○	○
	4		ComNet	○	○
	5		ComCtrl	○	○
	6		Multi-function input reference 3 (terminal S3)	○	○
	7		Multi-function input reference 4 (terminal S4)	○	○
	8		Multi-function input reference 5 (terminal S5)	○	○
	9		Multi-function input reference 6 (terminal S6)	○	○
	A		Multi-function input reference 7 (terminal S7)	○	○
	B		Multi-function input reference 8 (terminal S8)	×	○
	C		Multi-function input reference 9 (terminal S9)	×	○
	D		Multi-function input reference 10 (terminal S10)	×	○
	E		Multi-function input reference 11 (terminal S11)	×	○
	F		Multi-function input reference 12 (terminal S12)	×	○
0002H			Frequency reference (Unit: set by o1-03)	○	○
0003H			Not used	—	—
0004H			Torque reference	×	○
0005H			Torque compensation	×	○
0006H			PID aimed value	○	○
0007H			Analog output 1 setting (-11V/-1540 to 11 V/1540, valid when H4-01 is set to 31)	○	○
0008H			Analog output 2 setting (-11V/-1540 to 11 V/1540, valid when H4-04 is set to 31)	○	○
0009H			Multi-function output setting	○	○
	0		Contact output (terminals M1 and M2) 1: ON 0: OFF	○	○
	1		PHC1 (terminals P1 and PC) 1: ON 0: OFF	○	○
	2		PHC2 (terminals P2 and PC) 1: ON 0: OFF	○	○
	3		PHC3 (terminals P3 and C3) 1: ON 0: OFF	×	○
	4		PHC4 (terminals P4 and C4) 1: ON 0: OFF	×	○
	5		Not used	—	—
	6		Fault contact (terminals MA and MC) depends on the setting of bit 7. 1:ON 0:OFF	○	○
	7		Fault contact (terminals MA and MC) 1:ON 0:OFF	○	○
	8-F		Not used	○	○
000AH — 000EH			Not used	—	—
000FH			Reference selection setting	○	○
	0		Not used	○	○
	1		PID aimed value input 1: Valid 0: Invalid	○	○
	2-B		Not used	○	○
	C		1: Simultaneous data terminal S5 input 1: Valid 0: Invalid	○	○
	D		1: Simultaneous data terminal S6 input 1: Valid 0: Invalid	○	○
	E		1: Simultaneous data terminal S7 input 1: Valid 0: Invalid	○	○
	F		1: Simultaneous data terminal S8 input 1: Valid 0: Invalid	×	○

Note: When writing data into the register, write 0 to the unused bit.   Do not write any data to the reserved register.

8.1.2 Status Data (Read Only)

Register No.			Meaning	Inverter	
	BIT	Display		F7	G7
0010H			Inverter status	○	○
	0		1: Running	○	○
	1		1: Zero speed	○	○
	2		1: Reverse running	○	○
	3		1: Reset signal inputting	○	○
	4		1: Speed agree	○	○
	5		1: Inverter ready	○	○
	6		1: Minor fault	○	○
	7		1: Major fault	○	○
	8-D		Not used	—	—
	E		1: ComRef status	○	○
	F		1: ComCtrl status	○	○
0011H			Operator status	○	○
	0		1: OPE occurring	○	○
	1		1: ERR occurring	—	—
	2		1: PRG mode	○	○
	3-4		1CN status 00: JVOP-160 01: JVOP-161 11: PC		
	5-F		Not used	—	—
0012H			OPE No.	○	○
0013H			Inverter code F7: 2020H G7: 2050H	○	○
0014H			Fault contents 1	○	○
	0	PUF	Fuse blown	○	○
	1	UV1	Main circuit undervoltage / main circuit MC operation error	○	○
	2	UV2	Control power fault	○	○
	3	UV3	Inrush prevention circuit fault	○	○
	4	—	Not used	—	—
	5	GF	Ground fault	○	○
	6	OC	Overcurrent	○	○
	7	OV	Main circuit Overvoltage	○	○
	8	OH	Cooling fan overheat	○	○
	9	OH1	/ Cooling fan stop in inverter	○	○
	A	OL1	Motor overload	○	○
	B	OL2	Inverter overload	○	○
	C	OL3	Overtorque 1	○	○
	D	OL4	Overtorque 2	○	○
	E	RR	Internal braking transistor fault	○	○
	F	RH	Installed braking resistor overheating	○	○
0015H			Fault contents 2		
	0	EF3	External fault (input terminal S3)	○	○
	1	EF4	External fault (input terminal S4)	○	○
	2	EF5	External fault (input terminal S5)	○	○
	3	EF6	External fault (input terminal S6)	○	○
	4	EF7	External fault (input terminal S7)	○	○
	5	EF8	External fault (input terminal S8)	×	○
	6	—	Not used	—	—
	7	OS	Overspeed	○	○
	8	DEV	Excessive speed deviation	○	○
	9	PGO	PG disconnection detected	○	○
	A	PF	Main circuit voltage fault	○	○
	B	LF	Output open phase	○	○
	C	OH3	Motor overheat alarm	○	○
	D	OPR	Operator connection fault	○	○
	E	ERR	EEPROM write error	○	○
	F	OH4	Motor overheating	○	○

Register No.	BIT	Display	Meaning	Inverter F7	Inverter G7
0016H			Fault contents 3	○	○
	0	CE	MEMOBUS communications error	○	○
	1	BUS	SI-P1 communications error	○	○
	2	—	Not used	—	—
	3	—	Not used	—	—
	4	CF	Control fault	○	○
	5	SVE	Zero servo fault	×	○
	6	EFO	External fault input from communications card	○	○
	7	FBL	PID control feedback command loss	○	○
	8	UL3	Undertorque detection 1	○	○
	9	UL4	Undertorque detection 2	○	○
	A	OL7	High-slip braking OL	○	○
	B	EF9	External fault (input terminal S9)	×	○
	C	EF10	External fault (input terminal S10)	×	○
	D	EF11	External fault (input terminal S11)	×	○
	E	EF12	External fault (input terminal S12)	×	○
	F	CPF	Hardware fault	○	○
0017H			CPF contents 1	○	○
	0		Not used	—	—
	1		Not used	—	—
	2		CPF02 occurring	○	○
	3		CPF03 occurring	○	○
	4		CPF04 occurring	○	○
	5		CPF05 occurring	○	○
	6		CPF06 occurring	○	○
	7-F		Not used	—	—
0018H			CPF contents 2	○	○
	0		CPF20 occurring	○	○
	1		CPF21 occurring	○	○
	2		CPF22 occurring	○	○
	3		CPF23 occurring	○	○
	4-F		Not used	—	—
0019H			Minor fault contents 1	○	○
	0	UV	Main circuit undervoltage	○	○
	1	OV	Main circuit overvoltage	○	○
	2	OH	Cooling fin overheating	○	○
	3	OH2	Inverter overheating pre-alarm	○	○
	4	OL3	Overtorque 1	○	○
	5	OL4	Overtorque 2	○	○
	6	EF	FWD/REV run command input together	○	○
	7	BB	External baseblock	○	○
	8	EF3	External fault (input terminal S3)	○	○
	9	EF4	External fault (input terminal S4)	○	○
	A	EF5	External fault (input terminal S5)	○	○
	B	EF6	External fault (input terminal S6)	○	○
	C	EF7	External fault (input terminal S7)	○	○
	D	EF8	External fault (input terminal S8)	×	○
	E	—	Not used	—	—
	F	OS	Overspeed	○	○

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Register No.	BIT	Display	Meaning	Inverter F7	Inverter G7
001AH			Minor fault 2	○	○
	0	DEV	Excessive speed deviation	○	○
	1	PGO	PG disconnection	○	○
	2	OPR	Digital operator connection fault	○	○
	3	CE	MEMOBUS communications error	○	○
	4	BUS	SI-P1 communications error	○	○
	5	CALL	Waiting for communications	○	○
	6	OL1	Motor overload	○	○
	7	OL2	Inverter overload	○	○
	8	—	Not used	—	—
	9	EFO	SI-P1 external fault detecting	○	○
	A	—	Motor switching during running	○	○
	B	FBL	PID feedback reference lost	○	○
	C	CALL	Communications on standby	○	○
	D	UL3	Undertorque 1	○	○
	E	UL4	Undertorque 2	○	○
	F	SE	Sequence Error	○	○
001BH			Minor fault 3		
	0	—	Not used	—	—
	1	OH3	Motor overheating alarm	○	○
	2	EF9	External fault (input terminal S9)	×	○
	3	EF10	External fault (input terminal S10)	×	○
	4	EF11	External fault (input terminal S11)	×	○
	5	EF12	External fault (input terminal S12)	×	○
	6-F	—	Not used	—	—
0020H			Inverter status	○	○
	0		1: Running	○	○
	1		1: Reverse running	○	○
	2		1: Inverter ready	○	○
	3		1: Fault	○	○
	4		1: Data setting error	○	○
	5		1: Multi-function contact output (M1 and M2) ON	○	○
	6		1: Multi-function PHC1 output (P1 and PC)	○	○
	7		1: Multi-function PHC2 output (P2 and PC)	○	○
	8		1: Multi-function PHC3 output (P3 and C3)	×	○
	9		1: Multi-function PHC4 output (P4 and C4)	×	○
	A-F		Not used	—	—

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Register No.	Meaning		Inverter	
	BIT	Display	F7	G7
0021H	Fault contents		○	○
	0	Overcurrent (OC), ground fault (GF)	○	○
	1	Main circuit overvoltage (OV)	○	○
	2	Inverter overload (OL2)	○	○
	3	Radiation fan overheating, inverter internal cooling fan stop [OH (OH1)]	○	○
	4	Internal braking transistor fault (rr), installed braking resistor overheating (RH)	○	○
	5	Fuse blown (PUF)	○	○
	6	PID control feedback command loss (FBL)	○	○
	7	External fault (EF0, EF3 to EF7)	○	○
	8	Hardware fault (CPF)	○	○
	9	Motor overload (OL1), overtorque detection 1 (OL3), overtorque detection 2 (OL4)	○	○
	A	PG disconnection (PGO), Overspeed (OS), excessive speed deviation (DEV)	○	○
	B	Main circuit undervoltage (UV) detecting	○	○
	C	Main circuit undervoltage, main circuit MC operation fault (UV1), control power fault (UV2), inrush prevention circuit fault (UV3)	○	○
	D	Output open phase (LF)	○	○
	E	MEMOBUS communications error	○	○
	F	Operator connection fault (OPR)	○	○
0022H	Data Link Status		○	○
	0	Data writing	○	○
	1	Not used	—	—
	2	Not used	—	—
	3	Upper/lower limit error	○	○
	4	Data consistency error	○	○
	5-F	Not used	—	—
0023H	Frequency reference (U1-01)		○	○
0024H	Output frequency (U1-02)		○	○
0025H	Output voltage reference (U1-06)		○	○
0026H	Output current (U1-03)		○	○
0027H	Output power (U1-08)		○	○
0028H	Torque reference (U1-09)		○	○
0029H	Not used		—	—
002AH	Not used		—	—
002BH	Sequence input status		○	○
	0	1: Multi-function contact input terminal S1 ON	○	○
	1	1: Multi-function contact input terminal S2 ON	○	○
	2	1: Multi-function contact input terminal S3 ON	○	○
	3	1: Multi-function contact input terminal S4 ON	○	○
	4	1: Multi-function contact input terminal S5 ON	○	○
	5	1: Multi-function contact input terminal S6 ON	○	○
	6	1: Multi-function contact input terminal S7 ON	○	○
	7	1: Multi-function contact input terminal S8 ON	×	○
	8	1: Multi-function contact input terminal S9 ON	×	○
	9	1: Multi-function contact input terminal S10 ON	×	○
	A	1: Multi-function contact input terminal S11 ON	×	○
	B	1: Multi-function contact input terminal S12 ON	×	○
	C-F	Not used	—	—

Register No.	Meaning			Inverter	
	BIT	Display		F7	G7
002CH	Inverter status			○	○
	0	1: Running		○	○
	1	1: Zero speed		○	○
	2	1: Speed agree		○	○
	3	1: Arbitrary speed agree		○	○
	4	Frequency detection 1 1: Output frequency $\leqq$ L4-01		○	○
	5	Frequency detection 2 1: Output frequency $\geqq$ L4-01		○	○
	6	1: Inverter ready		○	○
	7	1: Undervoltage detection		○	○
	8	1: Baseblocking		○	○
	9	Frequency mode 1: Other than communications 0: Communications		○	○
	A	Run command mode 1: Other than communications 0: Communications		○	○
	B	1: Overtorque detection		○	○
	C	1: Frequency reference loss		○	○
	D	1: Fault retry		○	○
	E	1: Fault occurring		○	○
	F	1: MEMOBUS time over		○	○
002DH	Multi-function output status			○	○
	0	Multi-function contact output (M1 and M2) ON		○	○
	1	Multi-function PHC output (P1 and PC) ON		○	○
	2	Multi-function PHC output (P2 and PC) ON		○	○
	3	Multi-function PHC output (P3 and C3) ON		×	○
	4	Multi-function PHC output (P4 and C4) ON		×	○
	5-F	Not used		—	—
002EH -0030H	Not used			—	—
0031H	Main circuit DC bus voltage			○	○
0032H	Torque monitor			○	○
0033H	Output power			○	○
0034H -0037H	Not used			—	—
0038H	PID control feedback			○	○
0039H	PID input volume			○	○
003AH	PID output volume			○	○
003BH	Software No. (CPU)			○	○
003CH	Software No. (FLASH)			○	○
003DH	Communications error contents			○	○
	0	CRC error			
	1	Incorrect data length		○	○
	2	Not used		—	—
	3	Parity error		○	○
	4	Overrun error		○	○
	5	Framing error		○	○
	6	Time over		○	○
	7-F	Not used		—	—
003EH	kVA setting			○	○
003FH	Control mode			○	○

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8.1.3 Monitor Data (Read Only)

For details, refer to the Varispeed Instruction Manuals.   The units to be monitored are the same as the operator displayed units excluding the units related to frequency and output current.

Status Monitor (U1-XX)

Register No.	Constant No.	Contents BIT			Inverter F7	Inverter G7
0040H	U1-01	Frequency reference[1]			○	○
0041H	U1-02	Output frequency[1]			○	○
0042H	U1-03	Output current (100%/8192)[2]			○	○
0043H	U1-04	Control mode			○	○
0044H	U1-05	Motor speed[1]			○	○
0045H	U1-06	Output voltage reference			○	○
0046H	U1-07	Main circuit DC bus voltage			○	○
0047H	U1-08	Output power			○	○
0048H	U1-09	Torque reference (internal)			○	○
0049H	U1-10	Input terminal status			○	○
			0	1: Control circuit terminal S1 closed	○	○
			1	1: Control circuit terminal S2 closed	○	○
			2	1: Control circuit terminal S3 closed	○	○
			3	1: Control circuit terminal S4 closed	○	○
			4	1: Control circuit terminal S5 closed	○	○
			5	1: Control circuit terminal S6 closed	○	○
			6	1: Control circuit terminal S7 closed	○	○
			7	1: Control circuit terminal S8 closed	×	○
			8	1: Control circuit terminal S9 closed	×	○
			9	1: Control circuit terminal S10 closed	×	○
			A	1: Control circuit terminal S11 closed	×	○
			B	1: Control circuit terminal S12 closed	×	○
			C-F	Not used	—	—
004AH	U1-11	Output terminal status			○	○
			0	1: Control circuit terminal M1 and M2 closed	○	○
			1	1: Control circuit terminal P1 closed	○	○
			2	1: Control circuit terminal P2 closed	○	○
			3	1: Control circuit terminal P3 closed	×	○
			4	1: Control circuit terminal P4 closed	×	○
			5-6	Not used	—	—
			7	1: Terminal MA/MB and MC closed	○	○
			8-F	Not used	—	—
004BH	U1-12	Operation status			○	○
			0	1: Running	○	○
			1	1: Zero speed	○	○
			2	1: Reverse running	○	○
			3	1: Reset signal inputting	○	○
			4	1: Speed agree	○	○
			5	1: Inverter ready	○	○
			6	1: Minor fault	○	○
			7	1: Major fault	○	○
			8	Not used	—	—
004CH	U1-13	Cumulative operation time			○	○
004DH	U1-14	Software No. (FLASH)			○	○
004EH	U1-15	Frequency reference terminal A1 input voltage			○	○
004FH	U1-16	Multi-function analog input terminal A2 input voltage			○	○
0050H	U1-17	Multi-function analog input terminal A3 input voltage			×	○

Register No.	Constant No.	Meaning BIT			Inverter F7	Inverter G7
0051H	U1-18	Motor secondary current (Iq)			○	○
0052H	U1-19	Motor exciting current (Id)			○	○
0053H	U1-20	Output frequency after soft-start[1]			○	○
0054H	U1-21	Speed control (ASR) input			○	○
0055H	U1-22	Speed control (ASR) output			○	○
0056H	-	Not used			−	−
0057H	U1-24	PID control feedback			○	○
0058H	U1-25	DI-16H2 input status			×	○
0059H	U1-26	Output voltage reference (Vq)			○	○
005AH	U1-27	Output voltage reference (Vd)			○	○
005BH	U1-28	Software No. (CPU)			○	○
005DH	-	Not used			−	−
005EH	-	Not used			−	−
005FH	U1-32	ACR output of q axis			○	○
0060H	U1-33	ACR output of d axis			○	○
0061H	U1-34	OPE fault constant			○	○
0062H	U1-35	Zero servo movement pulses			×	○
0063H	U1-36	PID input volume			○	○
0064H	U1-37	PID output volume			○	○
0065H	U1-38	PID command			○	○
0066H	U1-39	MEMOBUS communications error code			○	○
			0	1: CRC error	○	○
			1	1: Incorrect data length	○	○
			2	Not used	−	−
			3	1: Parity error	○	○
			4	1: Overrun error	○	○
			5	1: Framing error	○	○
			6	1: Time over	○	○
			7-F	Not used	−	−
0067H	U1-40	Cooling fan operating time			○	○
006 9 H	U1-42	Motor magnetic flux calculated value			×	○
006AH	U1-43	Motor magnetic flux current compensated value			×	○
006BH	U1-44	Speed control (ASR) output (without filter)			×	○
006CH	U1-45	Feed-forward control output			×	○

*1: The unit of frequency is 0.1 Hz with sign when command code 100FH/200FH bit 0 is set to 0.
The unit of frequency depends on the o1-03 setting without a sign when command code 100FH/200FH bit 0 is set to 1.
*2: Output current is 100%/1892.   100% indicates the inverter rated current.

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Status Monitor (U2-XX)

Register No.	Constant No.	Meaning / BIT		Inverter F7	Inverter G7
0080H	U2-01	Current fault (Refer to the next page for Fault Codes.)		○	○
0081H	U2-02	Last fault (Refer to the next page for Fault Codes.)		○	○
0082H	U2-03	Frequency reference at fault		○	○
0083H	U2-04	Output frequency at fault		○	○
0084H	U2-05	Output current at fault		○	○
0085H	U2-06	Motor speed at fault		○	○
0086H	U2-07	Output voltage reference at fault		○	○
0087H	U2-08	DC bus voltage at fault		○	○
0088H	U2-09	Output power at fault		○	○
0089H	U2-10	Torque reference at fault		○	○
008AH	U2-11	Input terminal status at fault		○	○
		0	1: Control circuit terminal S1 closed	○	○
		1	1: Control circuit terminal S2 closed	○	○
		2	1: Control circuit terminal S3 closed	○	○
		3	1: Control circuit terminal S4 closed	○	○
		4	1: Control circuit terminal S5 closed	○	○
		5	1: Control circuit terminal S6 closed	○	○
		6	1: Control circuit terminal S7 closed	○	○
		7	1: Control circuit terminal S8 closed	×	○
		8	1: Control circuit terminal S9 closed	×	○
		9	1: Control circuit terminal S10 closed	×	○
		A	1: Control circuit terminal S11 closed	×	○
		B	1: Control circuit terminal S12 closed	×	○
		C-F	Not used	—	—
008BH	U2-12	Output terminal status at fault		○	○
		0	1: Control circuit terminals M1 and M2 closed	○	○
		1	1: Control circuit terminal P1 closed	○	○
		2	1: Control circuit terminal P2 closed	○	○
		3	1: Control circuit terminal P3 closed	×	○
		4	1: Control circuit terminal P4 closed	×	○
		5-6	Not used	—	—
		7	1: Terminal MA/MB and MC closed	○	○
		8	Not used	—	—
008CH	U2-13	Operation status at fault		○	○
		0	1: Running	○	○
		1	1: Zero speed	○	○
		2	1: Reverse running	○	○
		3	1: Reset signal inputting	○	○
		4	1: Speed agree	○	○
		5	1: Inverter ready	○	○
		6	1: Minor fault	○	○
		7	1: Major fault	○	○
		8	Not used	—	—
008DH	U2-14	Cumulative operation time at fault		○	○

Fault History (U3-XX)

Register No.	Constant No.	Meaning	Inverter F7	Inverter G7
0090H	U3-01	Most recent fault (Refer to the table for Fault Codes.)	○	○
0091H	U3-02	Second most recent fault (Refer to the table for Fault Codes.)	○	○
0092H	U3-03	Third most recent fault (Refer to the table for Fault Codes.)	○	○
0093H	U3-04	Fourth most recent or oldest fault (Refer to the table for Fault Codes.)	○	○
0094H	U3-05	Cumulative operation time at fault	○	○
0095H	U3-06	Accumulated time of second fault	○	○
0096H	U3-07	Accumulated time of third fault	○	○
0097H	U3-08	Accumulated time of fourth/oldest fault	○	○

Fault Codes of 0080, 0081, 0090 to 0093

Display	Meaning	Fault Code	Inverter F7	Inverter G7
PUF	Fuse blown	01H	○	○
UV1	Main circuit undervoltge	02H	○	○
UV2	Control power fault	03H	○	○
UV3	Inrush prevention circuit fault	04H	○	○
-	Not used	05H	−	−
GF	Ground fault	06H	○	○
OC	Overcurrent	07H	○	○
OV	Overvoltage	08H	○	○
OH	Cooling fan overheating　／ inverter internal	09H	○	○
OH1	cooling fan overheating	0AH	○	○
OL1	Motor overload	0BH	○	○
OL2	Inverter overload	0CH	○	○
OL3	Overtorque 1	0DH	○	○
OL4	Overtorque 2	0EH	○	○
RR	Internal braking transistor fault	0FH	○	○
RH	Installed braking resistor overheating	10H	○	○
EF3	External fault (input terminal S3)	11H	○	○
EF4	External fault (input terminal S4)	12H	○	○
EF5	External fault (input terminal S5)	13H	○	○
EF6	External fault (input terminal S6)	14H	○	○
EF7	External fault (input terminal S7)	15H	○	○
EF8	External fault (input terminal S8)	16H	×	○
-	Not used	17H	−	−
OS	Overspeed	18H	○	○
DEV	Excessive speed deviation	19H	○	○
PGO	PG disconnection detected	1AH	○	○
PF	Main circuit voltage fault	1BH	○	○
LF	Output open-phase	1CH	○	○
OPR	Digital operator connection fault	1EH	○	○
ERR	EEPROM write error	1FH	○	○
CE	MEMOBUS communications error	21H	○	○
BUS	SI-P1 communications error	22H	○	○
-	Not used	23H	−	−
-	Not used	24H	−	−
CF	Control fault	25H	○	○
SVE	Zero servo fault	26H	×	○
EFO	External fault from SI-P1	27H	○	○
FBL	PID control feedback command loss	28H	○	○
UL3	Undertorque 1	29H	×	○
UL4	Undertorque 2	2AH	×	○
OL7	High-slip braking OL	2BH	×	○
EF9	External fault (input terminal S9)	2CH	×	○
EF10	External fault (input terminal S10)	2DH	×	○
EF11	External fault (input terminal S11)	2EH	×	○
EF12	External fault (input terminal S12)	2FH	×	○
-	Not used	30H	−	−
VCF	DC bus neutral overvoltage	31H	×	○

8.1.4 Enter Command (Write Only)

Register No.	Name	Contents	Set Value
0900H	Enter command	Writes in constant data to non-volatile memory (EEPROM).	0000H
0910H	Enter command	Does not write in constant data to non-volatile memory (EEPROM).	0000H

Enter Command

To write in a constant to the inverter from the PROFIBUS-DP master, be sure to send an Enter command. The written set value becomes valid when the inverter receives the Enter command. There are two types of Enter commands as described below.

Enter command that writes in a constant to the non-volatile memory

This command is executed by writing "0" to register number 0900H. When this command is executed, the changed set value is written in to the non-volatile memory and becomes valid. The value is stored in the inverter even after the power supply is turned OFF. However, the data can be written in to the inverter's non-volatile memory at most 100,000 times. So do not use this Enter command unnecessarily.

Enter command that does not write in a constant to the non-volatile memory

This command is executed by writing "0" to register number 0910H. When this command is executed, the changed set value is not written in to the non-volatile memory and becomes valid. The value is eliminated and returned to its original value when the power supply is turned OFF. Therefore, use this command when the set value of a constant is to be changed temporarily.

Register numbers 0900H and 0910H are exclusive for writing. If any of these registers is read out, "Incorrect fault No." (error code 02H) occurs.

8.1.5 Inverter Constants (Read and Write)

Register No.	Constant No.	Name	Inverter F7	Inverter G7
0100H	A1-00	Language selection for digital operator display	○	○
0101H	A1-01	Constant access level	○	○
0102H	A1-02	Control method selection	○	○
0103H	A1-03	Initialize	○	○
0104H	A1-04	Password	○	○
0105H	A1-05	Password setting	○	○
0106H-0125H	A2-01 to 32	User setting constants	○	○
0180H	b1-01	Reference selection	○	○
0181H	b1-02	Operation method selection	○	○
0182H	b1-03	Stopping method selection	○	○
0183H	b1-04	Prohibition of reverse operation	○	○
0184H	b1-05	Operation selection for setting E1-09 or less	×	○
0185H	b1-06	Read sequence input twice	○	○
0186H	b1-07	Operation selection after switching to remote mode	○	○
0187H	b1-08	Run command selection in programming mode	○	○
0189H	b2-01	Zero speed level (DC injection braking starting frequency)	○	○
018AH	b2-02	DC injection braking current	○	○
018BH	b2-03	DC injection braking time at start	○	○
018CH	b2-04	DC injection braking time at stop	○	○
0191H	b3-01	Speed search selection	○	○
0192H	b3-02	Speed search operating current	○	○
0193H	b3-03	Speed search deceleration time	○	○
0195H	b3-05	Speed search wait time	○	○
01A3H	b4-01	Timer function ON-delay time	○	○
01A4H	b4-02	Timer function OFF-delay time	○	○
01A5H	b5-01	PID control mode selection	○	○
01A6H	b5-02	Proportional gain (P)	○	○
01A7H	b5-03	Integral (I) time	○	○
01A8H	b5-04	Integral (I) limit	○	○
01A9H	b5-05	Derivative (D) time	○	○
01AAH	b5-06	PID limit	○	○
01ABH	b5-07	PID offset adjustment	○	○
01ACH	b5-08	PID primary delay time constant	○	○
01ADH	b5-09	PID output characteristics selection	○	○
01AEH	b5-10	PID output gain	○	○
01AFH	b5-11	PID reverse output selection	○	○
01B0H	b5-12	Selection of PID feedback command loss detection	○	○
01B1H	b5-13	PID feedback command loss detection level	○	○
01B2H	b5-14	PID feedback command loss detection time	○	○
01B3H	b5-15	PID sleep function operation level	○	○
01B4H	b5-16	PID sleep operation delay time	○	○
01B5H	b5-17	Acceleration/deceleration time for PID reference	○	○

Register No.	Constant No.	Name	Inverter F7	Inverter G7
01B6H	b6-01	Dwell frequency at start	○	○
01B7H	b6-02	Dwell time at start	○	○
01B8H	b6-03	Dwell frequency at stop	○	○
01B9H	b6-04	Dwell time at stop	○	○
01CAH	b7-01	Droop control gain	×	○
01CBH	b7-02	Droop control delay time	×	○
01CCH	b8-01	Energy-saving mode selection	○	○
01CDH	b8-02	Energy-saving gain	○	○
01CEH	b8-03	Energy-saving filter time constant	○	○
01CFH	b8-04	Energy-saving coefficient	○	○
01D0H	b8-05	Power detection filter time constant	○	○
01D1H	b8-06	Search operation voltage limiter	○	○
01DAH	b9-01	Zero-servo gain	×	○
01DBH	b9-02	Zero-servo completion width	×	○
0200H	C1-01	Acceleration time 1	○	○
0201H	C1-02	Deceleration time 1	○	○
0202H	C1-03	Acceleration time 2	○	○
0203H	C1-04	Deceleration time 2	○	○
0204H	C1-05	Acceleration time 3	○	○
0205H	C1-06	Deceleration time 3	○	○
0206H	C1-07	Acceleration time 4	○	○
0207H	C1-08	Deceleration time 4	○	○
0208H	C1-09	Emergency stop time	○	○
0209H	C1-10	Accel/decel time setting unit	○	○
020AH	C1-11	Accel/decel time switching frequency	○	○
020BH	C2-01	S-curve characteristic time at acceleration start	○	○
020CH	C2-02	S-curve characteristic time at acceleration end	○	○
020DH	C2-03	S-curve characteristic time at deceleration start	○	○
020EH	C2-04	S-curve characteristic time at deceleration end	○	○
020FH	C3-01	Slip compensation gain	○	○
0210H	C3-02	Slip compensation primary delay time	○	○
0211H	C3-03	Slip compensation limit	○	○
0212H	C3-04	Slip compensation selection during regeneration	○	○
0213H	C3-05	Output voltage limit operation selection	○	○
0215H	C4-01	Torque compensation gain	○	○
0216H	C4-02	Torque compensation primary delay time constant	○	○
021BH	C5-01	ASR proportional (P) gain 1	○	○
021CH	C5-02	ASR integral (I) time 1	○	○
021DH	C5-03	ASR proportional (P) gain 2	○	○
021EH	C5-04	ASR integral (I) time 2	○	○
021FH	C5-05	ASR limit	○	○
0220H	C5-06	ASR primary delay time	×	○
0221H	C5-07	ASR switching frequency	×	○
0222H	C5-08	ASR integral (I) limit	×	○
0223H	C6-01	CT/VT selection	○	×
0224H	C6-02	Carrier frequency selection	○	○
0225H	C6-03	Carrier frequency upper limit	○	○
0226H	C6-04	Carrier frequency lower limit	○	○
0227H	C6-05	Carrier frequency proportional gain	○	○
022DH	C6-11	Carrier frequency selection for open-loop vector control 2	×	○

Register No.	Constant No.	Name	Inverter F7	Inverter G7
0280H	d1-01	Frequency reference 1	○	○
0281H	d1-02	Frequency reference 2	○	○
0282H	d1-03	Frequency reference 3	○	○
0283H	d1-04	Frequency reference 4	○	○
0284H	d1-05	Frequency reference 5	○	○
0285H	d1-06	Frequency reference 6	○	○
0286H	d1-07	Frequency reference 7	○	○
0287H	d1-08	Frequency reference 8	○	○
0288H	d1-09	Frequency reference 9	○	○
028BH	d1-10	Frequency reference 10	○	○
028CH	d1-11	Frequency reference 11	○	○
028DH	d1-12	Frequency reference 12	○	○
028EH	d1-13	Frequency reference 13	○	○
028FH	d1-14	Frequency reference 14	○	○
0290H	d1-15	Frequency reference 15	○	○
0291H	d1-16	Frequency reference 16	○	○
0292H	d1-17	Jog frequency reference	○	○
0289H	d2-01	Frequency reference upper limit	○	○
028AH	d2-02	Frequency reference lower limit	○	○
0293H	d2-03	Master speed reference lower limit	○	○
0294H	d3-01	Jump frequency 1	○	○
0295H	d3-02	Jump frequency 2	○	○
0296H	d3-03	Jump frequency 3	○	○
0297H	d3-04	Jump frequency width	○	○
0298H	d4-01	Frequency reference hold function selection	○	○
0299H	d4-02	+ - Speed limits	○	○
029AH	d5-01	Torque control selection	×	○
029BH	d5-02	Torque reference delay time	×	○
029CH	d5-03	Speed limit selection	×	○
029DH	d5-04	Speed limit	×	○
029EH	d5-05	Speed limit bias	×	○
029FH	d5-06	Speed/torque control switching timer	×	○
02A0H	d6-01	Field weakening level	○	○
02A1H	d6-02	Field frequency	○	○
02A2H	d6-03	Field forcing function selection	×	○
02A4H	d6-05	A ϕ R time constant	×	○

Register No.	Constant No.	Name	Inverter F7	Inverter G7
0300H	E1-01	Input voltage setting	○	○
0302H	E1-03	V/f pattern selection	○	○
0303H	E1-04	Max. output frequency	○	○
0304H	E1-05	Max. voltage	○	○
0305H	E1-06	Base frequency	○	○
0306H	E1-07	Mid. output frequency	○	○
0307H	E1-08	Mid. output frequency voltage	○	○
0308H	E1-09	Min. output frequency	○	○
0309H	E1-10	Min. output frequency voltage	○	○
030AH	E1-11	Mid. output frequency 2	○	○
030BH	E1-12	Mid. output frequency voltage 2	○	○
030CH	E1-13	Base voltage	○	○
030EH	E2-01	Motor rated current	○	○
030FH	E2-02	Motor rated slip	○	○
0310H	E2-03	Motor no-load current	○	○
0311H	E2-04	Number of motor poles	○	○
0312H	E2-05	Motor line-to-line resistance	○	○
0313H	E2-06	Motor leak inductance	○	○
0314H	E2-07	Motor iron saturation coefficient 1	○	○
0315H	E2-08	Motor iron saturation coefficient 2	○	○
0316H	E2-09	Motor mechanical loss	×	○
0317H	E2-10	Motor iron loss for torque compensation	○	○
0318H	E2-11	Motor rated output	○	○
0319H	E3-01	Motor 2 control method selection	○	○
031AH	E3-02	Motor 2 max. output frequency	○	○
031BH	E3-03	Motor 2 max. voltage	○	○
031CH	E3-04	Motor 2 max. voltage frequency	○	○
031DH	E3-05	Motor 2 mid. output frequency	○	○
031EH	E3-06	Motor 2 mid. output frequency voltage	○	○
031FH	E3-07	Motor 2 min. output frequency	○	○
0320H	E3-08	Motor 2 min. output frequency voltage	○	○
0321H	E4-01	Motor 2 rated current	○	○
0322H	E4-02	Motor 2 rated slip	○	○
0323H	E4-03	Motor 2 no-load current	○	○
0324H	E4-04	Motor 2 number of poles	○	○
0325H	E4-05	Motor 2 line-to-line resistance	○	○
0326H	E4-06	Motor 2 leak inductance	○	○
0327H	E4-07	Motor 2 rated capacity	○	○

Register No.	Constant No.	Name	Inverter F7	Inverter G7
0380H	F1-01	PG constant	○	○
0381H	F1-02	Operation selection at PG open circuit (PGo)	○	○
0382H	F1-03	Operation selection at Overspeed (oS)	○	○
0383H	F1-04	Operation selection at deviation (dEv)	○	○
0384H	F1-05	PG rotation	○	○
0385H	F1-06	PG division rate (PG pulse monitor)	○	○
0386H	F1-07	Integral value during accel/decel enable/disable	○	○
0387H	F1-08	Overspeed detection level	○	○
0388H	F1-09	Overspeed detection delay time	○	○
0389H	F1-10	Excessive speed deviation detection level	○	○
038AH	F1-11	Excessive speed deviation detection delay time	○	○
038BH	F1-12	Number of PG gear teeth 1	○	○
038CH	F1-13	Number of PG gear teeth 2	○	○
038DH	F1-14	PG open-circuit detection time	○	○
038FH	F2-01	Bi-polar or uni-polar input selection	×	○
0390H	F3-01	Digital input option	×	○
0391H	F4-01	Channel 1 monitor selection	○	○
0392H	F4-02	Channel 1 gain	○	○
0393H	F4-03	Channel 2 monitor selection	○	○
0394H	F4-04	Channel 2 gain	○	○
0395H	F4-05	Channel 1 output monitor bias	○	○
0396H	F4-06	Channel 2 output monitor bias	○	○
0397H	F4-07	Analog output signal level for channel 1	○	○
0398H	F4-08	Analog output signal level for channel 2	○	○
0399H	F5-01	Channel 1 output selection	○	○
039AH	F5-02	Channel 2 output selection	○	○
039BH	F5-03	Channel 3 output selection	○	○
039CH	F5-04	Channel 4 output selection	○	○
039DH	F5-05	Channel 5 output selection	○	○
039EH	F5-06	Channel 6 output selection	○	○
039FH	F5-07	Channel 7 output selection	○	○
03A0H	F5-08	Channel 8 output selection	○	○
03A1H	F5-09	DO-08 output mode selection	○	○
03A2H	F6-01	Operation selection after communications error	○	○
03A3H	F6-02	Input level of external fault from Communications Option Card	○	○
03A4H	F6-03	Stopping method for external fault from Communications Option Card	○	○
03A5H	F6-04	Trace sampling from Communications Option Card	○	○
03A7H	F6-06	Torque reference/torque limit selection from optical option	×	○

Register No.	Constant No.	Name	Inverter F7	Inverter G7
0400H	H1-01	Terminal S3 function selection	○	○
0401H	H1-02	Terminal S4 function selection	○	○
0402H	H1-03	Terminal S5 function selection	○	○
0403H	H1-04	Terminal S6 function selection	○	○
0404H	H1-05	Terminal S7 function selection	○	○
0405H	H1-06	Terminal S8 function selection	×	○
0406H	H1-07	Terminal S9 function selection	×	○
0407H	H1-08	Terminal S10 function selection	×	○
0408H	H1-09	Terminal S11 function selection	×	○
0409H	H1-10	Terminal S12 function selection	×	○
040BH	H2-01	Terminal M1-M2 function selection (contact)	○	○
040CH	H2-02	Terminal P1 function selection (open-collector)	○	○
040DH	H2-03	Terminal P2 function selection (open-collector)	○	○
040EH	H2-04	Terminal P3 function selection (open-collector)	×	○
040FH	H2-05	Terminal P4 function selection (open-collector)	×	○
0410H	H3-01	Signal level selection (terminal A1)	×	○
0411H	H3-02	Gain (terminal A1)	○	○
0412H	H3-03	Bias (terminal A)	○	○
0413H	H3-04	Signal level selection (terminal A3)	×	○
0414H	H3-05	Multi-function analog input (terminal A3)	×	○
0415H	H3-06	Gain (terminal A3)	×	○
0416H	H3-07	Bias (terminal A3)	×	○
0417H	H3-08	Multi-function analog input terminal A2 function selection	○	○
0418H	H3-09	Multi-function analog input terminal A2 signal level selection	○	○
0419H	H3-10	Gain (terminal A2)	○	○
041AH	H3-11	Bias (terminal A2)	○	○
041BH	H3-12	Analog input filter time constant	○	○
041CH	H3-13	Terminal A1/A2 switching	○	×
041DH	H4-01	Monitor selection (terminal FM)	○	○
041EH	H4-02	Gain (terminal FM)	○	○
041FH	H4-03	Bias (terminal FM)	○	○
0420H	H4-04	Analog output 1 signal level selection	○	○
0421H	H4-05	Gain (terminal AM)	○	○
0422H	H4-06	Bias (terminal AM)	○	○
0423H	H4-07	Analog output 1 signal level selection	○	○
0424H	H4-08	Analog output 2 signal level selection	○	○
0425H	H5-01	Station address	○	○
0426H	H5-02	Communication speed selection	○	○
0427H	H5-03	Communication parity selection	○	○
0428H	H5-04	Stopping method after communication error	○	○
0429H	H5-05	Communication error detection selection	○	○
042AH	H5-06	Send wait time	○	○
042BH	H5-07	RTS control ON/OFF	○	○
042CH	H6-01	Pulse train input function selection	○	○
042DH	H6-02	Pulse train input scaling	○	○
042EH	H6-03	Pulse train input gain	○	○
042FH	H6-04	Pulse train input bias	○	○
0430H	H6-05	Pulse train input filter time	○	○
0431H	H6-06	Pulse train monitor selection	○	○
0432H	H6-07	Pulse train monitor scaling	○	○

Register No.	Constant no.	Name	Inverter F7	G7
0480H	L1-01	Motor protection selection	○	○
0481H	L1-02	Motor protection time constant	○	○
0482H	L1-03	Alarm operation selection during motor overheating	○	○
0483H	L1-04	Motor overheating operation selection	○	○
0484H	L1-05	Motor temperature input filter time constant	○	○
0485H	L2-01	Momentary power loss detection	○	○
0486H	L2-02	Momentary power loss ridethru	○	○
0487H	L2-03	Min. baseblock time	○	○
0488H	L2-04	Voltage recovery time	○	○
0489H	L2-05	Undervoltage detection level	○	○
048AH	L2-06	KEB deceleration time	○	○
048BH	L2-07	Momentary recovery time	○	○
048CH	L2-08	Frequency reduction at KEB start	○	○
048FH	L3-01	Stall prevention selection during accel	○	○
0490H	L3-02	Stall prevention level during accel	○	○
0491H	L3-03	Stall prevention limit during accel	○	○
0492H	L3-04	Stall prevention selection during decel	○	○
0493H	L3-05	Stall prevention selection during running	○	○
0494H	L3-06	Stall prevention level during running	○	○
0499H	L4-01	Speed agreement detection level	○	○
049AH	L4-02	Speed agreement detection width	○	○
049BH	L4-03	Speed agreement detection level (+/-)	○	○
049CH	L4-04	Speed agreement detection width (+/-)	○	○
049DH	L4-05	Operation when frequency reference is missing	○	○
049EH	L5-01	Number of auto restart attempts	○	○
049FH	L5-02	Auto restart operation selection	○	○
04A1H	L6-01	Torque detection selection 1	○	○
04A2H	L6-02	Torque detection level 1	○	○
04A3H	L6-03	Torque detection time 1	○	○
04A4H	L6-04	Torque detection selection 2	○	○
04A5H	L6-05	Torque detection level 2	○	○
04A6H	L6-06	Torque detection time 2	○	○
04A7H	L7-01	Forward drive torque limit	○	○
04A8H	L7-02	Reverse drive torque limit	○	○
04A9H	L7-03	Forward regenerative torque limit	○	○
04AAH	L7-04	Reverse regenerative torque limit	○	○
04ADH	L8-01	Protect selection for internal DB resistor (Type ERF)	○	○
04AEH	L8-02	Overheat pre-alarm level	○	○
04AFH	L8-03	Operation selection after overheat pre-alarm	○	○
04B1H	L8-05	Input open-phase protection selection	○	○
04B3H	L8-07	Output open-phase protection selection	○	○
04B5H	L8-09	Ground protection selection	○	○
04B6H	L8-10	Cooling fan control selection	○	○
04B7H	L8-11	Cooling fan control delay time	○	○
04B8H	L8-12	Ambient temperature	○	○
04BBH	L8-15	OL2 characteristics selection at two speeds	○	○
04BFH	L8-18	Soft CLA selection	○	○

Register No.	Consatnt No.	Name	Inverter F7	Inverter G7
0580H	N1-01	Hunting-prevention function selection	○	○
0581H	N1-02	Hunting-prevention gain	○	○
0584H	N2-01	Speed feedback detection control (AFR) gain	○	○
0585H	N2-02	Speed feedback detection control (AFR) time constant	○	○
0586H	N2-03	Speed feedback detection control (AFR) time constant 2	○	○
0588H	N3-01	High-slip braking deceleration frequency width	○	○
0589H	N3-02	High-slip braking current limit	○	○
058AH	N3-03	High-slip braking stop dwell time	○	○
058BH	N3-04	High-slip braking oL time	○	○
059AH	N4-07	Integral time of speed estimator	×	○
059BH	N4-08	Proportional gain of speed estimator	×	○
05A4H	N4-17	Torque adjustment gain	×	○
05A5H	N4-18	Feeder resistance adjustment gain	×	○
05B0H	N5-01	Feed forward control selection	×	○
05B1H	N5-02	Motor acceleration time	×	○
05B2H	N5-03	Feed forward proportional gain	×	○
0500H	o1-01	Monitor selection	○	○
0501H	o1-02	Monitor selection after power up	○	○
0502H	o1-03	Frequency units of reference setting and monitor	○	○
0503H	o1-04	Setting unit for frequency constants related to V/f characteristics	×	○
0504H	o1-05	LCD brightness adjustment	×	○
0505H	o2-01	LOCAL/REMOTE key enable/disable	○	○
0506H	o2-02	STOP key during control circuit terminal operation	○	○
0507H	o2-03	User constant initial value	○	○
0508H	o2-04	kVA selection	○	○
0509H	o2-05	Frequency reference setting method selection	○	○
050AH	o2-06	Operation selection when digital operator is disconnected	○	○
050BH	o2-07	Cumulative operation time setting	○	○
050CH	o2-08	Cumulative operation time selection	○	○
050EH	o2-10	Fan operation time setting	○	○
0510H	o2-12	Fault trace/fault history clear function	×	○
0515H	o3-01	Copy function selection	○	○
0516H	o3-02	Read permitted selection	○	○
0700H	T1-00	Motor 1/2 selection	○	○
0701H	T1-01	Autotuning mode selection	○	○
0702H	T1-02	Motor output power	○	○
0703H	T1-03	Motor rated voltage	○	○
0704H	T1-04	Motor rated current	○	○
0705H	T1-05	Motor base frequency	○	○
0706H	T1-06	Number of motor poles	○	○
0707H	T1-07	Motor base speed	○	○
0708H	T1-08	PG pulses per revolution for teaching	×	○

8.1.6 Error Code

Error Code	Contents
01H	Function code error ・ Function code from the master is any other than 03H and 10H.
02H	Incorrect register No. ・ The register number to be accessed has not been registered. ・ Enter command "0900H" or "0910H" was read out although they were write-only registers.
03H	Incorrect number of data items ・ The number of data items at write-in or read-out is not in the range from 2 to 8.
21H	Data setting error ・ A simple upper/lower limit error occurred when writing control data or a constant. ・ A constant setting error occurred when writing a constant.
22H	Write mode error ・ A constant was attempted to be written in from the master during running. ・ An Enter command was attempted to be written in from the master during running. ・ Any constant other than A1-00 to 05, E1-03 or o2-04 was attempted to be written in from the masterwhen"CPF03" occurred. ・ Read-only data was attempted to be written in from the master.
23H	Write mode error during main circuit Undervoltage ・ A constant was attempted to be written in from the master during UV occurrence. ・ An Enter command was attempted to be written in from the master during UV occurrence.
24H	Write mode error during constant processing ・ A constant was attempted to be written in from the master while the data was being stored.

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Varispeed SERIES OPTION CARD
PROFIBUS-DP COMMUNICATIONS INTERFACE CARD
USER'S MANUAL

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