

FRENIC

5000G11S/P11S

INSTRUCTION MANUAL

T-link Option
OPC-G11S-TL



CAUTION

- Read all operating instructions before installing, connecting (Wiring), operating, servicing, or inspecting the inverter.
- Ensure that this instruction manual is made available to the final user of the inverter.
- Store this manual in a safe, convenient location.
- The product is subject to change without prior notice.

Edition history

Edition	Date	Contents	ROM version
-	Nov. 2000	First edition	P30000

Preface

Thank you for choosing our OPC-G11S-TL, an option for inverter.

Thoroughly read this manual and the instruction manual for inverter and understand operating procedures before use. Misuse may result in a malfunction, failure, and/or shorter service life.



This manual does not cover the FRENIC 5000 G11S/P11S and MICREX. For detail, see the respective instruction manuals.

If you need further information about the product or this instruction manual, please contact the dealer from which the product was purchased or the nearest sales office of Fuji Electric.

Safety Instructions

Read this manual carefully before installing, connecting (Wiring), operating, servicing, or inspecting the inverter. Familiarize yourself with all safety features before using the inverter.

In this manual, safety messages are classified as follows:

 WARNING	Improper operation may result in serious personal injury or death.
 CAUTION	Improper operation may result in slight to medium personal injury or property damage.

Situations more serious than those covered by CAUTION will depend on prevailing circumstances. Always follow instructions.

Installation, removal, and wiring of optional card

WARNING

- Turn the power switch off before any work. Even after the circuit breaker is switched off, the smoothing condenser remains live and may cause electric shock if touched. Check that the CHARGE or CRG lamp on the inverter has gone off and check with a tester that the DC inverter voltage has dropped to a safe level. There is a possibility of electric shock.

CAUTION

- Do not use the product with a faulty or missing part. Doing so may lead to injury or damage.
 - Incorrect installation or removal of the product may lead to damage.
- There is a possibility of failure.

Operation

WARNING

- Making the communication valid or invalid via the T link or external signal terminal with a run command on will suddenly start the unit. Check in advance that all run commands are off.
- Resetting the alarm via the T link with a run command on will suddenly start the unit. Check in advance that the run commands are off.
- If a communication error occurs during operation via the T link, the stop command sent via the T link may be ignored. A provision is required to make an emergency stop in this case using the Forced Stop (BX) signal terminal on the inverter.
- If the product is programmed to keep running when a communication error occurs and automatically recover after the error is corrected, the inverter and, consequently, the motor may start after the error correction. Take care to prevent accidents. There is a possibility of accidents.

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1. Outline

1-1 Feature

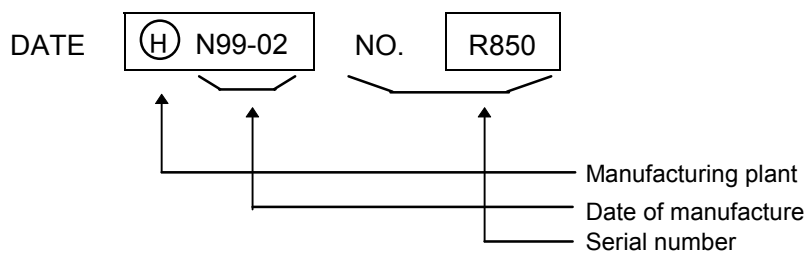
- This product is an interface card for connecting a Fiji's programmable controller MICREX and inverter FRENIC5000 G11S/P11S via the T link and used for operating or monitoring the inverter according to the MICREX program and for changing or checking the settings for functions required for operation.

1-2 Guarantee

Any failure found within twelve months after the receipt or eighteen months after the date of manufacture, which is earlier, will be repaired at our cost except when:

- the product was used, repaired, or modified in a wrong manner,
- it was used beyond the specified limits,
- it was fallen after being purchased, or it was damaged or broken during transportation, or
- the failure was caused by an earthquake, fire, storm, flood, thunderbolt, irregular voltage, or another disaster or its secondary damage.

Date of manufacture and serial number (marked on the product)



1-3 Standard specifications

Table 1

Item		Specification
Designation		T-link option
Model		OPC-G11S-TL
Applicable inverter		S06000 or subsequent (not applicable to S01000 to S05999 inverters)
ROM version		H04000 or subsequent (not applicable to H01000 to H03999 inverters)
Transfer system		T link slave I/O transfer
Number of exclusive words for transfer		8 words in total (4 from MICREX to inverter and 4 from inverter to MICREX)
T link cable		A pair of twist-pair cables CPEV-SB, 0.9 dia. or KPEV-SB, 0.5 mm ² , Furukawa Denko
Operation	Operation command	Forward/reverse revolution, alarm reset, and X1 to X9 (standard format)
		Forward/reverse revolution, alarm reset, and X1 to X5 (G9 compatible format)
	Frequency setting and output frequency monitor	Preset (output) frequency x 20,000 / maximum frequency (F03) → 16-bit data (standard format) Preset resolution [binary code 0.01 Hz], [BCD code 0.1 Hz] (G9 compatible format)
Operation status monitor	Revolving direction, DC braking, inverter shut-down, braking, DC link circuit voltage, torque limited, voltage limited, current limited, accelerating, decelerating, sum-up alarm, link valid/invalid Right to download is reserved by TP or RS485. Errors in downloading from T link or TL and 'Data Downloading (Processing)' signals are monitored. Inverter operation parameters can be monitored using M codes listed in section 12. (Standard format)	
	Operating, frequency reached, frequency level detected, and other multi-function output signals via Y1 to Y5 terminals, sum-up alarm signal, and link status (valid/invalid) are monitored. Output current, output voltage, and calculated torque are monitored using M codes. (G9 compatible format)	

	Function codes	Function codes listed in section 12 can be changed or checked. In G9 compatible format, however, output current, output voltage, and calculated torque are the only M codes that can be monitored. In addition: - Function codes that are changeable from keypad during operation ⇒ Changeable during operation (checking also permitted) - Function codes that are not changeable from keypad during operation ⇒ Not changeable during operation (checking permitted)	
	Recovery in case of communication error	Automatic or manual recovery mode can be selected.	
	Content of error	Can be checked using M codes in standard format only.	
	Protective functions	Er 4: Option communication error (communication error between option and inverter) Er 5: T link communication error (communication error between MICREX and option)	
Environmental conditions	Operating environment	Indoor (remove ventilation cover for inverters of 3.7 kW [5.0 HP] or lower), at an altitude not more than 1000 m [3300 feet]. No corrosive or ignitable gases, dust, and direct sunlight allowed.	
	Ambient temperature	-10 to +50°C [-13 to +149°F]	Remove ventilation cover for inverters of 22 kW [30 HP] or lower if ambient temperature exceeds 40°C [104°F].
	Relative humidity	5% to 95%	
	Vibration	5.9 m/s ² (0.6 G) or less	
	Storing temperature	-20 to +65°C (permissible in short term, i.e. during transportation)	

Notes:

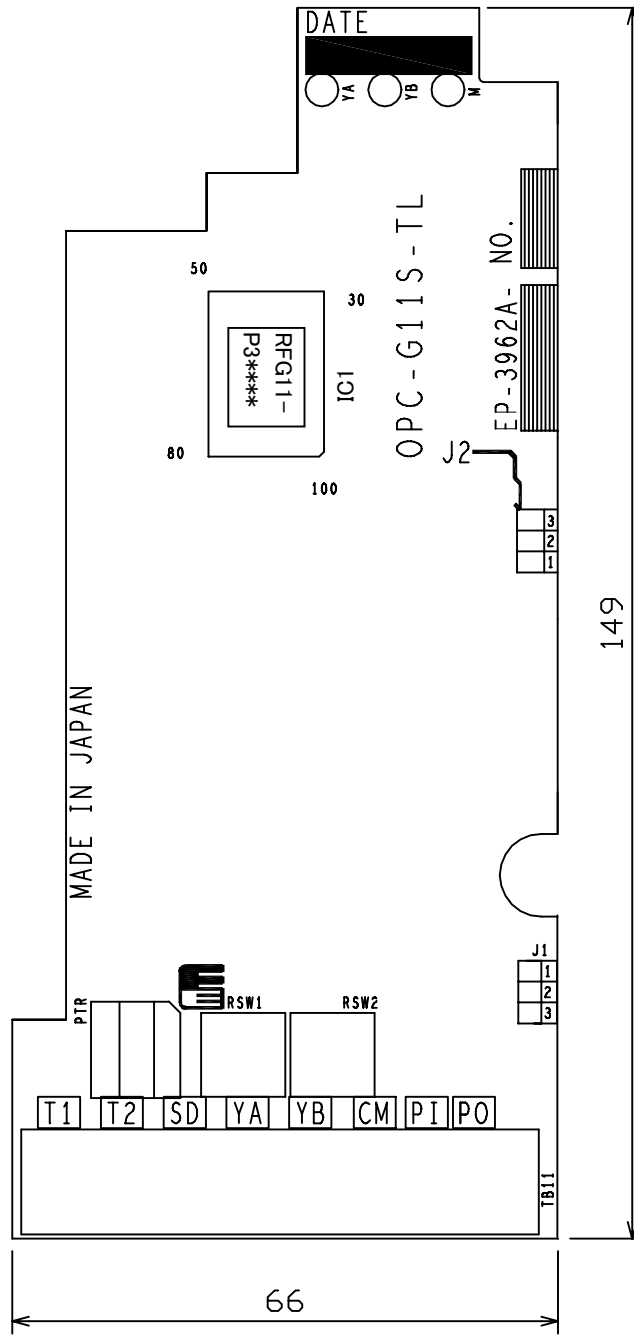
- This option is specially designed for our FRENIC5000 G11S/P11S series multi-function inverters. It cannot be used for other products.
- The ROM version can be checked with the 'Maintenance Information' screen shown on the display above the keypad.

I N V	= H * * * * *	← ROM version of inverter
K E Y P A	= K * * * * *	
D	= P * * * * *	← ROM version of option
O P T I O		
N		

Display above keypad

- Do not test terminals on the option with a megger.
- If the protective device of the inverter is activated, see 'Troubleshooting' in the instruction manual for inverter. After removing the cause, start again.
- Service/inspection items are the same as for the inverter. See the instruction manual for inverter.
- The ROM version of the option can also be checked on the IC1 label on the option (see the schematic drawing in the next page).

1-4 Schematic drawing



Unit: mm

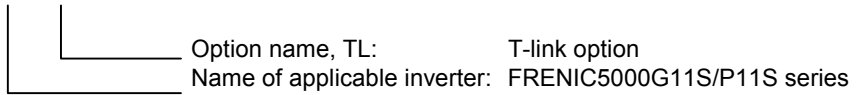
2. Incoming Inspection

⚠ CAUTION

- Do not use the product with a faulty or missing part. Doing so may lead to injury or damage.
There is a possibility of failure.

After receiving the product, make the following checks.

- (1) Check that the product is as ordered.
 Check that model number OPC-G11S-TL is marked on the optional card (see [the schematic drawing in 1-4](#)).
 Description of model number: OPC-G11S-TL



- (2) Check that the product has not been damaged during transportation.
- (3) Check for missing accessories.
 Accessories: Three supports
 A screw (M3 x 6)
 * For 22 kW [30 HP] or lower: Use three supports and a screw.
 * For 30 kW [40 HP] or higher: Use two supports and a screw.

3. Storage

3-1 Temporary storage

Table 2

- (1) Store in an indoor place under the same environmental conditions as required for operation.
- (2) Do not directly place on the floor. Place on a table or shelf.
- (3) If stored in an undesirable atmosphere, the product should be packaged with PCB sheet or packaging polyethylene film.
- (4) Where the product may be affected by moisture, seal in a dehumidifier (silica gel, for example) before packaging in (3).

Item	Specification	
Ambient temperature	-10 to +50°C [+14 to +122°F]	No condensation or freezing due to sudden temperature changes allowed.
Storing temperature	-25 to +65°C [-13 to +149°F]	
Relative humidity	5% to 95%	
Atmosphere	No dust, direct sunlight, ignitable gases, oil mist, vapor, waterdrops, and vibration allowed. Atmosphere should not contain much salt.	

Note:

The storing temperature only applies in a short time, i.e. during transportation. Do not store in a place where the temperature significantly changes as it may cause condensation or freezing even if the humidity requirement is satisfied.


3-2 Long-term storage

When the product is to be stored for an extended period after the receipt, storing requirements greatly depend on the environment. If careful storage is required, please contact the dealer from which the product was purchased or the nearest sales office of Fuji Electric with a detailed description of environmental conditions.

General extended storage requirements are described below.

- (1) Satisfy all the temporary storage requirements.
- (2) Completely package the product to prevent the intrusion of moisture. Seal in a dehumidifier (silica gel, for example) before packaging. For the dehumidifier quantity, see JIS Z 0301 'Moisture-proof Packaging Procedure'.
 The relative humidity inside the package should be kept below 70%, as a guide.
- (3) If this option is left in the inverter with accessories and control panel attached, it may be exposed to moisture or dust, especially in a building under construction. In this case, remove it with the inverter to another place where environmental conditions are satisfied, and follow the instruction manual for inverter.

4. Installation

 WARNING	<p>Turn the power switch off before any work. Even after the circuit breaker is switched off, the smoothing condenser remains live and may cause electric shock if touched. Check that the CHARGE or CRG lamp on the inverter has gone off and check with a tester that the DC inverter voltage has dropped to a safe level. There is a possibility of electric shock.</p>
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4-1 Operating conditions

The product should be used under the following conditions.


Table 3

Item	Specification	
Operating environment	Indoor (remove ventilation cover for inverters of 3.7 kW [5.0 HP] or lower)	
Ambient temperature	-10 to +50°C [+14 to +122°F]	Remove ventilation cover for inverters of 22 kW [30 HP] or lower if ambient temperature exceeds 40°C [104°F].
Relative humidity	5% to 95%	
Atmosphere	No dust, direct sunlight, ignitable gases, oil mist, vapor, waterdrops, and vibration allowed. Atmosphere should not contain much salt. No condensation or freezing due to sudden temperature changes allowed.	
Altitude	1000 m [3300 feet] or less	
Vibration	5.9 m/s ² (0.6 G) or less	

Note:

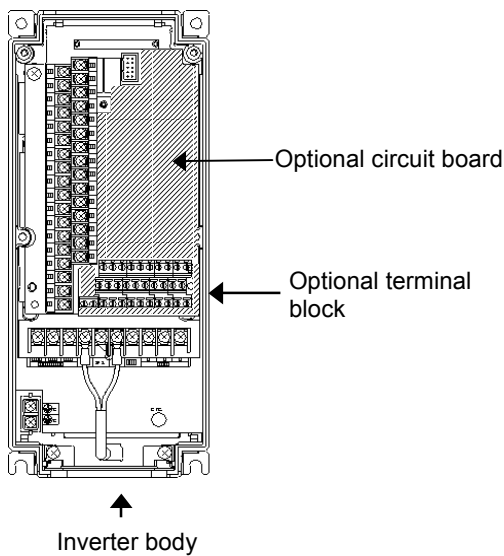
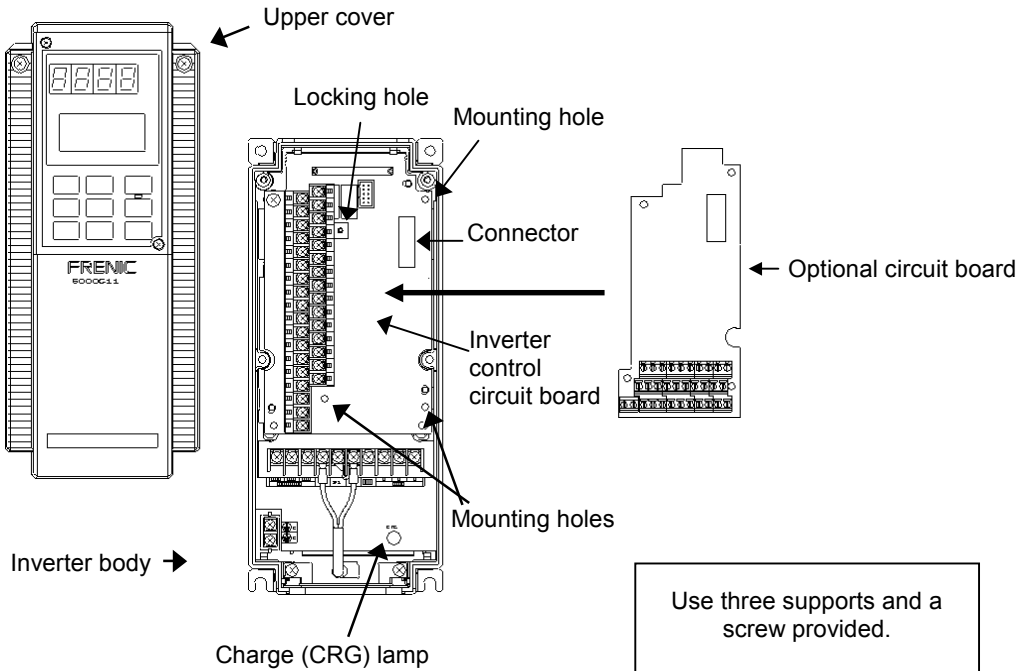
Deviations from the above environmental conditions may lead to deterioration in performance, shorter service life, and/or failure.

4-2 Installation procedure

 CAUTION	Incorrect installation or removal of the product may lead to damage. There is a possibility of failure.
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Install or remove the option after turning the inverter input power off and checking that the CHARGE or CRG lamp has gone off.

Applicable models
 FRN22G11S-2/4 (22 kW [30 HP]) or lower



Step 1

Remove the upper cover. Insert the supports to the mounting holes (at three locations) on the inverter control circuit board.

Step 2

Engage the optional circuit board with the supports installed in step 1. Fully insert the optional connector and control circuit board connector. Check that the support jaws are projected from the optional circuit board.

Step 3

Install the screw (M3 x 6) to the locking hole to secure the optional circuit board.

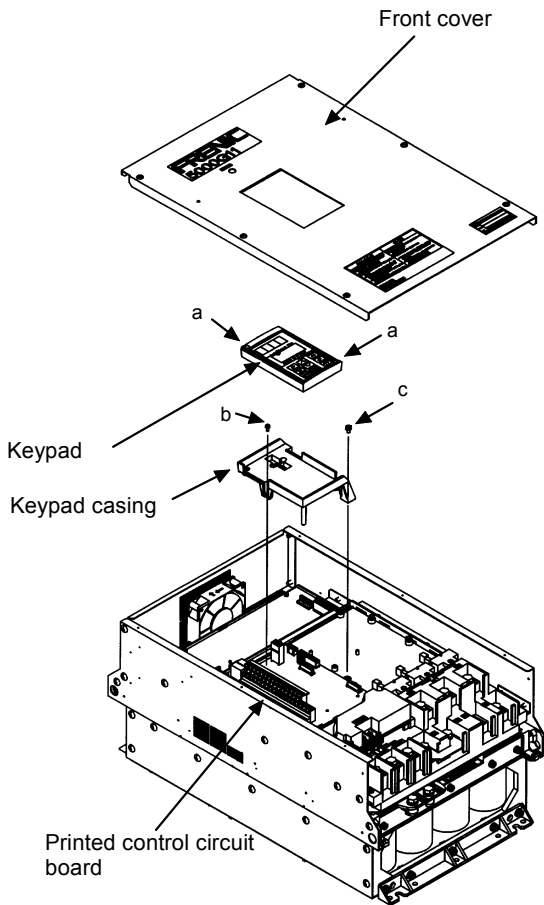
Step 4

Wire the option according to the basic wiring diagram.

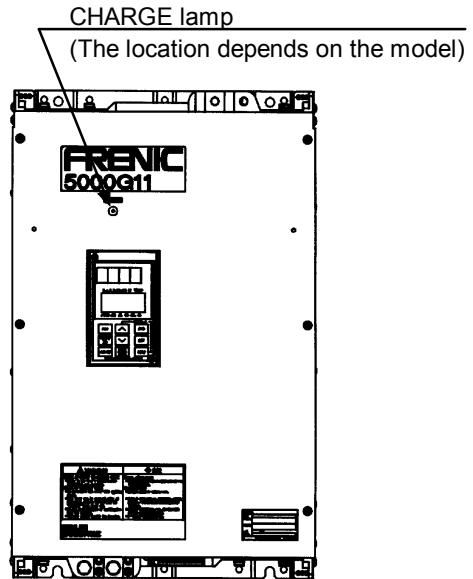
Step 5

After checking that the optional circuit board and all wires have been correctly installed, install the upper cover to the inverter.

Applicable models
FRN30G11S-2/4 (30 kW [40 HP]) or higher



Use two supports and a screw provided.



Step 1

Remove the front cover. Loosen the two screws (M3) at points a. Remove the keypad.

Step 2

Remove the screw (M3) at point b and the one (M4) at point c. Remove the keypad casing.

Step 3

Engage the two supports at points d with the printed control circuit board.

Step 4

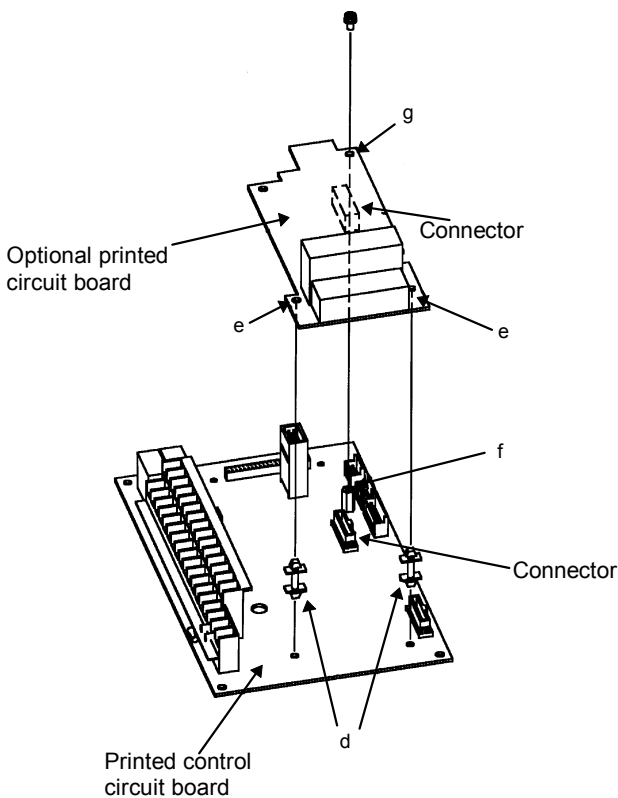
Insert the two supports at points d to the holes at points e on the optional printed circuit board. Align the support at point f with the hole at point g on the optional printed circuit board. Insert the connector through them.

Step 5

Install the screws (M3 x 6) at points f and g to secure the optional printed circuit board.

Step 6

Install the keypad and front cover in the reverse procedure of disassembly.



5. Connection

5-1 Functions of terminals

5-1-1 Arrangement of terminals

T1	T2	SD	YA	YB	CM	PI	PO
----	----	----	----	----	----	----	----

5-1-2 Description of terminals

Table 4

Terminal code	Terminal name	Description
T1 T2 SD(shielded)	T link cable connecting terminals	For connecting T link cable
YA YB CM PI PO		

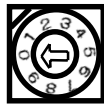
5-2 Description of switches

5-2-1 Rotary switches

Set the station address using rotary switches RSW1 and RSW2 on the optional circuit board.



RSW1



RSW2

RSW1: First digit (x10)
RSW2: Second digit (x1)

- * When more than one options are used, they should be assigned with different addresses.
- * RSW1 and RSW2 have been set to 0 (station address 00) before delivery.

5-5-2 Jumper switches

Jumper switches J1 and J2 have been connected before delivery and should not be disconnected.

5-3 Basic connection diagram

A basic connection diagram is shown in the next page. The following rules should be observed in making connections.

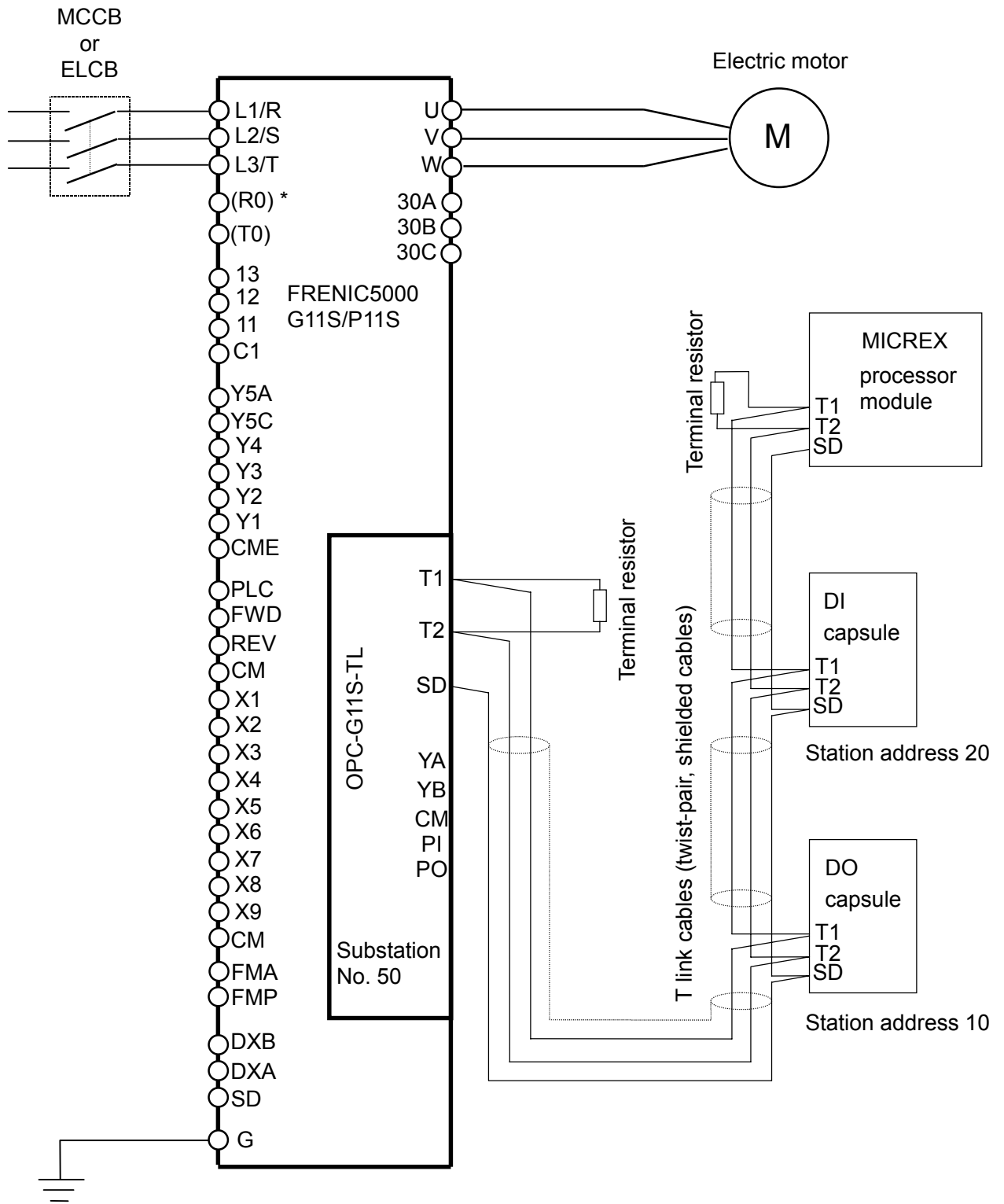
[Caution in making connections]

- (1) Use either of the following cable pairs for connecting the T link.
 - A pair of twist-pair cables CPEV-SB, 0.9 dia., Furukawa Denko
 - A pair of twist-pair cables KPEV-SB, 0.5 mm², Furukawa Denko

For specifications for the above cables, see data for MICREX.

- (2) Connect the terminal resistor, 100 Ω, provided with the MICREX processor module to both ends of the T link.
- (3) The T link cables must be laid out as single mains as shown in the basic connection diagram. Branching will prevent correct transfer.
- (4) To prevent a malfunction due to noise, the option cables should be as (at least 30 cm [1 feet]) far from the main and driving circuits of the inverter as possible and must not be put in the same conduit with them.

[Basic Connection Diagram]



* Terminals R0 and T0 are not applicable to 0.75 kW [1.0 HP] or lower models.

6. Preparatory Operations


After installing and wiring the product, make the following checks before turning the inverter on.

- (1) Any wrong connections?
- (2) Any refuse wires and left screws?
- (3) Any loose screws and terminals?
- (4) Any wire ends at crimped terminals in contact with other terminals?
- (5) Rotary switches correctly set?
- (6) Terminal resistors correctly connected?

After turning the inverter on, make the following checks before starting operation.

- (1) Function settings for multi-function input terminals X1 to X9 (settings of function codes E01 to E09) matched with the intended purposes?
- (2) Function setting for the link (setting of H30) matched with the intended purpose? (For the procedure for setting H30, see [8 'Changeover of Link Functions'](#).)
- (3) Settings of function codes for the T link option (o27 to o29) correct? (For the function codes for options, see [7 'Function Codes for Options'](#).)

7. Function Codes for Options

 WARNING	- If the product is programmed to keep running when a communication error occurs and automatically recover after the error is corrected, the inverter and, consequently, the motor may start after the error correction. Take care to prevent accidents. There is a possibility of accidents.
--	--

The function codes used for the optional T link are limited to o27, o28, and o29 (see Table 5). If the product is not to be programmed to keep running when a communication error occurs, see o29 in Table 5 and proceed to [7-2 'Function code o29 for options'](#).

Table 5

Function code	Function	Data code	Description
o27	Mode selection on error	0	Immediate trip Er5 immediately trips when a communication error occurs.
		1	Forced trip after timer count-up The option keeps running for a time set by timer after a communication error occurs (holds last received run command until the error is corrected). Er5 trips after the preset time. If the communication recovers within the preset time, the option follows subsequent commands and Er5 trips after the preset time.
		2	Recheck after timer count-up The option keeps running for a time set by timer after a communication error occurs (holds last received run command until the error is corrected). Er5 trips after elapse of the preset time if the communication has not recovered. If the communication recovers within the preset time, the option follows subsequent commands and keeps running.
		3	No trip In a communication error occurs, alarm Er5 is not given. The option holds last received run command until the error is corrected and, after the communication recovers, returns to normal operation mode where it follows subsequent commands.
o28	Timer setting	0.0 to 60.0s	The time for which the option keeps running after a communication error occurs. Effective when o27 = 1 or 2
o29	Transfer format	0	Format 1 (standard format, 4W + 4W)
		1	Must not be used.
		2	Format 3 (G9 compatible mode, for changeover from G9 to G11)

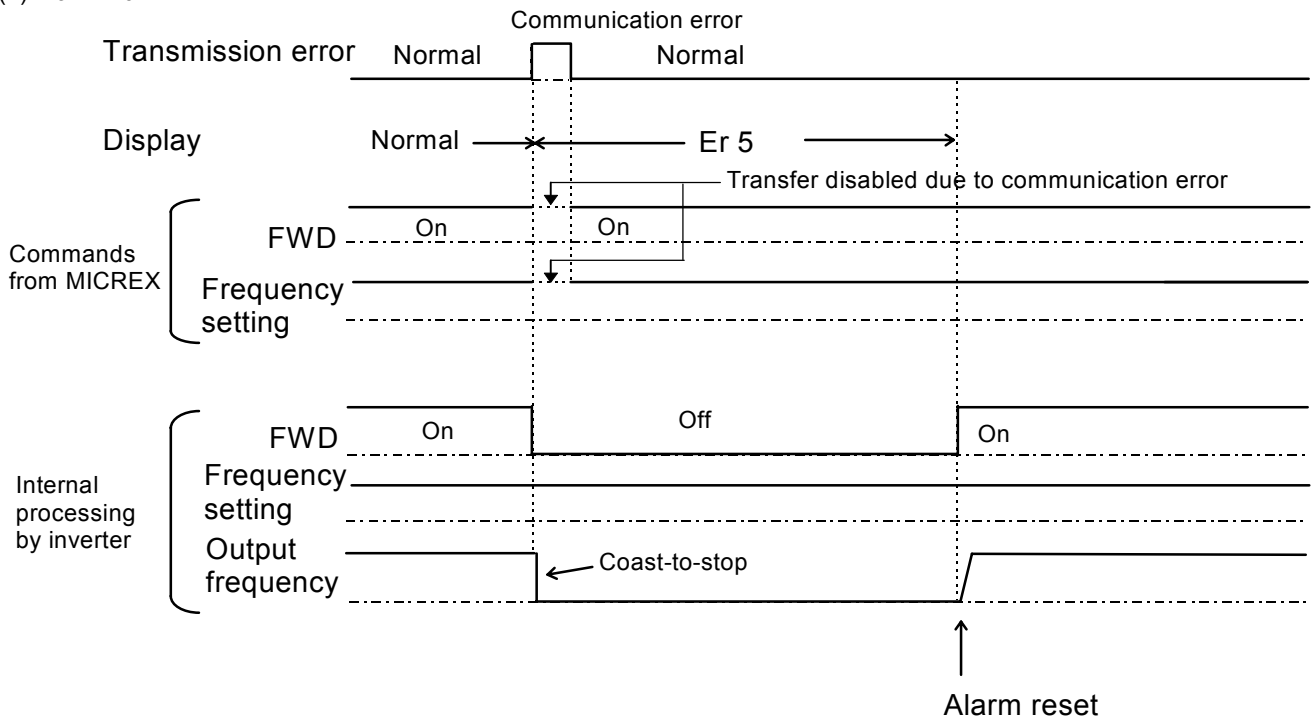
- * - Er5 should be reset using the RST terminal, RESET key, or reset signal from the MICREX after the cause of the error is removed.
- The following conditions are considered as communication errors.
 - (1) A failure of the optional printed circuit board
 - (2) A faulty T link construction (duplicated address, cut wire, MICREX power off)
 - (3) A check sum error due to noise, etc.
- All codes have been set to 0 before delivery.
- If the o29 setting is changed, turn the inverter power switch (and auxiliary power switches if auxiliary power sources R0 and T0 are used) on, off, and then on again. After restarted, the option runs with the newly selected transfer format.

7-1 Function codes o27 and o28 for options

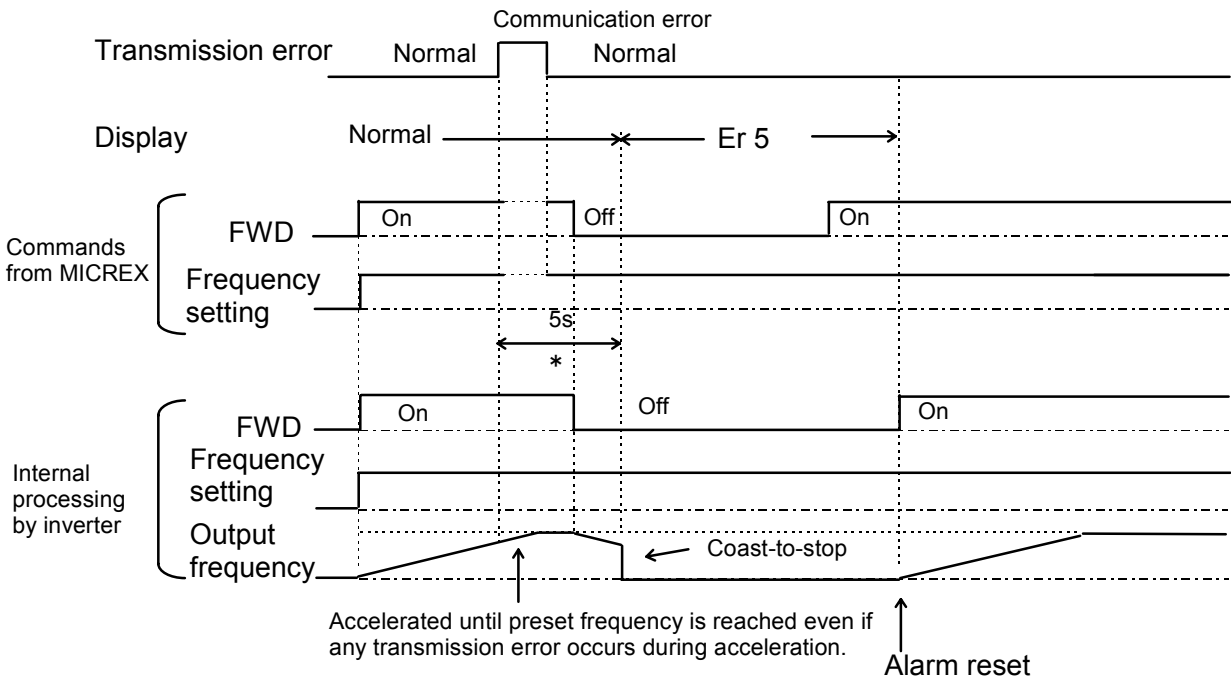
[Description of operation timing]

Shown below are the examples of operation timing in case of an in-process communication error with FWD and frequency setting commands being sent from the MICREX.

(1) If o27 = 0:

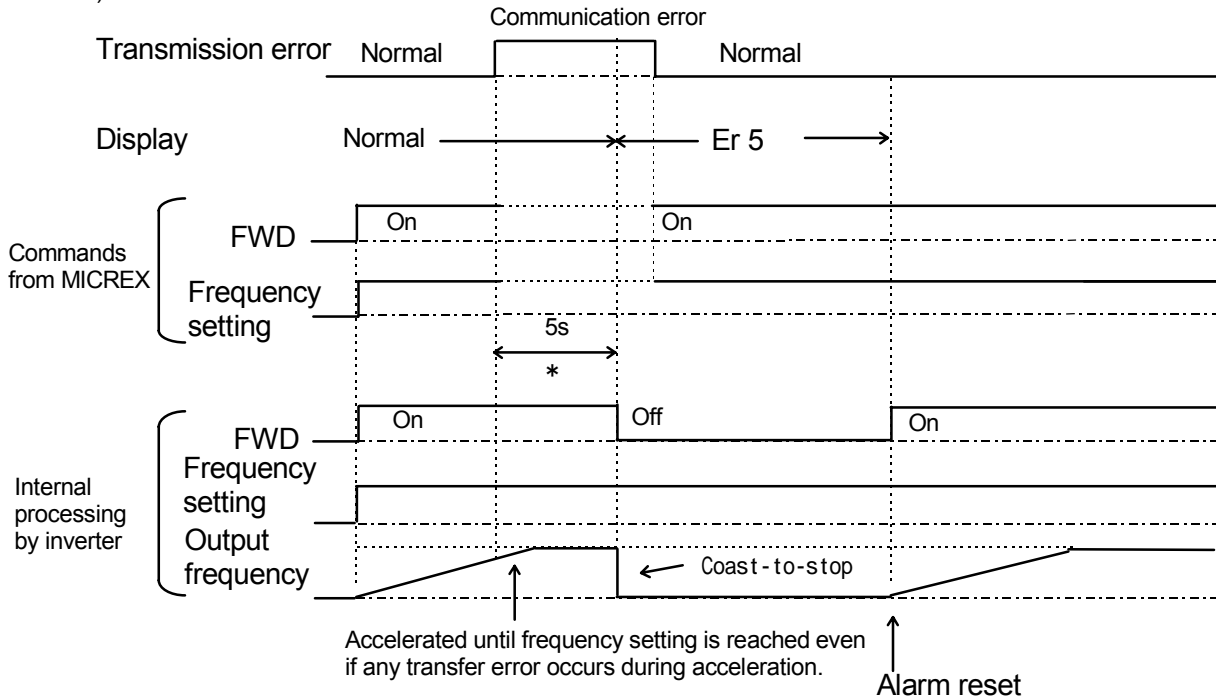


(2) If o27 = 1 and o28 = 5.0 (five seconds' forced stop after communication error):



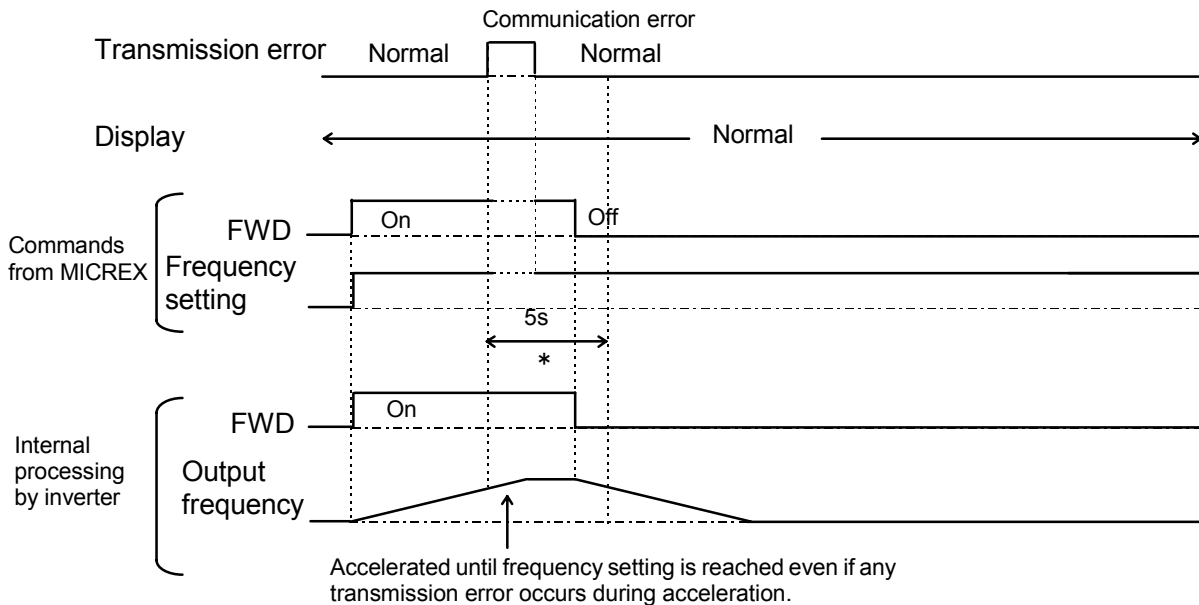
* The (run and/or frequency setting) command(s) received when the communication error was pending is (are) held for this period unless the communication recovers and a new command or value is received.

(3) If o27 = 2 and o28 = 5.0 (communication does not recover and Er5 trips five seconds after occurrence of a communication error):



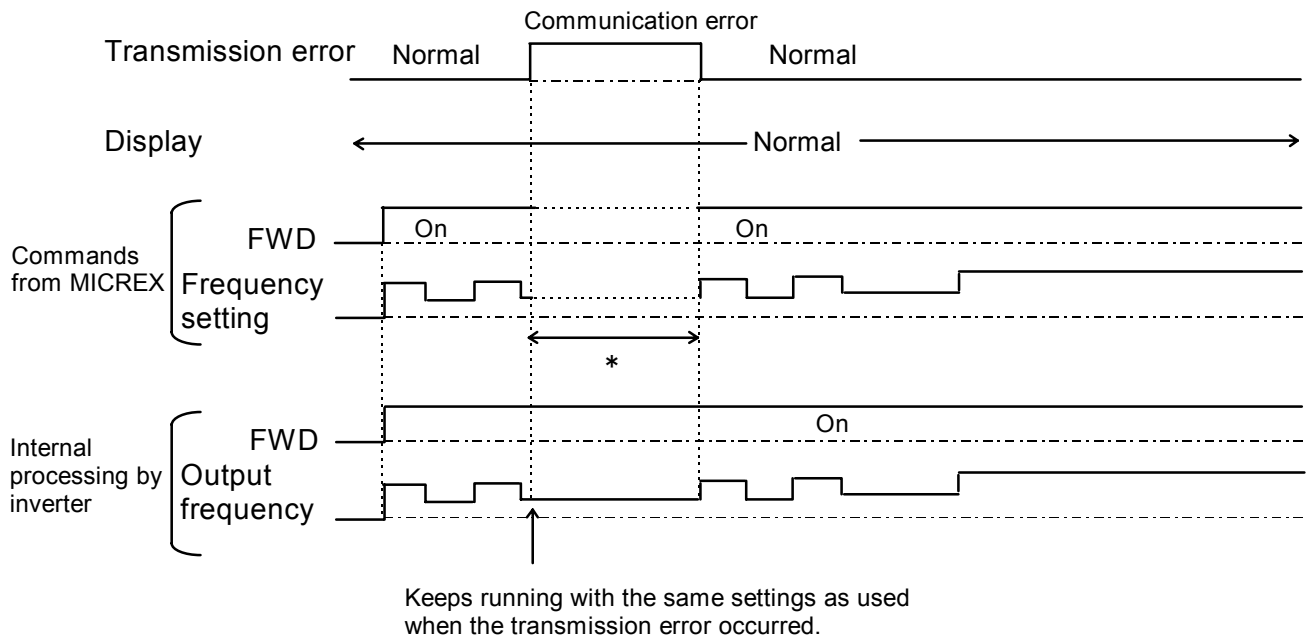
* The (run and/or frequency setting) command(s) received when the communication error was pending is (are) held for this period unless the communication recovers and a new command or value is received.

(4) If o27 = 2 and o28 = 5.0 (communication recovers within five seconds after occurrence of a communication error):



* The (run and/or frequency setting) command(s) received when the communication error was pending is (are) held for this period unless the communication recovers and a new command or value is received.

(5) If o27 = 3:



* The (run and/or frequency setting) command(s) received when the communication error was pending is (are) held for this period unless the communication recovers and a new command or value is received.

7-2 Function code o29 for options



This code is used to select either of two transfer formats.

- 1) If o29 = 0: Format 1 (standard format: 4 + 4 exclusive words)
- 2) If o29 = 2: Format 3 (G9 compatible format: 4 + 4 exclusive words)

Note:

If the transfer format is changed, turn the inverter power switch (and auxiliary power switches if auxiliary power sources RO and TO are used) on, off, and then on again. After restarted, the option runs with the newly selected transfer format. For detail of each format, see 9 'Operation Area and Assignment of Data Addresses'.

8. Changeover of Link Functions

 WARNING	<p>- Making the communication valid or invalid via the T link or external signal terminal with a run command on will suddenly start the unit. Check in advance that all run commands are off.</p> <p>There is a possibility of accidents.</p>
 CAUTION	<p>- Making the communication valid or invalid via the T link or external signal terminal with a run command on will suddenly start the unit. Check in advance that all run commands are off.</p> <p>In addition, making the communication valid or invalid via the T link or external signal terminal during operation may bring the unit into manual operation mode, resulting in a sudden stop. Do not unnecessarily switch the communication on/off as doing so may lead to injury or damage.</p> <p>There is a possibility of accidents.</p>

Link functions can be made available by setting function code H30* or the relevant one of X1 to X9 to '24'.

To 'change or check the function code data' from the T link, it is not necessary to make the link valid/invalid. Data can also be changed from the keypad as far as no data is being uploaded from the T link. Use the F00 data protective function to disable the data updating from the keypad.

* For the procedure for making the H30 programmed run commands and frequency setting valid/invalid, see Table 6 in the next page.

8-1 Procedure for making the communication valid/invalid

The communication can be made valid/invalid using multi-function input terminals (X1 to X9) of the inverter as far as the general input terminals (E01 to E09: X1 to X9) have been set to make the link functions available (set to 24) in advance. If not, the communication is automatically made valid.

Input terminal	State
OFF	Communication valid
ON	Communication invalid

Notes:

- Since all memories are initialized upon power-up, the command and operation data sent via the communication line should be downloaded again from upstream units.
- When the communication is invalid, the command and operation data can be downloaded but will not be reflected by SW1 and SW2. Shockless switching can be accomplished by setting data with the communication invalid in advance and making the communication valid again.

8-2 Link functions (operation status selection)

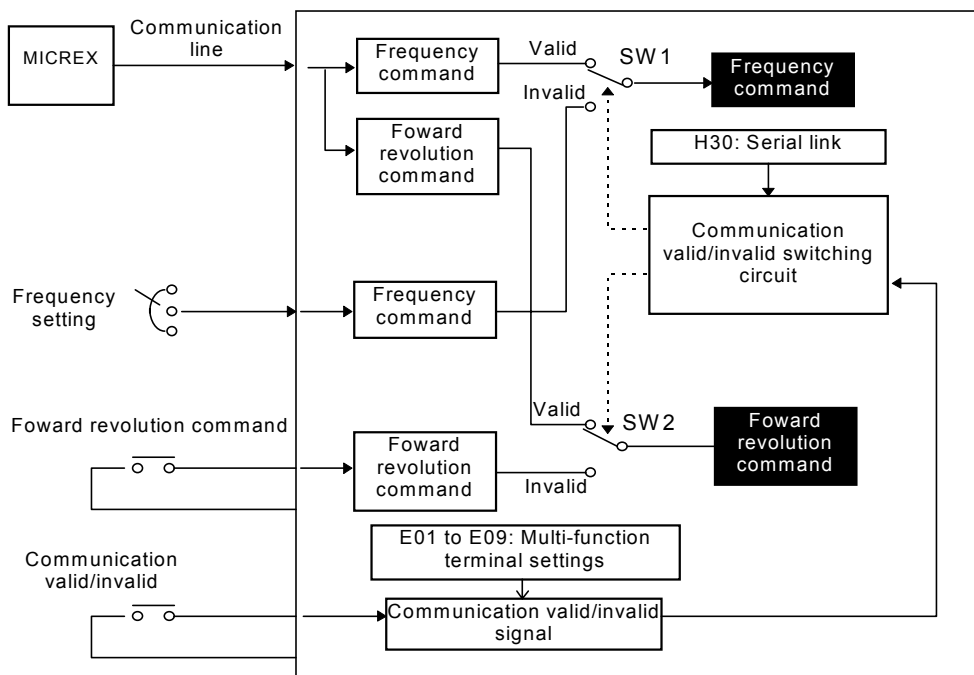
The command and operation data status (valid or invalid) with the communication on can be independently specified by setting 'H30: Serial link'. (The communication can also be switched on/off by making the H30 data valid/invalid with no multi-function input terminal set to make the link functions available and, thus, with the communication always on.)

Table 6

		H30 = 0 (pre-delivery setting)	H30 = 1	H30 = 2	H30 = 3
All of X1 to X9 are not set to 24 or any of X1 to X9 is set to 24 with the respective X terminal on.	Frequency setting	Valid for inverter only	Valid for T link only	Valid for inverter only	Valid for T link only
	FWD, REV, X1 to X9	Valid for inverter only		Valid for T link only *1	
	RST, BX	Valid for inverter only		Valid for both inverter and T link	
Any of X1 to X9 is set to 24 with the respective X terminal off.	Frequency setting	Valid for inverter only			
	FWD, REV, X1 to X9				
	RST, BX				

*1 The link functions can be made valid for the inverter only using X1 to X9. (See Table 8 in 10-1-2 'Data format (MICREX ⇒ inverter').)

*2 The status of input terminals such as FWD, REV, X1, and RST, which are sent via the terminal block and communication line, can be independently checked with the I/O Check screen shown on the display above the keypad.



8-3 Coexistence of link (option) and RS485 communication

When this option and RS485 coexist, some restrictions are imposed on the communication as described below.

Link: Can be used to check or change the data available for operation (either or both of command and operation data), operation status monitor, and function code data via the communication line.

RS485: Can be used to check the operation status monitor and change the function code data as loader.
(The inverter cannot be operated via the RS485.)

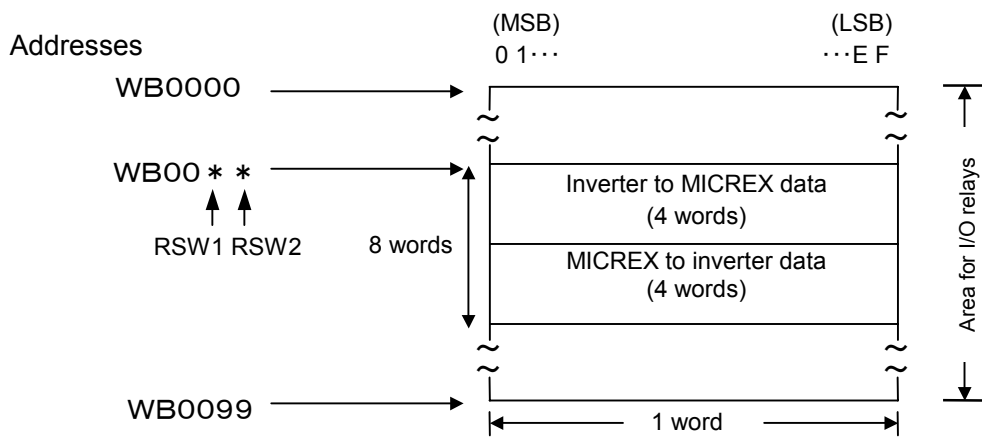
Notes:

- In this case, M14 (communication valid bit) indicates that the communication is possible through the T link option, not the RS485.
- If a command or operation data is sent to the inverter through RS485, the inverter sends NAK as a response.
- If a function code is changed by a command issued through RS485 during the function code change from the T-link, the inverter sends NAK (no right to download) as a response.

9. Operation Area and Assignment of Data Addresses

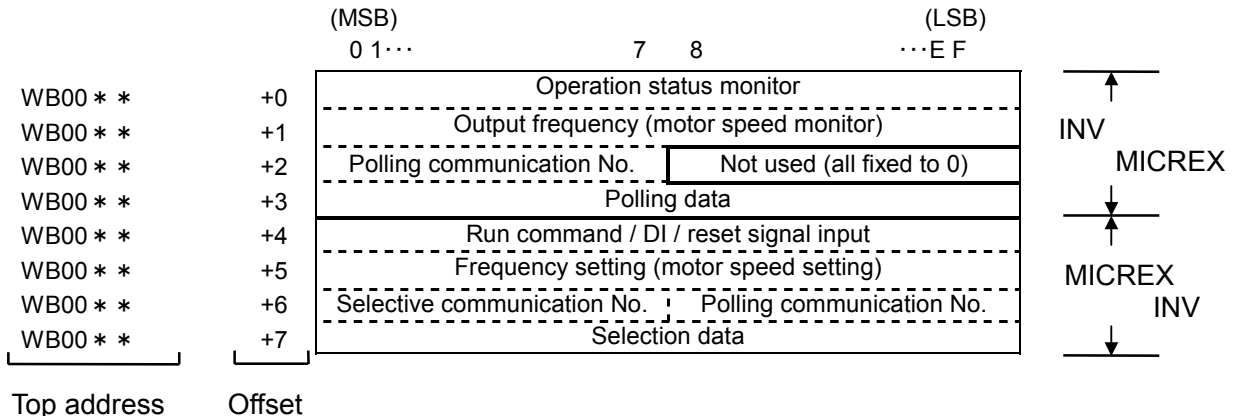
9-1 Operation Area

Within the area reserved for I/O relays, successive eight words are used for each inverter. Set a two-digit address (** of WB00** below) using rotary switches RSW1 and RSW2 on the optional card.



9-2 Assignment of Data Addresses

9-2-1 Format 1 (standard format, 4W + 4W)



9-2-2 Format 3 (G9 compatible mode, 4W + 4W)

(See the instruction manual for T link for G9, INR-HF50624 .)

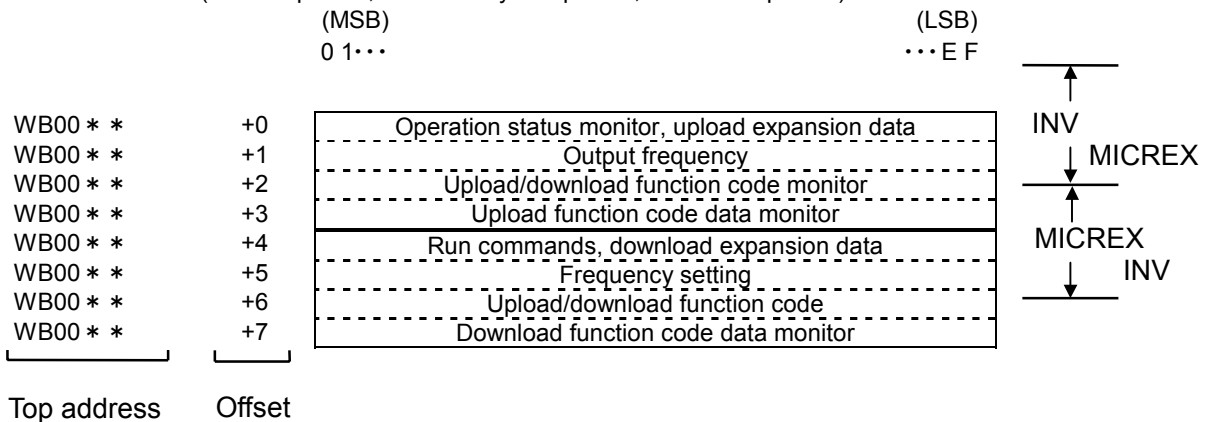
This transfer format is intended to minimize the necessity of modifying the MICREX software in case of changeover from G9 to G11. However, it is not completely compatible and has restrictions listed in the following table.

This format is used for changeover from G9 to G11 and may not be supported in future. It is essentially recommended to use format 1, which the standard format for Fuji Electric's inverters, in future.

Table 7

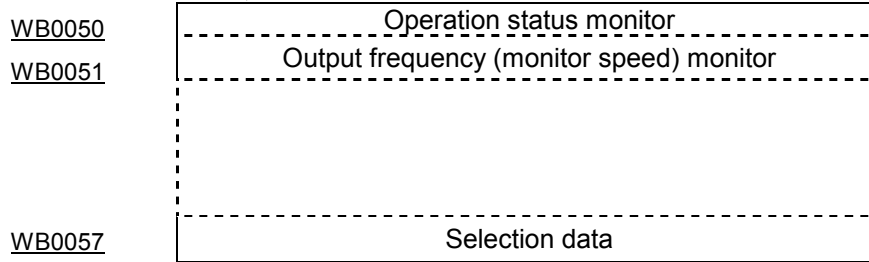
Function	Compatibility	Description
Operation status monitor, upload expansion data	○	Y1 to Y5 are serviceable. Upload extension data should be fixed to 0.
Output frequency	○	
Function codes uploading	×	M01 (output current monitor), M02 (output voltage monitor), and M03 (calculated torque) are the only serviceable (completely compatible) M codes.
Run commands, download expansion data	△	No signal input to BX is permitted unless BX is assigned to any of X1 to X9 using relevant function code between E01 and E09. Download expansion data input is invalid.
Frequency setting	○	
Function codes downloading	×	For setting procedure, see 13 'Examples of Data Transfer'.

(○ : Compatible, △ : Partially compatible, X: Not compatible)



9-2-3 Example of address setting

(In format 1 (standard format), 4W + 4W)
 Station address 50: RSW1 = 5, RSW2 = 0



Note:

Assignment of data addresses may differ depending on the model. For detail, see the instruction manual for the relevant model.

10. T Link Transfer Format

If format 3 (G9 compatible mode) is used, see the instruction manual for T link for G9, INR-HF50624 . When changing or checking the function code data in format 3, see the data codes in 10-2 'G9 compatible mode'.

10-1 Format 1 (standard format, 4W + 4W)

10-1-1 Data format (inverter ⇒ MICREX)

(1) Operation status monitor (each bit is set to 1 when on)
 (MSB)

														(LSB)	
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
BUSY	ERR	WR	RL	ALM	DEC	ACC	IL	VL	TL	NUV	BRK	INT	EXT	REV	FWD

Meanings of the bits used for the operation status monitor are shown below.

FWD: Forward revolution	IL: Current limited
REV: Reverse revolution	ACC: Accelerating
EXT: DC braking	DEC: Decelerating
INT: Inverter shut-down	ALM: Sum-up alarm
BRK: Braking	RL: Link valid/invalid
NUV: DC link circuit voltage	WR: Right to download function codes 0 = Reserved by keypad or RS485 1 = Reserved by TL
TL: Torque limited	ERR: Downloading/uploading error from TL
VL: Voltage limited	BUSY: Data being downloaded (processed)

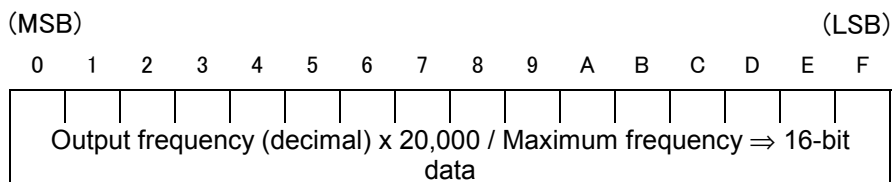
Note:

- ERR is set to '0' when data is normally downloaded/uploaded. It is set to '1' when any of the following downloading/uploading error occurs and automatically reset to '0' when the subsequent downloading/uploading process is normally completed. If this bit is set to '1' during a downloading/uploading process, keep downloading/uploading until this bit is reset to '0'.

Causes of downloading/uploading errors: Change or access to a communication number not in use, overwriting to a read-only function code, overwriting during operation to a function code that is not changeable during operation, overwriting with FWD/REV terminal on to a function code that is not changeable with FWD/REV on, entry of a value out of programmable range

- BUSY is set to '1' while data is downloaded (processed) (or the download communication number is changed). If you want to successively download next data, wait until this bit is reset to '0'. Data downloaded with this bit set to '1' will be ignored.

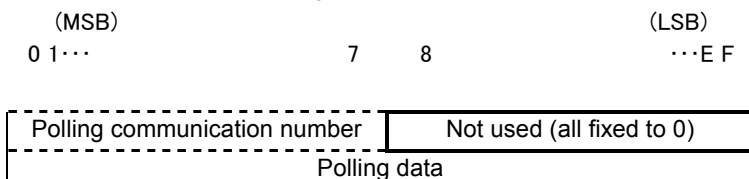
(2) Output frequency monitor



* The maximum frequency is determined by function code F03 in Hz. It may be obtained by calculating backward with the above formula. If the value is negative (complement of 2), it indicates that the motor is reversely revolving.

* In format 1, BCD codes cannot be used for settings.

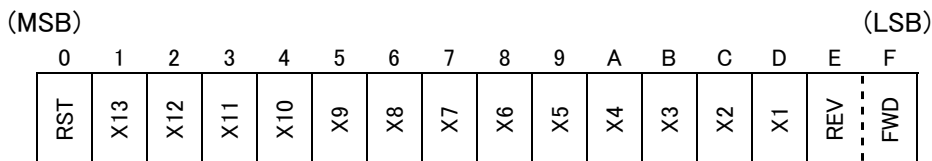
(3) Polling communication number and polling data



The communication number corresponding to the function code requested for polling by the MICREX is stored as polling communication number (8 bits). The relevant data is stored as polling data. For detail, see 12 'List of Function Codes'.

10-1-2 Data format (MICREX ⇒ inverter)

(1) Run command, Di, and RESET inputs (each bit is set to 1 when on)



Meanings of the bits are shown below.

FWD: Forward revolution

REV: Reverse revolution

X1 to X13: Multi-function inputs (defined by settings of function codes E01 to E09)

X10 to X13 are ignored (not used).

RST: Alarm reset

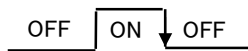
Note:

- When any run command is sent via the communication line, the relationship with inverter terminal commands will be as shown in Table 8.

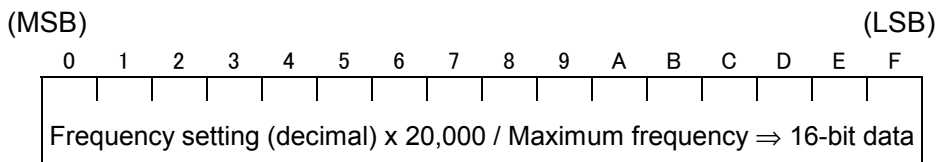
Table 8

Function			Command		
Classification	Code	Name	Communication	Terminal block	
Operation command	FWD/REV	Forward/reverse revolution command	Valid	Invalid	
Multi-function inputs	0 to 3	SS1, 2, 4, 8			Multi-step frequency
	4, 5	RT1, RT2	Acceleration/deceleration time selection		
	6	HLD	Self-retention signal	Invalid	
	7	BX	Coast-to-stop command	Valid	
	8	RST	Alarm reset	Invalid	Valid
	9	THR	External alarm	Invalid	Valid
	10	JOG	Jog	Invalid	Valid
	11	Hz2/Hz1	Frequency setting 2/1	Valid	Invalid
	12	M2/M1	Motor 2/1		
	13	DCBRK	DC braking command		
	14	TL2/TL1	Torque limit 2/1		
	15, 16	SW50, SW60	Commercial frequency selection (50 or 60 Hz)	Invalid	Valid
	17, 18	UP, DOWN	UP/DOWN command	Invalid	Valid
	19	WE-KP	Edit enable command	Valid	Invalid
	20	Hz/PID	PIC control cancel		
	21	IVS	Forward/reverse motion	Invalid	Valid
	22	IL	Interlock	Invalid	Valid
	23	Hz/TRQ	Torque control cancel	Valid	Invalid
	24	LE	Link operation	Invalid	Valid
	25	U-DI	Universal Di		
26	STM	Starting characteristics selection	Valid	Invalid	
27	PG/Hz	SY/PG valid command	Valid	Invalid	
28	SYC	SY synchronization command			
29	ZERO	Zero speed command (with PG vector)			
30	STOP1	Forced stop (within usual deceleration time)	Invalid	Valid	
31	STOP2	Forced stop (within 4th deceleration time)			
32	PREFLX	Preliminary excitation	Valid	Invalid	

- The alarm reset signal should be turned on and then off as shown below after the cause of the alarm is removed.

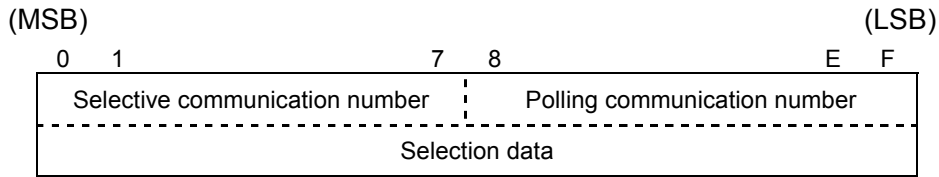


(2) Frequency setting



The above formula is the same as used for the output frequency monitor. The maximum frequency is determined by function code F03 in Hz. Enter a value calculated with the above formula in the form of 16-bit data (or as complement of 2 if negative).

(3) Polling and selective communication numbers and selection data



Function codes may be downloaded with the selective communication number (8 bits) and selection data (16 bits). The communication number corresponding to the function code requested for polling is requested should be specified with the polling communication number (8 bits). For detail, see [12 'List of Function Codes'](#).

Note:

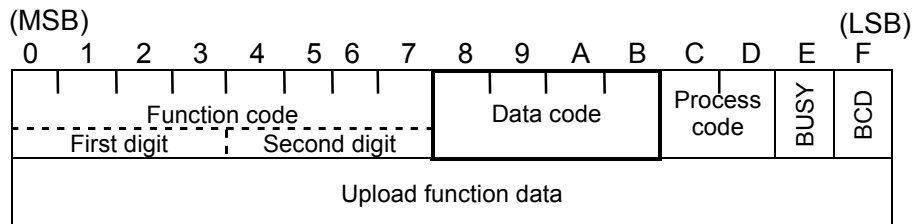
For selective communication, the communication number and data should be entered at the same time with the following procedure.

First, set 00H to 'selective communication number'. → Enter selection data. → Enter selective communication number. → Check with ERR bit of the operation status monitor that data is correctly downloaded.

Failure to observe the above procedure may cause data to be downloaded to wrong function codes. For detail, see [13 'Examples of Data Transfer'](#).

10-2 Format 3 (G9 compatible mode, 4W + 4W)

In the G9 compatible mode, the function type such as F, o, or M is represented by a data code. The data codes assigned to different function types are listed below. (This assignment applies to both data sending and data receiving.) For the procedure for uploading/downloading function codes in the G9 compatible mode, see [13-2-1 'Function code data settings'](#) under [13 'Examples of Data Transfer'](#).



Data code (Hexadecimal)	(Binary)	
0	0000	F codes
1	0001	o codes (function codes for option)
2	0010	M codes (function codes for monitor)
3	0011	E codes
4	0100	C codes
5	0101	P codes (function codes 1 for motor)
6	0110	H codes
7	0111	A codes (function codes 2 for motor)

S codes are not supported in the G9 compatible mode.

11. Function Codes Exclusive for Communication

Apart from the function codes used for changing the inverter parameters, S and M codes are provided for exclusive use for communication to allow the operation and monitoring of the inverter via the communication line. For S and M codes, a common data format have been used for 11 series and subsequent models and, with the use of a standard transfer format (format 1), it has become possible to change or check S and M codes for different models using the same host program. The S and M codes that can be changed or checked via the optional T link are listed below.

All S codes are changeable even while the inverter is running.

11-1 Run command data

Table 9

Code	Name	Unit	Programmable range	Resolution	Read/Write
S07	Universal Do	-	See data format (9).	-	R/W

Note:

The universal Do is a function using the inverter Do via the communication line.

(For detail, see the description of E20 to E24 in the instruction manual for inverter, 5-2 'Detailed description of function selection'.)

11-2 Function data

Table 10

Code	Name	Unit	Programmable range	Resolution	Read/Write	
S08	Acceleration time	F07	s	0.1 to 3600.0	0.1	R/W
S09	Deceleration time	F08	s	0.1 to 3600.0	0.1	R/W
S10	Torque limit level 1 (Driving)	F40	%	20.00 to 200.00 (P11S: 20.00 to 150.00), 999	1.00	R/W
S11	Torque limit level 2 (Braking)	F41	%	0.00, 20.00 to 200.00 (P11S: 20.00 to 150.00), 999	1.00	R/W

Notes:

- 1) A value out of the programmable range is considered as an error.
- 2) The acceleration (S08) and deceleration (S09) times are assigned to 'F07: Acceleration time 1' and 'F08: Deceleration time 1' respectively. Therefore, the resolution depends on the data value (see data format (7)).
- 3) The torque limit levels 1 (S10) and 2 (S11) are assigned to 'F40: Torque limit 1 (Driving)' and 'F41: Torque limit 2 (Braking)' respectively. Note that the value of 999 may be entered as 7FFF (hexadecimal).

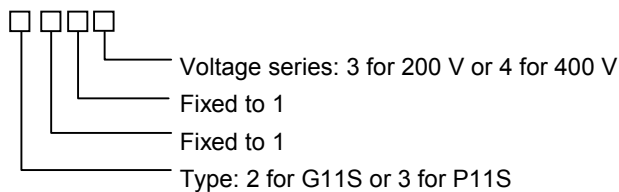
11-3 Monitor data

Table 11

Code	Name	Unit	Programmable range	Resolution	Read/Write
M01	Setting frequency (Final data)	-	-20,000 to 20,000 (maximum frequency at ± 20,000)	1	R
M05	Setting frequency (Final data)	Hz	0 to 400.00 (P11S: 0.00 to 120.00)	0.01	R
M06	Output frequency	-	-20,000 to 20,000 (maximum frequency at ± 20,000)	1	R
M07	Calculated torque	%	-200.00 to 200.00	0.01	R
M08	Torque current	%	-200.00 to 200.00	0.01	R
M09	Output frequency 1	Hz	0 to 400.00 (P11S: 0 to 120.00) (absolute value)	0.01	R
M10	Input power	%	0.00 to 200.00	0.01	R
M11	Output current	%	0.00 to 200.00 (inverter rating at 100.00)	0.01	R
M12	Output voltage	V	0.0 to 600.0	1.0	R
M13	Run command (Final data)	-	See data format (8).	-	R
M14	Operation status	-	See data format (10).	-	R
M15	Multi-function output terminal data	-	See data format (9).	-	R
M16	Latest fault memory	-	See Table 12 'Alarm codes'.	-	R
M17	2nd latest fault memory	-			
M18	3rd latest fault memory	-			
M19	4th latest fault memory	-			
M20	Cumulative operation time	h	0 to 65,535	1	R
M21	DC link circuit voltage	V	0 to 1,000	1	R
M23	Type code	-	See Note 1).	-	R
M24	Capacity code	-	See Table 13 'Capacity codes'.	-	R
M25	ROM version	-	0 to 59,999, see Note 2).	1	R
M26	Transmission error processing code (for RS485)	-	See instruction manual for RS485.	-	R
M27	Setting frequency at alarming (Final Data)	-	-20,000 to 20,000 (maximum frequency at ± 20,000)	1	R
M31	Setting frequency at alarming (Final Data)	Hz	0 to 400.00 (P11S: 0.00 to 120.00)	0.01	R
M32	Output frequency at alarming	-	-20,000 to 20,000 (maximum frequency at ± 20,000)	1	R
M33	Torque at alarming	%	-200.00 to 200.00	0.01	R
M34	Torque current at alarming	%	-200.00 to 200.00	0.01	R
M35	Output frequency 1 at alarming	Hz	0 to 400.00 (P11S: 0 to 120.00) (absolute value)	0.01	R
M36	Input power at alarming	%	0.00 to 200.00	0.01	R
M37	Output current at alarming	%	0.00 to 200.00 (inverter rating at 100.00)	0.01	R
M38	Output voltage at alarming	V	0.0 to 600.0	1.0	R
M39	Run command at alarming	-	See data format (8).	-	R
M40	Operation status at alarming	-	See data format (10).	-	R
M41	Multi-function output terminal data at alarming	-	See data format (9).	-	R
M42	Cumulative operation time at alarming	h	0 to 65,535	1	R
M43	DC link circuit voltage at alarming	V	0 to 1,000	1	R
M44	Inverter internal air temp. at alarming	°C	0 to 120	1	R
M45	Cooling fin temp. at alarming	°C	0 to 120	1	R
M46	Life of main circuit capacitor	%	0.0 to 100.0	0.1	R
M47	Life of printed circuit board capacitor	h	0 to 65,535	1	R
M48	Life of cooling fan	h	0 to 65,535	1	R

Notes:

1) Type code: A four-digit hexadecimal value indicating the type and voltage series.



2) A five-digit decimal value indicating the ROM version of the inverter CPU.

- Alarm codes

Table 12

Code	Description		Code	Description	
0	No alarm	---	28	Cut wire of PG	Pg
1	Overcurrent during acceleration (inverter output)	OC1	31	Memory error	Er1
2	Overcurrent during deceleration (inverter output)	OC2	32	Keypad communication error	Er2
3	Overcurrent during cruise (inverter output)	OC3	33	CPU error	Er3
5	Earthing	EF	34	Option communication error	Er4
6	Overvoltage during acceleration	OU1	35	Option error	Er5
7	Overvoltage during deceleration	OU2	36	Operating procedure error	Er6
8	Overvoltage during cruise	OU3	37	Output wiring error	Er7
10	Low voltage	LU	38	RS485 communication error	Er8
11	Missing input phase	Lin			
14	Blown fuse	FUS			
16	Output wiring error	Er7			
17	Overheated cooler	OH1			
18	External alarm	OH2			
19	Overheated inverter internal parts	OH3			
22	Overheated braking resistor	dbH			
23	Overload on motor 1	OL1			
24	Overload on motor 2	OL2			
25	Overload on inverter	OLU			
27	Overspeed	OS			

- Capacity codes

The capacity code is a decimal value indicating the inverter capacity in units of 0.1 kW (represented as capacity in kW X100).

Table 13

Capacity (kW)	Data	Capacity (kW)	Data	Capacity (kW)	Data	Capacity (kW)	Data
0.05	5 (5H)	7.5	750 (2EEH)	75	7500 (1D4CH)	315	31500 (7B0CH)
0.1	10 (A H)	11	1100 (44CH)	90	9000 (2328H)	355	35500 (8AACH)
0.2	20 (14H)	15	1500 (5DCH)	110	11000 (2AF8H)	400	40000 (9C40H)
0.4	40 (28H)	18.5	1850 (73AH)	132	13200 (3390H)	450	45000 (AFC8H)
0.75	75 (4BH)	22	2200 (898H)	160	16000 (3E80H)	500	50000 (C350H)
1.5	150 (96H)	30	3000 (BB8H)	200	20000 (4E20H)	630	60630 (ECD6H)
2.2	220 (DCH)	37	3700 (E74H)	220	22000 (55F0H)	710	60710 (ED26H)
3.7	370 (172H)	45	4500 (1194H)	250	25000 (61A8H)	Undefined	65535 (FFFFH)
5.5	550 (226H)	55	5500 (157CH)	280	28000 (6D60H)		

12. List of Function Codes

For the programmable range and unit of measurement for each function code, see the instruction manual for inverter.

Table 14

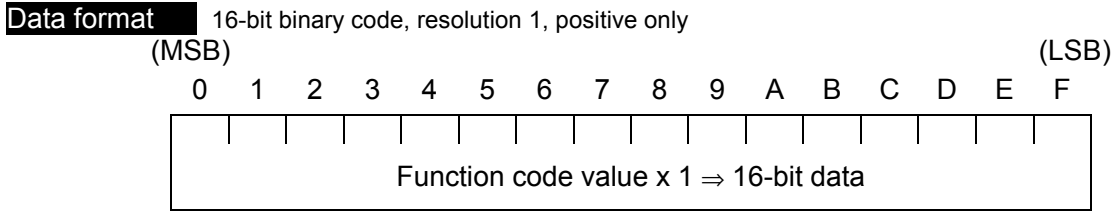
Code	Communication No.	Name	Data format	Code	Communication No.	Name	Data format
	Hexadecimal (decimal)				Hexadecimal (decimal)		
	01 (01) to 06(06)	Not used. See Note.		M47	3D(61)	Life of printed circuit board capacitor	①
				M48	3E(62)	Life of cooling fan	①
S07	07 (07)	Universal Do	⑨		3F (63) to 48 (72)	Not used. See Note.	
S08	08 (08)	Acceleration time	③				
S09	09 (09)	Deceleration time	③	F03	49 (73)	Maximum output frequency 1	①
S10	0A (10)	Torque limit level 1	⑥	F04	4A (74)	Base frequency 1	①
S11	0B (11)	Torque limit level 2	⑥	F05	4B (75)	Rated voltage 1	①
	0C (12) to 0E(14)	Not used. See Note.		F06	4C (76)	Maximum output voltage 1	①
M01	0F(15)	Setting frequency (Final data)	②	F07	4D (77)	Acceleration time 1	⑦
	10 (16) to 12(18)	Not used. See Note.		F08	4E (78)	Deceleration time 1	⑦
M05	13(19)	Setting frequency (Final data)	⑤	F09	4F (79)	Torque boost 1	③
M06	14(20)	Output frequency	②	F10	50 (80)	Electronic thermal relay 1 (Selection)	①
M07	15(21)	Calculated torque	⑥	F11	51 (81)	Electronic thermal relay 1 (Level)	⑦
M08	16(22)	Torque current	⑥	F12	52 (82)	Electronic thermal relay 1 (Thermal time constant)	③
M09	17(23)	Output frequency 1	⑤	F15	53 (83)	Frequency limiter (High)	①
M10	18(24)	Input power	⑤	F16	54 (84)	Frequency limiter (Low)	①
M11	19(25)	Output current	⑤	F17	55 (85)	Gain (for frequency setting signal)	③
M12	1A(26)	Output voltage	③	F18	56 (86)	Bias frequency	④
M13	1B(27)	Run command (Final data)	⑧	F20	57 (87)	DC brake (Starting frequency)	③
M14	1C(28)	Operation status	⑩	F21	58 (88)	DC brake (Braking level)	①
M15	1D(29)	Multi-function output terminal data	⑨	F22	59 (89)	DC brake (Braking time)	③
M16	1E(30)	Latest fault memory	①	F23	5A (90)	Starting frequency	③
M17	1F(31)	2nd latest fault memory	①	F24	5B (91)	Starting frequency (Holding time)	③
M18	20(32)	3rd latest fault memory	①	F25	5C (92)	Stop frequency	③
M19	21(33)	4th latest fault memory	①	F40	5D (93)	Torque limit 1 (Driving)	①
M20	22(34)	Cumulative operation time	①	F41	5E (94)	Torque limit 1 (Braking)	①
M21	23(35)	DC link circuit voltage	①	F42	5F (95)	Torque vector control 1	①
	24(36)	Not used. See Note.			60 (96) to 72 (114)	Not used. See Note.	
M23	25(37)	Type code	①	E10	73 (115)	Acceleration time 2	⑦
M24	26(38)	Capacity code	①	E11	74 (116)	Deceleration time 2	⑦
M25	27(39)	ROM version	①	E16	75 (117)	Torque limit 2 (Driving)	①
M26	28(40)	Transmission error processing code	①	E17	76 (118)	Torque limit 2 (Braking)	①
M27	29(41)	Setting frequency/speed at alarming (Final Data)	②		77 (119) to 7B(123)	Not used. See Note.	
	2A (42) to 2C(44)	Not used. See Note.		E30	7C (124)	Frequency arrival (FAR) (Detection width)	③
M31	2D(45)	Setting frequency at alarming (Final Data)	⑤	E31	7D (125)	Frequency detection (FDT) (Level)	①
M32	2E(46)	Output frequency at alarming	②	E32	7E (126)	Frequency detection (FDT) (Hysteresis width)	③
M33	2F(47)	Torque at alarming	⑥	E33	7F (127)	Overload prediction (Mode selection)	①
M34	30(48)	Torque current at alarming	⑥	E34	80 (128)	Overload prediction (Level)	⑦
M35	31(49)	Output frequency 1 at alarming	⑤	E35	81 (129)	Overload prediction (Timer Setting)	③
M36	32(50)	Input power at alarming	⑤		82 (130) to 85 (133)	Not used. See Note.	
M37	33(51)	Output current at alarming	⑤	C05	86 (134)	Multi-step frequency 1	⑤
M38	34(52)	Output voltage at alarming	③	C06	87 (135)	Multi-step frequency 2	⑤
M39	35(53)	Run command at alarming	⑧	C07	88 (136)	Multi-step frequency 3	⑤
M40	36(54)	Operation status at alarming	⑩	C08	89 (137)	Multi-step frequency 4	⑤
M41	37(55)	Multi-function output terminal data at alarming	⑨	C09	8A (138)	Multi-step frequency 5	⑤
M42	38(56)	Cumulative operation time at alarming	①	C10	8B (139)	Multi-step frequency 6	⑤
M43	39(57)	DC link circuit voltage at alarming	①	C11	8C (140)	Multi-step frequency 7	⑤
M44	3A(58)	Inverter internal air temp. at alarming	①		8D (141) to 96 (150)	Not used. See Note.	
M45	3B(59)	Cooling fin temp. at alarming	①				
M46	3C(60)	Life of main circuit capacitor	③				

Code	Communication No.	Name	Data format	Code	Communication No.	Name	Data format
P01	97 (151)	Motor 1 (Number of poles)	①	o01	CD (205)	Speed command system/automatic speed control system	①
P02	98 (152)	Motor 1 (Capacity)	⑤		CE (206)	Not used. See Note.	
P03	99 (153)	Motor 1 (Rated current)	⑦		CF (207)	Not used. See Note.	
P06	9A (154)	Motor 1 (No-load current)	⑦	o04	D0 (208)	Constant P of feedback speed controller	⑤
P07	9B (155)	Motor 1 (%R1)	⑤	o05	D1 (209)	Constant I of feedback speed controller	①
P08	9C (156)	Motor 1 (%X)	⑤	o06	D2 (210)	Time constant of feedback speed detection filter	①
P09	9D (157)	Motor 1 (Slip compensation control)	⑤		D3 (211) to E6 (230)	Not used. See Note.	
	9E (158) to A1 (161)	Not used. See Note.		o27	E7 (231)	Mode selection on error	①
H07	A2 (162)	ACC/DCC pattern	①	o28	E8 (232)	Timer setting	③
H09	A3 (163)	Start mode (Pick-up mode)	①	o29	E9 (233)	Transfer format	①
H10	A4 (164)	Energy-saving operation	①		EA (211) to FF (255)	Not used. See Note.	
H22	A5 (165)	PID control (P-gain)	⑤				
H23	A6 (166)	PID control (I-time)	③				
H24	A7 (167)	PID control (D-time)	⑤				
H28	A8 (168)	Droop operation	④				
H30	A9 (169)	Serial link (function selection)	①				
	AA (170) to B2 (178)	Not used. See Note.					
A01	B3 (179)	Maximum frequency 2	①				
A02	B4 (180)	Base frequency 2	①				
A03	B5 (181)	Rated voltage 2	①				
A04	B6 (182)	Maximum output voltage 2	①				
A05	B7 (183)	Torque boost 1	③				
A06	B8 (184)	Electronic thermal relay 2 (Selection)	①				
A07	B9 (185)	Electronic thermal relay 2 (Level)	⑦				
A08	BA (186)	Electronic thermal relay 2 (Thermal time constant)	③				
A09	BB (187)	Torque vector control 2	①				
A10	BC (188)	Motor 2 (Number of poles)	①				
A11	BD (189)	Motor 2 (Capacity)	⑤				
A12	BE (190)	Motor 2 (Rated current)	⑦				
A15	BF (191)	Motor 2 (No-load current)	⑦				
A16	C0 (192)	Motor 2 (%R1)	⑤				
A17	C1 (193)	Motor 2 (%X)	⑤				
A18	C2 (194)	Motor 2 (Slip compensation control)	⑤				
	C3 (195) to CC (204)	Not used. See Note.					

Note:

- If a polling or selective communication No. not in use is entered, it is considered as an error.

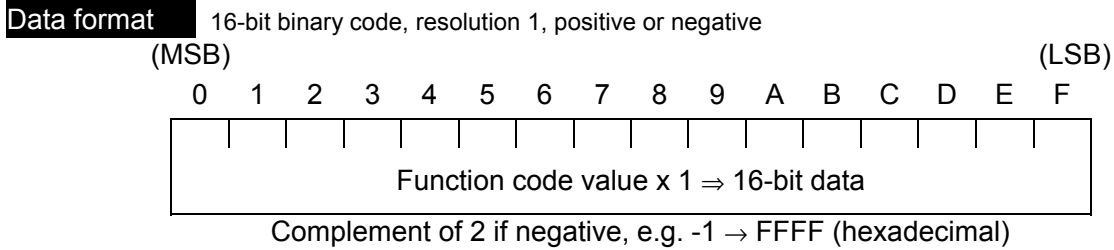
- Data formats



Example: If F15, communication No. 53h (frequency limiter, high) = 60 Hz,

$60 \times 1 = 60$ (decimal) = 003C (hexadecimal) \Rightarrow

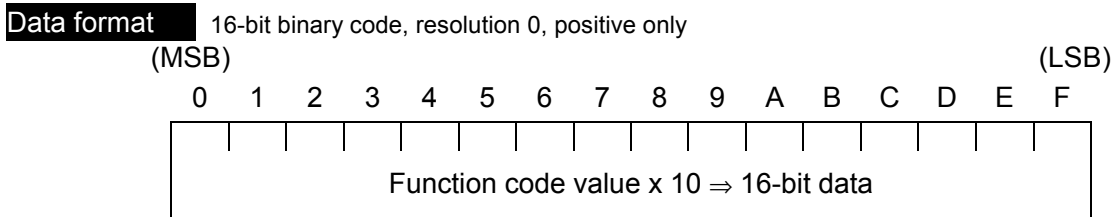
0	0	3	C
---	---	---	---



Example: If F18, communication No. 56h (bias frequency) = -20 Hz,

$-20 \times 1 = -20$ (decimal) = FFEC (hexadecimal) \Rightarrow

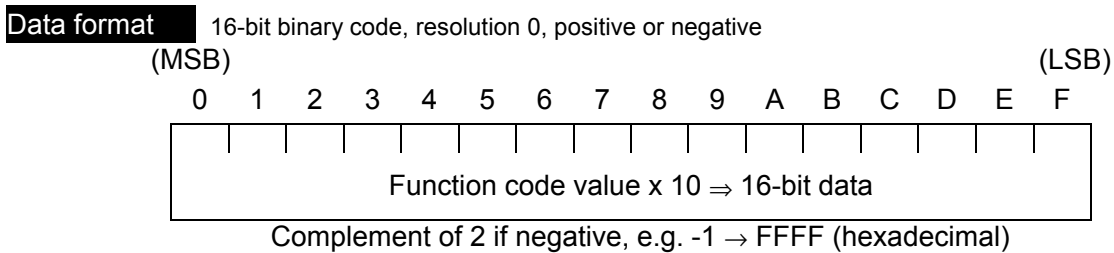
F	F	E	C
---	---	---	---



Example: If F17, communication No. 55h (gain for frequency setting signal) = 100.0%,

$100.0 \times 10 = 1000$ (decimal) = 03E8 (hexadecimal) \Rightarrow

0	3	E	8
---	---	---	---

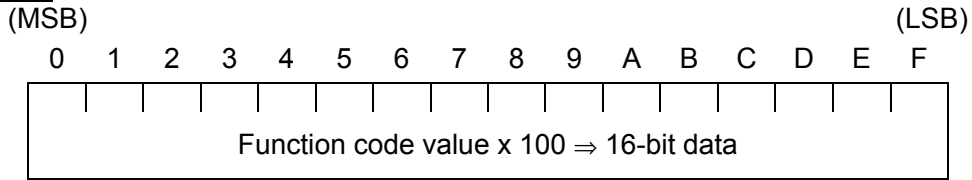


Example: If F28, communication No. A8h (droop control) = -5.0 Hz,

$-5.0 \times 10 = -50$ (decimal) = FFCE (complement of 2) \Rightarrow

F	F	C	E
---	---	---	---

Data format 16-bit binary code, resolution 0.01, positive only



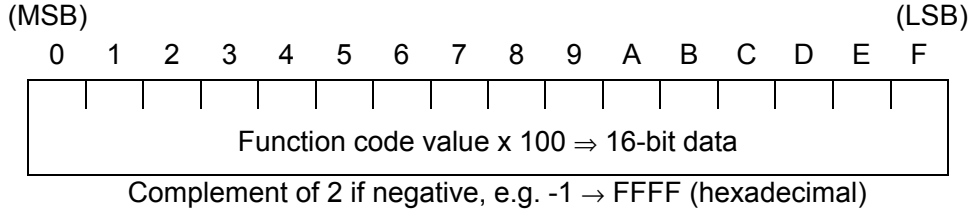
Example: If C05, communication No. 86h (multi-step frequency 1) = 50.25 Hz,

$$50.25 \times 100 = 5025 \text{ (decimal)} = 13A1 \text{ (hexadecimal)}$$

⇒



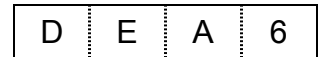
Data format 16-bit binary code, resolution 0.01, positive or negative



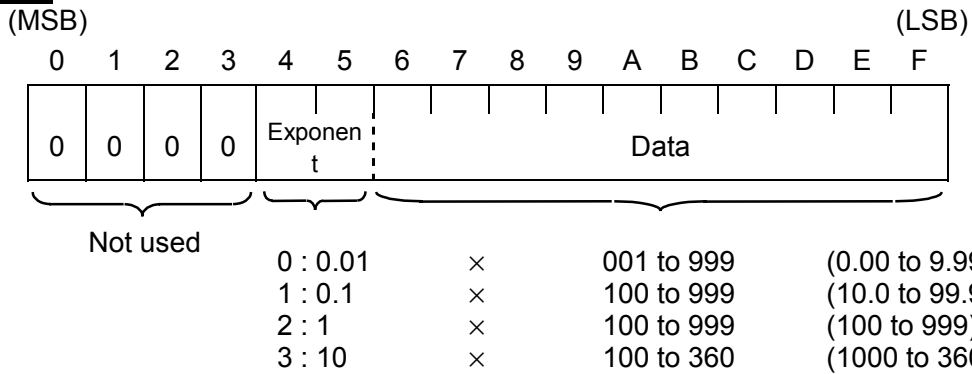
Example: If M07, communication No. 15h (torque) = -85.38%,

$$-85.38 \times 100 = -8538 \text{ (decimal)} = DEA6 \text{ (hexadecimal)}$$

⇒



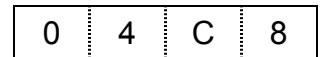
Data format Acceleration/deceleration time and current



Example: If F07, communication No. 4D (acceleration time 1) = 20.0 seconds,

$$20.0 = 0.1 \times 200$$

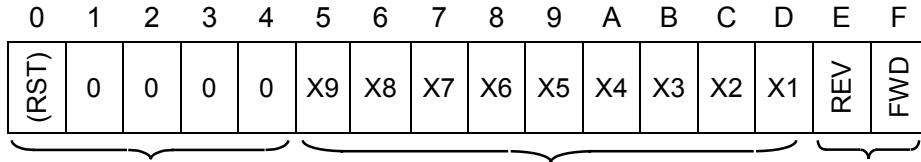
⇒



Data format

Run command

(MSB) (LSB)



Not used

Multi-function input terminal data

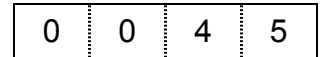
FWD: Forward revolution command
REV: Reverse revolution command

(Each bit is set to 1 when on)

Example: If M13, communication No. 1B (run command) = 0000 0000 0100 0101 (binary): FXW.X1.X5 = ON,

M13 = 0045 (hexadecimal)

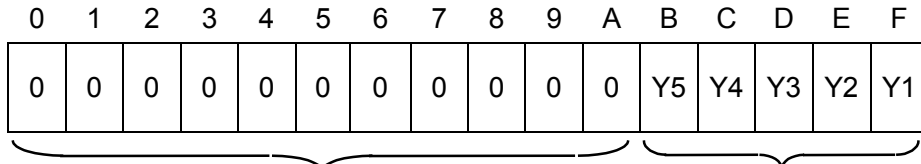
⇒



Data format

Multi-function output terminals

(MSB) (LSB)



Not used

Multi-function output terminal data

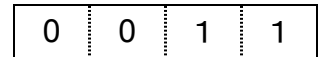
(Each bit is set to 1 when on)

Example: If M15, communication No. 1Dh (multi-function output terminal data)

= 0000 0000 0001 0001 (binary) and Y1, Y5 = ON,

M15 = 0011 (hexadecimal)

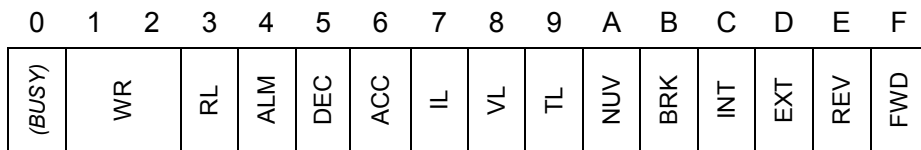
⇒



Data format

Operation status

(MSB) (LSB)



(Each bit is set to 1 when on or active)

FWD: Forward revolution
REV: Reverse revolution
EXT: DC braking
INT: Inverter shut-down
BRK: Braking
NUV: DC link circuit voltage
TL: Torque limited
VL: Voltage limited

IL: Current limited
ACC: Accelerating
DEC: Decelerating
ALM: Sum-up alarm
RL: Link valid/invalid
WR: Right to download function codes

0 = Reserved by keypad
1 = Reserved by RS485
2 = Reserved by T link

* (For the BUSY signal, use 0 bit of the operation status monitor.)

Example: Omitted (the monitoring method is the same as for formats (8) and (9)).

13. Examples of Data Transfer

13-1 Standard format (format 1)

13-1-1 Frequency setting and output frequency monitor

(1) If the frequency setting is 25.00 Hz (both the run command and frequency setting are valid for the link):

Conditions: FWD = ON, function code F03 (maximum frequency) = 50, H30 (link functions) = 3, and T link station address = 10

WB 14	0	0	0	1	FWD:ON
WB 15	2	7	1	0	2710 (hexadecimal) = <u>10000</u> (decimal) ⇒ Frequency setting: <u>10000</u> / 20000 = 50 (F03) = 25.00 Hz

↓ After acceleration is completed

WB 10	4	1	2	9	4219 (hexadecimal) = 0001 0000 0010 0001 (binary): Normally revolving, DC link circuit voltage, link valid
WB 11	2	7	1	0	2710 (hexadecimal) = <u>10000</u> (decimal) ⇒ Output frequency: <u>10000</u> / 20000 = 50 (F03) = 25.00 Hz

If the T link station address is 10, the frequency setting is specified with WB15 and the output frequency monitored with WB11.

(2) If the frequency setting (for the inverter) is 25.00 Hz (the run command is valid for the link and the frequency setting invalid for the link):

Conditions: FWD = ON, function code F03 (maximum frequency) = 50, H30 (link functions) = 2, and T link station address = 10

WB 14	0	0	0	1	FWD:ON
WB 15	0	0	0	0	Frequency setting from T link is 0.

↓ After acceleration is completed

WB 10	4	1	2	9	4219 (hexadecimal) = 0001 0000 0010 0001 (binary): Normally revolving, DC link circuit voltage, link valid
WB 11	2	7	1	0	2710 (hexadecimal) = <u>10000</u> (decimal) ⇒ Output frequency: <u>10000</u> / 20000 = 50 (F03) = 25.00 Hz

If H30 = 2, the frequency setting specified by the T link with WB15 is invalid and ignored.

13-1-2 Function code data settings

(1) If F07 (acceleration time 1), communication No. 4D is 20.0 seconds.

Condition: T link station address = 20

WB 26	0	0	*	*	Selective communication No. (former 8 bits) is set to 00. (** represents a read-only communication No. not related with downloading.)
-------	---	---	---	---	--

↓

WB 26	0	0	*	*	Since 20.0 = 0.1 x 200, WB27 is set to 4C8 (hexadecimal) ... Data format (7)
WB 27	0	4	C	8	

↓

WB 26	4	D	*	*	Selective communication No. (former 8 bits) is set to 4D (hexadecimal).
WB 27	0	4	C	8	Since 20.0 = 0.1 x 200, WB27 is set to 4C8 (hexadecimal).

- If the downloading is successfully completed:

WB 20	1	0	2	8	1028 (hexadecimal) = 0001 0000 0010 1000 (binary) and ERR bit (bit 1) = 0 if the downloading is successfully completed.
-------	---	---	---	---	---

If ERR bit (bit 1) = 0, download the same communication No. to confirm that data has been normally downloaded.

- If the downloading is not successfully completed:

WB 20	5	0	2	8	5028 (hexadecimal) = 0101 0000 0010 1000 (binary) and ERR bit (bit 1) = 1 if the downloading is not successfully completed.
-------	---	---	---	---	---

13-1-3 Function code data monitor (uploading)

- (1) If M11 (output current), communication No. 19h is monitored and 50.25% is read:
Condition: T link station address = 30

WB 36	*	*	1	9	Polling communication No. (former 8 bits) is set to 19h. (** represents a read-only communication No.)
↓					
WB 30	1	0	2	1	1021 (hexadecimal) = 0001 0000 0010 0001 (binary) and ERR bit (bit 1) = 0 if the downloading is successfully completed.
WB 31	?	?	?	?	Output frequency
WB 32	1	9	0	0	Currently read function code communication No. (former 8 bits)
WB 33	1	3	A	1	13A1 (hexadecimal) = 5025 (decimal) → 5025 / 100 = 50.25 ... Data format (5)

The currently read function code always represents the function code last entered as polling communication No.

13-2 G9 compatible format (format 3)

This format supports the G9 transfer format according to the specifications shown in Table 7. For the basic setting procedures, see the instruction manual for T link for G9, INR-HF50624 .

13-2-1 Function code data settings

- (1) If F02 (acceleration time 1), communication No. 4D is 20.0 seconds.
Condition: T link station address = 20

0: F code (for data codes, see Table 15 below)

WB 26	0	7	0	0	F07 is selected.
WB 27	0	4	C	8	Since 20.0 = 0.1 × 200, WB27 is set to 4C8 (hexadecimal) ... Data format (7)
↓					
WB 26	0	7	0	2	2 (hexadecimal) = <u>0010</u> (binary): A process code indicating that the download command is on.
WB 27	0	4	C	8	

- If the downloading is successfully completed:

WB 20	0	7	0	0	F07 is successfully downloaded.
-------	---	---	---	---	---------------------------------

- If the downloading is not successfully completed:

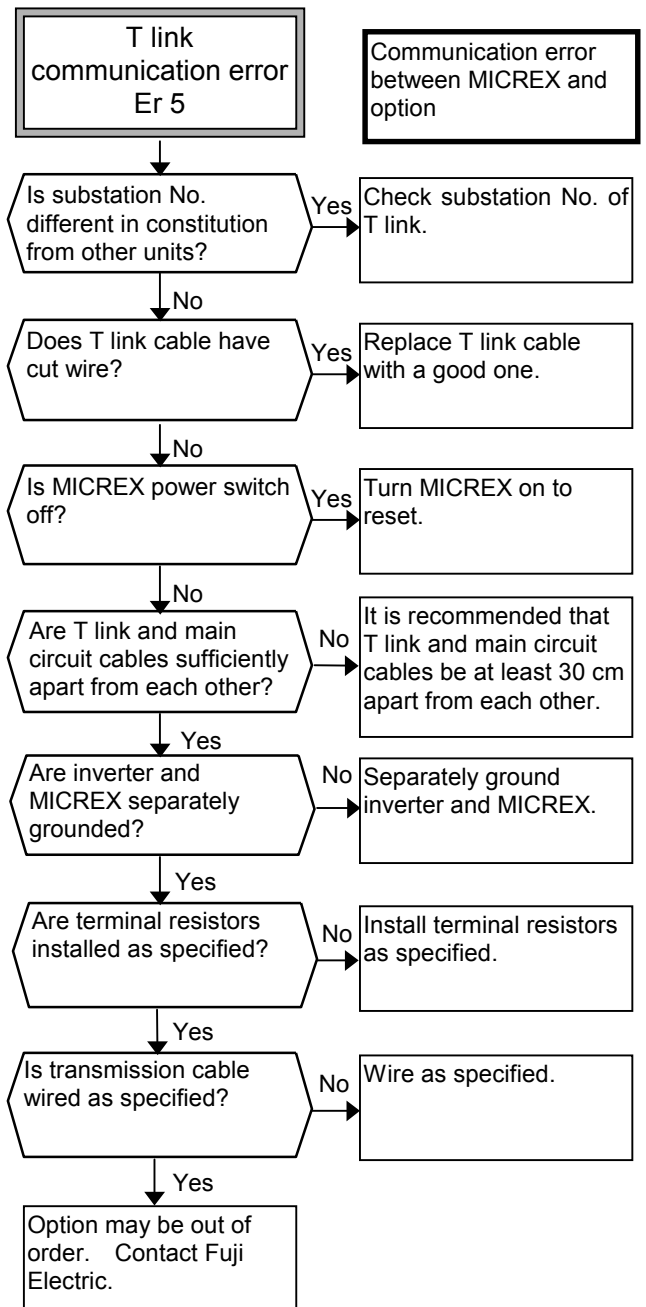
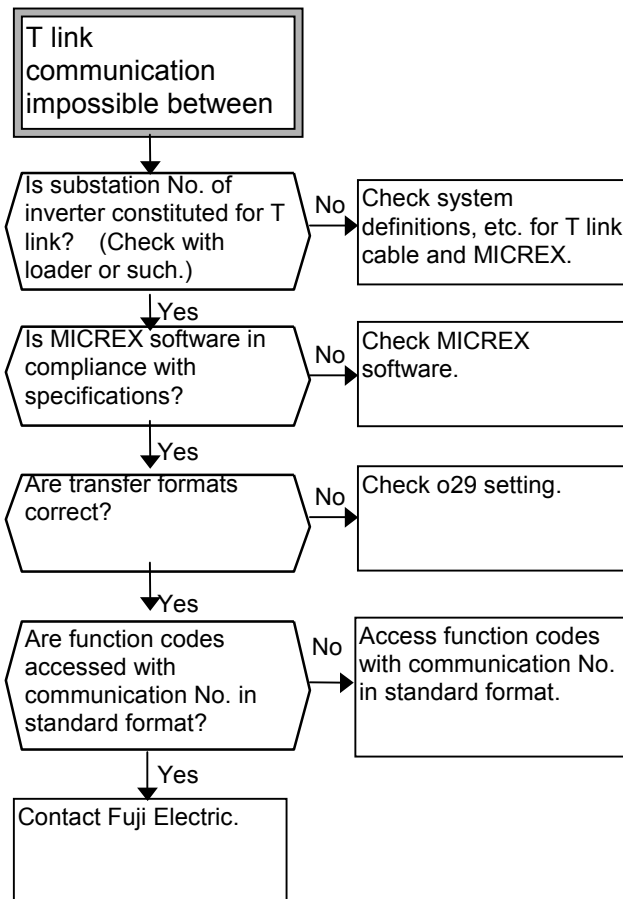
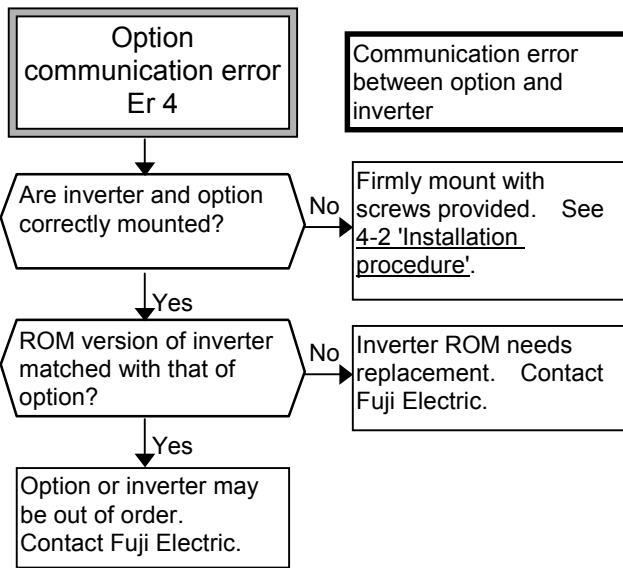
WB 20	0	7	0	C	C (hexadecimal) = <u>1100</u> (binary): A status code indicating a local mode error
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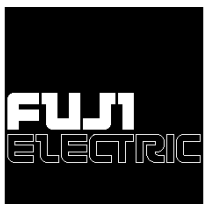
The procedures for setting the function codes are the same as used for G9 as shown above. The function code data may be programmed or uploaded using the data formats shown in Table 14 under 12 'List of Function Codes'. The data formats shown in this manual also apply in the G9 compatible mode except for M codes

Table 15

Data code	Code	Data code	Code
F	0	C	4
o	1	P	5
M	2	H	6
E	3	A	7

14. Troubleshooting





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