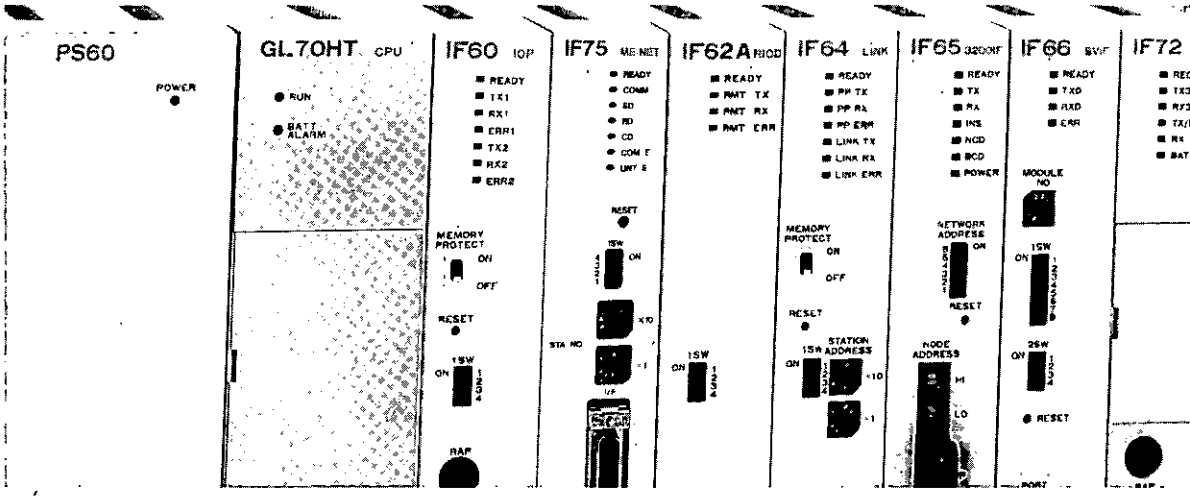
MEMOCON-SC GL60HT, GL70HT

PROGRAMMABLE CONTROLLER FOR ME-NET



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CONTENTS

1. INTRODUCTION 3

2. OUTLINE 4

3. SYSTEM CONFIGURATION 5
3.1 ME-NET SYSTEM CONFIGURATION 5
3.2 BASIC GL60HT, GL70HT CONFIGURATION 6

4. GL60HT, GL70HT SPECIFICATIONS 7
4.1 BASIC GL60HT, GL70HT SPECIFICATIONS 7
4.2 CPU MODULE SPECIFICATIONS 8
4.3 ME-NET INTERFACE MODULE SPECIFICATIONS 9

5. ME-NET COMMUNICATION FUNCTION 14
5.1 DATA LINK FUNCTION 14
5.1.1 Data Link Reference 14
5.1.2 Data Link Communication 16
5.1.3 Operation Flag 16
5.2 ME-NET COMPUTER LINK FUNCTION 18
5.2.1 Relation between Computer Link Memory Address and Reference 19
5.2.2 Computer Link Commands 21
5.2.3 GL60HT, GL70HT Computer Link Limitations and Precautions 22

6. LINK PARAMETER 23
6.1 LINK PARAMETER DATA 23
6.2 TYPICAL LINK PARAMETER ALLOCATION 28

7. ME-NET PROGRAMMER OPERATIONS 30
7.1 EQUIPMENT SETUP 31
7.2 FUNCTION TREE 32
7.2.1 On-line Mode 32
7.2.2 Off-line Mode 33
7.2.3 Description of Functions 34
7.3 OPERATION PROCEDURES 35
7.3.1 Power ON Operation 36
7.3.2 ATTACH Operation 37
7.3.3 SC Stop Operation 39
7.3.4 SC Start Operation 40
7.3.5 Data Link Stop Operation 41
7.3.6 Data Link Start Operation 42
7.3.7 Link Parameter Setting Operation 43
7.3.8 Loader Operations 54
7.3.9 Error Buffer Display Operation 64

8. ME-NET INSTALLATION AND EXECUTION RULES 66
8.1 SUMMARY 66
8.2 INSTALLATION AND EXECUTION RULES 66
8.2.1 Harmonic Coaxial Cable for use in ME-NET 66
8.2.2 End Stripping for Harmonic Coaxial Cable 70
8.2.3 End Stripping for Harmonic Metal Braid Armored Coaxial Cable 73
8.2.4 Installation of ME-GP-01 Type (Solderless) Connector 73
8.2.5 Waterproof and Insulating Connectors 75
8.2.6 Tools and Equipment Designed for use in ME-NET 76
8.2.7 Harmonics Coaxial Cable Installation 80
8.2.8 Connecting Harmonics Coaxial Cable Outside Control Board 82
8.2.9 Installing Metal Braid Armored Harmonic Coaxial Cable 83
8.2.10 Indicating Wire Gauge, Destination and ID Symbol for Harmonics Coaxial Cable 83
8.2.11 Checks Required After Wiring 86
8.2.12 Checks Communications 86

9. HANDLING AND MAINTENANCE 88
9.1 GL60HT OR GL70HT HANDLING 88
9.1.1 Installation of Mounting Bases 88
9.1.2 Installation of Modules 88
9.2 TROUBLESHOOTING 90

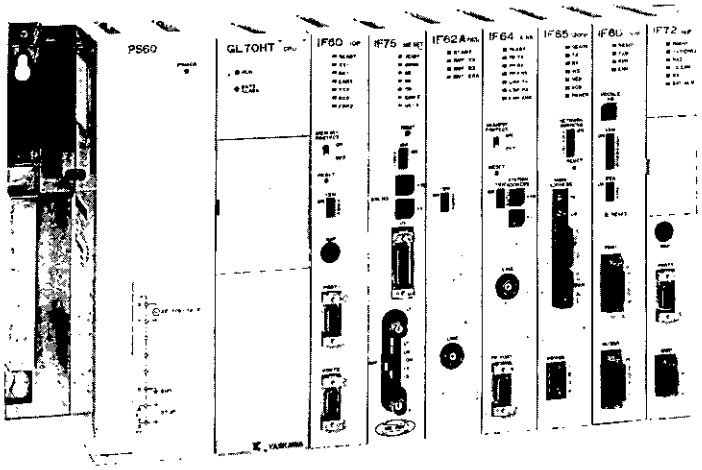
1. INTRODUCTION

The MEMOCON-SC GL60HT (hereafter called GL60HT) and the MEMOCON-SC GL70HT (hereafter called GL70HT) are MEMOCON-SC GL60H (hereafter called GL60H) and GL70H (hereafter called GL70H) Series compact large-capacity programmable controllers that conform to the ME-NET specifications. This manual contains the details for ME-NET communications capability and the instructions for implementing the communication functions.

Except that they are capable of communication on ME-NET, GL60HT and GL70HT are programmable controllers that offer the same functions as GL60H and GL70H. Therefore, read the following user's manuals for GL60H/GL70H before you proceed since they provide the information on arithmetic functions and instructions for the basic operation.

Reference

- MEMOCON-SC GL60H, GL70H USER'S MANUAL (SIE-C815-17.1)



MEMOCON-SC GL70HT FOR ME-NET

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Notes:

1. Due to ongoing product modification/improvement, all information, illustrations and specifications contained in this manual are subject to change without notice.
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3. All rights reserved. Reproduction of this manual, in whole or in part, is not permitted without prior written consent from YASKAWA ELECTRIC CORPORATION.
4. Send inquiries about ME-NET-capable equipment of other makers directly to the manufacturer of the equipment.

2. OUTLINE

ME-NET is a communications network that provides real time interconnections between control systems including programmable controllers and robot controllers made by different manufacturers, and can be positioned as the field bus in a plant system.

ME-NET is composed of a bus with a total length extending up to 1 km and is capable of interlinking up to 64 units of ME-NET capable equipment.

ME-NET has two communication functions-a data link function that permits cyclical transmission and reception of data based on link allocations and a computer link function that allows any computer on the network to communicate with a specific device.

This data link function allows up to 2048 points of relay links and 2048 bytes of register links to be linked. GL60HT/GL70HT uses internal coils and holding registers to provide data links to devices on ME-NET.

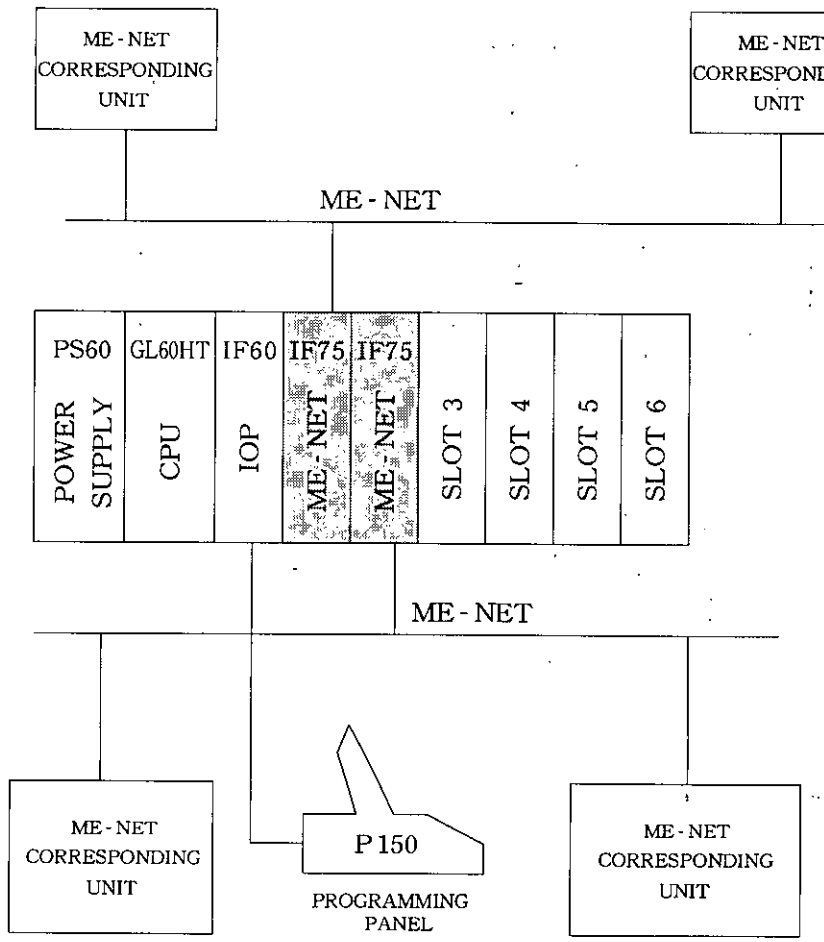
Table 2.1 ME-NET Communication Specifications

Item	Specifications
Communications Access standard	Token passing (Subset of IEEE 802.4)
Communications Network System	Bus system (Token bus system)
Modulation	Continuous phase frequency modulation (Carrier band)
Communication Speed	1.25 Mbps
Communication Media	JIS C 3501 75Ω coaxial cable
Total Cable Length	1 km
Connection Method	BNC connector
No. of Nodes	Up to 64 stations
Data Link Capacity	Relay Link: MAX 2048 points (256 bytes) Register Link: MAX 2048 bytes
Communication Function	Data link, computer link

3. SYSTEM CONFIGURATION

3.1 ME-NET SYSTEM CONFIGURATION

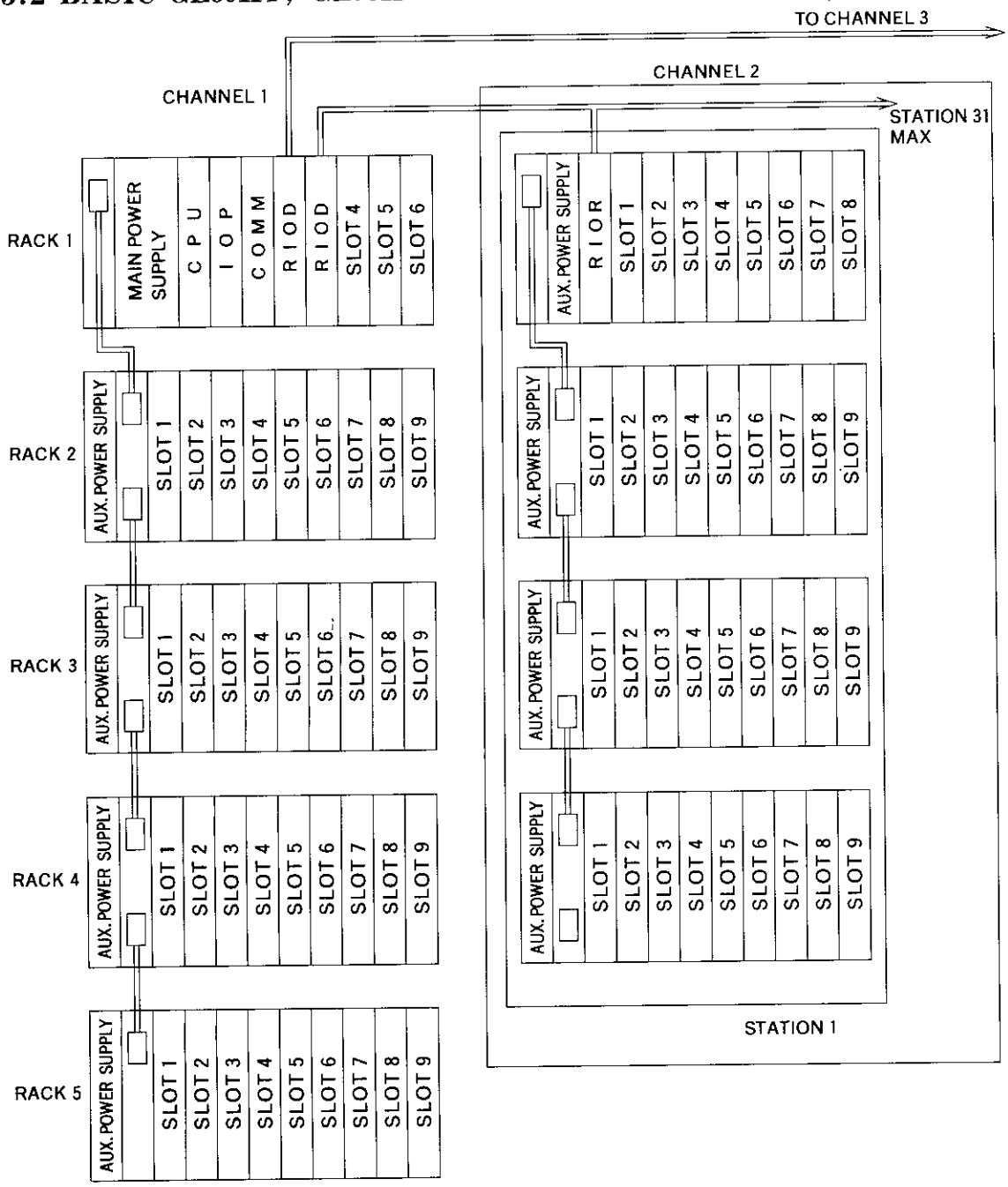
GL60HT/GL70HT can be linked to the ME-NET via a ME-NET interface module (Type: JAMSC-IF75, hereafter called IF75). GL60HT/GL70HT can accept up to two IF75s. Fig. 3.1 shows an example of ME-NET system configuration using a GL60HT equipped with two IF75s for upper and lower links. An IF75 can be inserted into any slot from Slot 1 to Slot 6.



PS60: Power supply module (JRMSP-PS60)
GL60HT: CPU module (DDSCR-GL60HT)
IF60: IOP module (JAMSC-IF60)
IF75: ME-NET interface module (JAMSC-IF75)
MB60: CPU mounting base (JRMSI-MB60)
P150: Programming panel (DISCT-P150-010)

Fig. 3.1 Typical ME-NET System Configuration

3.2 BASIC GL60HT, GL70HT CONFIGURATION



Notes:

1. Slots 1 to 3 are available in rack 1 of channel 1 (local). IF COMM and RIOD are not used, up to 6 slots are available. And up to 31 stations can be installed for channels 2 and 3 (remote) each; up to 4 racks can be installed for each station.
2. Up to 256 modules each for discrete input, discrete output, register input and register output; up to 1024 total I/0 modules, can be installed. Although the combination of input and output modules can be arranged freely, there are the following limitations:
   - Discrete input + discrete output $\leqq$ 4096
   - Register input + register output $\leqq$ 512

Fig. 3.2 Basic GL60HT, GL70HT Configuration

4. GL60HT, GL70HT SPECIFICATIONS

4.1 BASIC GL60HT, GL70HT SPECIFICATIONS

Table 4.1 Basic Specifications

Items	Specifications
Power Supply	Single-phase 85 to 132 VAC, 47.5 to 63Hz
Consumed Power	150VA (main power supply module), 70VA (aux. power supply module)
Holding Time	10 ms
Ambient Temperature	0 to + 55℃ (excluding peripheral devices)
Storage Temperature	−20℃ to + 85℃ (excluding lithium battery)
Humidity	30% to 95% relative (non-condensing)
Vibration-Resistance	In compliance with JIS* C 0911 (excluding peripheral devices)
Shock-Resistance	10 G max (excluding peripheral devices)
Environmental Condition	Free from explosive, inflammable, corrosive gases
Grounding	Grounding resistance: 100Ω or less
Dielectric Strength	1500 VAC for 1 minute
Insulation Resistance	100MΩ or more at 500 VDC
Noise Immunity	1500 Vp-p, pulse width: 1 μs, rising time: 1 ns

*Japanese Industrial Standard

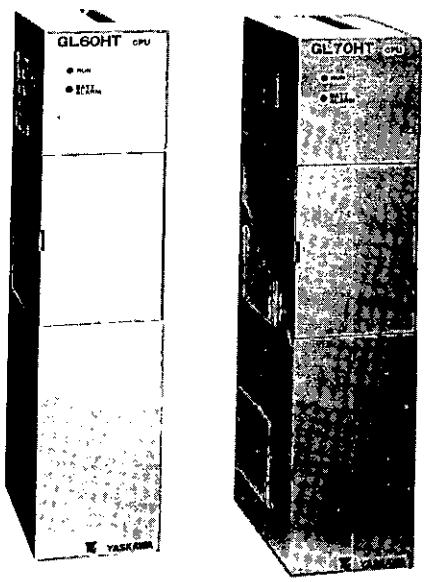


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Fig. 4.1 CPU Module

4.2 CPU MODULE SPECIFICATIONS

Table 4.2 CPU Module Specifications

Item	GL60HT	GL70HT
Type	DDSCR-GL60HT	DDSCR-GL70HT
Programming	Relay ladder diagram symbology, SFC (Sequential Function Chart)	
Program Memory Size	32K steps (24 bits per step)	64K steps (24 bits per step)
Data Memory Size	9999-word holding register, 4096-word constant register, 32k-word expanding register, 512-word input register, 512-word clock register (exclusive for SFC), 1024-word link register (exclusive for IF64)	
Basic Instruction Processing Time	0.083 μsec.	
Logic Function	Relay, timer, counter, arithmetic, arithmetic with sign, squared arithmetic, trigonometric function (since, cosine), move, move with index, data convertion, matrix, special function, ASCII, communication command, (memobus, YENET), motion command	
I/O Points	• Discrete I/O points: DI+DO $\leqq$ 4096 points (512 bytes) • Register I/O points: RI+RO $\leqq$ 512 registers (1024 bytes) • No.of local channels: 1 (42 I/O modules max in use per channel) • No.of remote channels: 2 (31 stations per channel)	
Diagnostic Check Function	• Checksum of memory • Watchdog timer • Battery monitoring (Battery Coil 4096) • Internal code • Reference number • I/O allocation • Memory diagnostic • Bus	
Communication I/F Function ( )indicates module required for I/F	• Memobus I/F function (JAMSC-IF60, JAMSC-IF61) • ASCII device I/F function (JAMSC-IF62A and JAMSC-IF71) • PC link I/F function (JAMSC-IF64) • YENET3200 I/F function (JAMSC IF65) • ME-NET communication I/F function (JAMSC-IF75) • Remote I/O communication I/O function (JAMSC-IF62A and JAMSC-IF70) • FMGC I/F function (JAMSC-IF72) • Servo I/F function (JAMSC-IF66)	

Notes:
1. Except that they are capable of communication on ME-NET, GL60HT/GL70HT have the same basic specifications as GL60H/GL70H. For details on specifications for sections other than the ME-NET section, refer to "MEMOCON-SC GH60H, GL70H USER'S MANUAL" (SIE-C815-17.1).
2. 4096 points are provided for the battery coils.

4.3 ME-NET INTERFACE MODULE SPECIFICATIONS

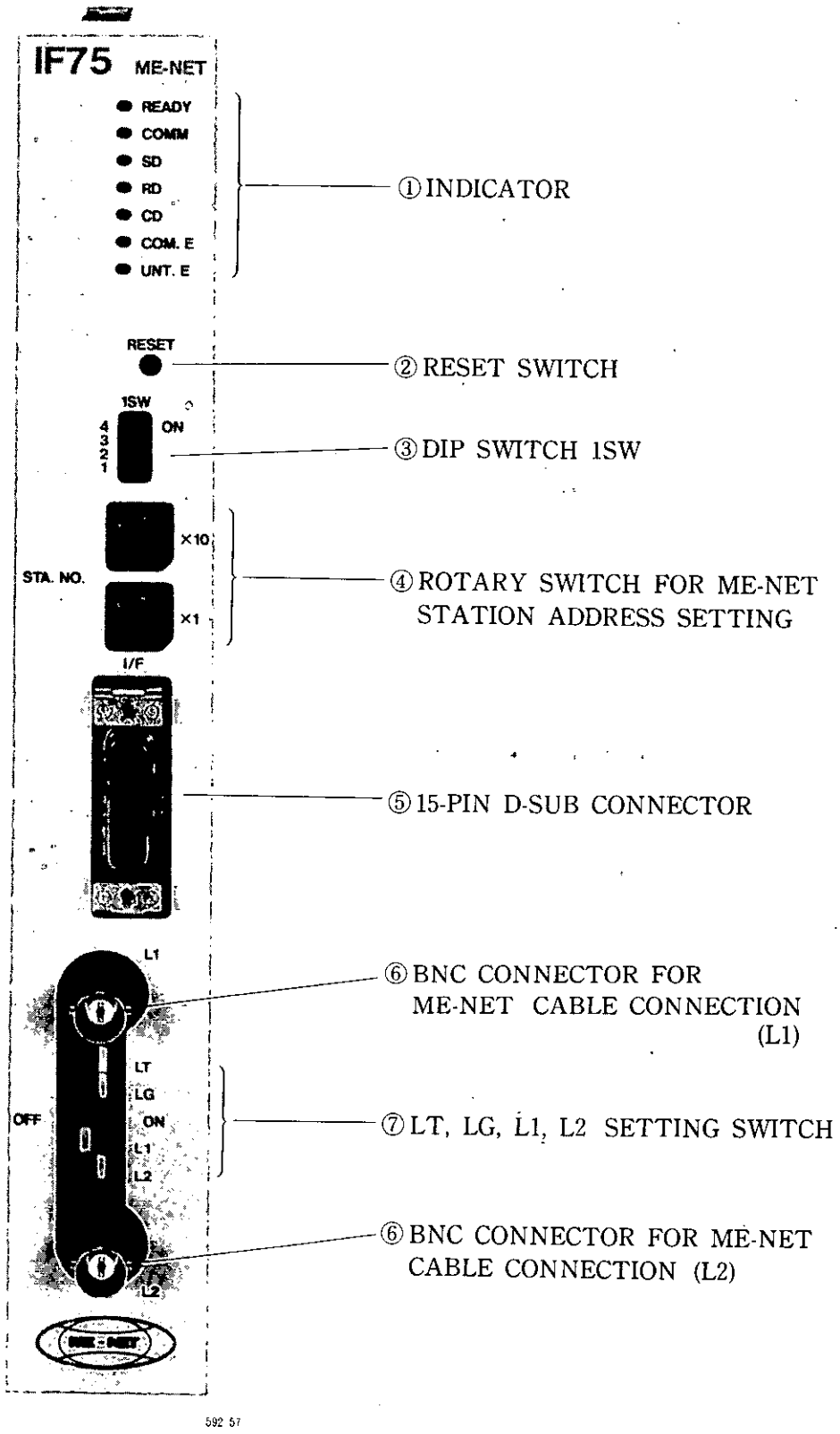


Fig. 4.2 ME-NET Interface Module

① Indicator

Table 4.3 List of Indicators

"LED"Name	Color	Description
READY	Green	Lights when IF75 normal.
COMM	Green	Lights during data link communication execution.
SD	Green	Blinks at data sending to ME-NET.
RD	Green	Blinks at data receiving from ME-NET.
CD	Green	Blinks at carrier detection.
COM.E	Red	Blinks if the ME-NET station setting rotary switch is set to "8" or "9" address. Lights if an ME-NET communication error or an incorrectly set link parameter exists.
UNT.E	Red	Blinks if IF75s watchdog timer is malfunctioning. Lights if IF75 hardware is malfunctioning.

- When COM.E indicator blinks:
  Reset the ME-NET station setting rotary switch (See ④) and select the correct number from 00 to 77, and turn the power ON again or depress the reset switch (See ②).

- When COM.E indicator lights:
  Check if the link parameters are correctly set. If the link parameters are correctly set and the indicator still goes ON after the power has been turned ON again or the reset switch has been depressed, replace the IF75 because its interface section is at fault.

- When UNT.E blinks or lights:
  If the indicator blinks or lights after the power has been turned ON again or the reset switch has been depressed, replace the IF75.

P150 can display an error code that specifies the problem. For details, see Par 7.3.9.

② Reset switch

Depressing this switch results in the same state as obtained when the power is turned ON again.

③ Dip switch 1SW

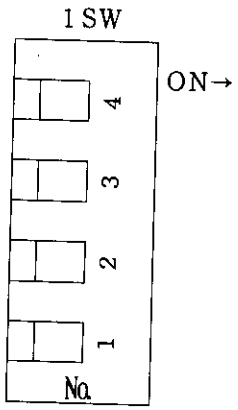


Fig. 4.3 Dip Switch

Table 4.4 Dip Switch Setting Function

Switch No.	Function	OFF	ON
1SW-1	IF75 module No. selector switch	1	2
1SW-2	Internal test mode selector switch†	Normal operation mode	Self-diaguosis mode
1SW-3	Computer link command selector switch	57-list	47-list 57-list
1SW-4	Not used‡	———	———

†: Use in OFF position at all times.
‡: Keep in OFF position.

• 1SW-1

GL60HT/GL70HT can accept up to two IF75s and the CPU needs to discriminate one from the other. 1SW-1 is a switch for setting a module number. Turn the switch to OFF position to choose Module No. 1 (hereafter called IF75-1) and turn it to ON position to choose Module No. 2 (hereafter called IF75-2). Setting the switch determines which internal coil and holding register can have access to data links. For details, see Par.5.1.2.

Note: When two IF75s are installed, the same module number cannot be set for both modules.

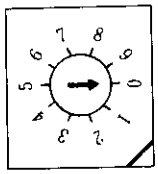
• 1SW-3

Computer links can be established with 57-and/or 47-list commands. 1SW-3 is used to select which command to accept. Turn the switch to OFF position to accept 57-list command and turn it to ON position to accept 47-and 57-list commands. For details on computer links, see Par.5.2.

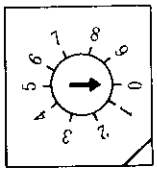
④ **ME-NET station address (station No.) setting rotary switch**

Use the upper switch to set high order digits and the lower switch to set low order digits. Use the octal numbering system (00 to 77) when setting address numbers (The number is set to 00 prior to shipment from the factory).

STA.NO.



x10 STATION NO. SWITCH
(UPPER DIGIT : 0 TO 7 EFFECTIVE)



x 1 STATION NO. SWITCH
(LOWER DIGIT : 0 TO 7 EFFECTIVE)

Fig. 4.4 Station Address Seting Rotary Switch

Table 4.5 Relation between Rotary Switch Setting and ME-NET Station No.

STA. NO. x10	STA. NO. x1	ME-NET Station No.	STA. NO. x10	STA. NO. x1	ME-NET Station No.	STA. NO. x10	STA. NO. x1	ME-NET Station No.
0	0	Master Station	3	0	Slave Station 24	6	0	Slave Station 48
0	1	Slave Station 1	3	1	Slave Station 25	6	1	Slave Station 49
0	2	Slave Station 2	3	2	Slave Station 26	6	2	Slave Station 50
0	3	Slave Station 3	3	3	Slave Station 27	6	3	Slave Station 51
0	4	Slave Station 4	3	4	Slave Station 28	6	4	Slave Station 52
0	5	Slave Station 5	3	5	Slave Station 29	6	5	Slave Station 53
0	6	Slave Station 6	3	6	Slave Station 30	6	6	Slave Station 54
0	7	Slave Station 7	3	7	Slave Station 31	6	7	Slave Station 55
1	0	Slave Station 8	4	0	Slave Station 32	7	0	Slave Station 56
1	1	Slave Station 9	4	1	Slave Station 33	7	1	Slave Station 57
1	2	Slave Station 10	4	2	Slave Station 34	7	2	Slave Station 58
1	3	Slave Station 11	4	3	Slave Station 35	7	3	Slave Station 59
1	4	Slave Station 12	4	4	Slave Station 36	7	4	Slave Station 60
1	5	Slave Station 13	4	5	Slave Station 37	7	5	Slave Station 61
1	6	Slave Station 14	4	6	Slave Station 38	7	6	Slave Station 62
1	7	Slave Station 15	4	7	Slave Station 39	7	7	Slave Station 63
2	0	Slave Station 16	5	0	Slave Station 40	*	8	Ineffective
2	1	Slave Station 17	5	1	Slave Station 41	*	9	Ineffective
2	2	Slave Station 18	5	2	Slave Station 42	8	*	Ineffective
2	3	Slave Station 19	5	3	Slave Station 43	9	*	Ineffective
2	4	Slave Station 20	5	4	Slave Station 44			
2	5	Slave Station 21	5	5	Slave Station 45			
2	6	Slave Station 22	5	6	Slave Station 46			
2	7	Slave Station 23	5	7	Slave Station 47			

* 0 to 7

⑤ 15-Pin D-sub connector

This connector is reserved for future use and is not required for use with IF75. Connect no connectors to it.

⑥ BNC connector for ME-NET cable connection (L1 and L2)

Those connectors are used to connect ME-NET cables. Use L1 or L2 when connecting an ME-NET cable. Do not use the two connectors at the same time. When BNC connector L1 is in use, set the L1 switch to ON. When BNC connector L2 is in use, set the L2 switch to ON. For further information on the L1 and L2 switches, see the following⑦. For ME-NET cable installation, see Par. 8.

⑦ LT, LG, L1, L2 setting switch

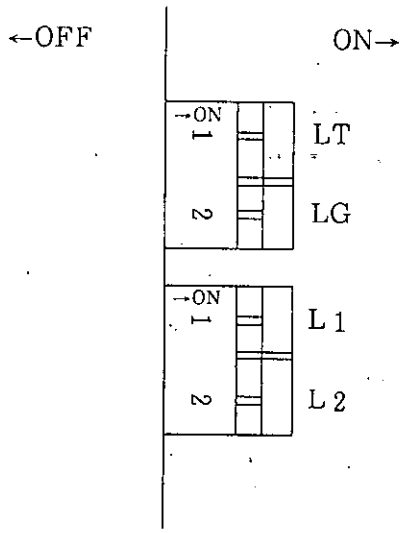


Fig. 4.5 LT, LG, L1, L2 Switch

Table 4.6 LT, LG, L1, L2 Switch Setting Function

Switch No.	Name	Description
LT	Terminating resistance setting switch	Setting this switch to ON will connect terminating resistance. This switch should be set to ON at stations located at each end of the ME-NET line.
LG	Shield setting switch	Setting this switch to ON will provide electrical connections between the shielding of the ME-NET cable and the frame ground of GL60HT/GL70HT. Normally it is set to ON.
L1	Communication line L1 connecting switch	Set this switch to ON when the ME-NET cable is connected to BNC connector L1.
L2	Communication line L2 connecting switch	Set this switch to ON when the ME-NET cable is connected to BNC connector L2.

5. ME-NET COMMUNICATION FUNCTION

5.1 DATA LINK FUNCTION

The data link function allows devices on ME-NET to share up to 2048 link relays and a data area of up to 2048 bytes stored in link registers and permits exchange of data with each other.

The link parameters allocate an area in the shared data link to be transmitted or received. The link parameters are stored in the communication interface unit of the ME-NET master (In the case of GL60HT/GL70HT, it is placed in IF75 with the station address of 00). For details on link parameters, see Par. 6.

In GL60HT/GL70HT, some of the internal coils and holding registers are used and assigned to a data link area.

5.1.1 Data Link Reference

Table 5.1 shows references that can be used as the data link area. In the case of IF75-1, 2048 internal coils from 04097 to 06144 are used as the relay link area and 1024 registers (2048 bytes) from holding registers 47926 to 48949 are allocated as the register link area. Similarly, in the case of IF75-2, internal coils from 06145 to 08192 are used as the relay link area while holding registers from 48950 to 49973 are allocated as the register link area. When ME-NET is not used, the internal coils and the holding registers allocated for those areas can be used as normal internal coils and internal registers.

Operation flags portray a communication status. For details see Par. 5.1.3.

Table 5.1 ME-NET Data Reference

Name	Data Reference	
	IF75-1	IF75-2
ME-NET Link Relay	04097 - 06144	06145 - 08192
ME-NET Link Register	47926 - 48949	48950 - 49973
Operation Flag	49974 - 49985	49986 - 49997

Note: The number that follows "JAMSC-IF75-" indicates a module number. For module number setting, see Par. 4.3.

Although the base unit for the data link area is one byte, the base unit of data for GL60HT/GL70HT is two bytes. The data link area of ME-NET and the corresponding references of GL60HT/GL70HT are shown in Fig. 5.1.

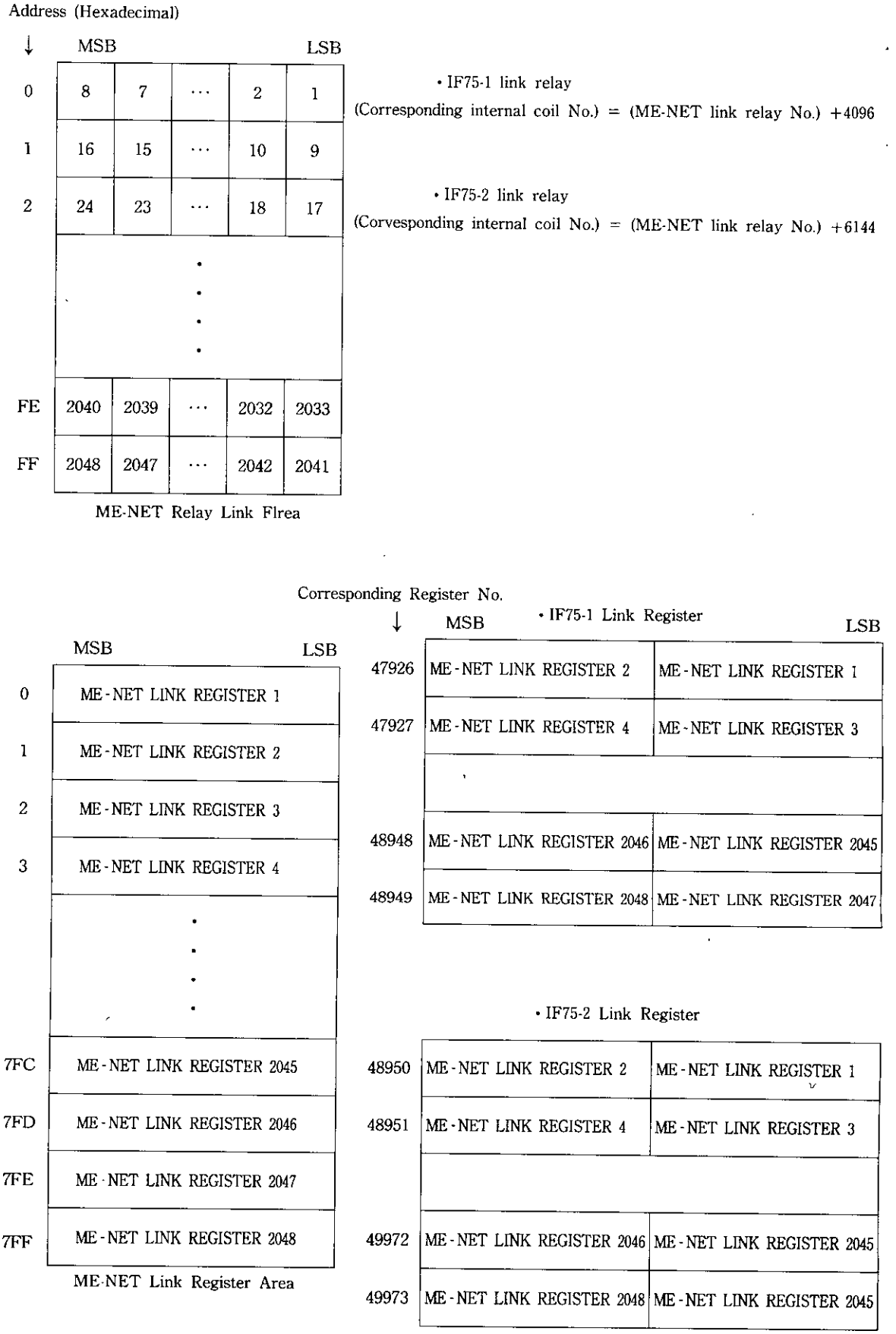


Fig. 5.1 GL60HT, GL70HT Data Link Corresponding Relation

5.1.2 Data Link Communication

Fig. 5.2 shows a conceptual example of three devices communicating via data link: each station is transmitting its data to the other station in a simultaneous calling after it has received the token.

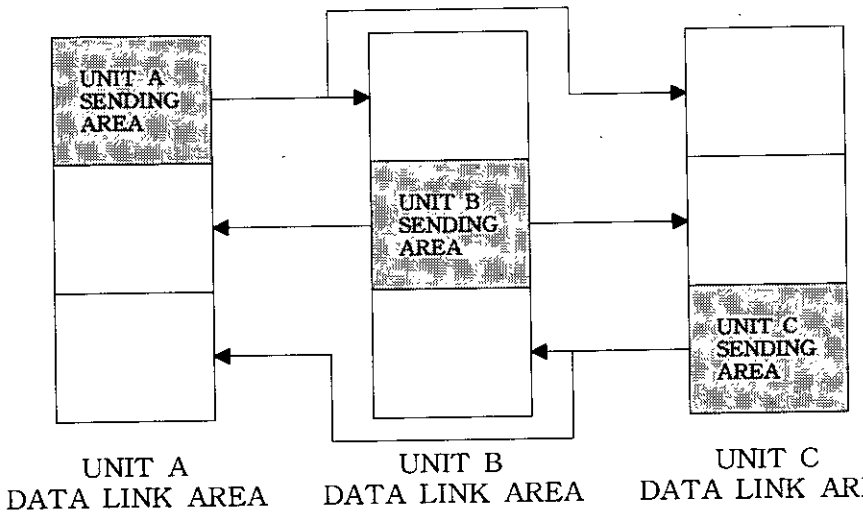


Fig. 5.2 Conceptual Diagram of ME-NET Data Link Communication

5.1.3 Operation Flag

Fig. 5.3 shows a communication flag table with a register length of 12, consisting of three types of operating flags: communication monitoring flag, status monitoring flag 1 and status monitoring flag 2. Each flag has a register length of 4 (64 bits = 64 stations). The operation flags indicate the communication status on ME-NET.

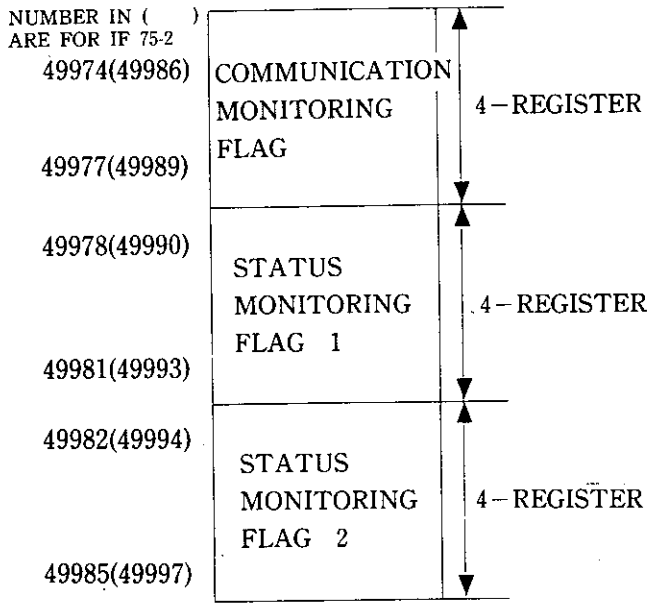


Fig. 5.3 Operation Flags

① Communication monitoring flag

The communication monitoring flag shows the status of communication with another station. The relevant bit 1 indicates a normal communication with the station.

	MSB															LSB
49974(49986)	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
49975(49987)	37	36	35	34	33	32	31	30	27	26	25	24	23	22	21	20
49976(49988)	57	56	55	54	53	52	51	50	47	46	45	44	43	42	41	40
49977(49989)	77	76	75	74	73	72	71	70	67	66	65	64	63	62	61	60

↑
CORRESPONDING STATION NO. (OCTAL NOTATION)

Fig. 5.4 Communication Monitoring Flag

② Status monitoring flag 1

The status monitoring flag 1 shows the status of operation of another station. The relevant bit 1 indicates that the station is under operation.

49978(49990)	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
49979(49991)	37	36	35	34	33	32	31	30	27	26	25	24	23	22	21	20
49980(49992)	57	56	55	54	53	52	51	50	47	46	45	44	43	42	41	40
49981(49993)	77	76	75	74	73	72	71	70	67	66	65	64	63	62	61	60

Fig. 5.5 Status Monitoring Flag 1

③ Status monitoring flag 2

The status monitoring flag 2 shows a norma/abnormal status of mother station. The relevant bit 1 indicates that the station is normal.

49982(49994)	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
49983(49995)	37	36	35	34	33	32	31	30	27	26	25	24	23	22	21	20
49984(49996)	57	56	55	54	53	52	51	50	47	46	45	44	43	42	41	40
49985(49997)	77	76	75	74	73	72	71	70	67	66	65	64	63	62	61	60

Fig. 5.6 Status Monitoring Flag 2

5.2 ME-NET COMPUTER LINK FUNCTION

The computer link function allows a computer on ME-NET to communicate with a specific device. Illustrated in Fig. 5.7 is the concept of communication via a computer link. In the illustration, GL60HT/GL70HT is providing the communication service in response to the FA computer request for communication service via the computer link.

This section deals with the computer link service which GL60HT/GL70HT can provide and the limitations of the service. For detailed information on an FA computer that issues a computer link command, contact the manufacturer of the computer.

The main functions of the computer link communication include reading out from and writing into relays and registers, reading and writing of programs, starting and stopping programmable controller operations.

Two types of computer link commands, 47-list and 57-list commands, can be accepted. Selection of a computer link command is made via the dip switch installed in the front of 1F75. For setting instructions, see Par. 4.3.

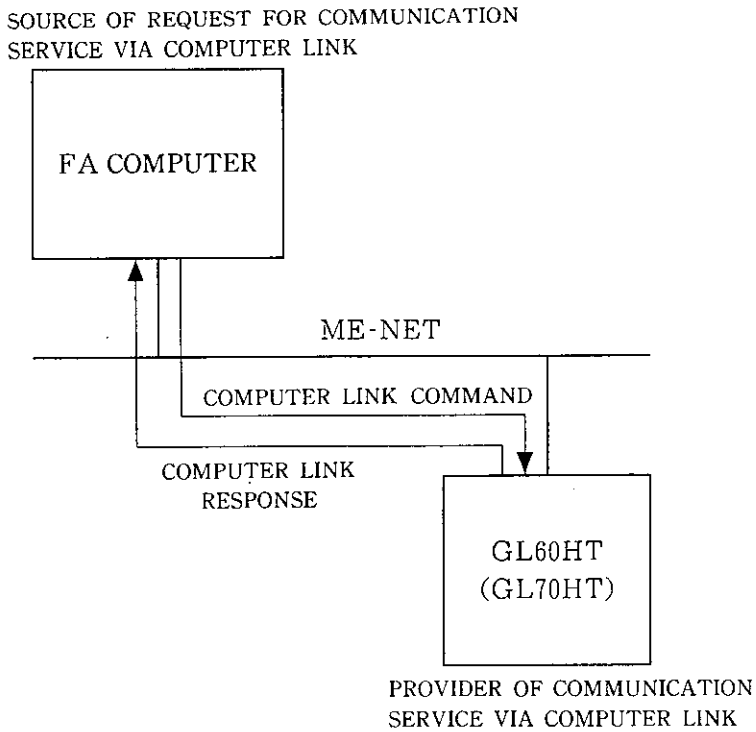


Fig. 5.7 Conceptual Diagram of ME-NET Computer Link Communication

5.2.1 Relation between Computer Link Memory Address and Reference

The ME-NET computer link memory addresses and the corresponding references of GL60HT/GL70HT are shown in Fig. 5.2 (for 57-list) and Fig. 5.3 (47-list).

Notes: 1. Since data from PLC are comprised of a word length of 16 bits, one register has a memory of 2 bytes.

2. One step in program memory is comprised of three bytes.

Table 5.2 Relation between Computer Link Memory Address and Reference (57-list)

Area	ME-NET Memory Address (Octal Notation)	GL60HT, GL70HT Corresponding Reference	Name	Capacity
Relay	Byte address: 0000 to 0777 Bit address: 0 to 7	00001 to 04096	Output Coil	4096 Points
Relay	Byte address: 1000 to 1777 Bit address: 0 to 7	04097 to 08192	Internal Coil	4096 Points
Register	Address: 004000 to 053035 SEG: 0	40001 to 49999	Holding register	9999 Points
Register	Address: 053400 to 055377 SEG: 0	30001 to 30512	Input register	512 Points
Register	Address: 055400 to 075377 SEG: 0	31001 to 35096	Constant register	4096 Points
Register	Address: 075400 to 100777 SEG: 0	R0001 to R1024	Link register	1024 Points
Register	Address: 101000 to 102777 SEG: 0	50001 to 50512	Clock register	512 Points
Program	Address: 000000 to 177777 SEG: 8 Address: 000000 to 077777 SEG: 9		Ladder program	32768 Steps

Table 5.3 Relation between Computer Link Memory Address and Reference (47-list)

Area	ME-NET Memory Address (Octal Notation)	GL60HT, GL70HT Corresponding Reference	Name	Capacity
Relay	Byte address: 000000 to 000777 Bit address (BLOC): 0 to 7 SEG: 0	00001 to 04096	Output Coil	4096 Points
Relay	Byte address: 001000 to 001777 Bit address (BLOC): 0 to 7 SEG: 0	04097 to 08192	Internal Coil	4096 Points
Relay	Byte address: 002000 to 002777 Bit address (BLOC): 0 to 7 SEG: 0	10001 to 14096	Input relay	4096 Points
Relay	Byte address: 003000 to 003177 Bit address (BLOC): 0 to 7 SEG: 0	R0001 to R1024	Link relay	1024 Points
Relay	Byte address: 003200 to 003277 Bit address (BLOC): 0 to 7 SEG: 0	S001 to S512	Step	512 Points
Register	Address: 004000 to 053035 SEG: 0	40001 to 49999	Holding register	9999 Points
Register	Address: 053400 to 055377 SEG: 0	30001 to 30512	Input register	512 Points
Register	Address: 055400 to 075377 SEG: 0	31001 to 35096	Constant register	4096 Points
Register	Address: 075400 to 101377 SEG: 0	R0001 to R1024	Link register	1024 Points
Register	Address: 101400 to 103377 SEG: 0	50001 to 50512	Clock register	512 Points
Program	Address: 000000 to 177777 SEG: 8 Address: 000000 to 177777 SEG: 9		Ladder program	32768 Steps

5.2.2 Computer Link Commands

Computer link commands are listed in Fig. 5.4. GL60HT/GL70HT is capable of processing commands marked with ○.

Table 5.4 List of Computer Link Commands

Command Code (HEX)	Function	57-list	47-list
2 0	Relay reading-out (1 Point)	○	○
3 0	Relay Setting, reset	○	○
3 2	Timer/Counter setting, reset	×	×
2 4	Register reading-out	○	○
3 4	Register writing-in	○	○
3 5	Register filling	○	○
0 4	Program reading-out	○	○
1 4	Program writing-in	○	○
F 8	Program mode change	○	○
E 8	Program mode reading-out	○	○
F 9	Writing-in Permission mode setting	○	○
E 9	Writing-in Permission mode reading-out	○	○
6 F	Maker code reading-out	○	○
4 F	Various information reading-out	○	—

5.2.3 GL60HT, GL70HT Computer Link Limitations and Precautions

Note the following in connection with the limitations of GL60HT/GL70HT on their capability for processing computer link commands issued by an FA computer due to their internal design.

(1) GL60HT and GH70HT are not equipped with fixed timer coils and counter coils. Therefore, they send back an NAK response message when they receive the timer/counter setting/reset command (command code 32). This is a limitation applicable to both 47-and 57-list commands.

(2) Since the data handled by registers used in GL60HT/GL70HT are comprised of a word length of 16 bits (2 bytes), note the following when executing the read-out-from register command (command code 24), write-into-register command (command code 34) or register-fill command (command code 35). This note applies to both 47- and 57-list commands.

The odd address "m" of start addresses of registers in the computer link starts from high order bytes of the corresponding GL60HT/GL70HT registers.

[Example of relation between computer link registers and GL60HT/GL70HT registers]

☐ Addresses shown in the table are for computer link registers (57-list).

GL60HT,GL70HT 4xxxx REGISTER ↓	UPPER BYTE	LOWER BYTE
40001	004001	004000
40002	004003	004002
40003	004005	004004
	:	:
49998	053033	053032
49999	053035	053034

	UPPER BYTE	LOWER BYTE
30001	053401	053400
30002	053403	053402
30003	053405	053404
	:	:
30511	055375	055374
30512	055377	055376

(3) The GL60HT/GL70HT program memory is designed to contain 24 bits (3 bytes) words. Note the following limitations when executing the program read-out command (command code 04) and program write-in command (command code 14).

[47-list]

- Use a multiple of 3 for the start address of a program.

[57-list]

- Use a multiple of 3 for the start address of a program.
- Set a multiple of 3 for the byte length of data to be read-out or written-in.

6. LINK PARAMETER

The link parameters are used to allocate a data link area. Set the link parameters on the master (station number "00"). The link parameters thus set are automatically transmitted to the slaves when the power is turned ON.

In GL60HT/GL70HT, the link parameters are stored in the EE-PROM (electrically erasable read-only memory) of IF75 with the station number of 00. Since it is stored in the EE-PROM, the link parameter data are retained after the power has been turned OFF. The link parameters are set with the ME-NET programmer. For details, see Par. 7.

6.1 LINK PARAMETER DATA

Table 6.1 shows data to be allocated by the link parameters.

The link parameters are used to set the number of stations to be linked to ME-NET, and the head address and the transmitting byte size of the data link area (relay links and register links) in each station on ME-NET.

In Table 6.1 the affixed number "8" indicates octal numerals, the affixed letter "H" represents hexadecimal numerals and no affixed letter or number means the decimal numbering system.

(1) Number of stations to be linked

The number of stations to be linked to ME-NET must be determined. Select from 2 (028) to 64 (778).

(2) Head address

The head address of the data link area to be shared must be set at each station.

The slave can have the same head address as the master or it can have separate head address.

If the slave has the same head address as the master, its head address will be disregarded. If the head address is to be set separately, it must be set as follows.

- Relay link head address (0000H-FFFFH)
- Register link head address (File number 0-7, Address 0000-FFFFH)

Determine what to set for the head address according to the link parameter specifications of each device. In the case of GL60HT/GL70HT, the data link area is fixed (See Par. 5.1) and therefore, set the head address to 0000 (relay link) and 0000 (register link).

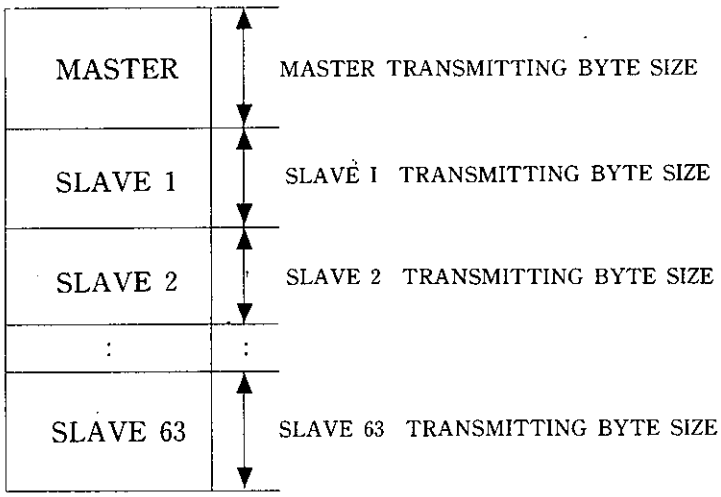
(3) Transmitting byte size

The transmitting byte size of each station in the data link area must be determined. Setting the transmitting byte size will determine the transmission area of each station. The transmission area will be allocated in order of station number starting with the master based on the transmitting byte size that has been determined (Fig. 6.1). Even if station numbers are set irregularly, the transmission area will be allocated in smallest-to-largest order of station number.

Relay link: Since the relay link area has 256 bytes (2048 points), determine the transmitting byte size of the relay link of each station so that the sum of the bytes of each station comes to 256 bytes or less.

Register link: Since the register link area has 2048 bytes, determine the transmitting byte size of the register link of each station so that the sum of the bytes of each station amounts to 2048 bytes or less.

Also determine the transmitting byte size of each station so that the sum of the transmitting bytes for the relay link and the register link of each station comes to 1024 bytes or less.



① Relay link transmitting byte size

(Master transmitting byte size)+(Slave 1 transmitting byte size)+(slave 2 transmitting byte size)···+(Slave 63 transmitting byte size) ≦ 256

② Register link transmitting byte size

(Master transmitting byte size)+(Slave 1 transmitting byte size)+(Slave 2 transmitting byte size)···+(Slave 63 transmitting byte size) ≦ 2048

③ Each station relay link, register link transmitting byte size

(Relay link transmitting byte size)+(Register link transmitting byte size) ≦ 1024

Fig. 6.1 Relation between Transmitting Byte Size and Transmission Area

Note: Limitations on the number of transmitting bytes of GL60HT/GL70HT

Although the base unit of data for the relay link and the register link is one byte, the base unit of data that GL60HT/GL70HT adopt it two bytes. Therefore, determine the transmitting byte size of the stations located before GL60HT/GL70HT so that the sum of their transmitting bytes amounts to an even number. In addition, set an even-numbered transmitting byte size for GL60HT/GL70HT. For example, in the illustration shown in Fig. 6.2, if the master, and slaves 1 and 2 are equipment manufactured by other companies and slave 3 is GL60HT/GL70HT, the transmitting byte size will have to be set as follows:

(Master station transmitting byte size)+(Slave 1 transmitting byte size)+(Slave 2 transmitting byte size)=(Even-number byte)

(Slave 3 transmitting byte size)=(Even-number byte)

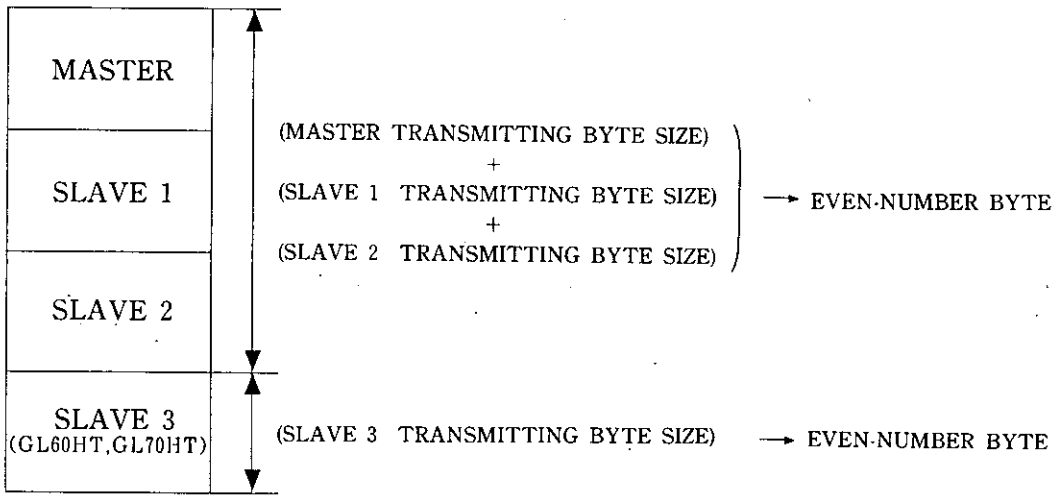


Fig. 6.2

(4) Flag head address

The head address of the communication monitoring flag must also be determined. Since GL60HT/GL70HT have fixed communication monitoring flags, 000 must be set for them.

(5) Link start switch

This parameter is used to start or stop data link operations, and to allow writing into EE-PROM. In GL60HT/GL70HT, this parameter is determined through link start and stop operations and loader operations. For details, see Par. 7.

Table 6.1 Link Parameter Data

Link Parameter Name	Link Parameter Data
Master Relay Link Area Head Address	The head address (0000-FFFFH) of the relay link area on the master must be determined. Set "0000" for GL60HT/GL70HT. Note: If the master accommodates ME-NET capable equipment other than GL60HT/GL70HT, the link parameter setting specified for the equipment must be used.
Data Link Function Selection	Set 1.
Number of Connected Station	Set the number of units to be connected to ME-NET (2 to 64 effective).
Slave 1 Relay Link Area Head Address	• Set relay link area head address (0000 to FFFF) on Slave 1. • Use the same head address as the master or determine a separate head address. If the same head address as the master is selected, the head address will be disregarded. Use the same head address as the master for GL60HT/GL70HT. Note: If the master accommodates ME-NET capable equipment other than GL60HT/GL70HT, the link parameter setting specified for the equipment must be used.
Slave 2 Relay Link Area Head Address	Set slave 2 data link area head address. Data means the same as slave 1.
:	:
Slave 63 Relay Link Area Head Address	Set slave 63 data link area head address. Data means the same as slave 1. Set the file No. (00-07H) and address (0000-FFFFH) which indicate the master register link area head address.
Master Register Link Area Head Address	Set file No.00 and address 0000 for the GL60HT/GL70HT. Note: If the master accommodates ME-NET capable equipment other than GL60HT/GL70HT, the link parameter setting specified for the equipment must be used.
Slave 1 Register Area Head Address	• Set the file No.(00-07H) and address (0000-FFFFH) which indicate the slave 1 register link area head address. • Use the same head address as the master or determine a separeate head address. If the same head address as the master is selected, the head address will be disregarded. Use the same head address as the master for GL60HT/GL70HT. Note: If the master accommodates ME-NET capable equipment other than GL60HT/GL70HT, the link parameter setting specified for the equipment must be used.

Table 6.1 Link Parameter Data (Cont'd)

Link Parameter Name	Link Parameter Data
Slave 2 Register Link Area Head Address	Set the slave 2 register link area head address. Data means the same as slave 1.
:	:
Slave Register Link Area Head Address	Set the slave 63 register link area head address. Date means the same as slave 1.
Master Relay Link Transmitting Byte Size	Set 0 to 256.
Slave 1 Relay Link Transmitting Byte Size	Set 0 to 256.
:	:
Slave 63 Relay Link Transmitting Byte Size	Set 0 t0 256.
Master Register Transmitting Byte Size	Set 0 to 1024.
Slave 1 Register Link Transmitting Byte Size	Set 0 to 1024.
:	:
Slave 63 Register Link Transmitting Byte Size	Set 0 to 1024.
Flag Head Address	• Set the file No.(00-07H) and address (0000H) which indicates the flag head address. Set file No.00 and address 0000 for the GL60HT/GL70HT. • Set the parameter either to allow the flag to be output to the PLC or prohibit it from being output to the PLC. Set to 80H to allow the flag to be output to the PLC, and set to 00H to prohibit it from being output to the PLC.
Link Start Switch	This switch is used to start or stop data link operations. Set to 00H to stop the operations, and set to 01H to start the operations. Set to 80H to allow writing the link parameters into the EE-PROM and stop the operations, and set to 81H to allow writing the link parameter into the EE-PROM and start the operations. Set to 08H to initialize the EE-PROM.

6.2 TYPICAL LINK PARAMETER ALLOCATION

An example of link parameter allocation is shown below.

[Example of system configuration]

Three units of GL60HT are interlinked via ME-NET. Station numbers are determined for each station as follows: Master (008), Slave 3 (038) and Slave 9 (118). Module number 1 is set for IF75.

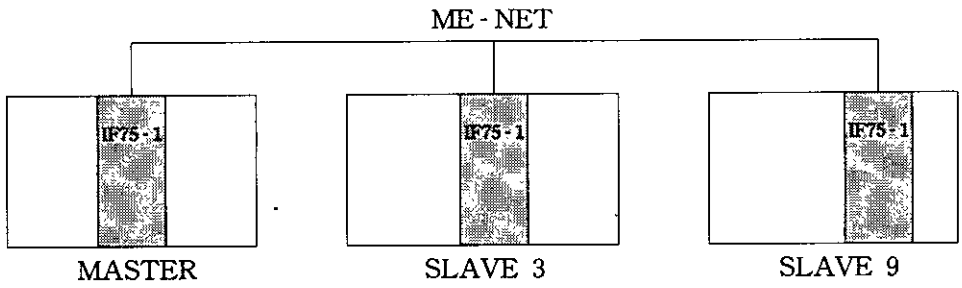


Fig. 6.3 Typical System Configuration

[Example of link allocation]

- Head address

  Since only GL60HT units are used, the head address of the master will be set to 0000 and the same head address will be set for both Slave 3 and 9.

- Transmitting byte size

  Transmitting byte size for relay links

  Master: 16 bytes; Slave 3: 8 bytes; Slave 9: 32 bytes

  Transmitting byte size of register links

  Master: 32 bytes; Slave 3: 32 bytes; Slave 9: 16 bytes

The data link relations shown in Figs. 6.4 and 6.5 will be established by the above allocation.

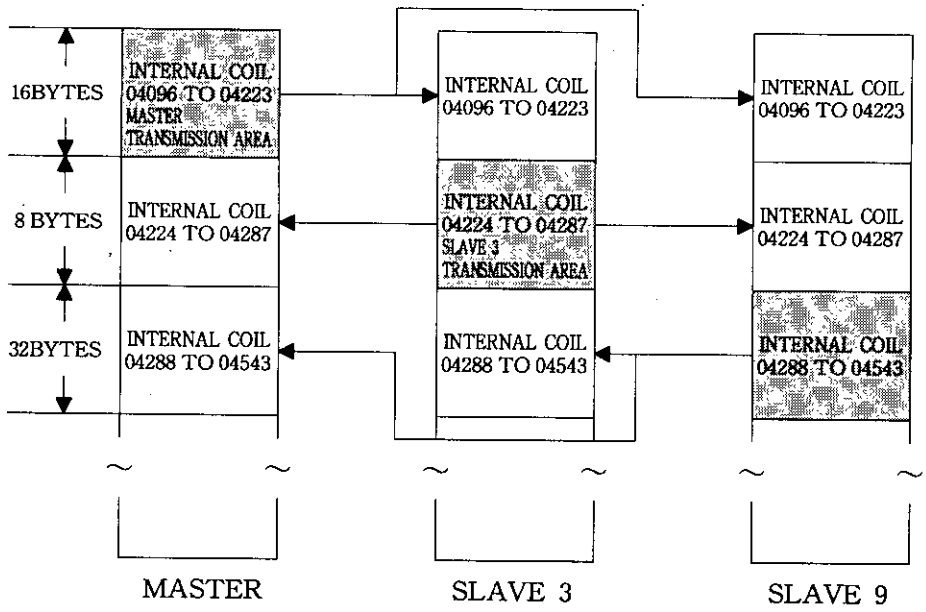


Fig. 6.4 Relay Link

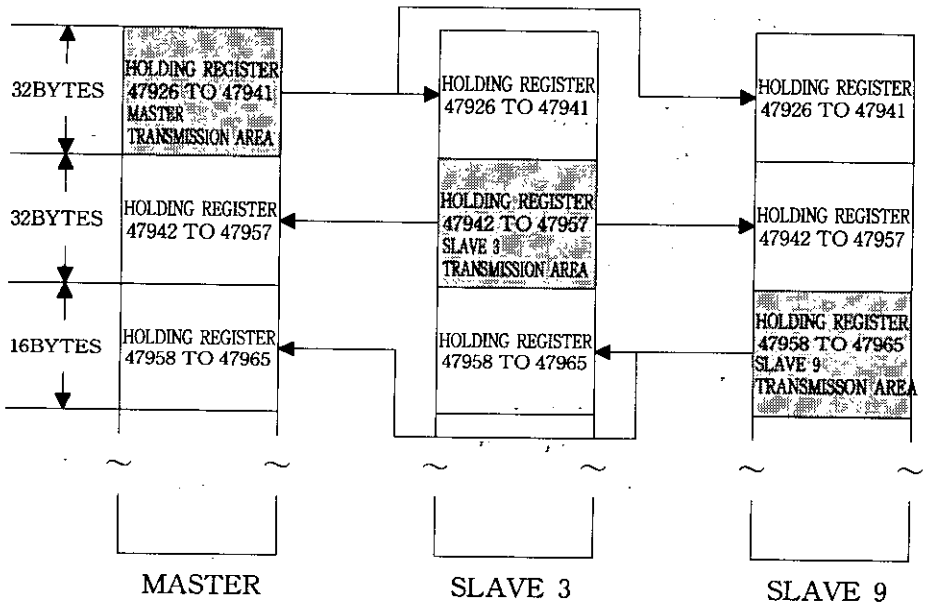


Fig. 6.5 Register Link

7. ME-NET PROGRAMMER OPERATIONS

The ME-NET programmer (Type: F70H-E007) is a system disk designed for the programming panel P150 (Type: DISCT-P150-010, hereafter called P150) and provides functions useful for implementing allocations for ME-NET, and monitoring errors. The basic operations including the programming operations using ladder and the monitor operations are performed by GL70H on-line programmer (Type: F70H-E001).

This section provides operational instructions for the ME-NET programmer.

Fig. 7.1 P150 Programming Panel 586-241

Table. 7.1 P150 Performance Specifications

Item		Specifications
Type		DISCT-P150-10
CPU		IAPX 186 (8 M Hz)
ROM		16k bytes (bootstrap and diagnostic)
Display Screen		Plazma display, orange, size 230 × 144 mm
Display Capability	Text Display	AN*: 25 lines × 80 words
	Dot Matrix	AN*: 8 × 16 dots (25 lines)
	Character Attribute	Reverse, blink, underline, blind
	Graphic Display	640 × 400 dots
Keyboard		94 keys, sculptured type
Floppy Disk Drive		Two 3.5-inch floppy disks (double-sided, double-density) Built-in
Serial Interface		One RS-232C and one RS-232C/422 port
Parallel Interface		A Centronics spec port
Composite Video Signal Interface		For connection of external CRT
Calendar watch		Battery back-up
OS†		MS-DOS‡ V 2.11
Dimensions in mm		348 (W) × 121 (H) × 435 (D)
Approx Mass		9 kg

*AN: Alpha-numeric
†OS: Operation System
‡MS-DOS: Trade mark of Microsoft Corp.

7.1. EQUIPMENT SETUP

The ME-NET programmer operations can be performed in off-line and on-line modes. In off-line mode, operations are performed via P150 alone. In on-line mode, GL60HT/GL70HT (main unit) is connected to P150 for operations. Perform operations in on-line mode on the master. Fig. 7.2 shows a setup example of minimum equipment required for on-line mode operations.

P/S : POWER SUPPLY MODULE (JRMSP-PS60)
CPU : CPU MODULE (DDSCR-GL60HT, OR DDSCR-GL70HT)
IF75 : ME-NET INTERFACE MODULE(JAMSC-IF75)
IOP : IOP MODULE (JAMSC-IF60)
MB : MOUNTING BASE (JRMSI-MB60)

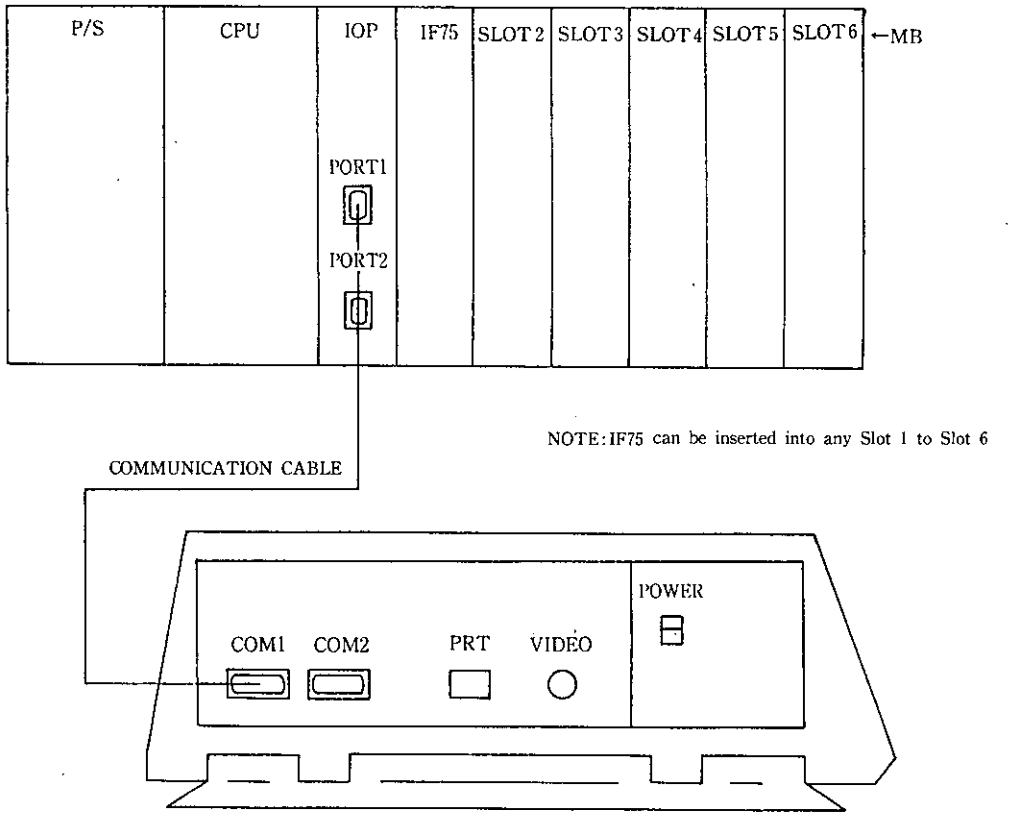


Fig. 7.2 Typical Equipment Setup

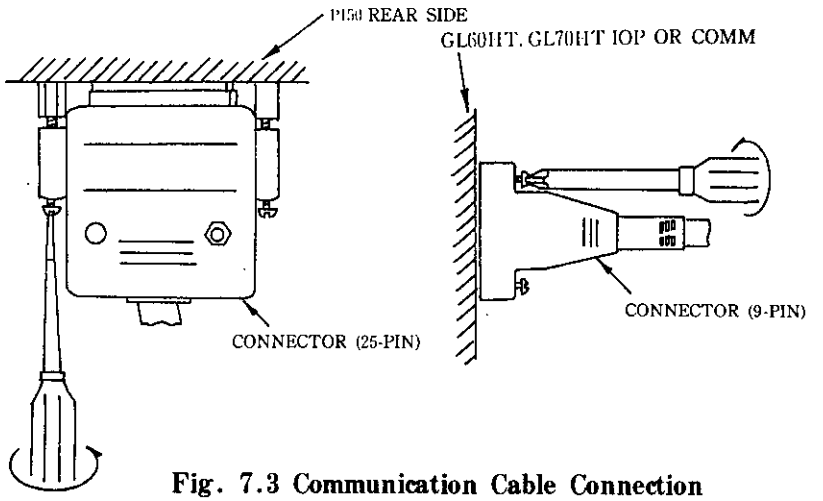
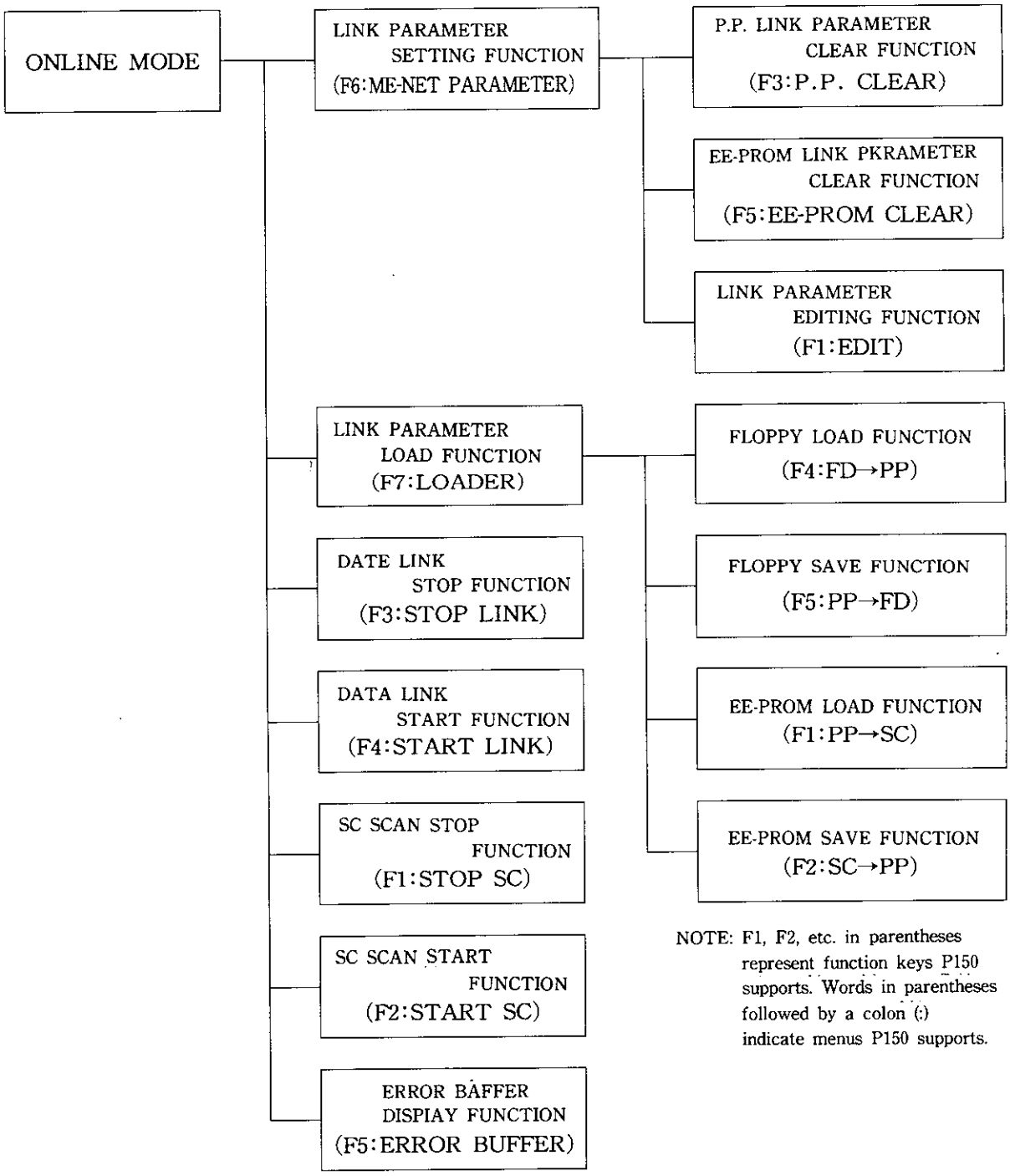


Fig. 7.3 Communication Cable Connection

7.2 FUNCTION TREE

7.2.1 On-line Mode



NOTE: F1, F2, etc. in parentheses represent function keys P150 supports. Words in parentheses followed by a colon (:) indicate menus P150 supports.

Fig. 7.4 On-line Mode Function Tree

7.2.2 Off-line Mode

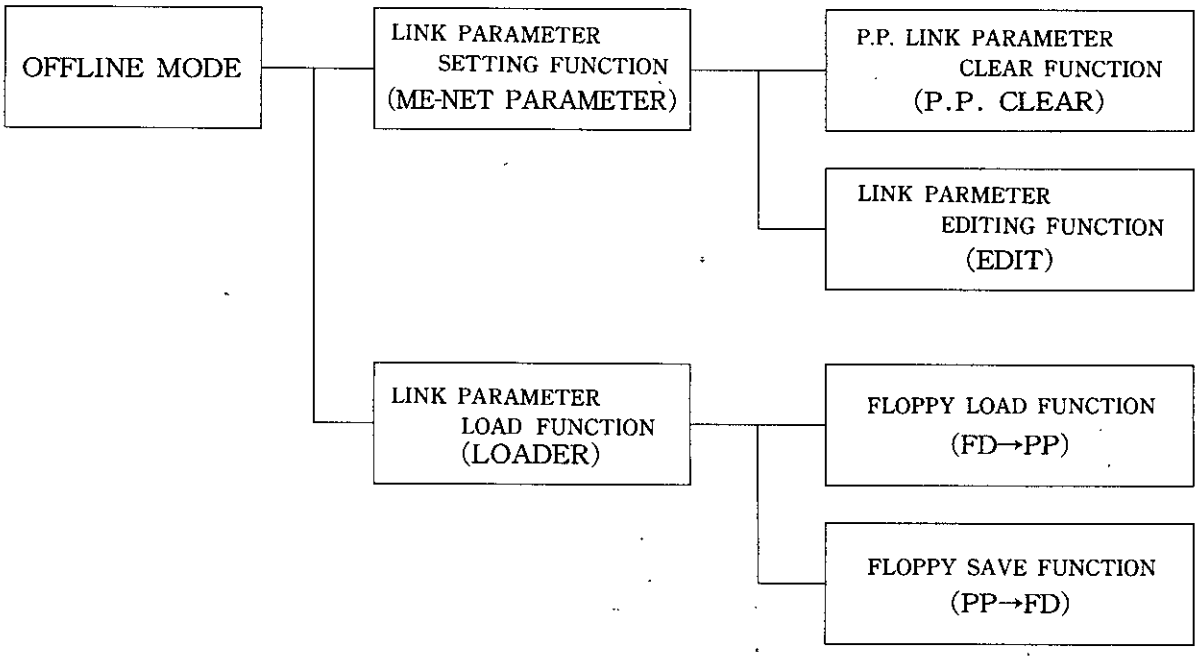


Fig. 7.5 Off-line Mode Function Tree

7.2.3 Description of Functions

Table 7.2 List of Functions

Function Name	Description
P.P. Link Parameter Clear Function	Clears the contents of the link parameter editing memory in P150.
EE-PROM Link Parameter Clear Function*	Clears the contents of the EE-PROM located in IF75.
Link Parameter Editing Function	Sets or changes link parameters in the link parameter editing memory.
Floppy Load Function	Reads out the link parameters stored in the floppy disk and loads into the link parameter editing memory.
Floppy Save Function	Writes the link parameters stored in the link parameter editing memory into floppy disks.
EE-PROM Load Function*	Writes the link parameters stored in the link parameter editing memory into the EE-PROM located in IF75.
EE-PROM Save Function*	Reads out the link parameters stored in the EE-PROM located in IF75 and loads into the link parameter editing memory.
Data Link Stop Function*	Stops data link operations on ME-NET.
Data Link Start Function*	Starts data link operations on ME-NET.
SC Scan Stop Fnuction*	Stops scan operation of GL60HT/GL70HT ("RUN LED" on CPU goes off).
SC Scan Start Function*	Starts scan operation of GL60HT/GL70TH ("RUN LED" on CPU goes on).
Error Buffer Display Function*	Displays errors related to ME-NET.

* : Available in on-line mode. All the other functions are available in both off-line and on-line modes.

7.3 OPERATION PROCEDURES

Instructions for power ON, ATTACH, stop and start, link parameter setting and load operations are provided here in this order. Although ME-NET programmer operations are performed in off-line and on-line modes, the same operations are performed to access the functions that are available in both modes. Operational instructions provided below are mainly concerned with on-line mode operations.

F1, F2, ... F8 shown in the following instructions indicate variable functions keys on the P150 keyboard.

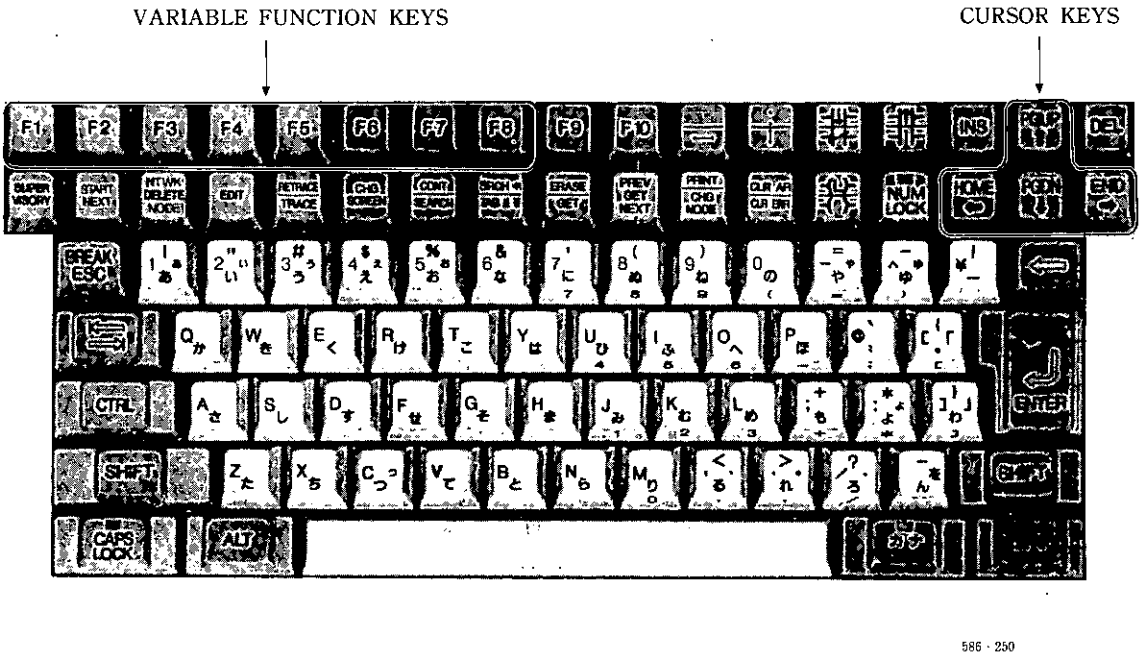
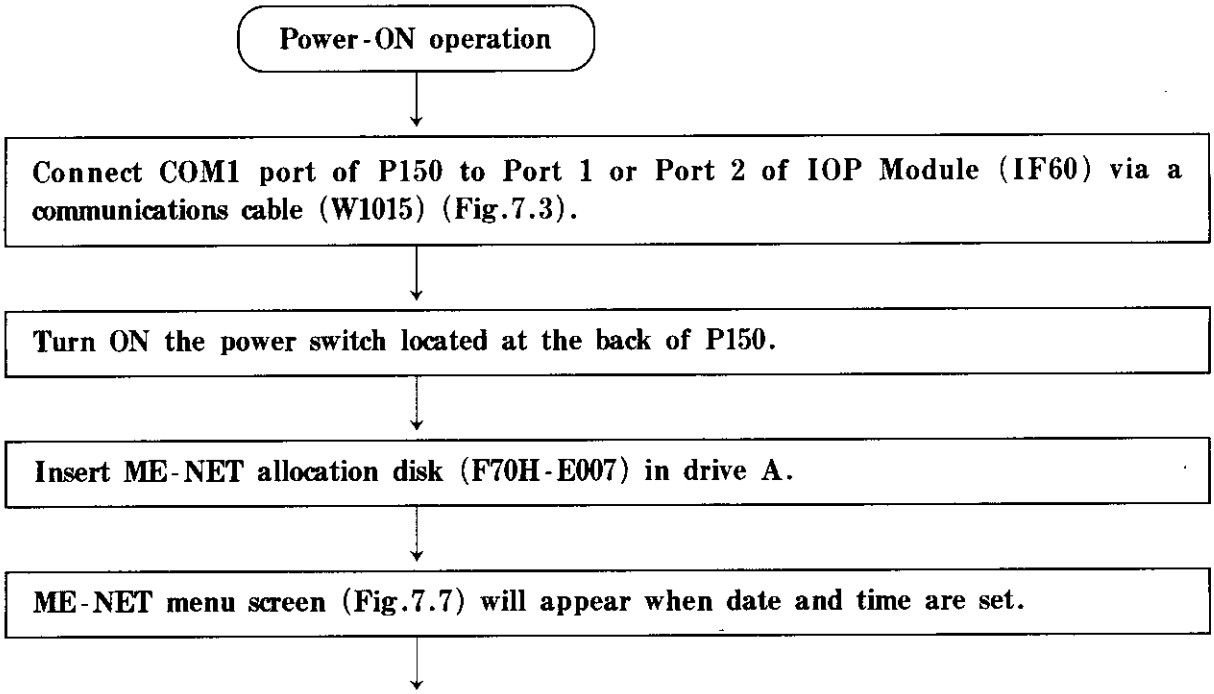


Fig. 7.6 P150 Keyboard

7.3.1 Power ON Operation



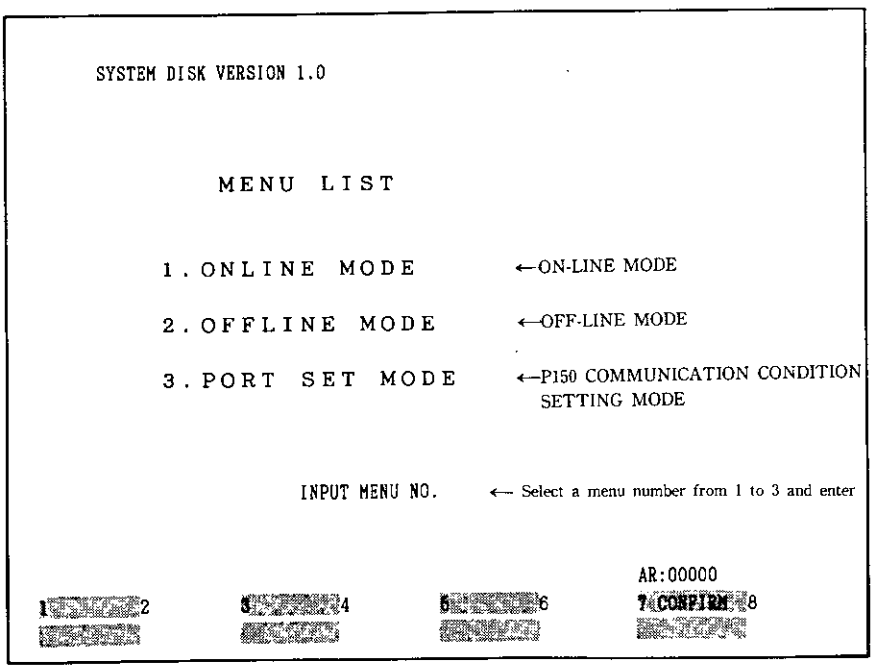
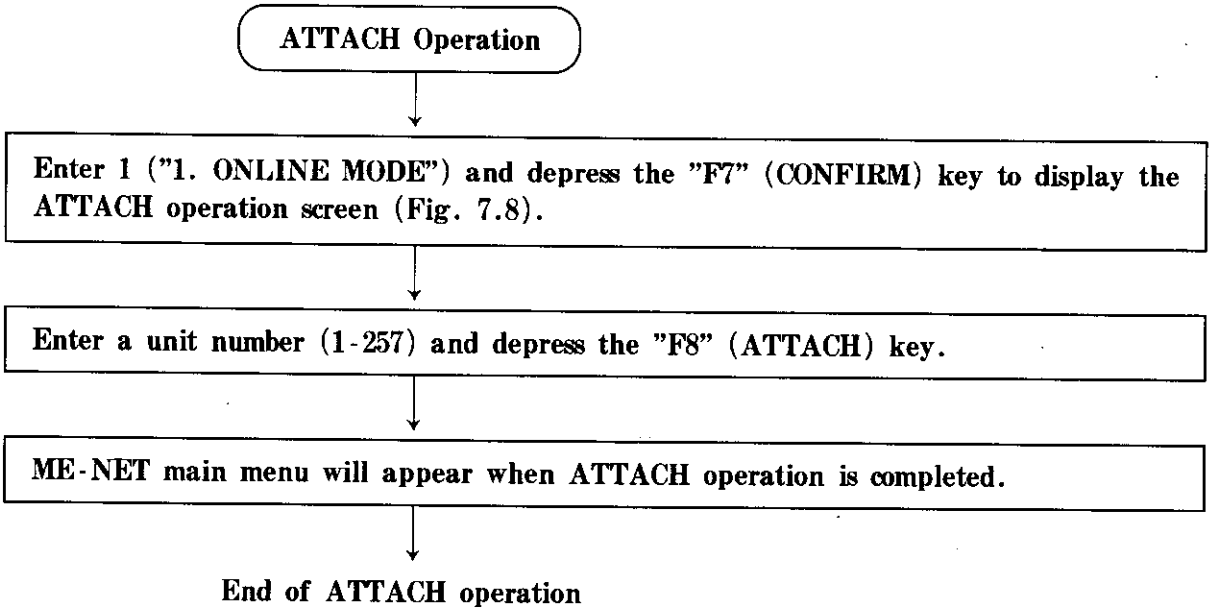


Fig. 7.7 ME-NET Menu Screen

7.3.2 ATTACH Operation

ATTACH Operation allows P150 to have software interface with MEMOCON-SC GL60HT (or GL70HT).



Notes:

1. Unit number 1 is set at the time of shipment from factory.
2. Unless the ME-NET menu screen is choosen there is no need to repeat ATTACH operation.
3. When "2. OFFLINE MODE" is choosen from the ME-NET menu screen, operations are performed via P150 alone, and ATTACH operation is not required.

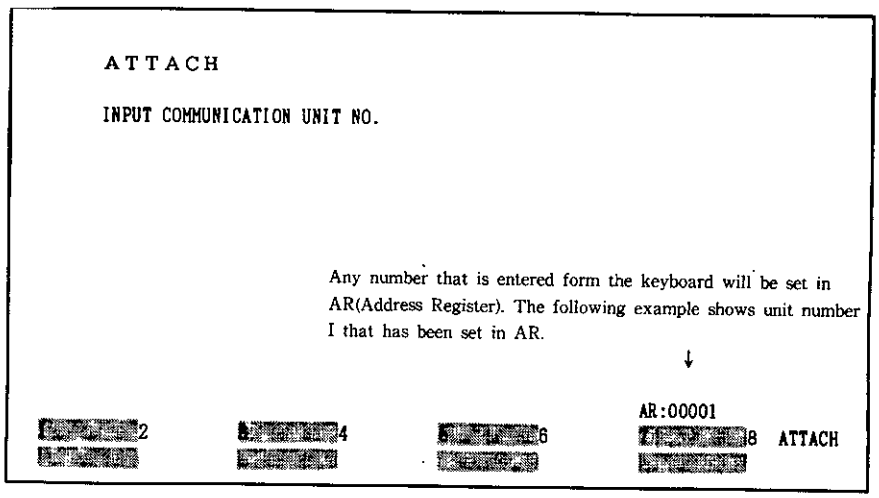


Fig. 7.8 ATTACH Operation Screen

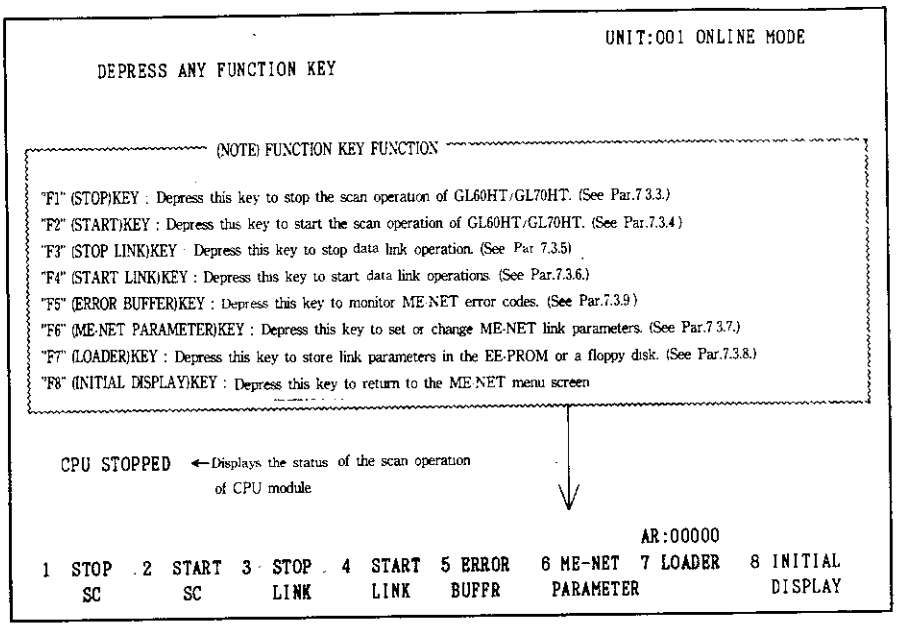


Fig. 7.9 ME-NET Main Menu Screen (ON-LINE Mode)

The main menu in off-line mode will be displayed as follows.

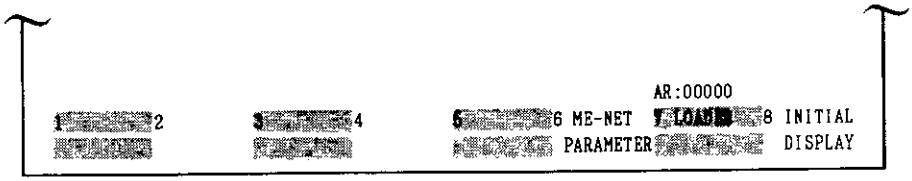
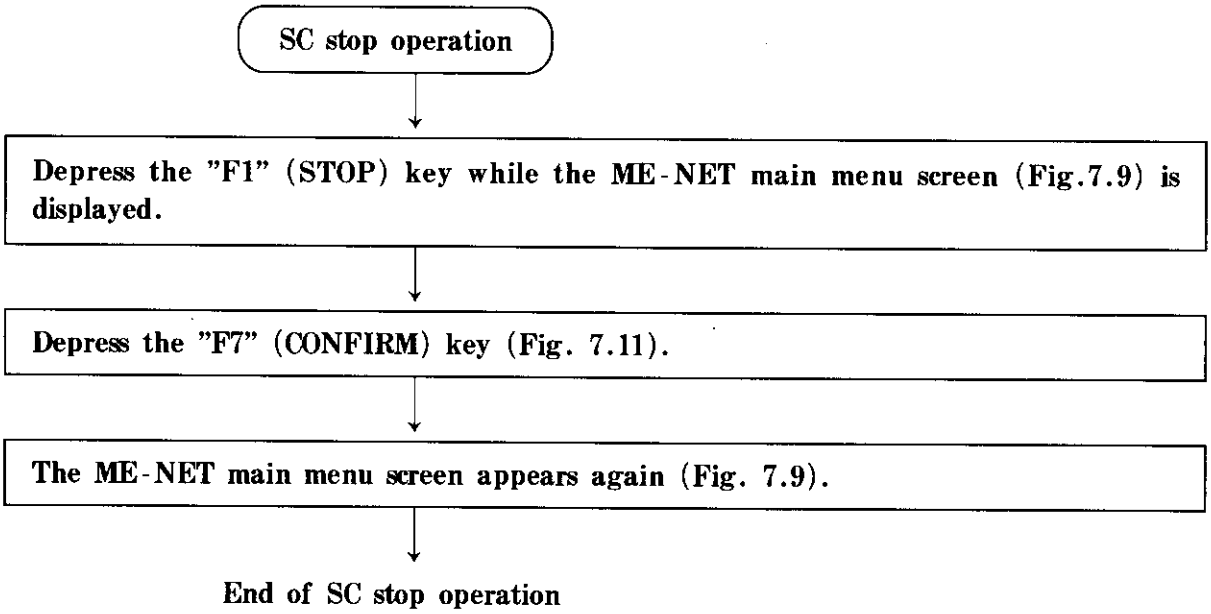


Fig. 7.10 ME-NET Main Menu Screen (OFF-LINE Mode)

7.3.3 SC Stop Operation

To stop the scan operation of GL60HT/GL70HT, proceed as follows. When scan operation is stopped, "RUN LED" on the CPU module is extinguished.



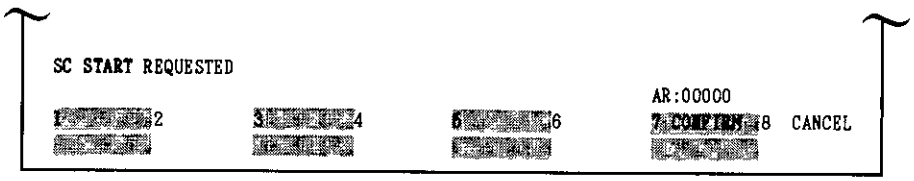
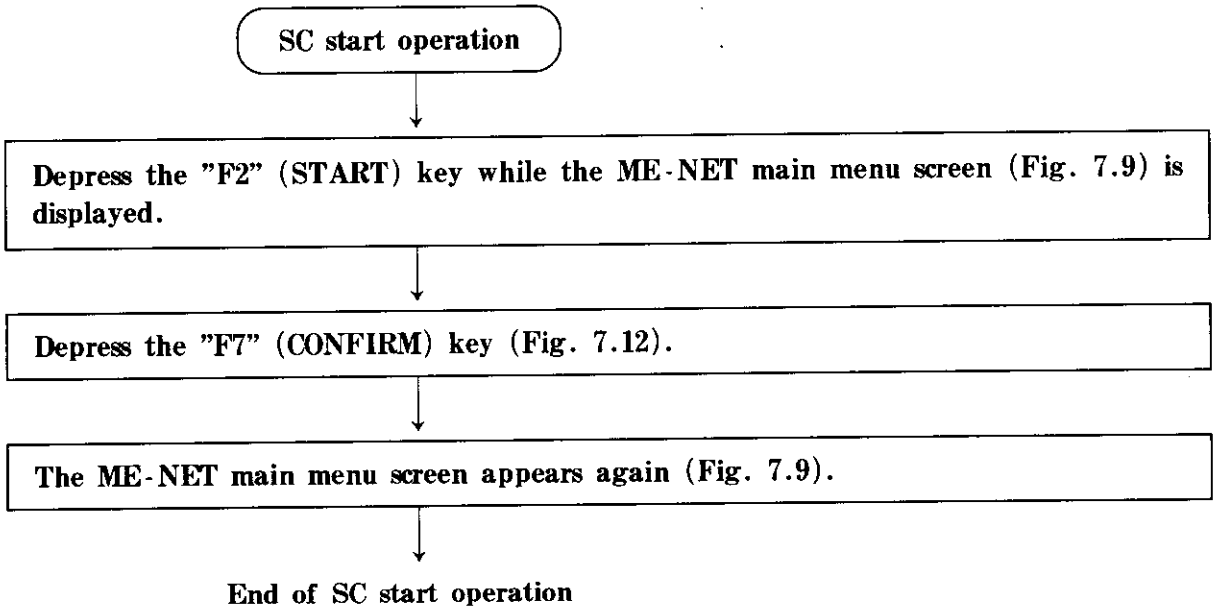


Fig. 7.11

Note: This operation is effective only in the ON-LINE mode.

7.3.4 SC Start Operation

To start the scan operation of GL60HT/GL70HT, proceed as follows. When scan operation is started, "RUN LED" on The CPU module lights.



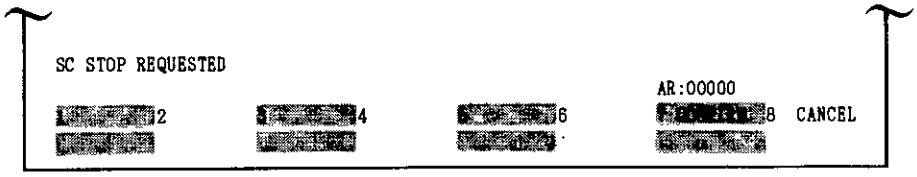
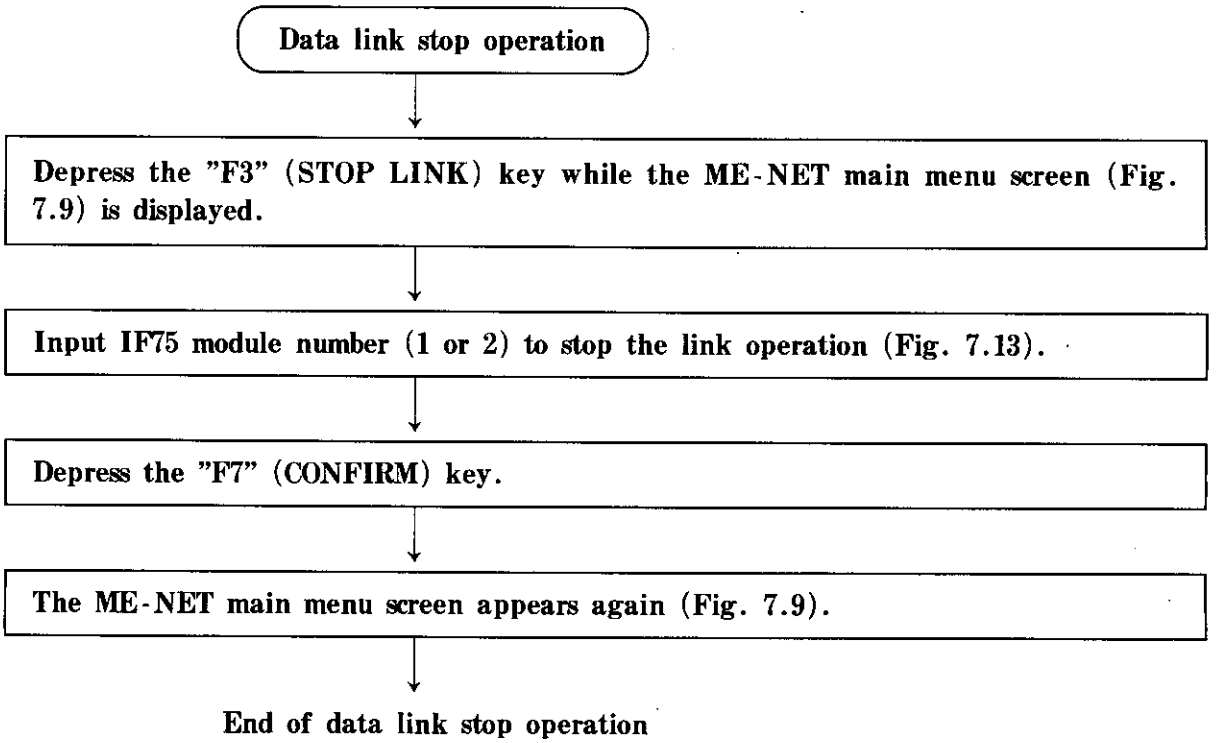


Fig. 7.12

Note: This operation is effective only in the ON-LINE mode.

7.3.5 Data Link Stop Operation

To stop data link operations, proceed as follows. When data link operations are stopped, "COM LED" on IF75 goes OFF. Make sure to stop the scan operation of GL60HT/GL70HT before proceeding with this operation.



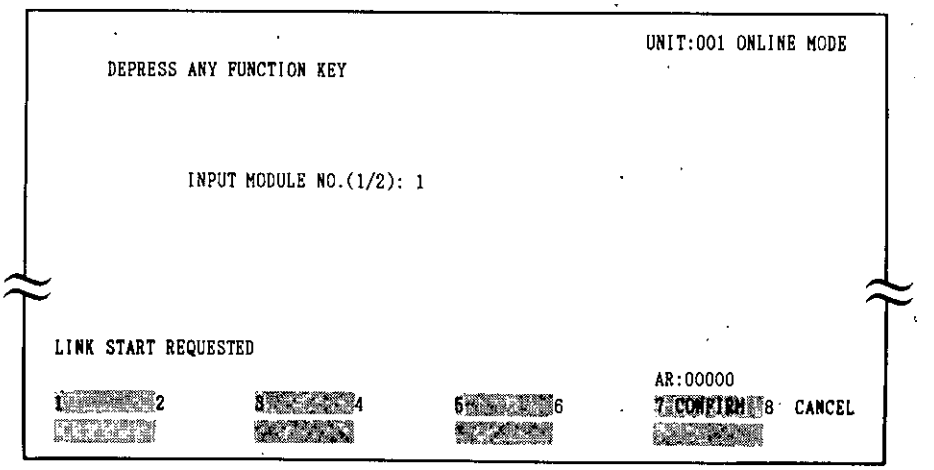
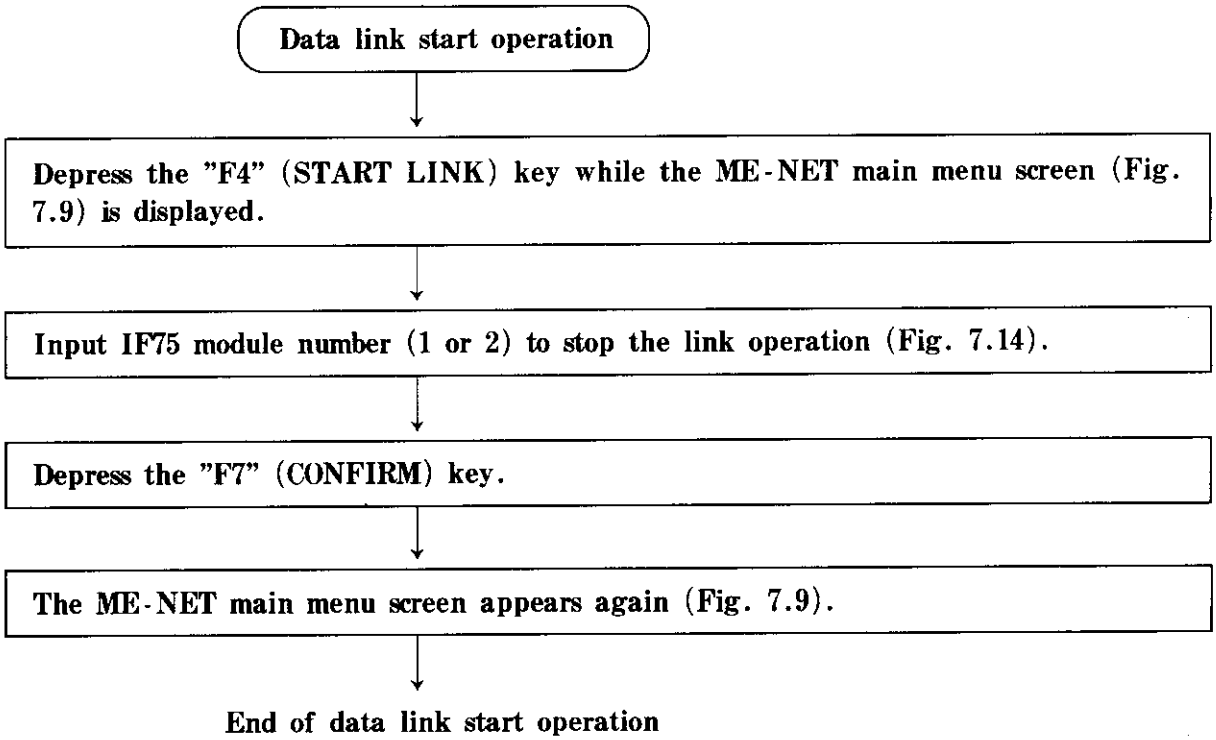


Fig. 7.13

Note: This operation is effective only in the ON-LINE mode.

7.3.6 Data Link Start Operation

To start data link operation, proceed as follows. When data link operations are started, "COM LED" on 1F75 lights. Make sure to stop the scan operation of GL60HT/GL70HT before proceeding with this operation.



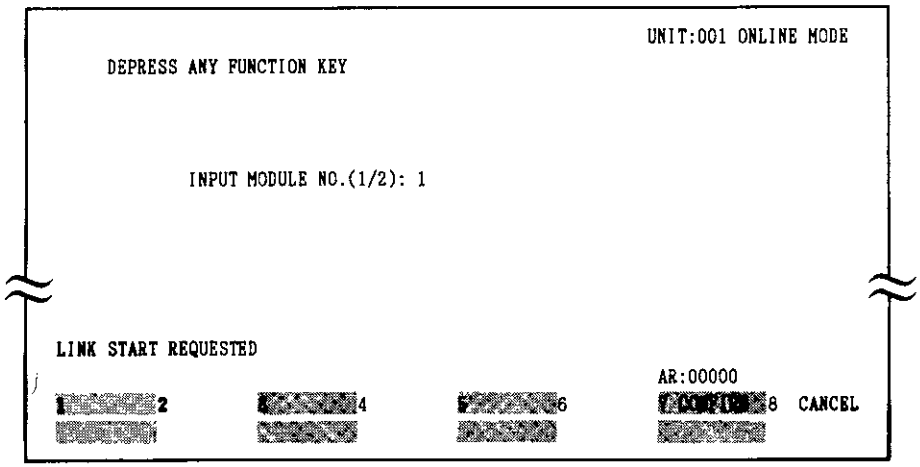


Fig. 7.14

Note: This operation is effective only in the ON-LINE mode.

7.3.7 Link Parameter Setting Operation

Depressing the "F6" (ME-NET PARAMETER) key on the main menu screen enters the link parameter menu screen shown in Fig. 7.15.

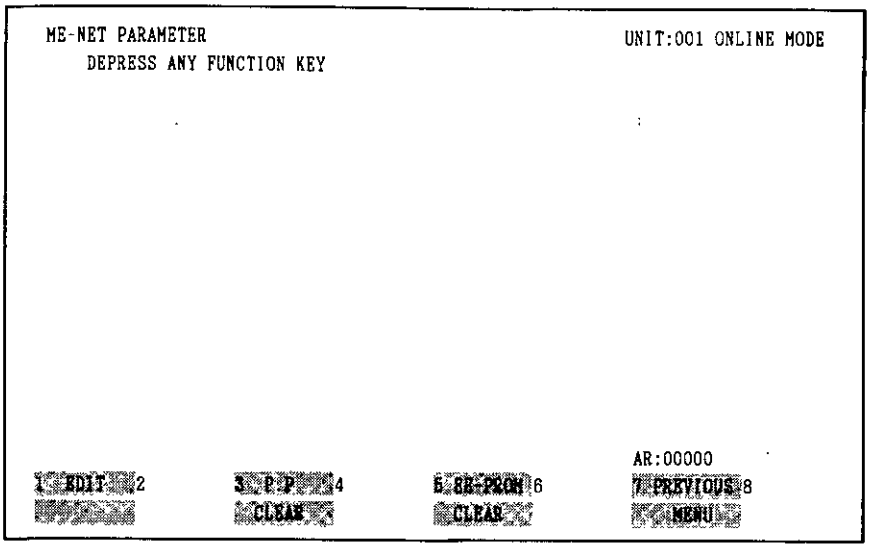
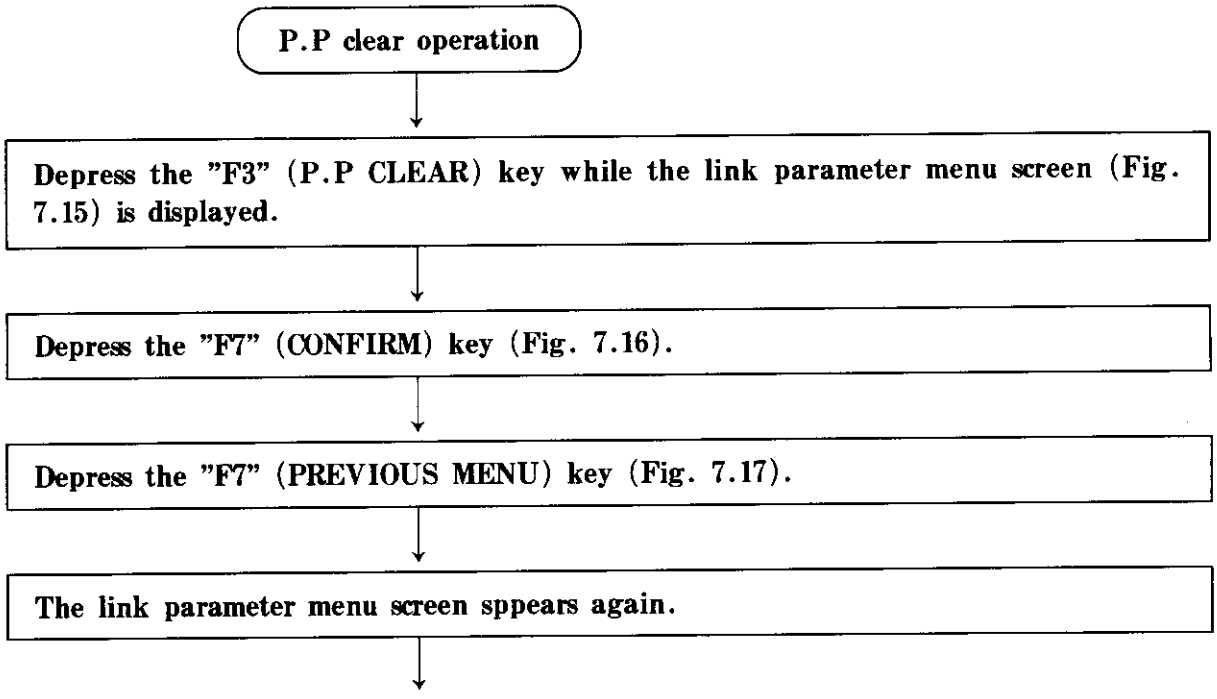


Fig. 7.15 Link Parameter Menu Screen

(1) P.P clear operation

Link parameter editing memory in the P150 is cleared.



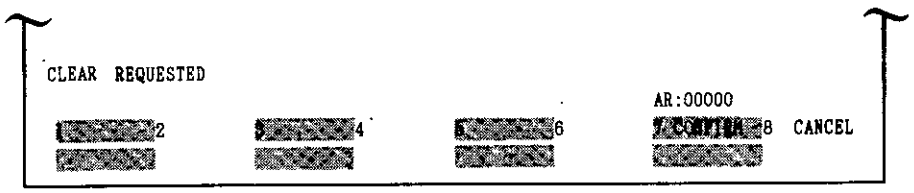


Fig. 7.16.

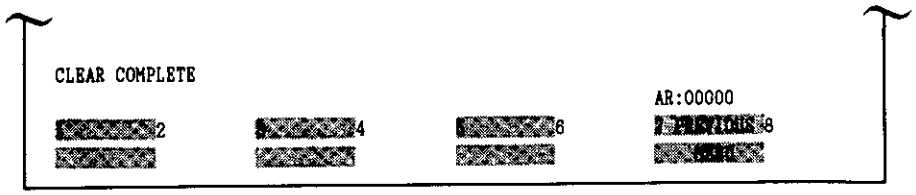
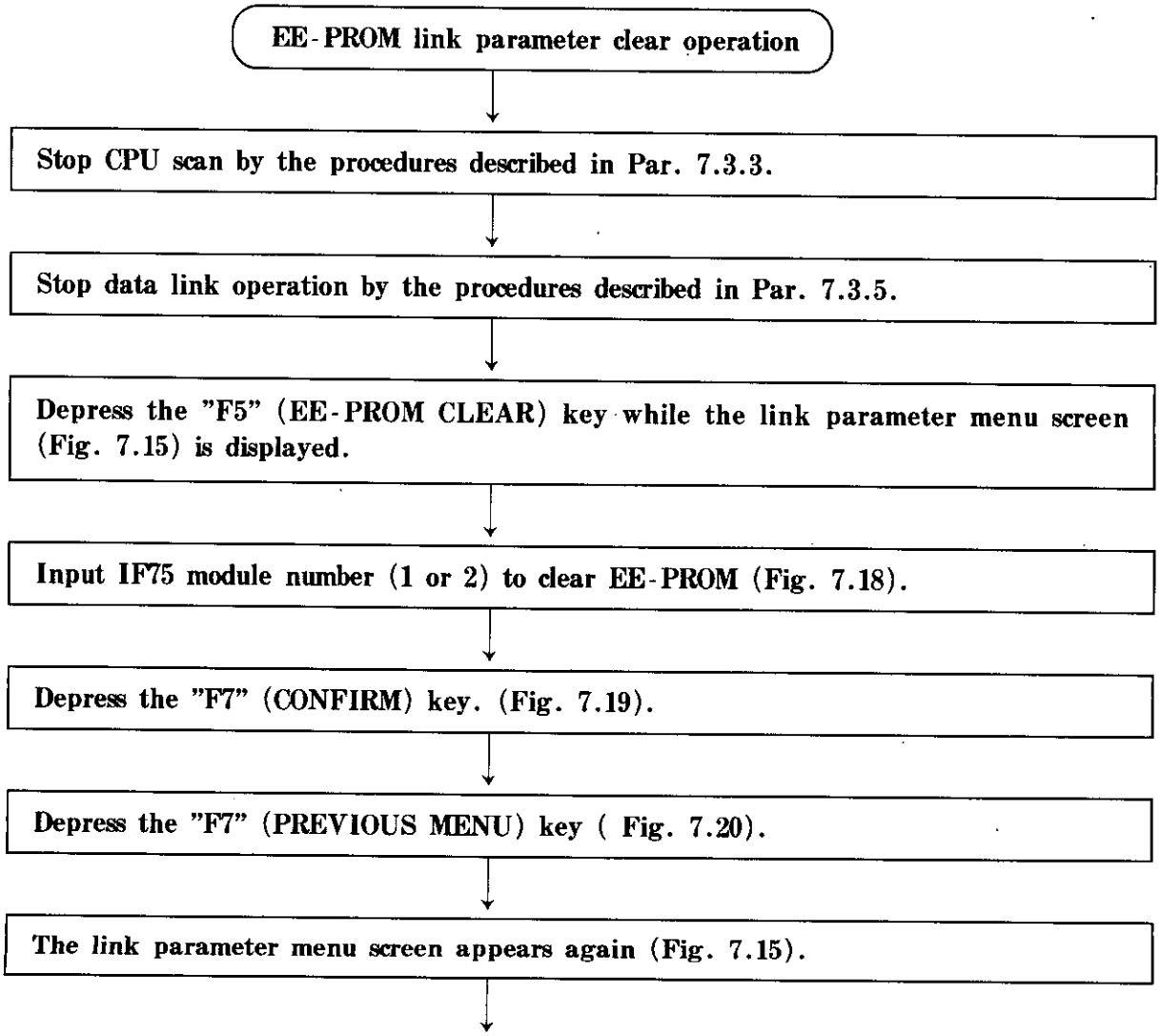


Fig. 7.17.

Note: This operation is effective both in the ON-LINE and OFF-LINE modes.

(2) EE-PROM Link Parameter Operation

Link parameter stored in the EE-PROM in the IF75 is cleared. Make sure to stop the scan operation and data link operation of GL60HT/GL70HT before proceeding with this operation.



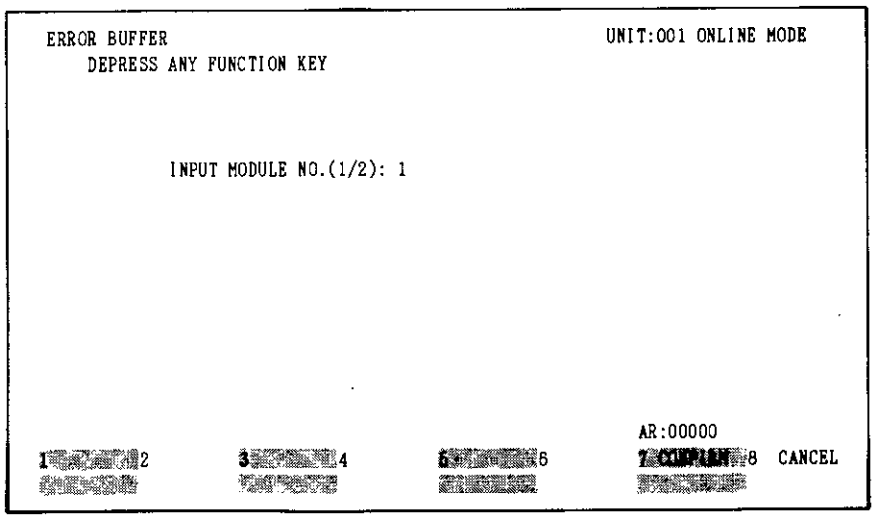


Fig. 7.18.

Notes: 1. This operation is effective only in the ON-LINE mode.
2. Step the CPU scan and data link operation before proceeding with this operation.

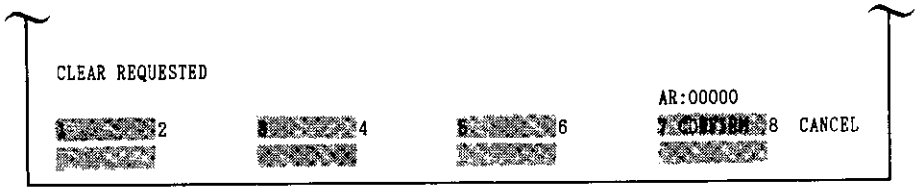


Fig. 7.19.

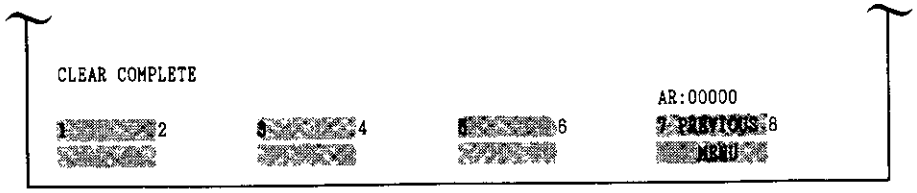


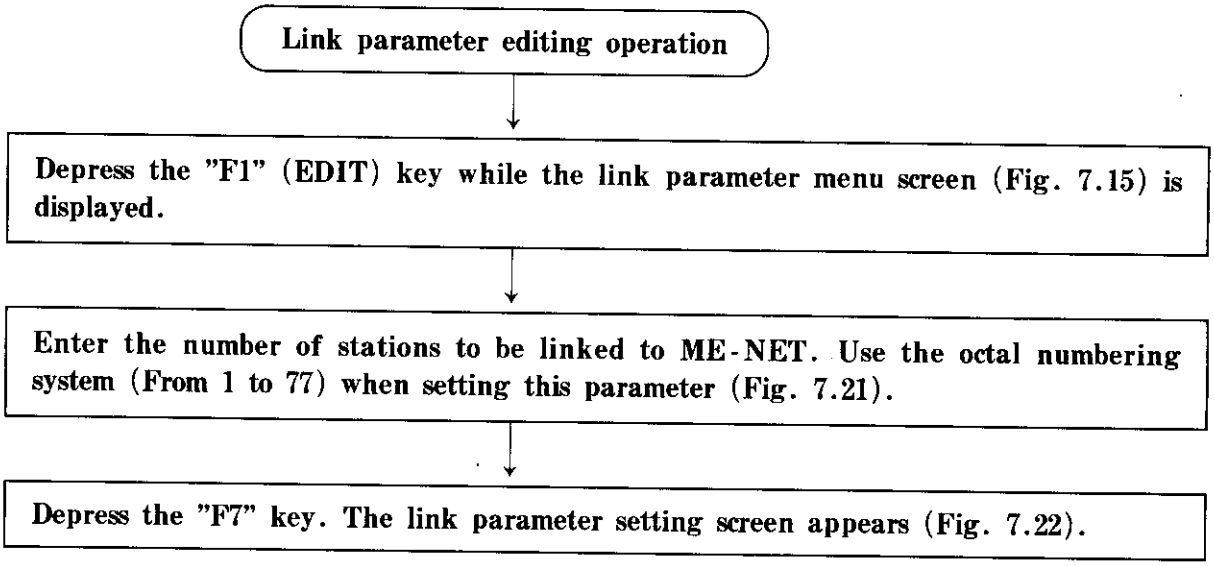
Fig. 7.20.

(3) Link parameter editing operation

The link parameters must be set in the P150 editing memory. Set the number of stations to be linked, head address and the transmitting byte size in that order. Once the link parameters are set in the editing memory, they will be retained in the editing memory even if the screen is changed.

Since the contents of the editing memory will be cleared when P150 is switched OFF, use the load function (Par. 7.3.8) to store parameters in a floppy disk or the EE-PROM and save them.

Procedure for link parameter editing operation is the same in ON-LINE and OFF-LINE modes.



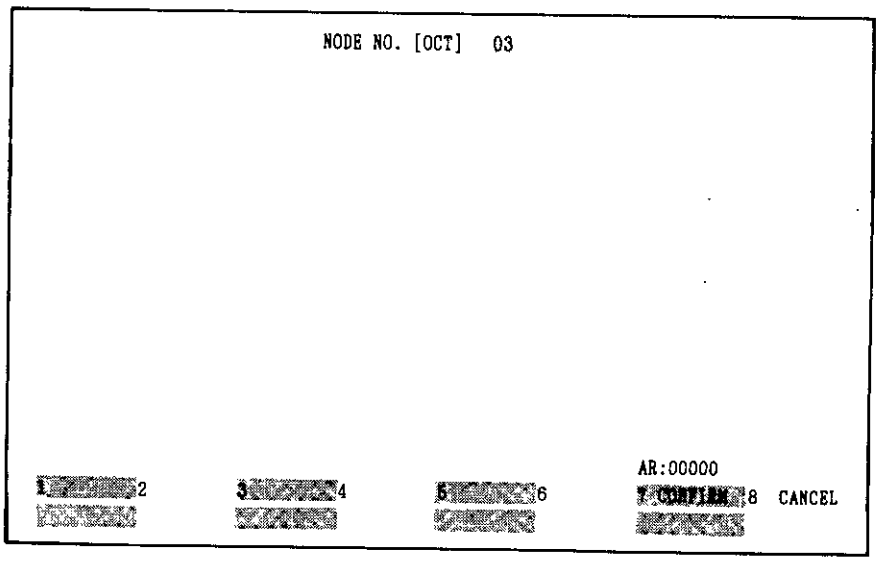


Fig. 7.21 Connected Station Number Input Screen(When Set to 3)

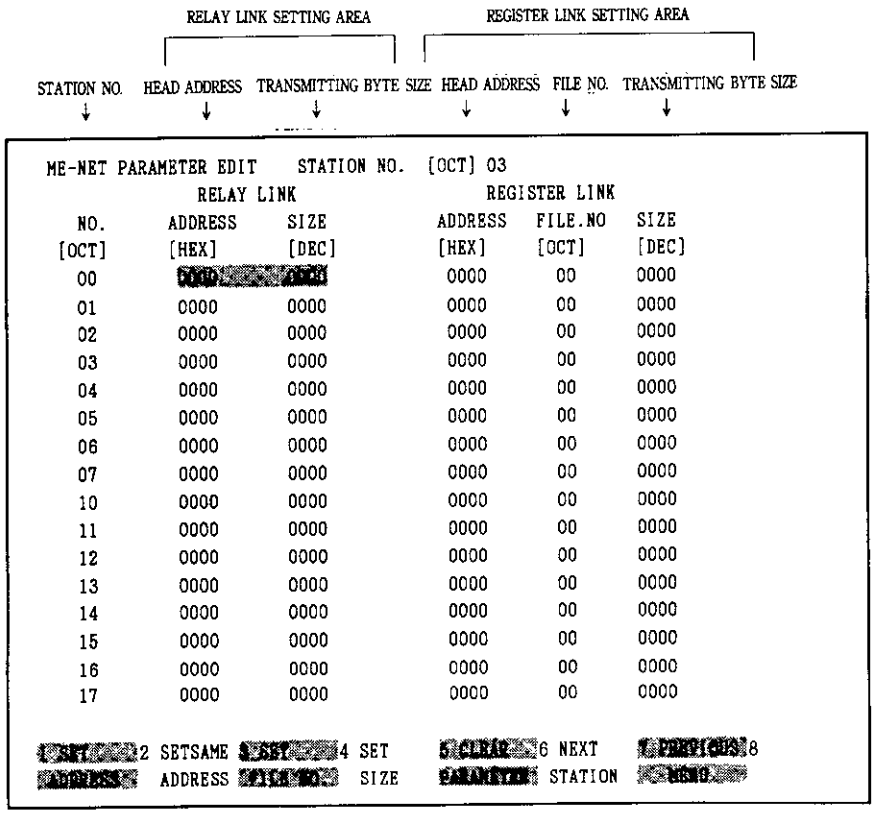


Fig. 7.22 Link Parameter Setting Screen

[Explanatory notes on link parameter screen]

- Link parameters for up to 16 stations can be set in one screen.
- Columns on the left side are used to set relay link parameters and columns on the right side are used to set register link parameters.
- The address and the transmitting byte size of the station number over which the cursor is placed can be set. Use the cursor keys to move the cursor.
- Station numbers are shown in octal numerals.
- Hexadecimal numerals must be used to set head addresses.
- Octal numerals must be used to set file numbers.
- Decimal numerals must be used to set transmitting byte sizes.

[Setting procedure]

Use the cursor keys to move the cursor to the position of a station number whose parameters need to be set or changed. To enter data, type in parameters, select the corresponding function key from "F1" to "F4" and depress.

For details on each link parameter data, see Par. 6.

Table. 7.3 Key Operation Function

Key Operation	Contents
Parameter Value (0 to FFFF)+"F1"(SET ADDRESS) key	Sets the head address for the station the cursor is placed over.
"F2"(SET SAME ADDRESS) key	Sets the same head address as the master's for the slave the cursor is placed over.
Parameter Value (0 to 7)+"F3"(SET FILE NO.) key	Sets the file number for the station the cursor is placed over.
Parameter Value (Relay: 0 to 256, Register: 0 to 2048)+ "F4"(SET SIZE) key	Sets the transmitting byte size for the station the cursor is placed over.
"F5"(CLEAR PARAMETER) key	Clears the parameter the cursor is placed over.
"F6"(NEXT STATION) key	Displays the next link parameter screen.
"F7"(PREVIOUS MENU) key	Returns to the link parameter screen for setting operation.

Notes:

1. If this programmer is used to set link parameters, the master must be GL60HT/GL70HT at all times.
2. If parameters are set for GL60HT/GL70HT, the head address must be the same as the master and an even number must be set for the transmitting byte size.
3. If parameters are set for equipment made by other manufacturers, parameters suitable for the equipment must be set.

Example of parameter setting when three stations are to be linked and the parameters shown in Table 7.4 are to be used.

Table 7.4 Typical Parameters

Station No.	Relay link Head address	Relay link Transmitting byte size	Register link Head address	Register link File No.	Register link Transmitting byte Size
Master (Station No.00)	0000	16	0000	00	32
Slave 1 (Station No.01)	Same as master	24	Same as master	Same as master	48
Slave 2 (Station No.02)	0100	32	0100	07	16

Setting link parameters for master

↓

Input "16" for the transmitting byte size of relay link and depress the "F4" (SET SIZE) key (Fig. 7.23).

↓

Move the cursor to the right, input "32" for the transmittng byte size of register link and depress the "F4" key (Fig. 7.24).

↓

Setting link parameters for slave 1

↓

Move the cursor to the relay rink area of the station number 01 and enter "F2" (SETSAME ADDRESS) Key (Fig. 7.25).

↓

Input "24" for the transmitting byte size of relay link and depress the "F4" key (Fig. 7.26).

↓

Move the cursor to the right and depress the "F2" key (Fig. 7.27).

↓

Input "48" for the transmitting byte size of register link and depress the "F4" key (Fig. 7.28).

↓

Setting link parameters for slave 2

↓

Move the cursor to the relay link area of the station number 02, input "100" for the head address of relay link and depress the "F1" (ADRESS) key (Fig. 7.29).

↓

Input "32" for the transmittng byte size of relay link and depress the "F4" key (Fig. 7.30).

↓

Move the cursor to the right, input "100" for the head address of register link and depress the "F1" (Fig. 7.31).

↓

Input "7" for the file number of the register link's head address and depress the "F3" (SET FILE NO.) key (Fig. 7.32).

↓

Input "16" for the transmitting byte size of register link and depress the "F4" key (Fig. 7.33).

↓

End of link parameter setting operation

To return to the link parameter menu screen (Fig. 7.14), depress "F7" (PREVIOUS MENU) key.

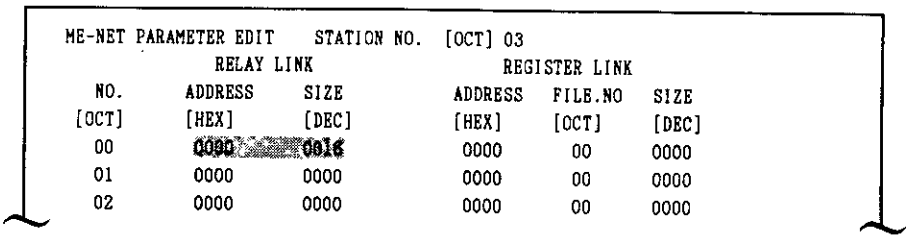


Fig. 7.23

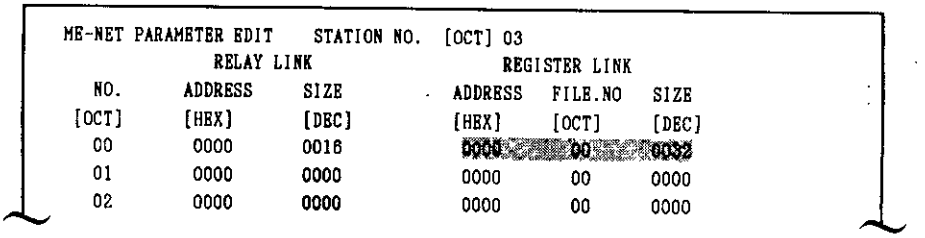


Fig. 7.24

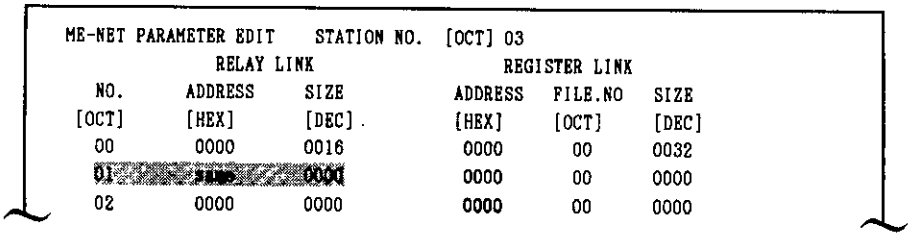


Fig. 7.25

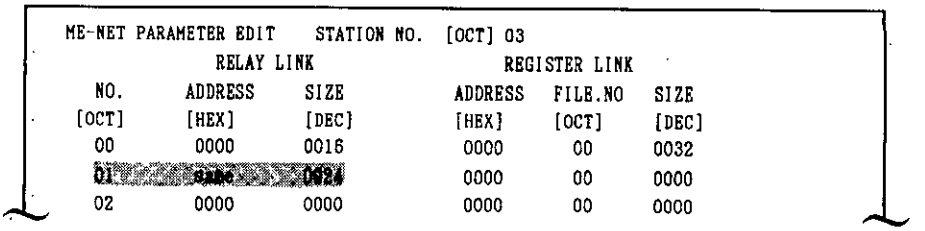


Fig. 7.26

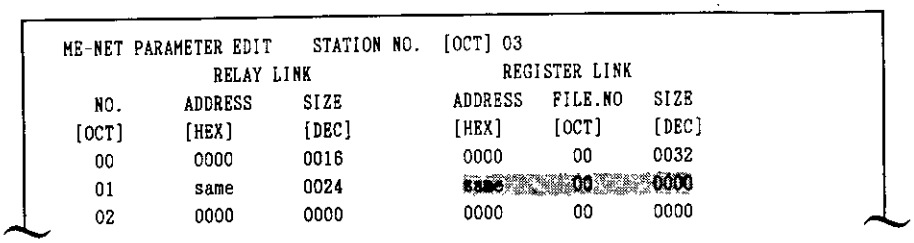


Fig. 7.27

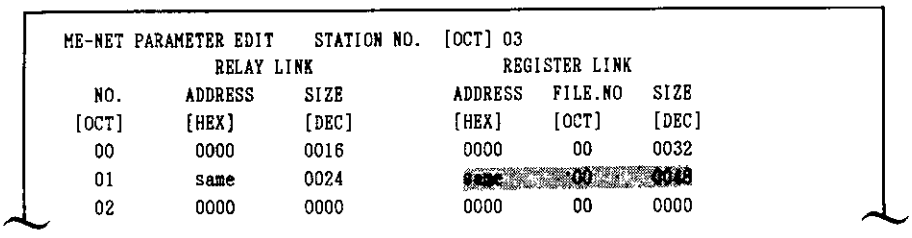


Fig. 7.28

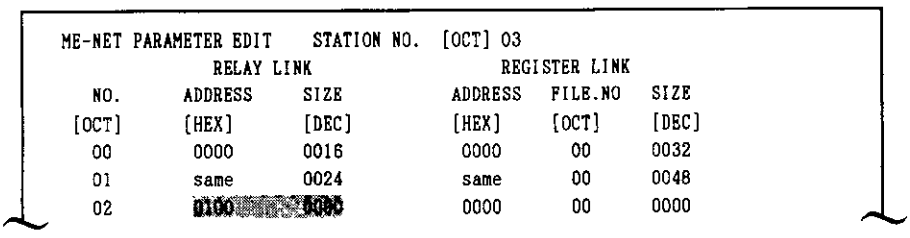


Fig. 7.29

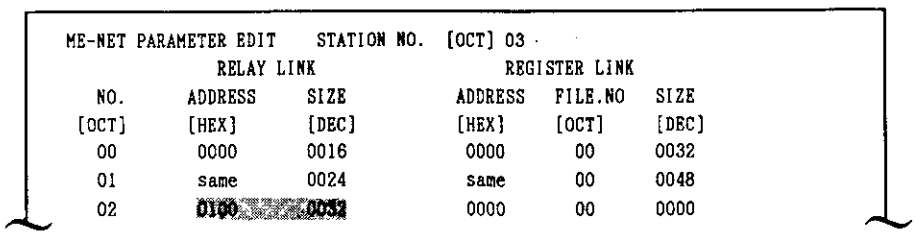


Fig. 7.30

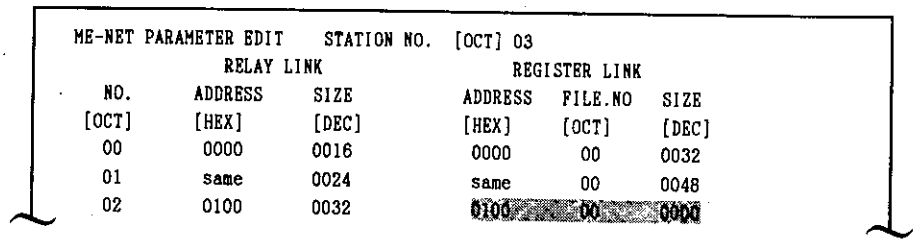


Fig. 7.31

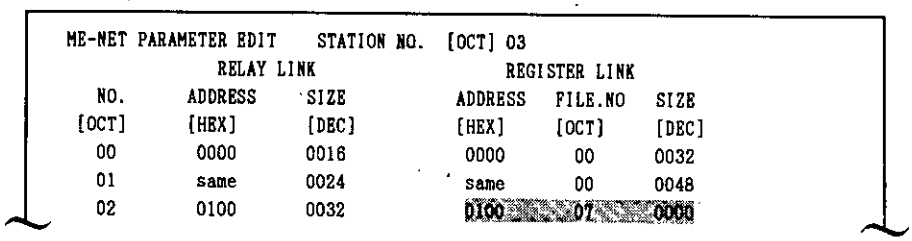


Fig. 7.32

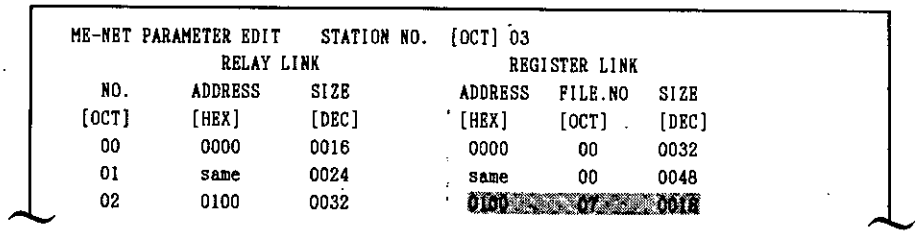


Fig. 7.33

7.3.8 Loader Operations

The four functions provided through loader operations include the following:

① Allows link parameters from the P150 editing memory to be stored in a floppy disk (PP-to-FD saving operation).

② Allows link parameters to be read out from a floppy disk and loaded into P150 editing memory (FD-to PP-loading operation).

③ Allows link parameters to be written from P150 editing memory into the EE-PROM (PP-to-SC loading operation).

④ Allows link parameters to be read out from the EE-PROM and loaded into P150 editing memory (SC-to-PP saving operation).

Functions ① and ② are available in both ON-LINE and OFF-LINE modes. Functions ③ and ④ are available only in ON-LINE mode. Fig. 7.34 shows how the functions provided through loader operations are related to link parameters.

Note: 2DD (double-sided, double-density) floppy disks must be used.

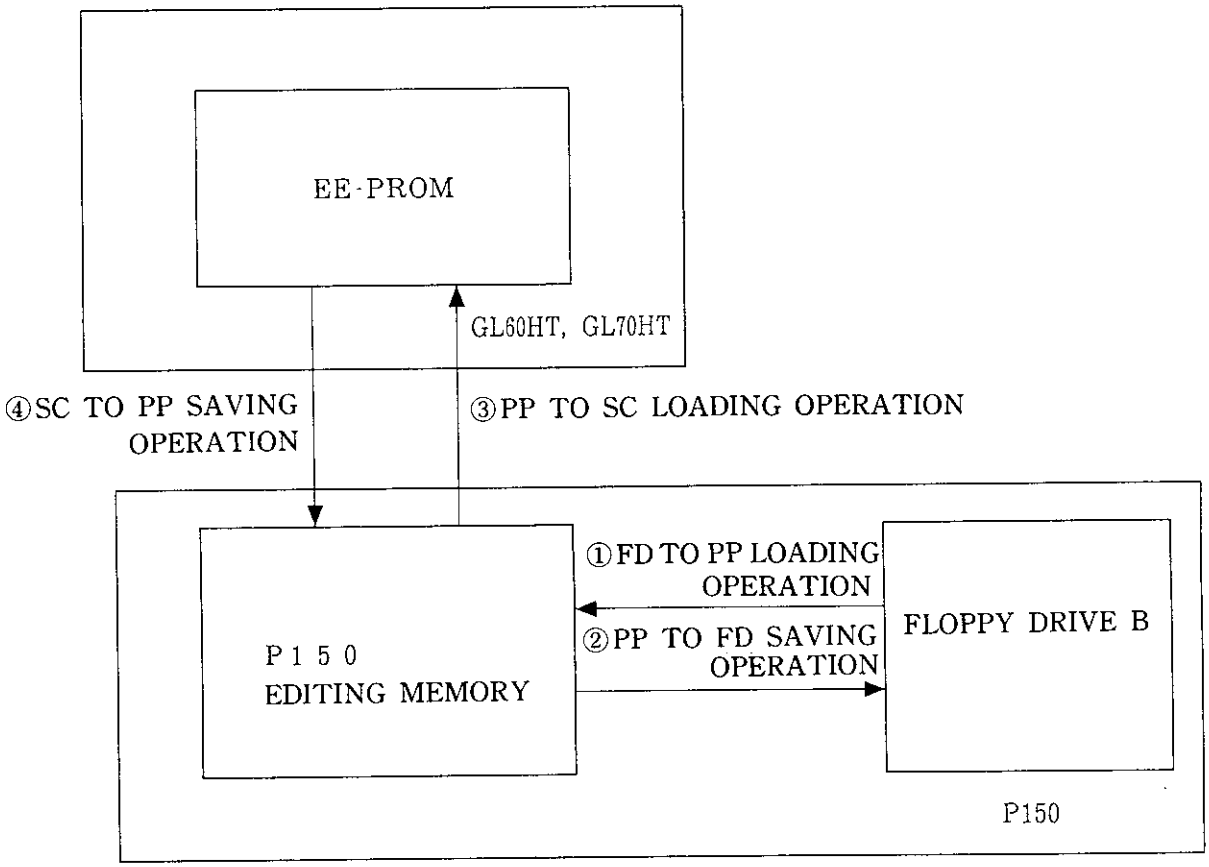


Fig. 7.34

(1) FD to PP loading operation

Use 2DD (double-sided, double-density) floppy disks.

FD to PP saving operation

↓

Insert a floppy disk in drive B to store link parameters.

↓

Depress the "F7" (LOADER) key while the main menu screen (Fig. 7.9) is displayed.

↓

The loader menu screen (Fig. 7.35) appears.

↓

Depress the "F4" (LOAD FD → PP) key . The display as shown in Fig. 7.36 will appear.

↓

A list of the file names contained in the floppy disk placed in drive B will be displayed. Move the cursor to the file name to be loaded (Fig. 7.37).

↓

Depress the " ENTER" key. The file name will be displayed next to FILE NAME (Fig. 7.38).

↓

Depress the "F7" (CONFIRM) key. Loading from FD to the editing memory will begin (Fig 7.39).

↓

A buzzer sounds to indicate the end of loading operation (Fig, 7.40). The time required for loading is just a few seconds.

↓

End of FD to PP loading operation

Notes: 1. If the "F7" (PREVIOUS MENU) is depressed during the process shown in Fig. 7.39, the loader menu screen will reappear.

2. If a file other than a file that contains link parameters is loaded, an error message "NOT MENET FILE" will be displayed.

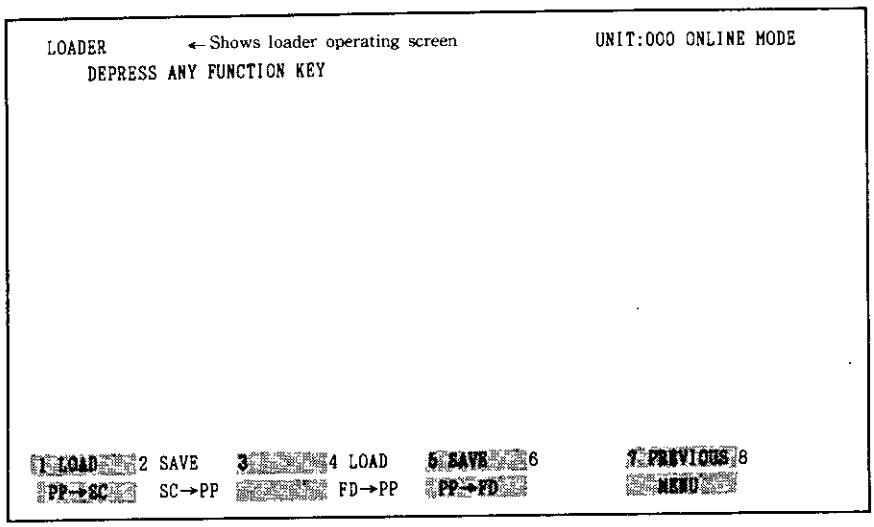


Fig. 7.35 Loader Menu Screen

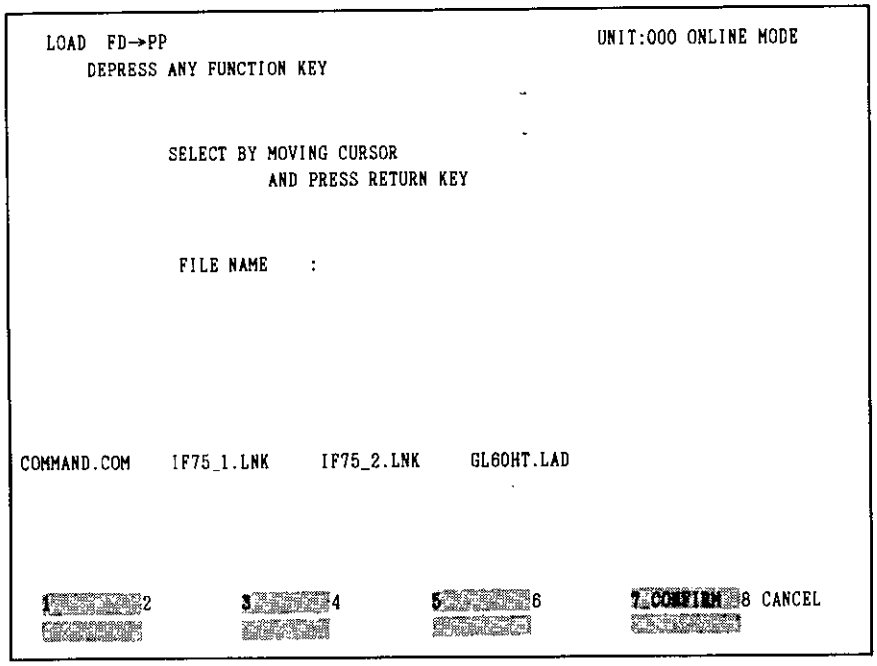


Fig. 7.36

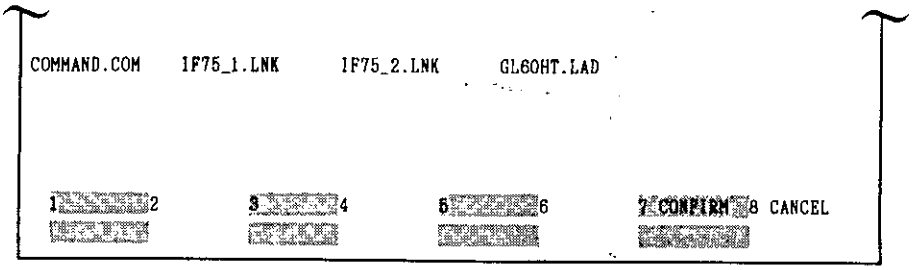


Fig. 7.37

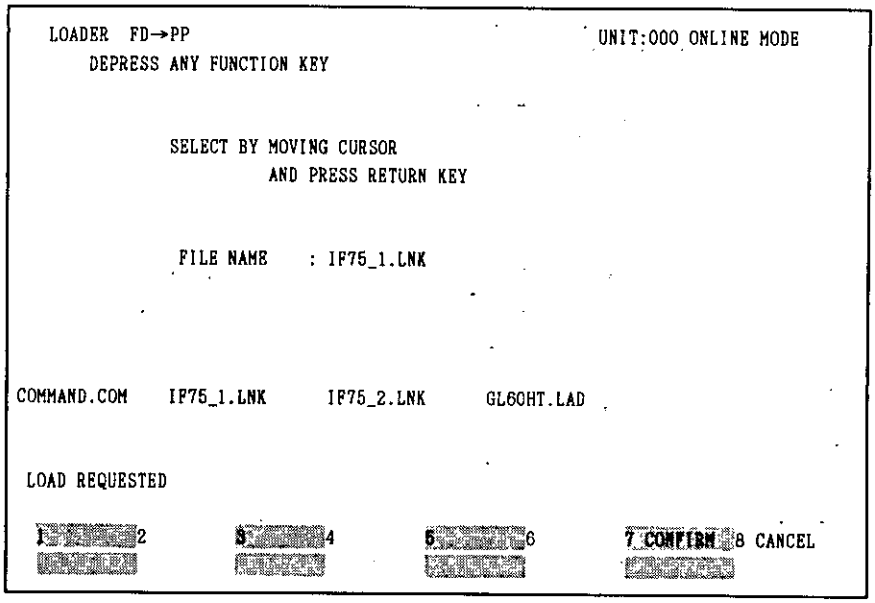


Fig. 7.38

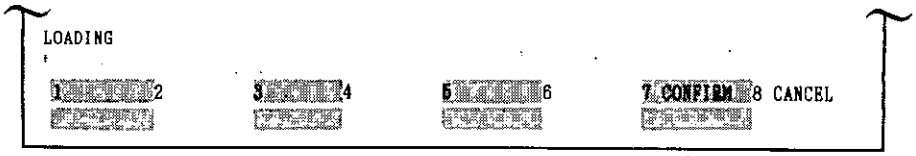


Fig. 7.39

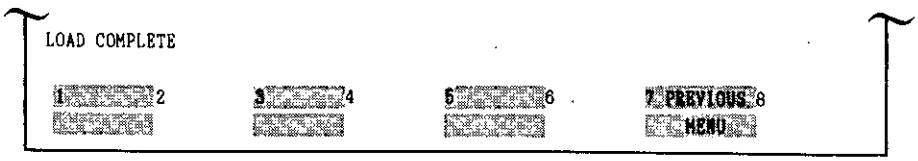
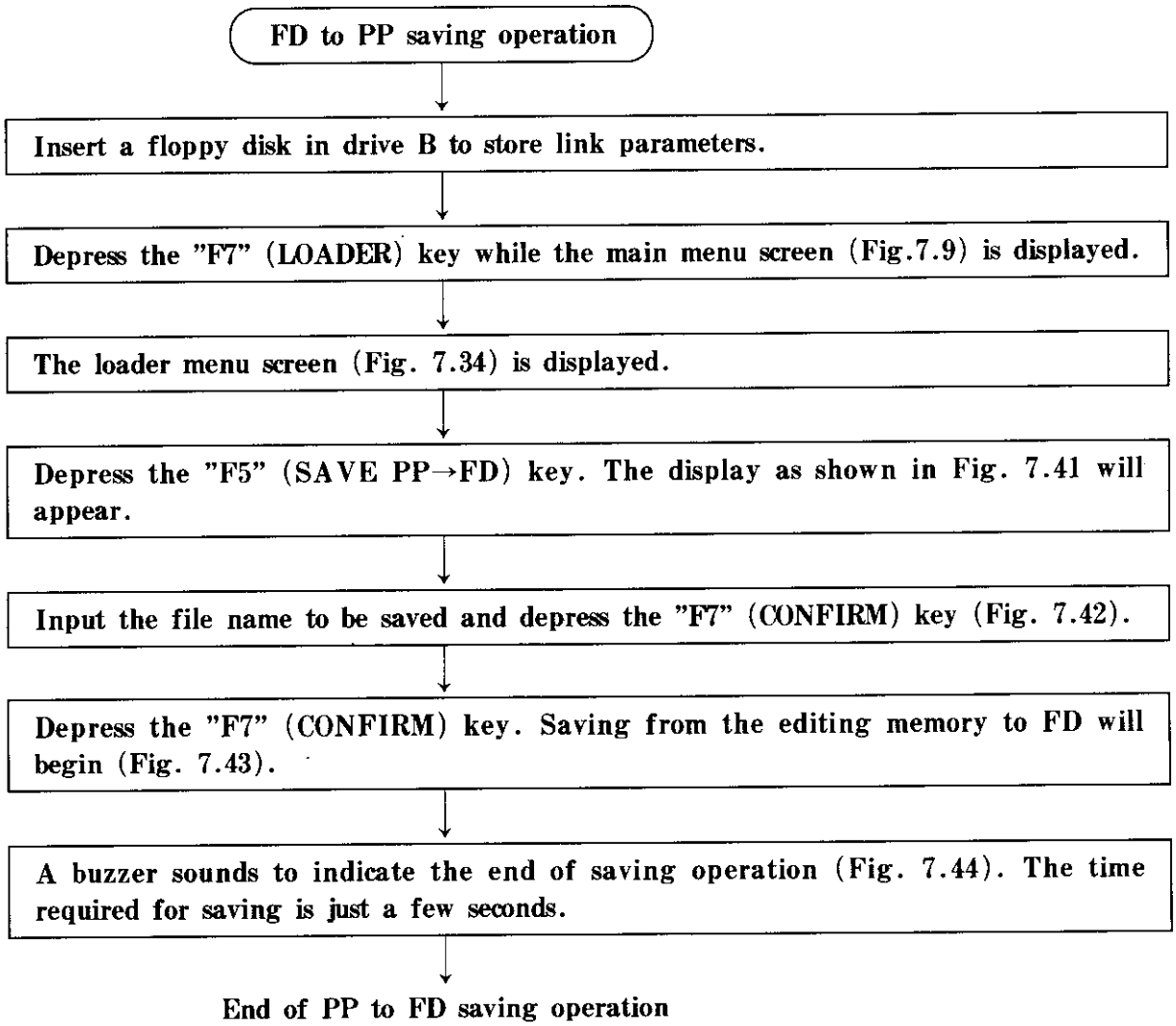


Fig. 7.40

(2) PP to FD saving operation



Notes:

1. If the "F7" (PREVIOUS MENU) key is depressed during the process shown in Fig. 7.44, the loader menu screen (Fig. 7.35) will reappear.
2. The memory protect switch of the floppy disk must be turned to OFF position. If save operation is selected with the protect switch in ON position, the following message will be displayed.

   "B DRIVE WRITE PROTECT
   Abort or Retry? <R/A> A"

   Depress the "A" key and the "ENTER" key to abort the saving operation. To proceed with saving operation, turn the memory protect switch to OFF position and then depress the "R" key and the "ENTER" key.
3. If the file to be saved is already contained in the floppy disk placed in drive B, the following message will be displayed.

   "FILE ALREADY EXIST ! DELET OK ? (OK → F. 7)"

   Depress the "F7" (CONFIRM) key to save the link parameter in the same file.

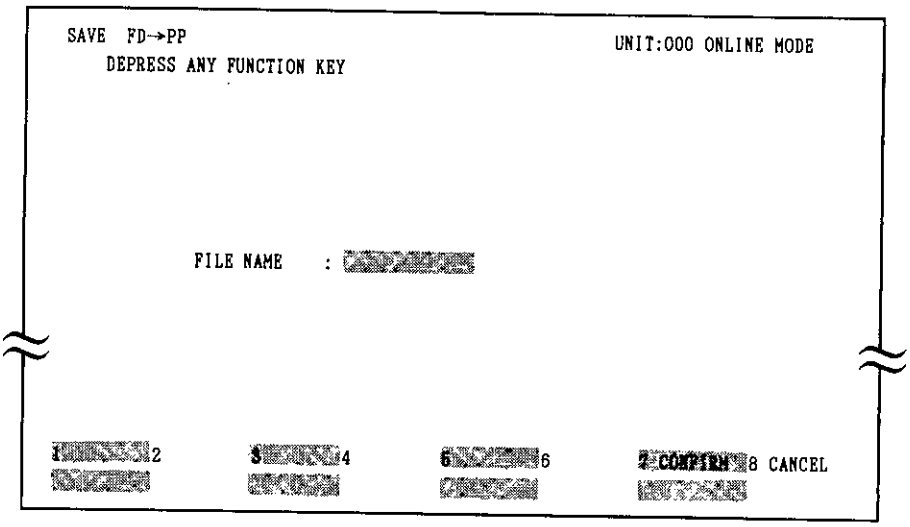


Fig. 7.41

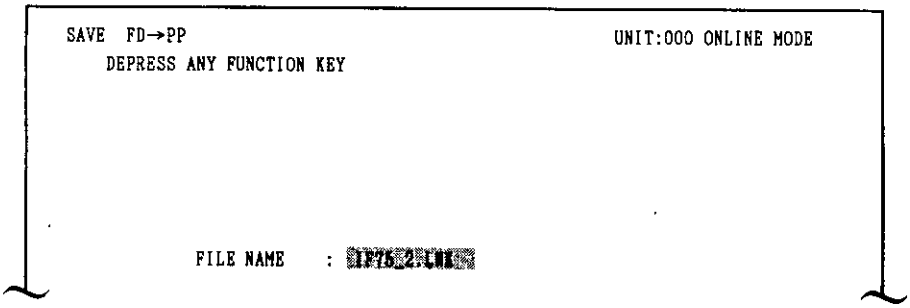


Fig. 7.42

Fig. 7.43

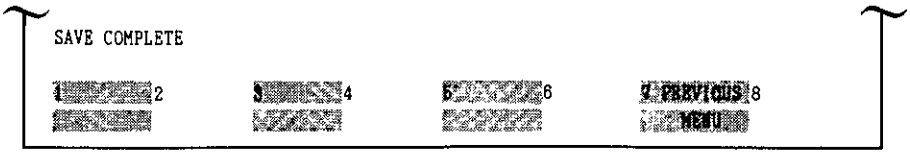
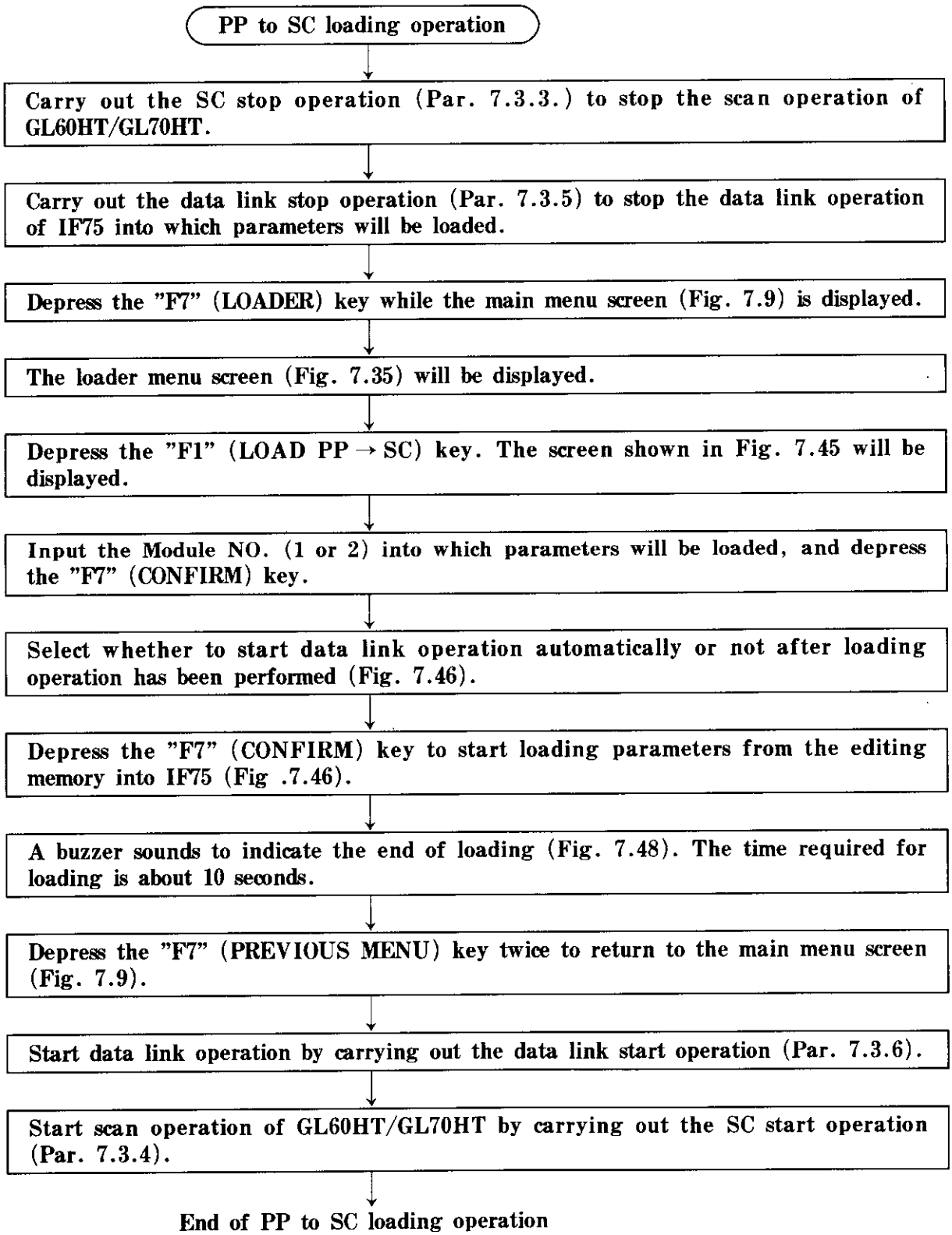


Fig. 7.44

(3) PP to SC loading operation



Note: If the automatic start of data link operation after loading is desired, the "Y" key and "F7" (CONFIRM) key must be depressed, and data link operation will not be required after loading.

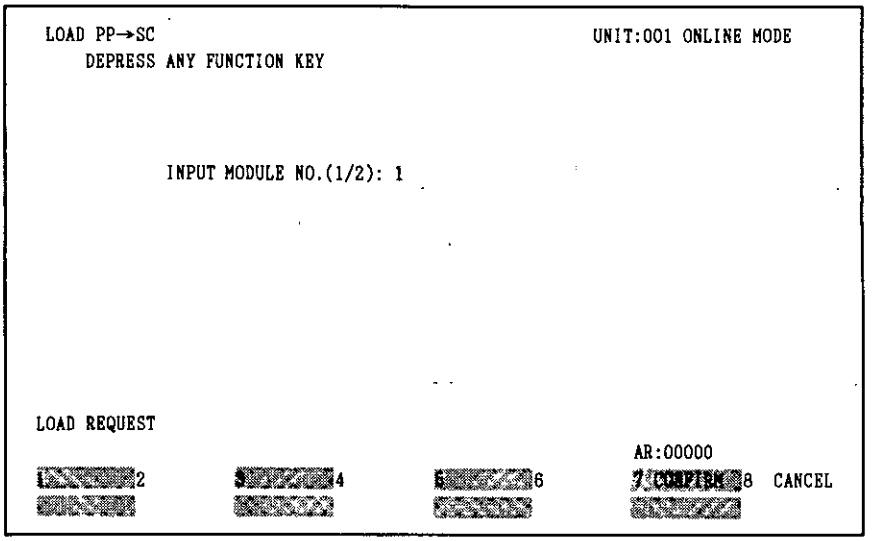


Fig. 7.45

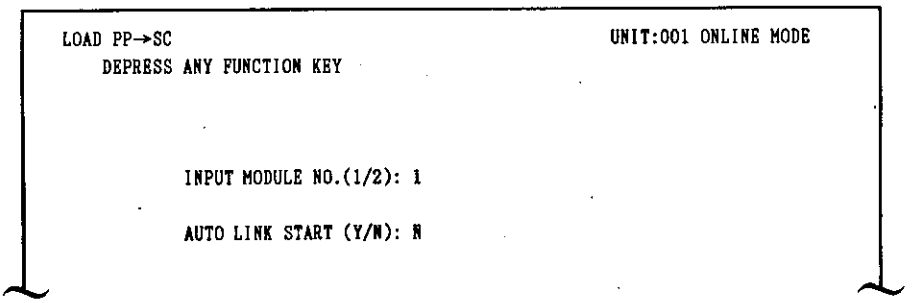


Fig. 7.46

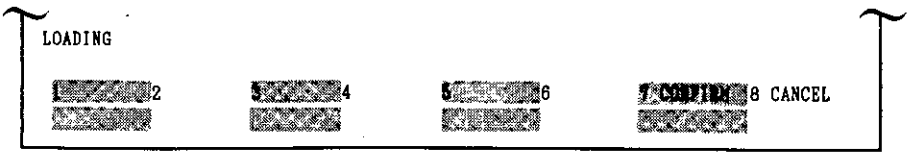
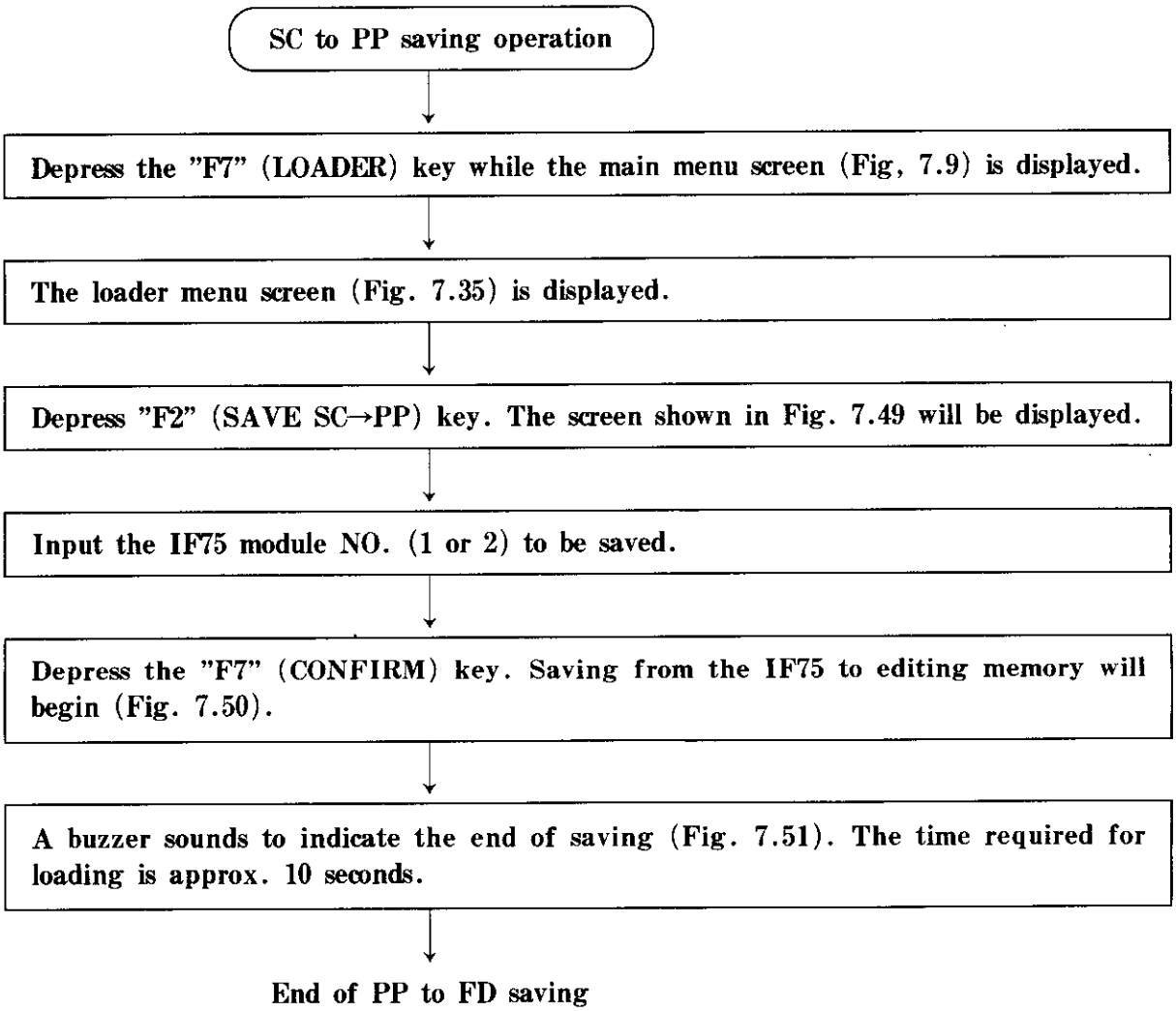


Fig. 7.47

Fig. 7.48

(4) SC to PP saving operation



Note: SC to PP saving operation is enabled even during data link operation or when the CPU module is in RUN status.

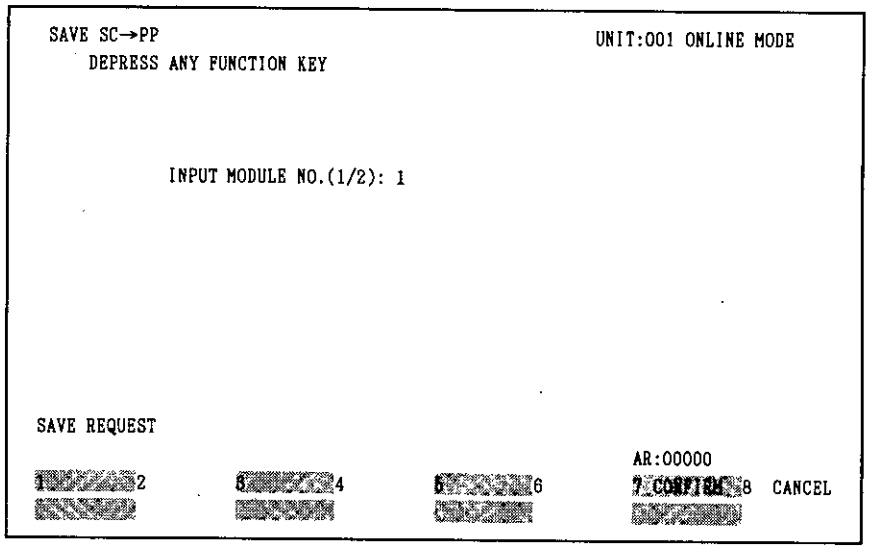


Fig. 7.49

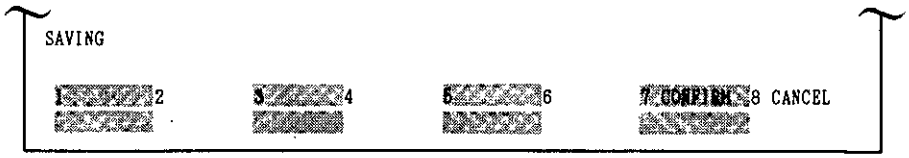
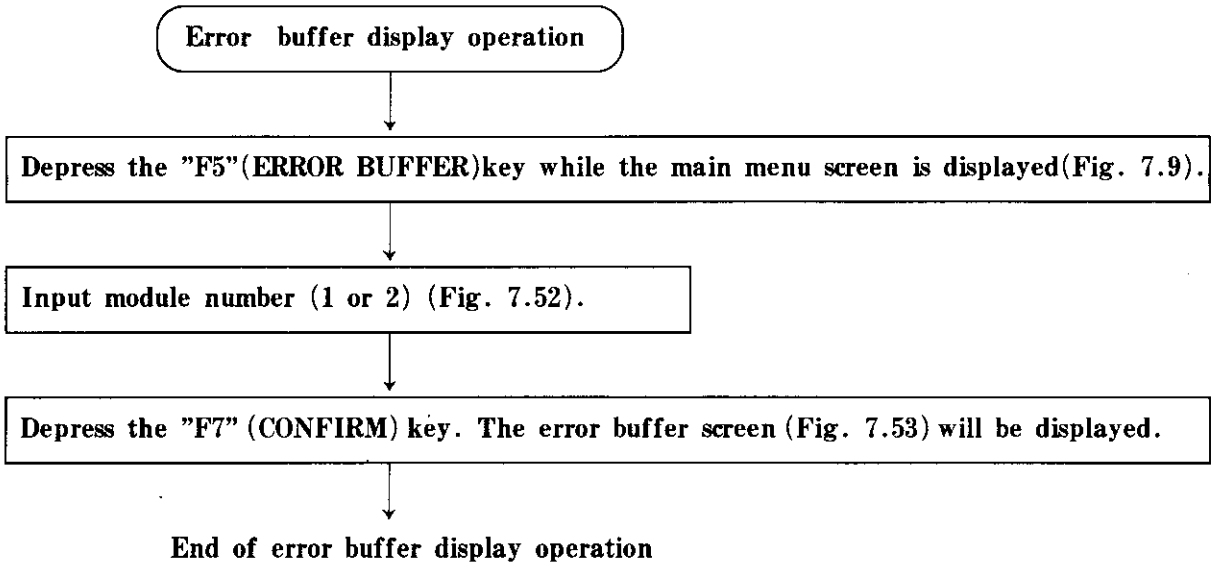


Fig. 7.50

Fig. 7.51

7.3.9 Error Buffer Display Operation

To display errors related to ME-NET, proceed as follows. Information on up to eight errors will be displayed in order of their occurrence. The error code is composed of two digits of hexadecimal numerals. For details on error code and error description, see Table 7.5. This opetration is effective only in the ON-LINE mode.



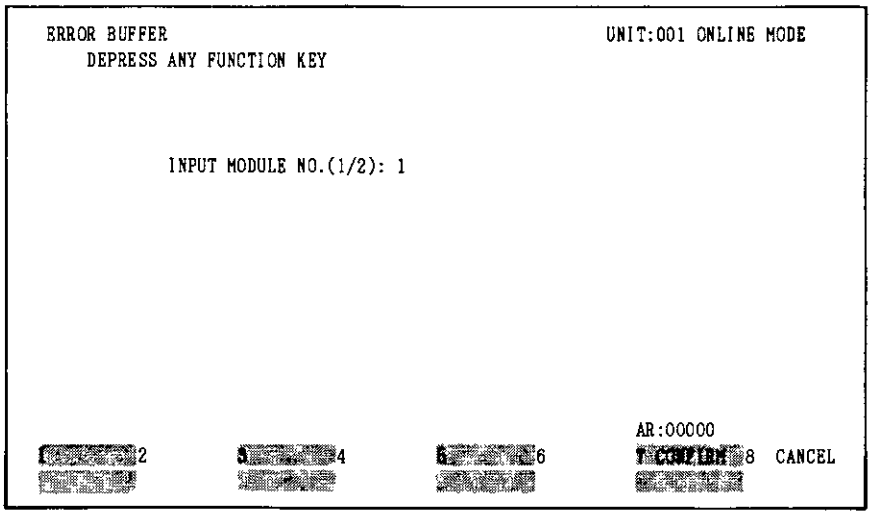


Fig. 7.52

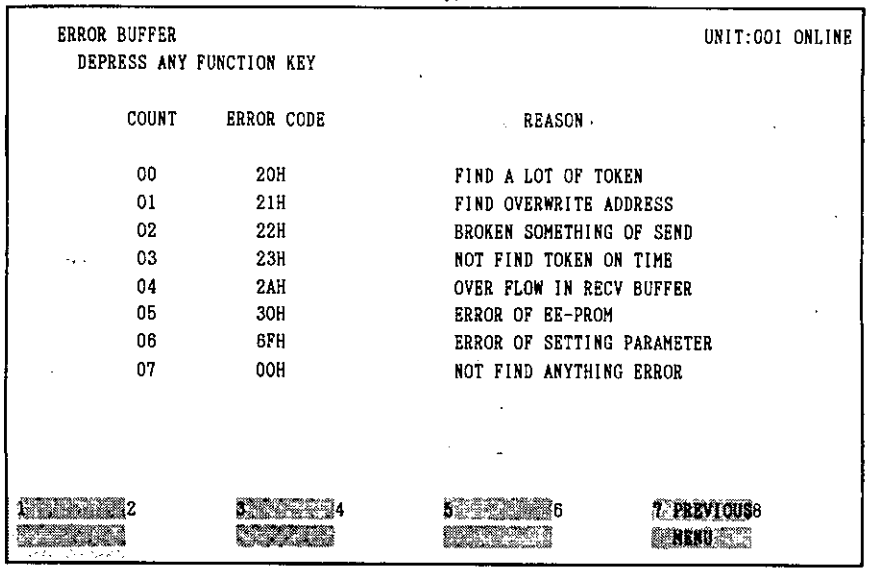


Fig. 7.53 Error Buffer Display Screen

Table 7.5 List of Error Codes

Error Code	Error Display	Cause and Corrective Actions
01	MAIN CPU ROM ERROR	PROM for upper CPU installed in IF75 is defective. Replace IF75.
02	MAIN CPU ROM ERROR	RAM for upper CPU installed in IF75 is defective. Replace IF75.
03	HOST-MAIN 2 PORT RAM ERROR	2-port RAM for upper CPU installed in IF75 is defective. Replace IF75.
04	MAIN-COM 2 PORT RAM ERROR	2-port RAM for communication CPU installed in IF75 is defective. Replace IF75.
05	MAIN WDT ERROR	IF75 watchdog timer is defective. Replace IF75.
11	COM CPU ROM ERROR	ROM for communication CPU installed in IF75 is defective. Replace IF75.
12	COM CPU RAM ERROR	RAM for communication CPU installed in IF75 is defecitve. Replace IF75.
18	COM CPU LSI ERROR	Communication LSI installed in IF75 is defective. Replace IF75.
19	COM SOMETHING ERROR	Any other part for communication CPU installed in IF75. Replace IF75.
1A	COM TIME OUT ERROR	No response from communication CPU installed in IF75. Replace IF75.
20	FIND A LOT OF TOKEN	More than one token has been detected on ME-NET.
21	FIND OVERWRITE ADDRESS	Addresses of the same number exist. Check the address of each station.
22	BROKEN SOMETHING OF SEND	Transmitting section is at fault. Check ME-NET cable and connectors.
23	NOT FIND TOKEN OF TIME	Token has not been received within the specified time. Take same action as specified for error code 22.
2A	OVER FLOW IN RECV BUFFER	Receving buffer in communication CPU has overflowed. Take same action as specified for error code 22 or replace IF75.
30	ERROR OF EE-PROM	EE-PROM installed in IF75 is defective. Carry out EE-PROM clearing operation or replace IF75.
31	ROTERY SWITCH SETTING ERROR	Rotary address switch is not properly set. Check address.
6F	ERROR OF SETTING PARAMETER	Link parameter is not properly set. Check link parameter.

8. ME-NET INSTALLATION AND EXECUTION RULES

The specifications of coaxial cables and connectors, and tools and installation methods to be used in ME-NET are specified.

8.1 SUMMARY

The cable to be used for ordinary trunk lines and branch lines in ME-NET shall be a coaxial cable (Type: ME-5C-2V) that conforms to JIS-C-3501. An harmonic metal braid armored coaxial cable (Type: ME-5C-2V-MCY) shall be used in a harsh environment.

Solderless BNC connectors shall be used. T-branch connectors and junction connectors are recommended to be waterproof and have protection for their armor in order to prevent water from entering.

8.2 INSTALLATION AND EXECUTION RULES

The contents in this section are copied from the ME-NET installation and execution rules.

8.2.1 Harmonic Coaxial Cable for use in ME-NET

(1) Cable for ordinary trunk and branch lines

Type: ME-5C-2V (Standard: JIS C 3501)
Manufacturer: Mitsubishi Cable Industries, Ltd.
Agent: Chugai Co., Ltd.

① Scope

The specifications provided herein apply to the harmonic coaxial cable (Type: ME-5C-2V) manufactured by Mitsubishi Cable Industries, Ltd.

② Installation

Table 8.1

Item	Installation	Specification(mm)
Inner conductor	Annealed solid copper wire	0.8±0.02
Insulator	Polyethylene (natural color)	4.9±0.12
Outer conductor	0.14mm braided annealed copper wire (braiding density: 90.7% or over)	5.6±0.2
Sheath	Vinyl (black)	7.4±0.5
Mass	———	73.8±10 kg/km

Note: The product type, manufacturer's logo and name as shown in the following square brackets shall be printed repeatedly on the surface of the cable. [ME-5C-2V MITSUBISHI CABLE]

③ Characteristics

Table 8.2 Electrical Characteristics

Item	Specification
Inner conductor resistance	35.9 Ω/km or less
Withstand voltage	1000VAC for one minute
Insulation resistance	More than 1000MΩ/km
Capacitance	67±3 pF/m (1 kHz)
Characteristic impedance	75±3Ω (10 MHz)
Wave length contraction coefficient	66±2% (10 MHz)
Attenuation*	12.5 dB/km (2.4 MHz)
	15.5 dB/km (3.9 MHz)

Note: The specification (max, value) marked with an asterisk (*) shall be less than 115% of the standard value.

Table 8.3 Physical Characteristics

Item		Specification
		ME-5C-2V
Tensile strength of insulator		1.0kgf/mm²
Elongation of insulator		More than 400%
Tensile strength of sheath		1.0kgf/mm²
Elongation of sheath		More than 200%
Heating resistance of insulation	Tensile strength	More than 80% of value before heating
	Elongation	More than 65% value before heating
Heating resistance of sheath	Tensile strength	More than 80% of value before heating
	Elongation	More than 80% of value before heating
Dielectric loss tangent		Less than $(6\times10)^{-4}$
Dielectric constant		2.2 to 2.5
Heating-resistant contractibility		Within ± 10%
Translation of plasticizer		Less than $(2\times10)^{-4}$
Low-Temperature resistant winding <harsh test>		No cracks or broken parts allowed on the surface

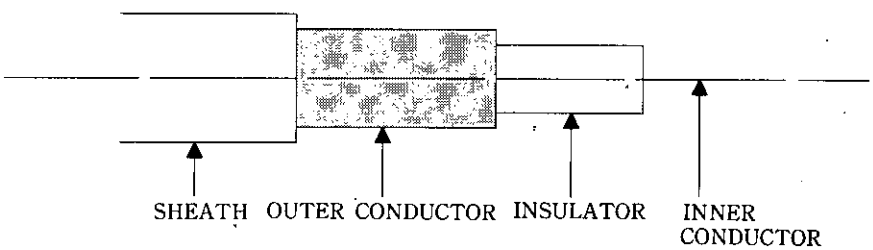


Fig. 8.1 Harmonic Coaxial Cable
(Type: ME-5C-2V)

(2) Cable for use in harsh environment

Type: ME-5C-2V-MCY

(Harmonic metal braid armored coaxial cable)

Manufacturer: Mitsubishi Cable Industries, Ltd.

Agent: Chugai Co., Ltd.

① Scope

The specifications provided herein apply to the polyethylene insulated coaxial cable manufactured by Mitsubishi Cable Industries, Ltd., that is armored with galvanized iron wire braiding and then covered with vinyl sheath [Type: ME-5C-2V-MCY].

② Installation

Table 8.4

Item	Installation	Specifications(㎜)
Inner conductor	Annealed stranded copper wires (7/0.26)	0.78±0.02
Insulator	Polyethylene (natural color)	4.6±0.12
Outer conductor	Braided annealed copper wire (0.14 ㎜) (Braiding density: 90% or over)	5.3±0.2
Sheath	Vinyl (black)	7.3±0.5
Drain wire	Tin-coated annealed stranded copper wires (7/0.203 ㎜)	7/0.203±0.01
Armor	Galvanized iron wire braiding (0.32 ㎜) (Braiding density: 90% or over)	8.7±0.5
Sheath	Vinyl (blue)	11.1±0.8
Weight		186±20kg/㎞

③ Characteristics

Table 8.5 Electrical Characteristics

Item	Specification
Inner conductor resistance	52.0 Ω/㎞ or less
Withstand voltage	1000VAC for one minute
Insulation resistance	More than 1000 MΩ/㎞
Capacitance	67±3 pF/m (1 kHz)
Characteristic impedance	75±3 Ω (10 MHz)
Wave length contraction coefficient	66±2%
Attenuation*	12.5dB/㎞ (2.4 MHz)
	15.5dB/㎞ (3.9 MHz)

Note: The specification (max. value) marked with an asterisk (*) shall be less than 115% of the standard value.

Table 8.6 Physical Characteristics

Item		Specification
Tensile strength of insulator		1.0kgf/mm^2
Elongation of insulator		More than 400%
Tensile strength of sheath		More than 1.0kgf/mm^2
Elongation of sheath		More than 200%
Heating resistance of insulation	Tensile strength	More than 80% of value before heating
	Elongation	More than 65% of value before heating
Heating resistance of sheath	Tensile strength	More than 80% of value before heating
	Elongation	More than 80% of value before heating
Dielectric loss tangent		Less than $(6\times10)^{-4}$
Dielectric constant		2.2 to 2.5
Heating-resistant contractibility		Within $\pm10\%$
Translation of plasticizer		Less than $(2\times10)^{-4}$
Low-Temperature resistant winding <harsh test>		No cracks or broken parts allowed on the surface

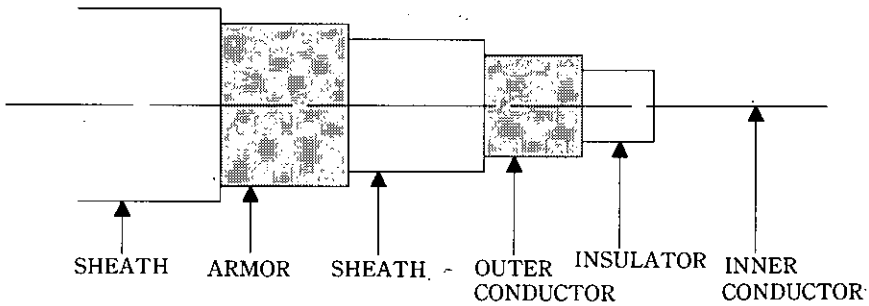


Fig. 8.2 Harmonic Metal Braid Armored Coaxial Cable
(Type:ME-5C-2V-MCY)

8.2.2 End Stripping for Harmonic Coaxial Cable

(1) Applicable cable

Use a ME-5C-2V harmonic coaxial cable that conforms to the JIS C 3501 standard.

(2) Required tool

CST-TM (For details, see Par. 8.2.6.)

(3) End stripping procedure

① Basic action

Pushing the cam wheel (orange ring) back and forth will allow the cable holder to move back and forth as shown in Fig. 8.3. Check this basic action first. Put your index finger through the hole and use your thumb to move the cam wheel back and forth.

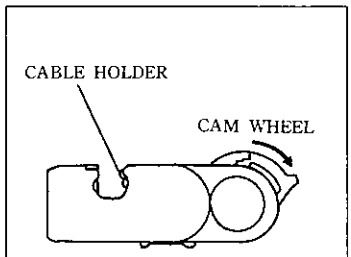


Fig. 8.3

② Setting pressure

Use the slider on the bottom of the tool to set the working range of the cable holder (Fig. 8.4). Pressure increases as the index position moves to the left. This rule requires the tool to be used with the slider set at the extreme right of the graduated scale.

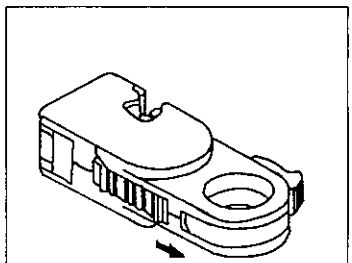


Fig. 8.4

③ Setting cutter blade

Place the attached cutting blade setting gauge as shown in Fig. 8.5.

Position the cutting blade in line with the cavity of the gauge, push the cam wheel toward you and secure the cable firmly. Of the three adjust screws located on the front of the screw holder, turn the screws at each side clockwise until they stop.

Fine adjustment will be required for the right depth of cut.

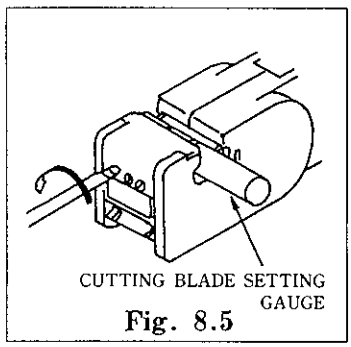


Fig. 8.5

④ Stripping off insulation

To stop the cam wheel push it forward five times. (Fig.8.6)

〈Procedure〉

Step1: Push the cam wheel three times and turn it in the direction of the arrow (Fig. 8.7, 2 or 3 times).

Step2: Push the cam wheel once again and turn it in the direction of the arrow as described in Step 1 (2 or 3 times).

Step3: Push the cam wheel one more time and turn it in the direction of the arrow as described in Step 1 (2 or 3 times).

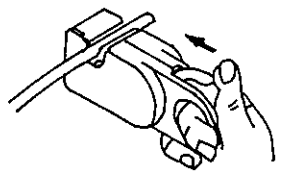


Fig. 8.6

The cam wheel will stop now after it has been pushed five times in all.

With the above Steps 1 to 3 in mind, place the cable in the cable stripper, leaving about 10 ㎜ from the tip outside of the stripper (Fig. 8.7), hold it firmly with the middle, ring and little fingers of your left hand so that the cable does not move during the rotation of the stripper. Put the index finger into the hole, follow Step 1, proceed to Step 2 when the resistance to the rotation has stopped, and then follow Step 3 when the resistance to the rotation has stopped. Thus, follow Step 1 through Step 3.

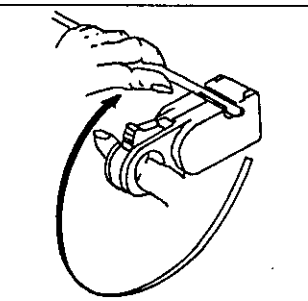


Fig. 8.7

⑤ Removing insulation

While holding the cable with your left hand, hold the cable stripper at a right angle to the cable with your right hand (Fig. 8.8) , push the cable stripper with the thumb of your left hand and remove it. If the cable stripper cannot be removed easily, adjustment of the blade has not been properly made. Therefore, push back the cam wheel and then remove the cable from the tool itself.

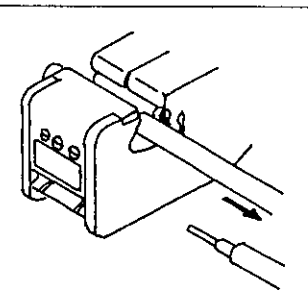


Fig. 8.8

⑥ Fine adjustments of blade

If the stripper does not cut the insulation to the required depth or if it cuts too deep and nicks the conductor, make fine adjustments by slightly turning the screws on the screw holder (Fig. 8.9).

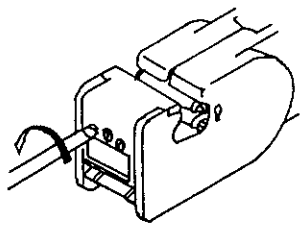


Fig. 8.9

⑦ Indication of blade setting

When fine adjustments of the screws on the screw holder are completed, it is recommended that you fill in the sticker included in the tool and put it under the adjusting screws in order to retain the adjusted condition of the blade adjusting screws (Fig. 8.10).

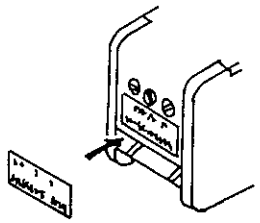


Fig. 8.10

⑧ Replacement of blade

Lift the upper part of A using a screwdriver or a similar tool, and open the screw holder as shown in Fig. 8.11. Take out the blade cassette and reverse the blade or put in a fresh cassette from above as shown in the figure.

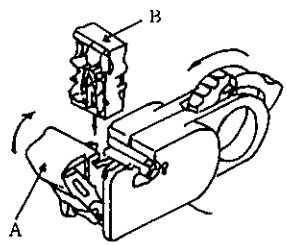
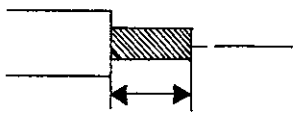


Fig. 8.11

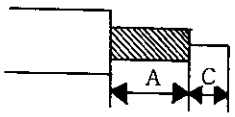
⑨ The end of the harmonic coaxial cable that has been stripped off by the stripper will have the final dimensions as shown in Fig. 8.12.



10±0.5mm

Fig. 8.12

⑩ Referring to Fig. 7.13, use a nipper or a similar tool to cut off dimension C to the proper length of 4 mm.



A = 10±0.5mm
C = 4±0.5mm

Fig. 8.13

⑪ For installation of the ME-GP-01 connector designed for harmonic coaxial cables, see Par. 8.2.4.

8.2.3 End Stripping For Harmonic Metal Braid Armored Coaxial Cable

(1) Applicable cable
ME-5C-2V-MCY

(2) Required tool
CSM-TM ··· Used to strip off sheaths, outer conductors and insulators.
(For details, see Par. 8.2.6.)
Knife, nipper, or similar tool···Used to strip off sheaths and armor.

(3) End stripping procedure

① Cut off about 30 mm of sheath from the cable end and expose the iron wire braiding (Fig. 8.14).

② Use a screwdriver to loosen the exposed armor (braided iron wire) and cut it off. When cutting off the armor, use care not to cut off the drain wire, which will be used to provide grounding (grounding resistance: 100Ω or less).

③ For the remaining steps continued from Step 2, see "End stripping procedure for harmonic coaxial cable (ME-5C-2V)."

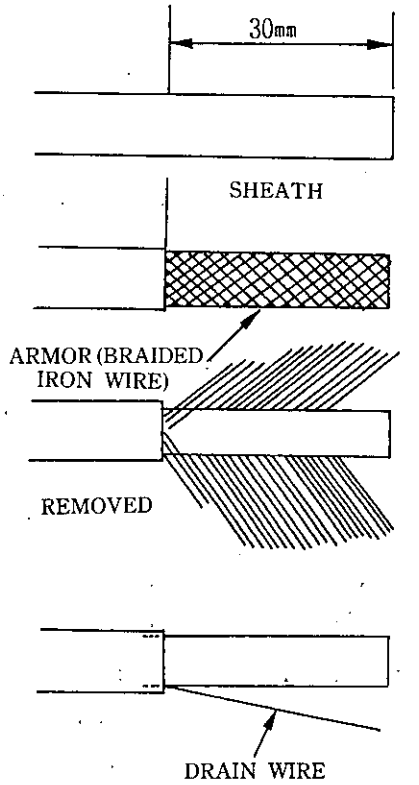


Fig. 8.14

8.2.4 Installation of ME-GP-01 Type (Solderless) Connector

(1) Applicable cable
ME-5C-2V

(2) Applicable connector
ME-GP-01

(3) Connector parts (in mm)

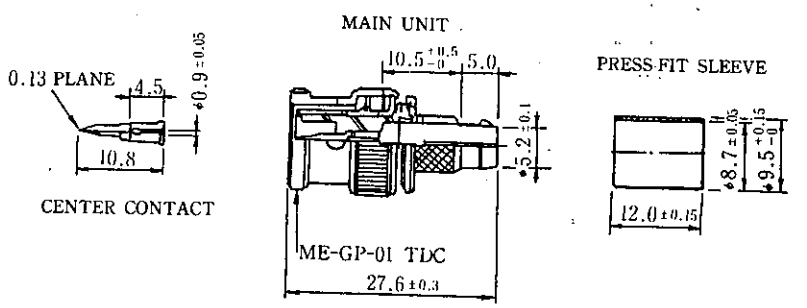


Fig. 8.15

(4) Required tool

Handy type crimping tool (described on page 77).

(5) Crimping procedure

① Put the sleeve over an end-stripped harmonic coaxial cable or an end-stripped metal-braided armored harmonic coaxial cable.

② Put the contact over the center conductor of the cable.

③ Crimp the center contact in the following manner.

ME-42H (See Fig. 8.22.)

Place the diamond-shaped ◇ upper die blade on the collar of the contact, squeeze the moving frame against the fixed frame until the ratchet disengages. (Crimping width: 2.2 ㎜)

④ Push the harmonic coaxial cable with the crimped on contact over the center conductor into the connector, insert the arrowhead between the cable insulator and the outer conductor, open the arrowhead in such a way that the outer conductor does not come in contact with the connector, and then push it until the tip of your finger touches the tip of the contact.

⑤ Crimp the outer conductor in the following manner.

Press the sleeve against the return groove of the connector body and crimp.

ME-42H Type (See Fig. 8.22.)

Place the hexagonal upper die close to the connector body and squeeze until the ratchet disengages. (Crimping width 10 ㎜)

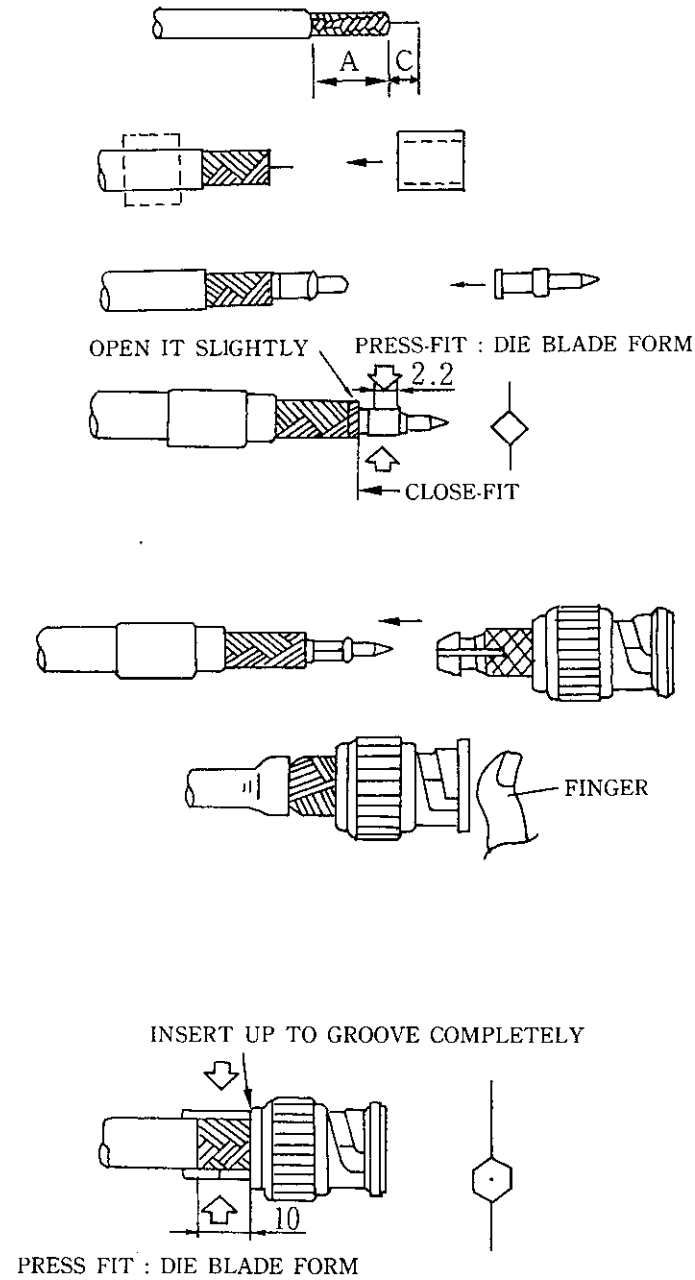


Fig.8.16

⑥ Check if the connector body is insulated from the contact in the following manner.

Check continuity using a tester to make sure the center and outer conductors are not shorting out inside the connector body. In the non-conducting state, the tester gives a reading of $\infty\Omega$ (Fig. 8.17).

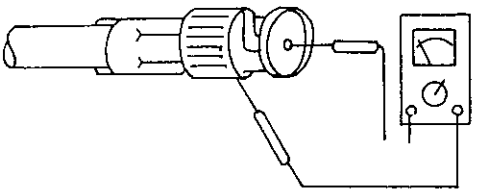


Fig. 8.17

⑦ Continuity check

Short one end of the cable connector and then check that there is continuity (Fig. 8.18).

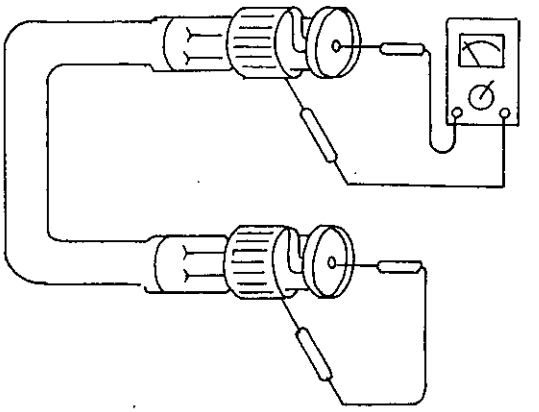


Fig. 8.18

8.2.5 Waterproof and Insulating Connectors

It is recommended to waterproof T-branch and junction connectors by winding a self-amalgamating tape on them in order to keep out water. Also protect the connectors with insulating jackets (See Par. 8.2.6 (4)).

(1) Winding procedure

① When winding self-amalgamating tape on a T-branch connector, cut the tape to a length of about 10 cm and start at the ① position. In the same manner, start winding the tape at the ② and ③ positions (Fig. 8.19).

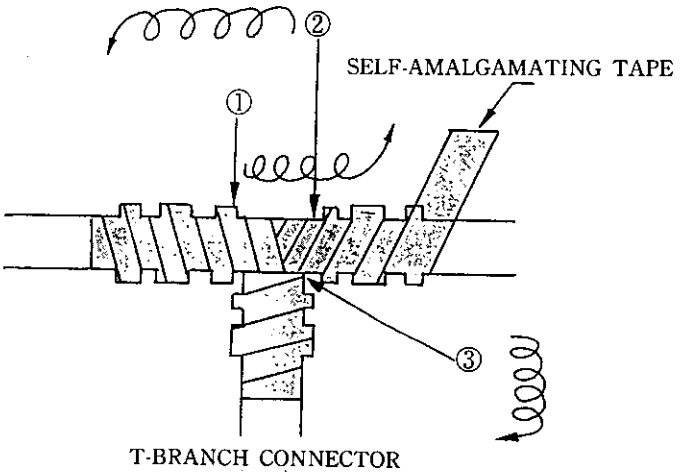


Fig. 8.19

② When winding self-amalgamating tape on a junction connector, cut the tape to a length of about 15 cm and start at the ① position (Fig. 8.20).

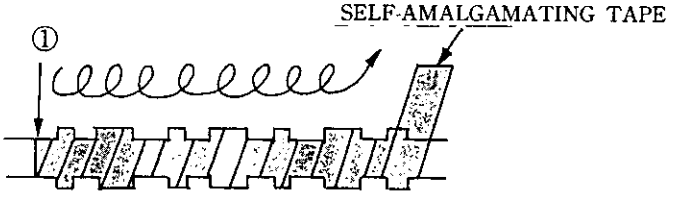


Fig. 8.20

Note: Clean the surface of the connector before winding the tape. Keep a slight tension on the tape with

its adhesive side facing inward so that the tape does not wrinkle and adheres to the connector, and wind the tape evenly all around the connector until the metal part of the connector is completely covered, letting successive turns overlap half of the width of the tape at each turn. Use care not to overstretch the tape.

8.2.6 Tools and Equipment Designed for use in ME-NET

(1) Stripper for harmonic coaxial cable

Table 8.7

Type	Components	Quantity
CST-TM	Body (with screw holder)	1
	Blade cassette	1
	Cutting blade setting gauge	1

The stripper comes equipped with a screw holder and a blade cassette.
Manufacturer : Nippon Wide Muller Co.,Ltd.

Agent : Chugai Co.,Ltd.

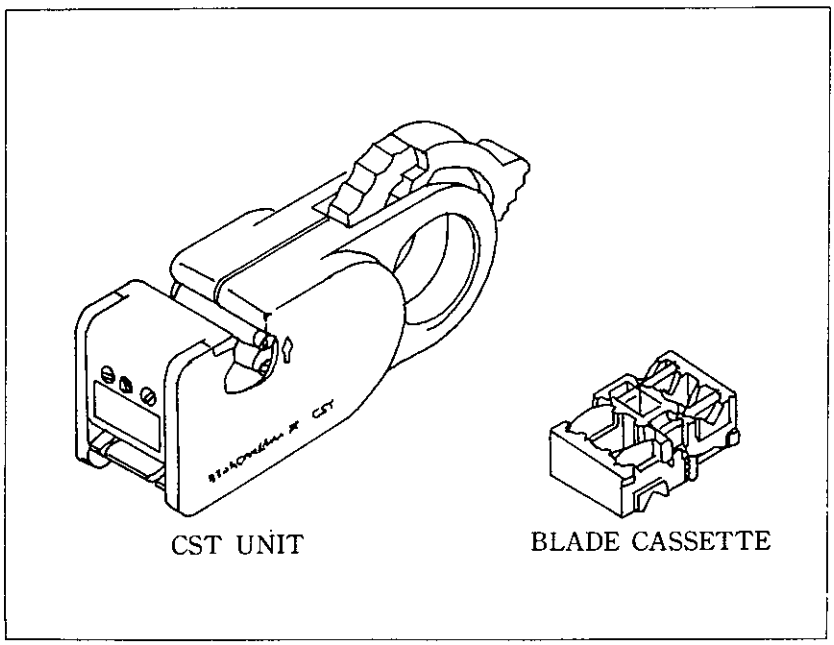


Fig. 8.21

(2) **Handy type crimping tool**

Table 8.8

Crimping Tool Model	ME-42H
Dice NO.	67-42H
Stamp	ME-42H
Crimping width	10㎜

Manufacturer : Toko Denshi Co.,Ltd.

Agent : Chugai Co.,Ltd.

DIMENSIONS in mm

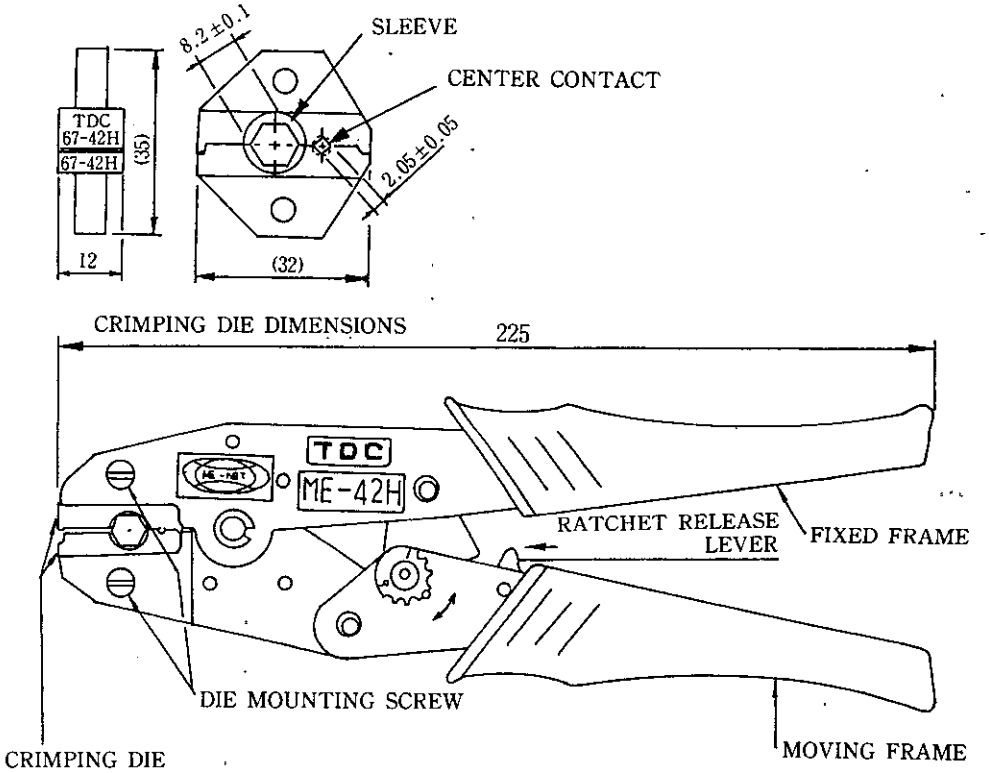


Fig. 8.22 Handy Type Crimping Tool

(3) Harmonic coaxial connectors (for ME-NET)

Table 8.9

Name	Type	Marking
Connector	ME-GP-01	ME-GP-01TDC
Tees	ME-TA-01	ME-TA-01TDC
Straight	ME-JI-01	ME-JJ-01TDC
Elbow	ME-LA-01	ME-LA-01TDC
Termination, for end resistor	ME-75	ME-75

For the external dimensions of connectors, refer to Fig. 8.15.

Manufacturer : Toko Denshi Co.,Ltd.

Agent : Chugai Co.,Ltd.

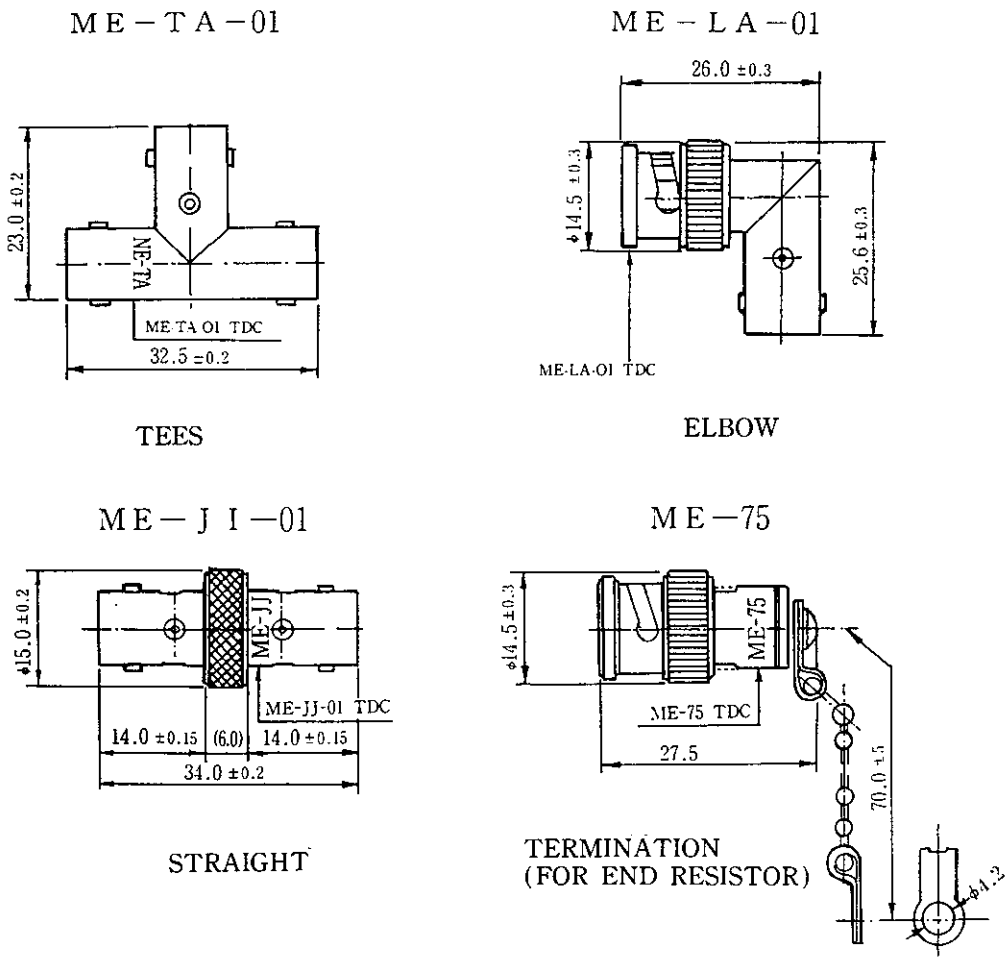


Fig. 8.23 External Dimensions in mm

(4) Jackets and self-amalgamating tape (for waterproofing and insulation)

① Insulating method

Wherever T-branch connectors, junction connectors, crimp-type connectors, elbow connectors are used, make sure to use the following jackets on them for protection. If a connector comes in contact with an external housing, a communications problem will occur.

Manufacturer : Shinagawa Shoko
Agent : Chugai Co.,Ltd.

DIMENSIONS in mm

T-JACKET
(SB-2879)

L-JACKET
(SB-2878)

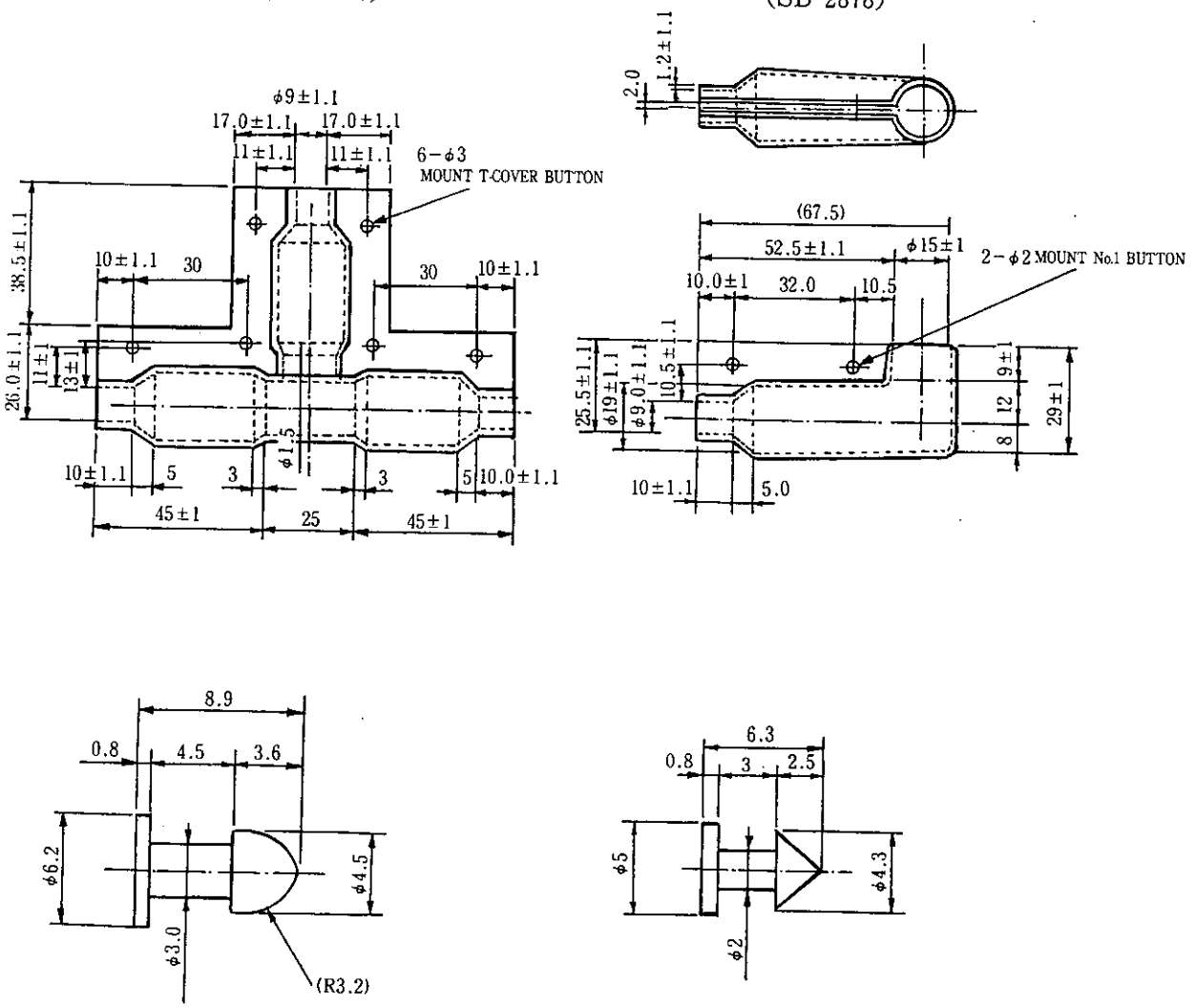


Fig. 8.24

② Waterproofing method

If water is likely to find its way into T-branch connectors, junction connectors or other connectors, waterproof them by winding a self-amalgamating tape on them.

Manufacturer : Nitto Tape
Agent : Chugai Co.,Ltd.

■ Electric in sulation tape

Table 8.10

Parts NO.	Parts Name	Base Material	Standard Size			General Characteistics				Classification of Heat Resistance	Features and Applications
			Thick-ness (㎜)	Width (㎜)	Length (㎜)	Peel Adhesion (g/19㎜ wide)	Tensile Strength (kg/19㎜ wide)	Enlongation (%)	Breakdown Voltage (kV)		
NO.11	Self-amalgamating butyl-rubber tape	Butyl-rubber	0.50	19	10	—	2.6	500	23.0	Y	For insulating cable connections and stripping cable ends (block)

8.2.7 Harmonics Coaxial Cable Installation

(1) Installing cable between communication stations

① When installing a cable between communication stations, keep the length of the cable to the minimum starting from the nearest station regardless of the station number.

(2) Trunk and branch lines

① In the figure shown below, the bold line represents a trunk line and branch lines are those that are T-branched from the trunk line.

② Keep the length of branch line that T-branches from the trunk line to within 400 ㎜.

③ When bending a cable, keep the bending radius to 45 ㎜ (outside) or over.

④ Keep the total length of a cable to within 1 ㎞.

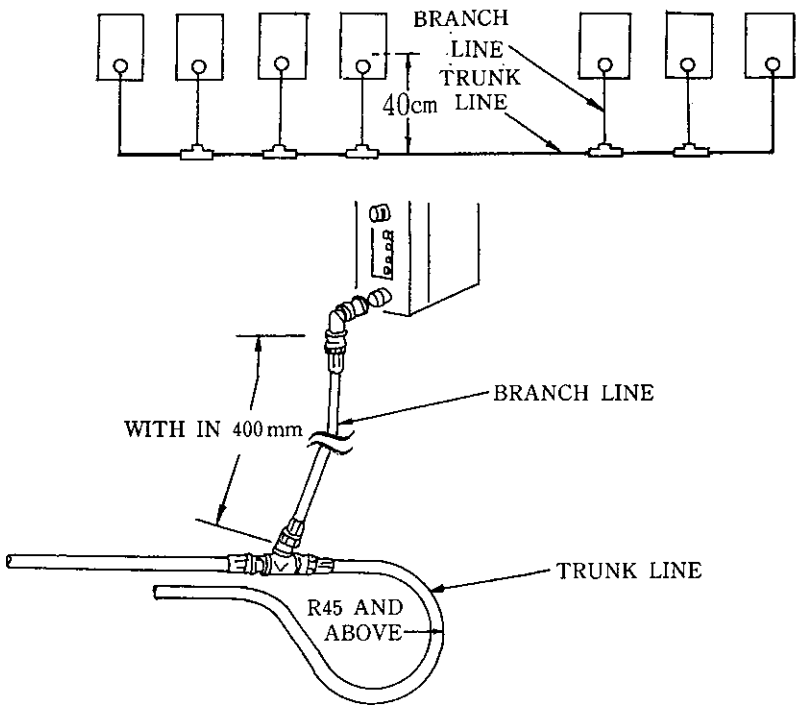


Fig. 8.25

(3) Connecting cables on a trunk line

When connecting cables in the middle of a trunk line via a connector, use a direct adaptor (ME-JJ-01) and do NOT use a T-branch connector.

Cover connector shells with insulating tape.

Note: Connect cables on a trunk line via a direct adaptor only at a place that absolutely requires such a connection. Connecting cables in the middle of a trunk line via junction connectors will result in a lowering of reliability including a loss of signal level.

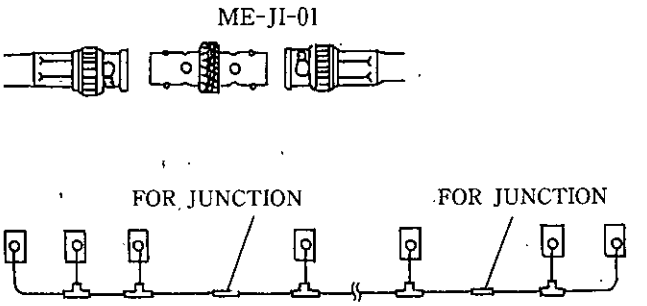


Fig. 8.26

(4) Procedures for connecting cables inside the control board

① Secure the cable near the cable entrance to a control board and the spot where the cable T-branches into the unit so that excessive force does not apply to the cable or the unit.

② Extra length of cable

When connecting a cable in a control board, supply an extra length of 2 to 3 meters for easy operation during end stripping and relocation of the unit.

③ Connecting cable connectors

Do not merely insert a cable connector, but make sure to turn it clockwise until the connector lock engages.

④ Connector insulating cover

Make sure to insulate the connector shell in case it should come in contact with a high voltage part and to prevent people from receiving an electric shock.

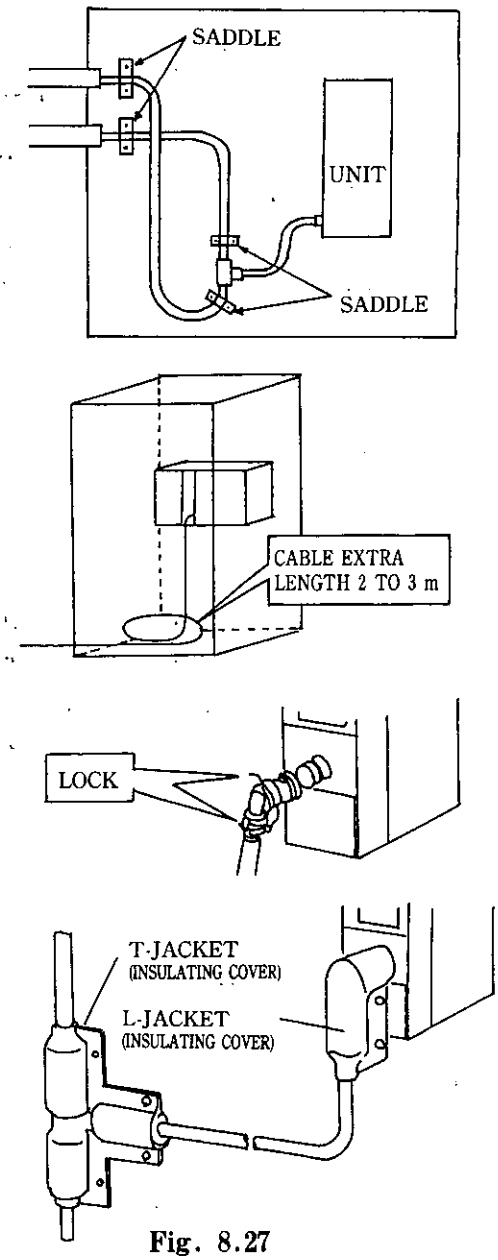


Fig. 8.27

⑤ Grounding power unit

- Make sure to connect the GND terminal of the power unit for use in ME-NET to the ground (grounding resistance: 100 Ω or less).
- If the power unit is not grounded, continuity will not be established with the earth even if the LG switch of ME-NET is turned ON (For the LG switch, see Par. 4.3.⑦).
- For LG switch setting, see Par. 4.3.⑦).

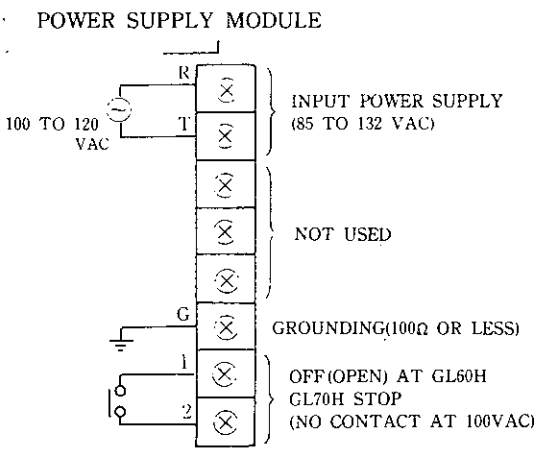


Fig. 8.28

8.2.8 Connecting Harmonics Coaxial Cable Outside Control Board

(1) Do NOT bundle a harmonics coaxial cable and a power cable together, but install them separately at a minimum distance of 100 ㎜ from each other. The best way to install a harmonics coaxial cable is to house a harmonics coaxial cable in a separate cable duct rather than to house it in the power cable duct.

(2) Do not allow a coaxial cable to be placed under a load of a heavy object such a cable.

When housing a coaxial cable in a duct together with another cable, put the coaxial cable on top of the other cable.

CAUTION

Do NOT install a coaxial cable overhead in the open.
Overhead installation of a coaxial cable may result in malfunction of the unit due to induced lighting or air charged with electricity during lightning or during electrical storm activity.

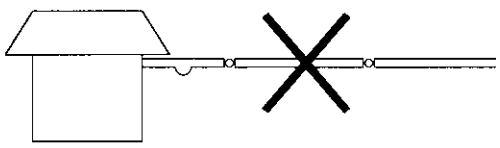
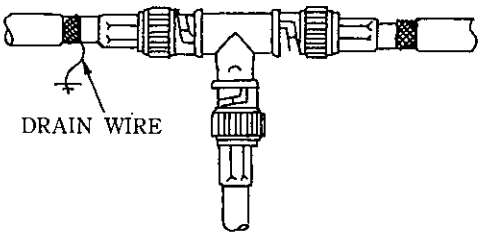


Fig. 8.29

8.2.9 Installing Metal Braid Armored Harmonic Coaxial Cable

(1) Make sure to protect connectors with T-jackets for insulation.

Wind a self-amalgamating type on connectors and then use T-jackets for further protection at places where water may trickle down to the connectors.



(2) Connect the drain wire to the earth (grounding resistance: 100Ω or less).

(3) Connect the drain wire to the earth (grounding resistance: 100Ω or less) only at one end of the cable.

(4) Wind a vinyl insulating tape on the exposed portion of armor (iron wire braiding) where sheath has been removed.

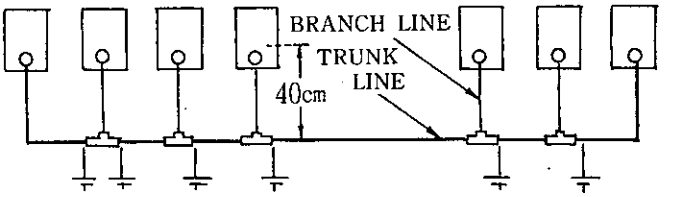
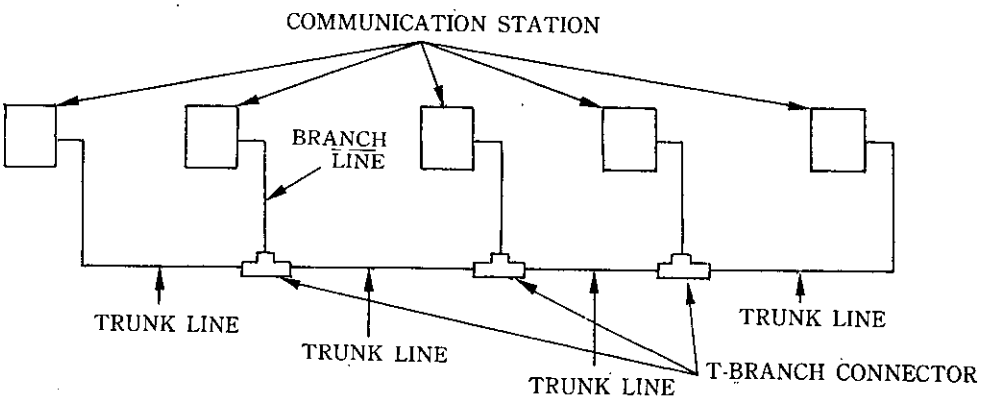


Fig. 8.30

8.2.10 Indicating Wire Gauge, Destination and ID Symbol for Harmonics Coaxial Cable

When installing a coaxial cable in a control board or between control boards, affix an ID mark to prevent false connections. An example is shown below.

(1) Configuration for a communication line and definition of each component



Communication station: ME-NET communication I/F unit

Trunk line: Wiring between a communication station and a T-branch connector or between T-branch connectors

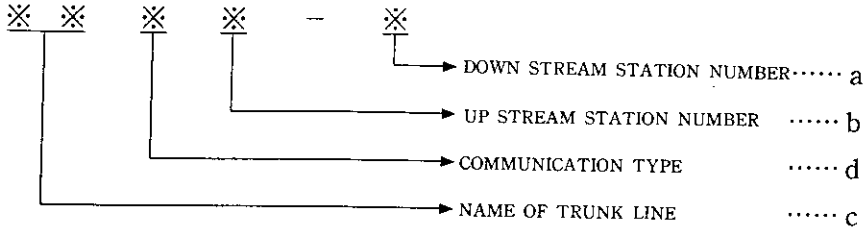
Branch line: Wiring between a communication station and T-branch connector

T-branch connector: Connector that allows a trunk line to branch off into a branch line

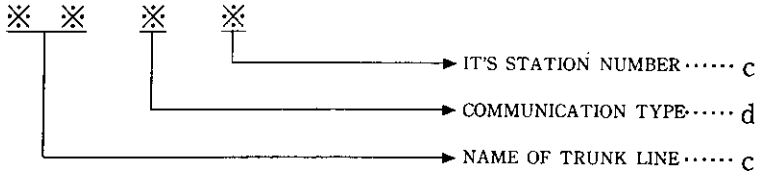
Fig. 8.31

(2) How to number lines

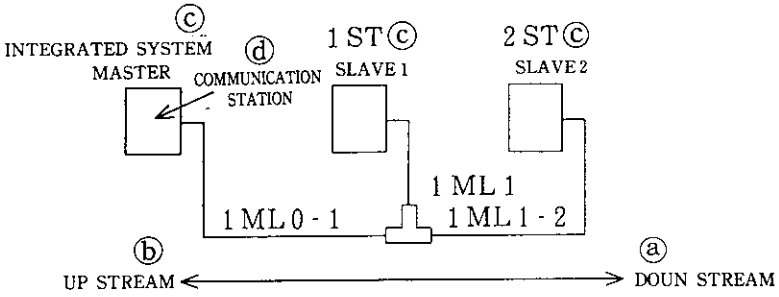
① Trunk line



② Branch line



③ Description



a.b: A master shall be the up stream station (end of the line), and terminals shall be down stream stations.

c: The master shall have a station number of 0 and each of its slaves shall have a octal number only for this specific slave.

d: Symbol that represents a communication type (e.g. L for ME-NET, R for remote I/O, and C for computer link)

e: Symbol that is used to identify a communication system when more than one commnunication system is employed in a facility.

No symbol: Not required to identify a system
*M: Communication between integrated system and station
*S : Communication within station
*U: Communication within unit
* : Communication for upper rank system
└→: If more than one communication system exists in the above systems, write in a number.

④ Example:

IMLO-2: Wiring between master and slave 1 on the first ME-NET system used between the integrated system and a station

IML1-2: Wiring between slave 1 and slave 2 on the first ME-NET system used between the integrated system and a station

IML1 : Wiring between slave 1 and junction device

(3) Display

Wire gauge·····To be marked on the cable·····b

Destination·····To be indicated on the cable·····c

Name of communication station·····To be indicated on equipment·····d

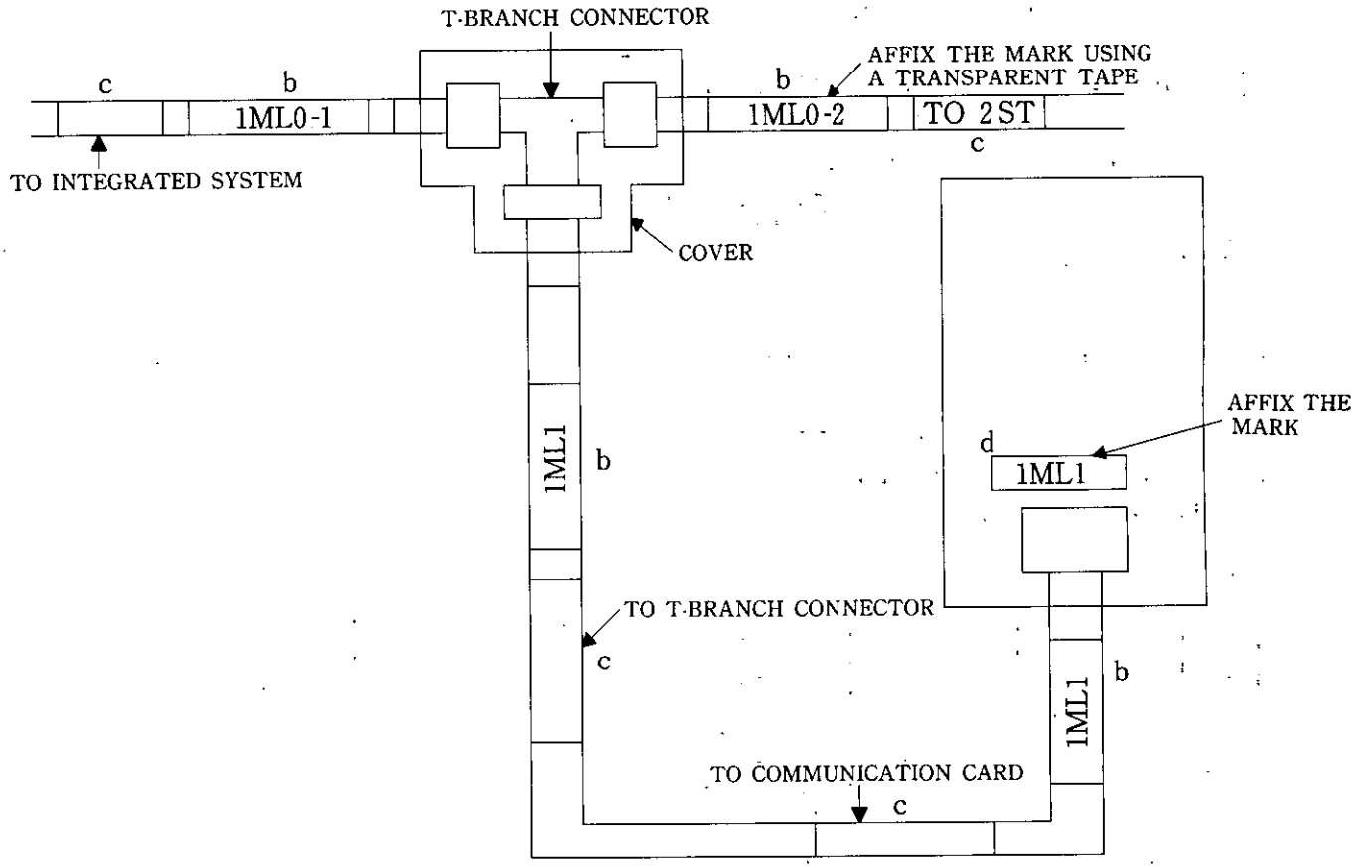


Fig. 8.32

8.2.11 Checks Required After Wiring

Check to see if each of the following items specified by the Installation and Execution Rule are observed.

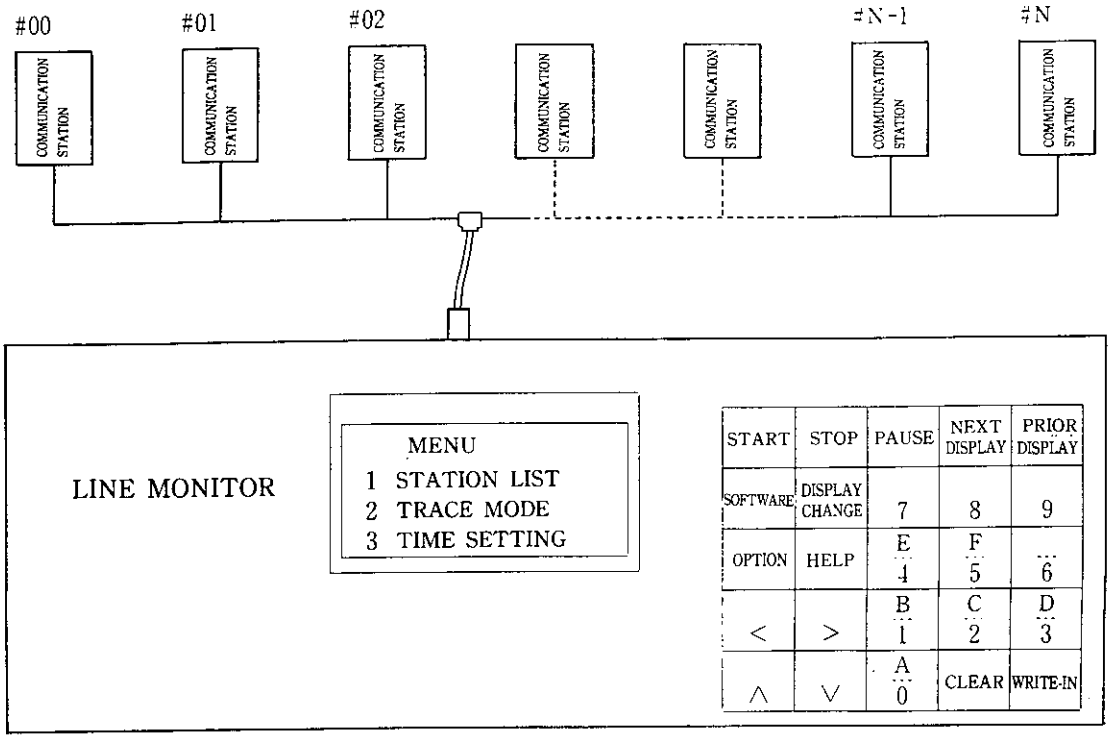
Table 8.11

1	Are ME-NET standard connectors used?
2	Are ME-NET standard coaxial cables used?
3	Are L1, L2, LG and LT switches of each station set as designed?
4	Is the connector (ME-GP-01) locked securely?
5	Is the bending radius of the cable 45 mm or over?
6	Are the connectors insulated with T and L jackets?
7	Are the identification symbols marked according to the drawing?
8	Is no heavy object placed on the coaxial cable?
9	Is the coaxial cable not bundled together with a power line (Is it separated more than 100 mm from a power line)?
10	Is the length of the branch line kept to within 400 mm?
11	Is the total length of the trunk line cable kept to within 1 km?
12	Is the drain cable of the metal braid armored coaxial cable connected to the earth (grounding resistance :100Ω or less)
13	Is tape wound on the exposed portion of armor?

8.2.12 Checks Communications

Check if the wiring for the communication line is correct after the wiring has been completed by switching ON all stations. This can be easily checked with a line monitor. An example of connection between the line monitor and communication stations are shown below.

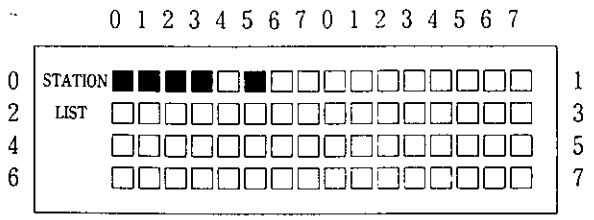
Line monitor
Manufacturer: Cosmo Denso Co., Ltd,



〈Check Items〉

(1) List of participating stations

This function allows the user to display a list of stations that are currently engaged in communications. ■ is used to indicate participating stations, and □ is used to show non-participating stations.



Master 00 and slaves 01, 02, 03, 05 are communicating. Other stations are not participating in communications.

The line monitor can be used regardless of the existence of a master to easily detect failure in the master or a break in the cable.

(2) Event counting

This function allows the user to count and display the number of various events detected during communications.

The four items that can be detected and counted include the retransmission of token, and abort, CRC error and short-F in connection with data frame. Communications can be stabilized through continuous monitoring of these items.

[EXAMPLE]

TOKEN	RE-SENDING	0 0 0 0 TIMES
ERR	ABORT	0 0 0 0 TIMES
	CRC ERROR	0 0 0 0 TIMES
	s h o r t _ F	0 0 0 0 TIMES

The stability of a communications line can be roughly measured by totaling the number of events that indicate the communications state.

Note: Detection is carried out on ME-NET to prevent transmission of false data. In reality, detected data are discarded and the transmission is repeated. This mechanism thus assures no errors will occur in overall communications.

9. HANDLING AND MAINTENANCE

9.1 GL60HT OR GL70HT HANDLING

The mounting base, various modules and I/0 cables of GH60HT or GL70HT will be separately delivered. When installing GL60HT/GL70HT in the control board, proceed as follows. For details on switch setting for ME-NET interface module, see Par. 4.3 and for details on ME-NET cable installation and execution, see Par. 8. For switch setting for various modules other than the ME-NET interface module, see Par. 9 of "MEMOCON -SC GL60H/GL70H PROGRAMMABLE CONTROLLER"(SIE-C815-17.1) , a user's manual for MEMOCON-SC GL60H/GL70H.

9.1.1 Installation of Mounting Bases

According to (1) of Par. 8.4.2, determine the layout of mounting bases and drilled holes. Install wire ducts as necessary. There are three types of mounting bases. Install the mounting base by fastening four M5 screws through the four holes provided.

Note:The mounting base connectors are covered. When installing the mounting base, leave the cover installed over the connectors to protect them from foreign matter.

9.1.2 Installation of Modules

Install modules of the GL60HT or GL70HT on the fixed mounting bases. Fig. 9.1 shows how to install a module on a mounting base.

Remove the connector cover. Fit the guide posts of the module into the guide holes of the mounting base and push the module in. Then fasten the moudle to the mounting base with the M4 screws provided with the module.

Note:Do not remove the connector cover if no module is to be installed.

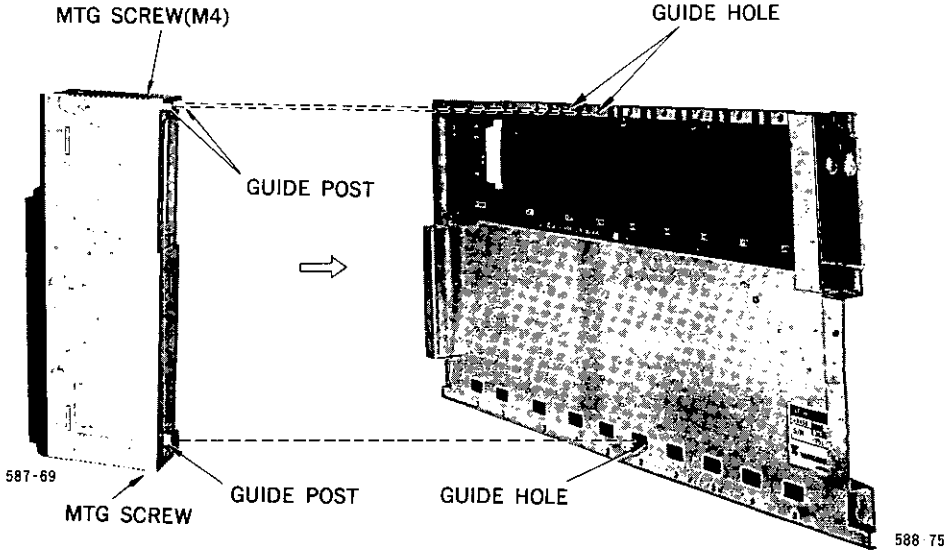


Fig. 9.1 Module Installation

The type of mounting base and the mounting location are determined depending on module types. Figs. 9.2 to 9.4 show mounting location of each module on the mounting base.

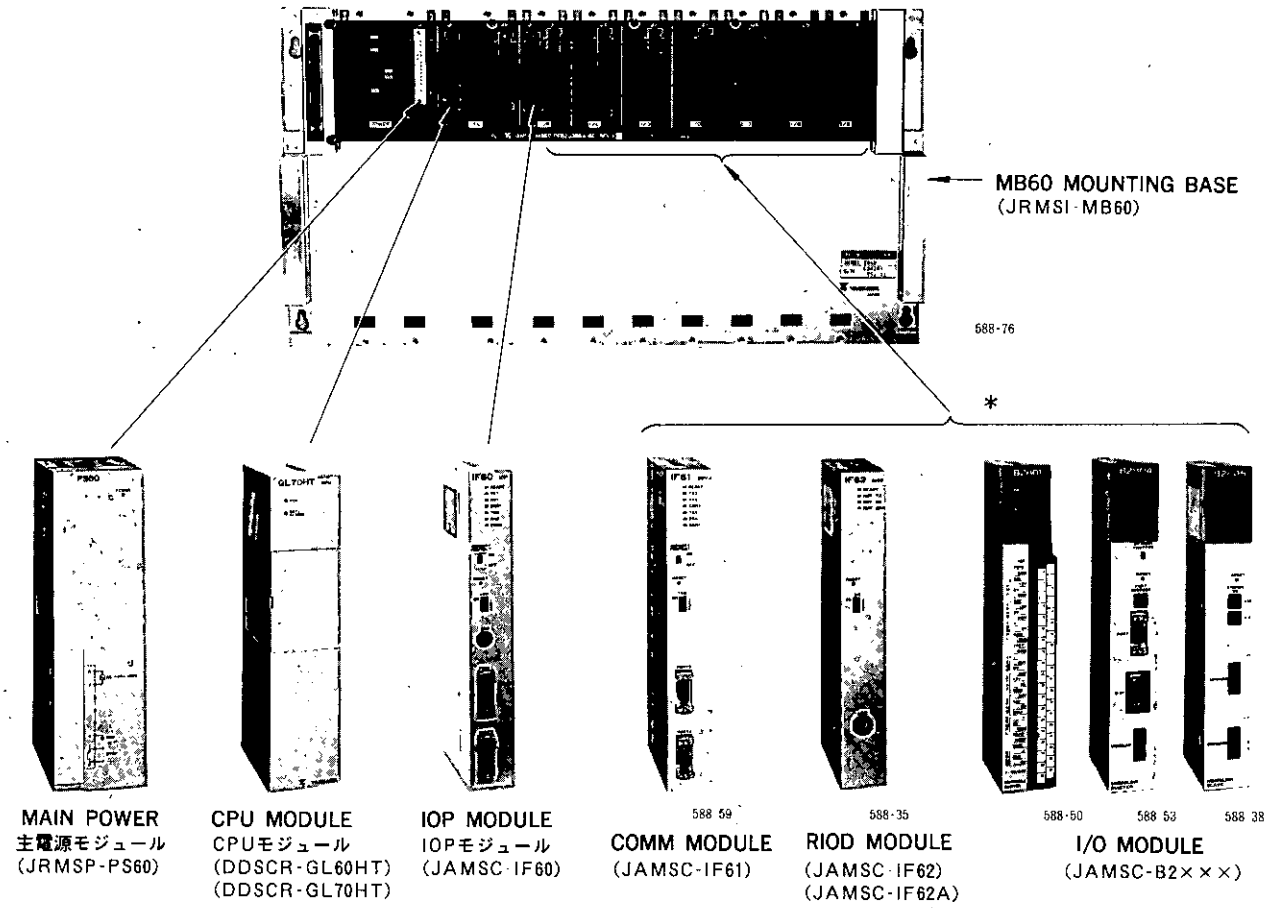


Fig. 9.2 Module Mounting on Mounting Base MB60

***:PC link(IF64), servo IF(IF66), 3200I/F(IF65), FMGC control(IF72) or ME-NET interface(IF75) can be mounted.**

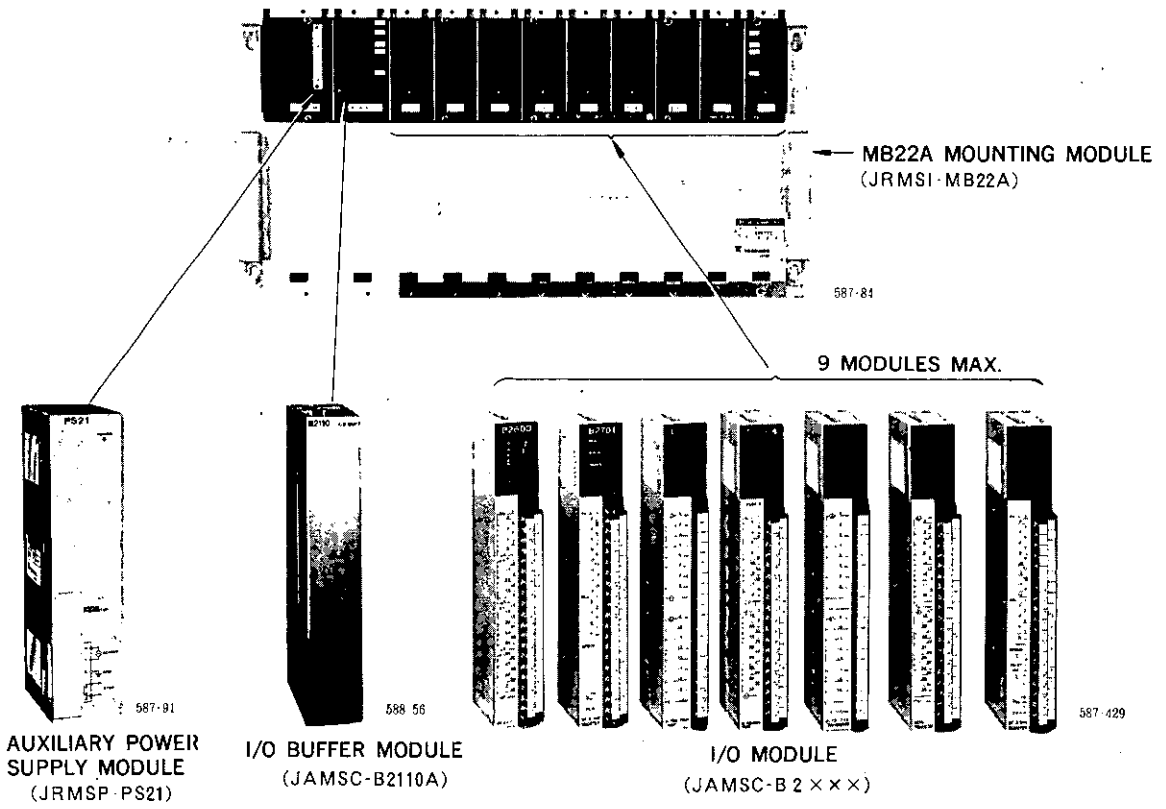


Fig. 9.3 Module Mounting on Mounting Base MB22A

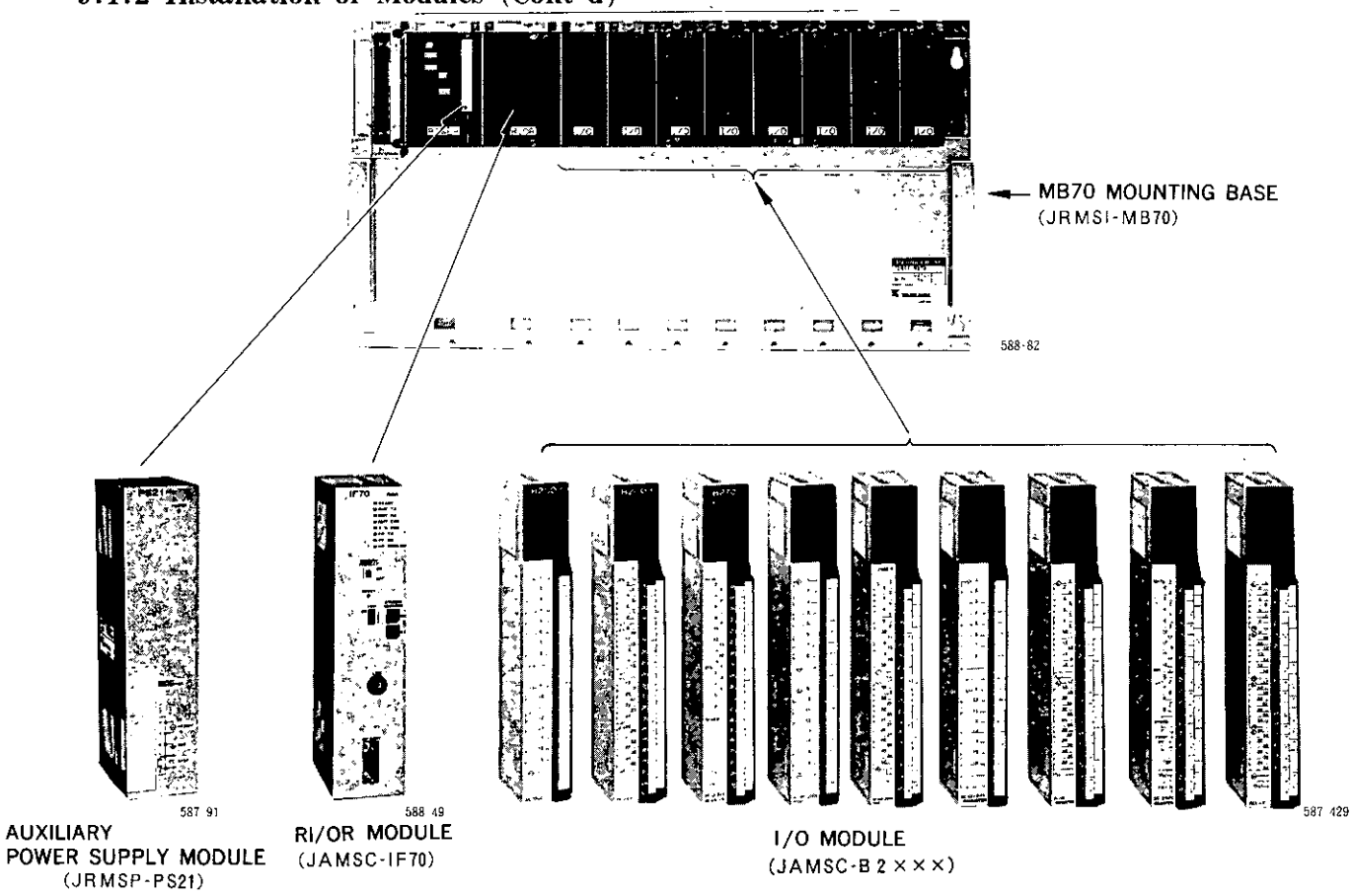


Fig. 9.4 Module Mounting on Mounting Base MB70

9.2 TROUBLESHOOTING

In order that repairs can be made as easily and quickly as possible without a knowledge of details, the GL60HT or GL70HT is maintained in basic units of modules, that is, by module replacement.

If a failure occurs, the first thing to do is to identify the problem accurately and follow the prescribed procedure for maintenance. Make use of the general GL60HT or GL70HT troubleshooting flowcharts provided in this section.

Maintenance of the GL60HT or GL70HT requires spare parts listed in Par. 9.8 of the MEMOCON-SC GL60H, GL70H USER'S MANUAL (SIE-C815-17.1).

Notes:

1. The symbols used in the flow charts have the following meanings:
   ▭ : Action; ▢ : Teminal or comment; ◇ : Decision; ○: Connector
2. Power ON/OFF operations are omitted from the flow charts. Normally, power will be turned OFF before a maintenance action, and turned ON after the action has been completed.

(1) CPU Module Check

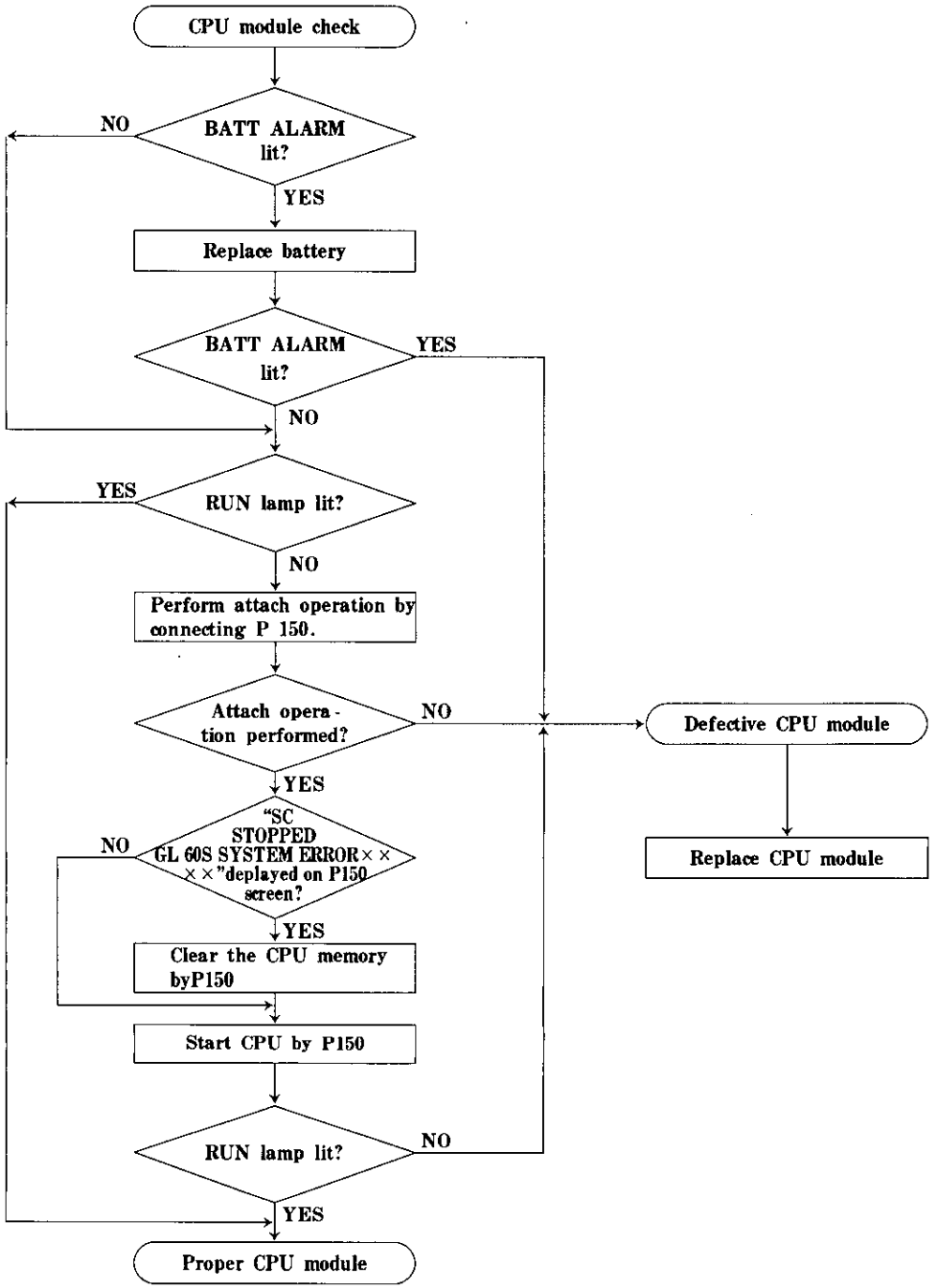
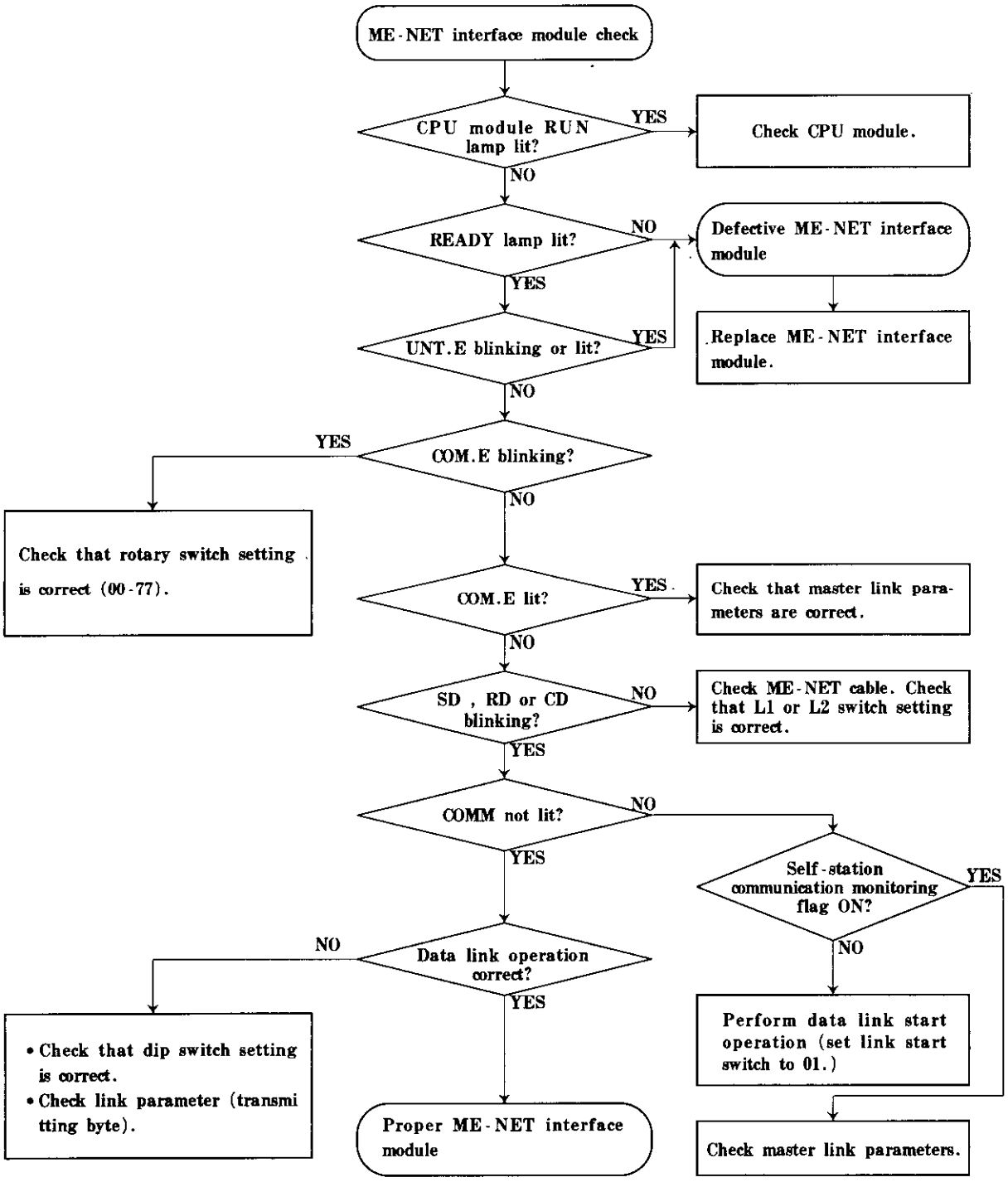


Fig. 9.5 ME-NET Interface Module Check

(2) ME-NET Interface Module (JAMSC-IF75) Check



Note: For details of LED display, rotary switch or dip switch, refer to Par. 4.3. For details of link parameters, refer to Par 6.

Fig. 9.6 ME-NET Interface Module Check

APPENDIX A

GL60HT, GL70HT COMPONENTS LIST

Component	Type	Function or Application	Remarks
CPU Module	DDSCR-GL70HT	Program memory 64k-word (24 bits/word)	Mounted on M60
CPU Module	DDSCR-GL60HT	Program memory 32k-word (24 bits/word)	Mounted on MB60
Main Power Supply Module	JRMSP-PS60	CPU, IOP, I/O modules (up to 6)	Mounted on MB60
Auxiliary Power Supply Module	JAMSP-PS21/PS22	B2110, I/O ,module (up to 9)	Mounted on MB21 or MB70
IOP Module	JAMSC-IF60	For communication module, P150, MEMOBUS, RAP	Mounted on MB60
COMM Module	JAMSC-IF61	For communication module, P150, MEMOBUS	Mounted on MB60
RIOD Module	JAMSC-IF62A	Driver module for remote lines (up to 2)	Mounted on MB60
PC Link Module	JAMSC-IF64	For PC link communication interface	Mounted on MB60
3200 I/F Module	JAMSC-IF65	For YENET-3200 communication interface	Mounted on MB60
Servo I/F Module	JAMSC-IF66	For servo interface (up to 4)	Mounted on MB60
RIOR Module	JAMSC-IF70	Receiver module for remote lines	Mounted on MB70
ASCII Module	JAMSC-IF71	For ASCII device interface (up to 8)	Mounted on MB60, MB70, MB71 or MB21
FMGC Control Module	JAMSC-IF72	For FMGC control	Mounted on MB60
ME-NET Interface Module	JAMSC-IF75	ME-NET communication interface module (up to 2)	Mounted on MB60
Register Access Panel (RAP)	DISCT-IF69	Monitor modules for status and parameter	Connected to IOP
I/O Buffer Module	JAMSC-B2110	Used for I/O bus buffer, racks 2 to 5	With I/O cable connector
MB60 Mounting Base	JRMSI-MB60	For mounting CPU, power supply, IOP, COMM, RIOD and I/O modules	For rack 1
MB22 Mounting Base	JRMSI-MB22/22A	For mounting I/O buffer, auxiliary power supply, I/O modules	For racks 2 to 5
MB70 Mounting Base	JAMSI-MB70	For mounting RIOR, auxiliary power supply, I/O modules	For remote station rack 1
I/O Cables	JZMSZ-W20-1	Connection between racks 0.5m long	
	JZMSZ-W20-2	Connection between racks 1.5m long	
I/O Modules	JAMSC-B2501	100VAC 16-point input, input current 10mA/100 VAC,60Hz	

Component	Type	Function or Application	Remarks
I/O Modules	JAMSC-B2503	200VAC 16-point input, input current 10mA/200VAC, 60Hz	
	JAMSC-B2505	100VAC 32-point input, input current 10mA/100VAC, 60Hz	
	JAMSC-B2507	200VAC 32-point input, input current 10mA/200VAC, 60Hz	
	JAMSC-B2601	12/24VDC 16-point input, input current 10mA/24VDC, 5mA/12VDC	
	JAMSC-B2603	12/24VDC, 32-point input, input current 10mA/24VDC, 5mA/12VDC	
	JAMSC-B2605	12/24VDC 64-point input	
	JAMSC-B2607	5VDC 32-point input	
	JAMSC-B2500	100/200VAC 16-point output, rated output current 1A/circuit, 3A/8 circuits	
	JAMSC-B2504	100/200VAC 32-point output, rated output current 0.3A/circuit, 1.2A/8 circuits	
	JAMSC-B2600	12/24VDC 16-point output, rated output current 2A/circuit, 5A/8 circuits	With status indicator
	JAMSC-B2602	12/24VDC 32-point output, rated output current 0.3A/circuit, 0.6A/4 circuits	With status indicator
	JAMSC-B2604	12/24VDC 64-point output	
	JAMSC-B2606	5VDC 32-point output	
	JAMSC-B2902/ B2912	Relay contact 32-point output, relay coil voltage 24VDC, rated current 1A/circuit (220VAC), 1A/circuit (24VDC)	
	JAMSC-B2904	Bestact relay contact 16-point output (independent contact), relay coil voltage 24VDC, small load rated current 0.5A/circuit (220VAC), 0.3A/circuit (110VDC), min. rating 5V, 1mA	
	JAMSC-B2914	Bestact relay contact 16-point output (independent contact), relay coil voltage 24VDC, general-use type rated current 0.5A/circuit (220VAC), 0.3A/circuit (110VDC), min. rating 24V, 10mA	

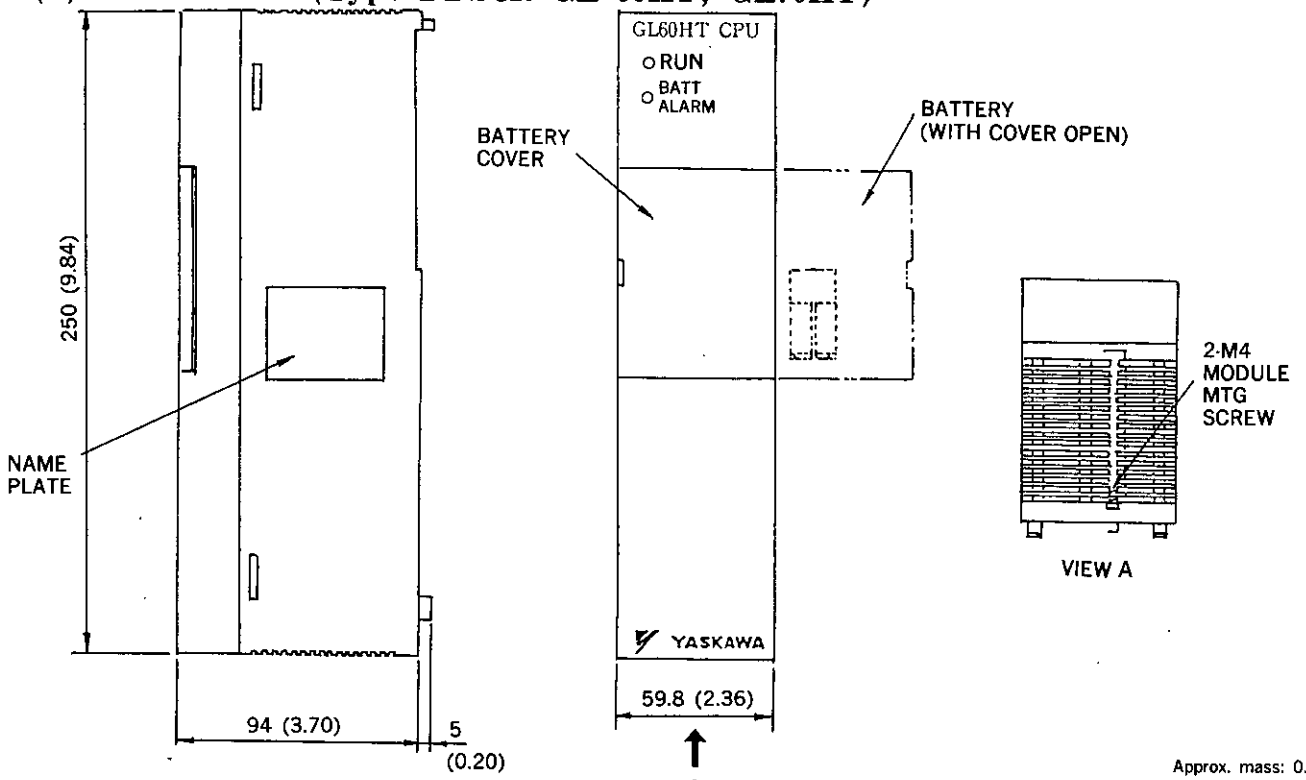
Component		Type	Function or Application	Remarks
I/O Modules		JAMSC-B2701/ B2711	Register input, numerical data (16-bit)×8, strobe variable period (64/32ms)	
		JAMSC-B2700/ B2710	Register input, numerical data (16-bit)×8, strobe variable period (64/32ms)	
		JAMSC-B2703	Analog input (A/D) 0 to + 10V, 8 circuits	
		JAMSC-B2733	Analog input (A/D) −10 to + 10V, 8 circuits	
		JAMSC-B2743	Analog input (A/D) 4 to + 20mA, 8 circuits	
		JAMSC-B2702	Analog output (D/A) 2 circuits	
		JAMSC-B2712	Analog output (D/A) 0 to + 5V, 2 circuits	
		JAMSC-B2722	Analog output (D/A) -5 to + 5V, 2 circuits	
		JAMSC-B2732	Analog output (D/A) -10 to 10V, 2 circuits	
		JAMSC-B2742	Analog output (D/A) 4 to 20mA, 2 circuits	
		JAMSC-B2800	PID module, 1 circuit	
		JAMSC-B2801	Variable counter, 2 circuits	
		JAMSC-B2802	Preset counter, 1 circuit	
		JAMSC-B2803	Positioning (Speed analog command type) 1-axis corresponding to absolute encoder	
		JAMSC-B2813	Positioning (speed pulse command type) 1-axis	
		JAMSC-B2804	Memolink master	
		JAMSC-B2805	Memolink slave	
Programming Panel		DISCT-P150-10	Plasma display, full-key type, 2FD	P150 system disk is needed.
		DISCT-P150-11	Plasma display, sheet key type, 2FD	P150 system disk is needed.
		DISCT-P140	Liquid crystal display, sheet key type	P140 ROM pack is needed.
Floppy Disk Unit		DISCT-FD400	Floppy disk unit for P140	
P150 Program Disk	Programmer	F70H-E001	Program creation, change, storing, monitor	Used in common with GL60HT (pair)
	Ladder Lister	F70H-E002	For program print out	Used in common with GL60HT
	MT-NET programmer	F70H-E007	ME-NET link parameter setting, change, storing	Used in common with GL60HT
	Blank Disk	F150-000	Blank disk	Format completed
P140 ROM Pack		P70H-E001	Program creation, change, storing, monitor	Used in common with GL60HT

GL60HT, GL70HT COMPONENTS LIST (Cont'd)

Component	Type	Function or Application	Remarks
Remote I/O Junction Cable	JZMSZ-W60	From RIOD, RIOR to main cable (3C-2V)	
Remote I/O Main Cable	JZMSZ-W453	From RIOD, RIOR to main cable (5C-FB)	
Adapter	T-298	Repeater	
Interface Cable	JZMSZ-W1015-T1	For connection between P150 and GL60H, GL70H, IOP or COMM module ports	2.5m long
	JZMSZ-W1015-T2		15m long
	JZMSZ-W1015-21	For connection between ACGC 400 series and GL60H, GL70H, IOP or COMM module ports	2.5m long
	JZMSZ-W1015-22		15m long
	JZMSZ-W1017-T1	For connection between J1078 modem and GL60H, GL70H, IOP or COMM module ports	5m long
	JZMSZ-W1017-T2		15m long
	JZMSZ-W1019-1	For connection between U84/U84S and GL60H, GL70H	5m long
	JZMSZ-W1019-2		15m long

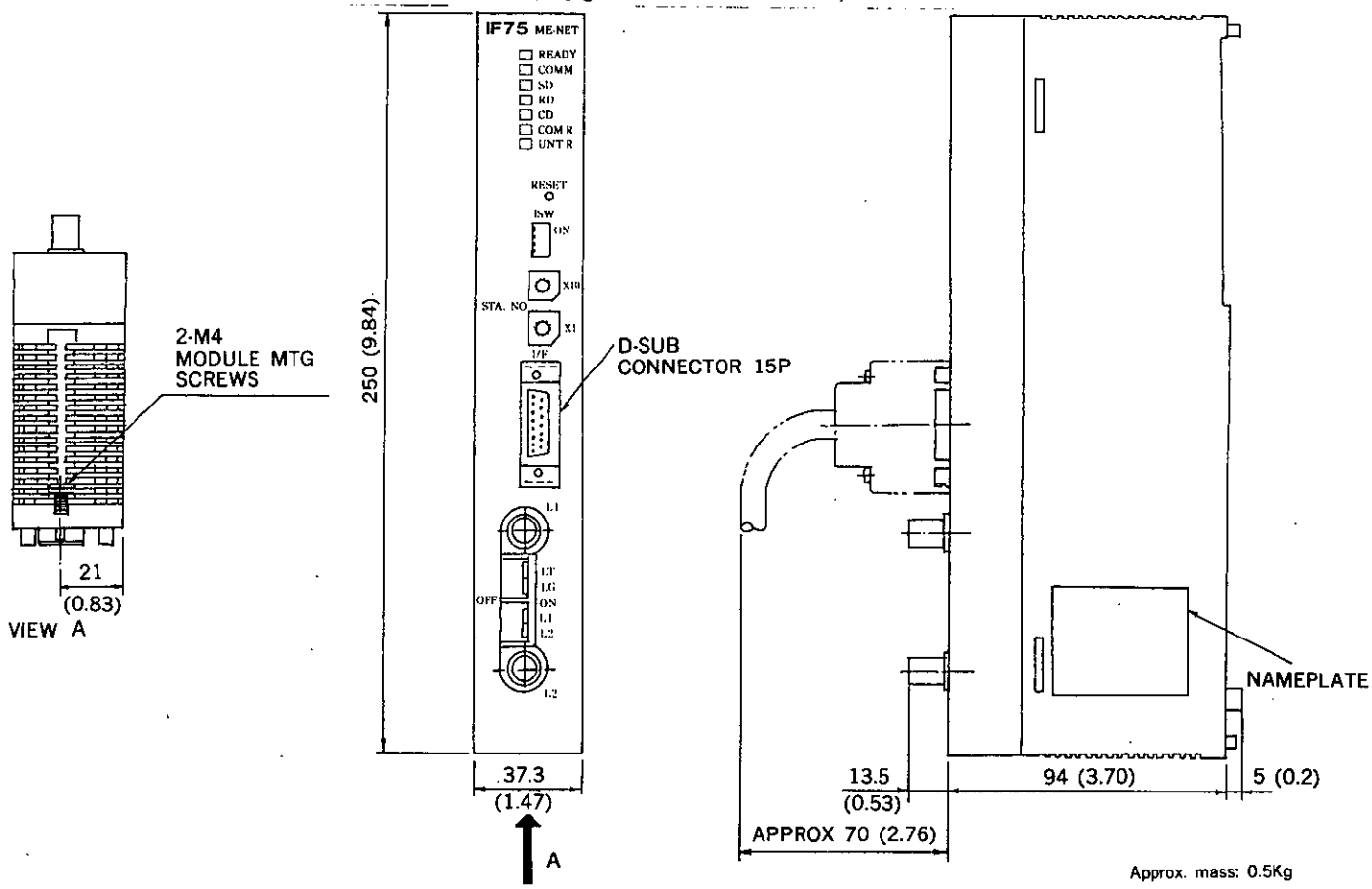
APPENDIX B Dimensions in mm (inch)

(1) CPU Module (Type DDSCR-GL 60HT, GL70HT)



Approx. mass: 0.75Kg

(2) ME-NET Interface Module (Type JAMSC-IF75)



Approx. mass: 0.5Kg

MEMOCON-SC GL60HT, GL70HT

PROGRAMMABLE CONTROLLER FOR ME-NET

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