Appendix

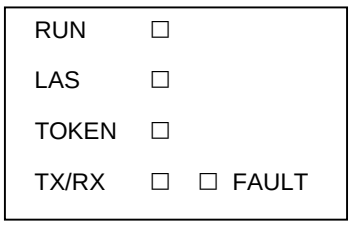
A1 LED Specifications

A1.1 LED specifications of Fnet master module

1) Units to be applied :

G3L-FUEA, G3L-FUOA, G4L-FUEA, G5L-FUEA, G0L-FUEA

G6L-FUEA



2) LED indication spec.

(1) RUN : Indicates that PLC CPU module and interface is proceeding actively.
- On : PLC and interface normal
- Off : Interface abnormal, or interface stopped

When normal, it seems to be 'On', but, because the flash cycle changes according to PLC scan, it may seem to be 'Off' in visual as it becomes 'On' at intervals or by once for 1~2 sec. when PLC User Program Scan is long(200ms or more), or communication module of 2 or more has been mounted on PLC so that many data may be exchanged. This is not abnormal operation of communication module, but because data processing speed has become late due to many communication quantity.

(2) LAS : The LED of the station that assign tokens to each station becomes On in order to perform data Tx/Rx with communication module connected. Among many communication stations, the communication module that is firstly powered on has LAS, and among all stations connected via single network, LAS LED of only one station becomes On.

- On : Being in performing function with Link Active Scheduler(LAS).
- Off : Being in performing function with Link Master(LM).

(3) TOKEN : Indicates that module is sending transmission data by assigning circulation token from LAS. If network has many stations connected, and each station has many data, LED flashes at late speed.

- On : Currently possesses circulation token.
- Off : Does not possess token.

(4) TX/RX : Indicates that self station is receiving data from other station or sending self data.

– On : Indicates that it is sending or receiving.
– Off : Indicates that there is no Tx/Rx frame.

(5) FAULT : This is a LED indicating whether error occurred in communication module, which becomes 'Off' during normal operation, and flashes at 1 sec. interval when error that normal operation is impossible occurs. The type of error is indicated through 5 LEDs of LED0(RUN)~LED4(FAULT).

☐ If it flashes at intervals, it means that there is a error in communication module, communication cable, terminal resistance, connection status, duplicated station, and the other. Thus, check the followings :

☐ Is terminal resistance correctly connected?
☐ Is cable securely connected?
☐ Is communication cable shield line connected with connector?(must be connected)
☐ Do cable and terminal resistance fit to the specifications?
☐ Is total length of cable 750m or less?
☐ Isn't there any duplicated station?

Table A.1.1 describes LED indication contents of Fnet master module.

Table A.1.1 LED indication contents of Fnet master group

Segment	Error type	LED status	Error contents
FMM_00	During power on	● ○ ○ ○ ○	Being in self diagnosis of internal memory 1 in this module
FMM_01		○ ● ○ ○ ○	Being in self diagnosis of internal memory 2 in this module
FMM_02		○ ○ ● ○ ○	Being in self diagnosis of communication
FMM_03		○ ○ ○ ● ○	Being in diagnosis of CPU and interface
FMM_04	Normal communication	● ○ ◍ ◍ ○	Module is not LAS.
FMM_05		● ● ◍ ◍ ○	Module is LAS.
FMM_06	Hardware error	● ○ ○ ○ ▥	Error in self diagnosis of internal memory 1
FMM_07		○ ○ ○ ● ▥	Error in self diagnosis of internal memory 2
FMM_08		○ ○ ● ○ ▥	Error in self diagnosis of communication
FMM_09		○ ○ ● ● ▥	Error in diagnosis of interface chip
FMM_10		○ ● ○ ○ ▥	Error in diagnosis of interface RAM
FMM_11		○ ● ○ ● ▥	Error 1 in diagnosis of CPU and interface
FMM_12		○ ● ● ○ ▥	Error 2 in diagnosis of CPU and interface
FMM_13		○ ● ● ● ▥	Error 3 in diagnosis of CPU and interface
FMM_14	System operation error	● ○ ○ ○ ▥	System error during operation
FMM_15		● ○ ○ ● ▥	
FMM_16	Abnormal communication	● ● ○ ○ ▤	Error in configuration of network
FMM_17		● ● ○ ◍ ▤	Repeated station No., abnormal terminal resistance
FMM_18		● ● ◍ ◍ ▤	Cable cut off/Short
FMM_19		● ● ○ ◍ ▤	Specified length of cable is not proper or hardware error of this module
FMM_20		● ○ ◍ ◍ ▤	
FMM_21		● ○ ○ ○ ▤	Error in configuration of network
FMM_22	Interface error	○ ● ◍ ◍ ○	Interface error(stopped) for LAS
FMM_23		○ ○ ◍ ◍ ○	Interface error(stopped) for not LAS
FMM_24	Not restorable error	● ● ● ● ●	Hardware error of communication module
FMM_25		● ○ ○ ○ ○	
FMM_26		○ ○ ○ ○ ○	
FMM_27		○ ○ ○ ○ ●	

※ LED position follows the sequence of signal RUN, LAS, TOKEN, TX/RX, and FAULT from left side.

● Light on ○ Light off

▥ Flash at 1 sec. interval

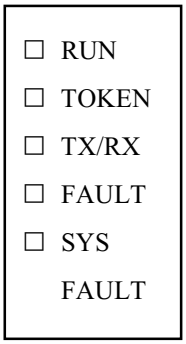
▤ Irregular non-interval flash or Off

◍ Irregular non-interval flash

A1.2 LED specifications of slave module

1) Units to be applied : G3L-RBEA, G3L-RBOA, G4L-RBEA

2) LED position



3) LED indication spec.

(1) RUN(LED 0) : Indicates RUN status, and means that I/O inspection and I/O refresh operation is normally being operated. This becomes off when power error of extension base, or error occurrence during special module access or I/O refresh.

– On : Indicates being in normal operation of slave.
– Off : Abnormal operation of slave.

(2) TOKEN(LED 1) : Indicates that module is sending transmission self data by assigning circulation token from LAS. This flashes during normal operation. If network has many stations connected, and each station has many data, LED flashes at slow speed.

– On : Currently possesses circulation token.
– Off : Does not possess token.

(3) TX/RX(LED 2) : Indicates that self station is receiving data from other station or sending self data.

– On : Indicates that it is sending or receiving.
– Off : Indicates that there is no Tx/Rx frame.

(4) FAULT(LED 3)

– Flash : Flashes when communication error/service error occur in link module.
– Off : Indicates being in normal operation.

☐ If it flashes at intervals, it means that there is an error in communication cable. Thus, check the followings :

☐ Is terminal resistance correctly connected?
☐ Is cable securely connected?
☐ Is communication cable shield line connected with connector body?(must be connected)
☐ Do cable and terminal resistance fit to the specifications?
☐ Is total length of cable 750m or less?
☐ Isn't there any duplicated station?

(5) SYS FAULT(LED 4) : This is a LED indicating error occurrence or not in communication module, which becomes 'Off' during normal operation and flashes at 1 sec. interval when error that normal operation is impossible occurs. The type of error is indicated through 5 LEDs of LED0~LED4.

Table A.1.2 LED indication specifications of slave group

Segment	Error type	LED status	Error contents
FSM_00	During power on	● ○ ○ ○ ○	Being in self diagnosis of internal memory 1 in this module
FSM_01		○ ● ○ ○ ○	Being in self diagnosis of internal memory 2 in this module
FSM_02		○ ○ ● ○ ○	Being in self diagnosis of communication
FSM_03		○ ○ ○ ● ○	Being in self diagnosis of special module interface RAM memory
FSM_04	Normal communication	● ◉ ◉ ○ ○	When module communication is normal.
FSM_05	Hardware error	○ ○ ○ ○ ▥	Error in self diagnosis of internal memory 1
FSM_06		○ ○ ○ ● ▥	Error in self diagnosis of internal memory 2
FSM_07		○ ○ ● ○ ▥	Error in self diagnosis of communication
FSM_08		○ ○ ● ● ▥	Error in writing/reading special module
FSM_09		○ ● ○ ○ ▥	Error in writing/reading I/O module
FSM_10		○ ● ○ ● ▥	Error in mounting module, Fuse problem
FSM_11	System operation error	● ○ ○ ○ ▥	System error during operation
FSM_12		● ○ ○ ● ▥	
FSM_13	Abnormal communication	● ◉ ◉ ▤ ○	Cable cut off, short
FSM_14		● ◉ ○ ▤ ○	Specified length of cable is not proper
FSM_15		● ○ ○ ▤ ○	Hardware error of this module
FSM_16			Error in configuration of network
FSM_17	Not restorable error	● ● ● ● ●	Hardware error of communication module
FSM_18		● ○ ● ○ ●	
FSM_19		○ ○ ○ ○ ○	
FSM_20		○ ○ ○ ○ ●	

※ LED position follows the sequence of signal RUN, TOKEN, TX/RX, FAULT, and SYS FAULT from left side.

● Light on ○ Light off

▥ Flash at 1 sec. interval

▤ Irregular non-interval flash or Off

◉ Irregular non-interval flash

A1.3 LED specifications of stand-alone type remote module(G0L-SMQA/SMIA/SMHA)

Segment	Error type	LED status PWR/ONTX/ERR	Error contents
FSM_30	Being in normal communication	● ◉ ○	Being in normal communication
FSM_31	Abnormal communication	● ◉ ≋	Bad communication status
FSM_32	System error	● ○ ▥	Self diagnosis error of communication or system error during operation
FSM_33	No communication	● ○ ○	Not communicates with other station of network
FSM_34	Power off	○ ○ ○	Power off status

A1.4 LED specifications of repeater module(G0L-FREA)

Segment	Error type	LED status PWR/TRTA/TRXB	Error contents
FOU_40	Being in normal communication	● ◉ ◉	Being in normal communication
FOU_41	Abnormal communication	● ◉ ○	Unstable status in side A communication
FOU_42		● ○ ◉	Unstable status in side B communication
FOU_43	No communication	● ○ ○	Not communicates with other station of network
FOU_44	Power off	○ ○ ○	Power off status

A1.5 LED specifications of electric, optical signal switching module(G0L-FOEA)

Segment	Error type	LED status PWR/TRX	Error contents
FOU_50	Being in normal communication	● ◉	Being in normal communication
FOU_51	Abnormal communication	● ○	Network not communicates
FOU_52	Power off	○ ○	Power off status

A1.6 LED specifications of active coupler module(optical signal distributor)

Segment	Error type	LED status PWR/TRX	Error contents
FOU_60	Being in normal communication	● ◉	Being in normal communication
FOU_61	Abnormal communication	● ○	Network not communicates
FOU_62	Power off	○ ○	Power off status

● Light on　　○ Light off

▥ Flash at 1 sec. interval

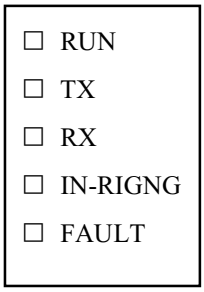
≋ Irregular non-interval flash or Off

◉ Irregular non-interval flash

A1.7 LED specifications of Mnet communication module

1) Units to be applied : G3L-MUEA, G0L-MUEA

2) LED position



3) LED indication spec.

(1) RUN(LED 0)
- Light on when CPU module and interface are normal.
- Light off when interface is abnormal or stopped.

(2) TX(LED 1)
- Light on when communication module is sending data or token.
- Light off when it does not have any token.

(3) RX(LED 2)
- Light on when communication module is receiving data or token.

(4) IN-RING(LED 3)
- Light on when one or more communication modules are connected via cable and communicate each other.
- Flashes when only one communication module operates.

(5) FAULT(LED 4)
- Flashes when CPU error is detected : RUN LED lights off.
- Flashes when interface RAM address error occurs : RUN LED lights on.
- Flashes when error that can not normally operates occurs in communication module.
- Light off when normal operation.

Table A1.7 LED specifications of Mnet MCM group

Segment	Error type	LED status	Error contents
MCM_00	During power on	○ ○ ○ ○ ○	Inspection on inside of CPU and 256k RAM after communication module H/W reset.
MCM_01		● ○ ○ ○ ●	Communication module 256k RAM inspection normal. Inspection on communication module modem and TBC.
MCM_02		● ○ ○ ● ●	Inspection on communication module modem and TBC normal. Inspection on IC access for communication and interface RAM of communication module side.
MCM_03		● ○ ○ ● ○	Inspection on interface RAM of communication module side normal. Inspection ready on interface RAM of CPU side and interface RAM initialization data inspect-ion.
MCM_04	During normal operation	● ● ● ● ○	Being in communicating with various station in network.
MCM_05		● ● ● ◍ ○	Being in communicating by itself only.
MCM_06	Hardware error when initialization	● ○ ○ ○ ◍	Error when system memory test.
MCM_07		● ○ ○ ● ◍	Modem test error (when initialization)
MCM_08		● ○ ○ ◍ ●	TBC test error (when initialization)
MCM_09		◍ ○ ○ ◍ ○	Interface RAM test error (when initialization)
MCM_10	Error occurrence during operation	● ○ ○ ○ ◍	Interface RAM access error
MCM_11		○ ○ ○ ○ ○	Error of IC for interface RAM, and CPU module error
MCM_12		● ● ○ ○ ○	F-connector error(during operation) Transformer error
MCM_13		● ○ ● ○ ○	Modem error(during operation), Clock error for modem
MCM_14		● ○ ● ● ○	Modem error(during operation), Clock error for modem

※ LED position follows the sequence of signal RUN, TX, RX, IN-RING, and FAULT from left side.

● Light on ○ Light off

◍ Irregular non-interval flash

A2 Communication module setting in the Fnet/Mnet PC

1) Units to be applied : G0L-FUEA/G0L-MUEA

2) Hardware setting : For PC communication module, Fnet module(G0L-FUEA) uses 32kbytes, Mnet module(G0L-MUEA) 64kbytes. Therefore, user must set to I/O address and memory base address in order that memory area may not overlap with other modules mounted on PC.

※ I/O address(port) size is 32 bytes, and memory size is 16 kbytes.

Table A2.1 Port/memory address map

Switch value (HEX)	Fnet module(G0L-FUEA)		Mnet module(G0L-MUEA)		Remark
	I/O Address	Memory Base	I/O Address	Memory Base	
0	3EO	FC00	3E0	FC00	*When factory default, I/O address is set to No.5(340), and memory base is set to No.D(C800).
1	3CO	F800	3C0	F800	
2	3AO	F400	3A0	F400	
3	380	F000	380	F000	
4	360	EC00	360	EC00	
5	340*	E800	340*	E800	
6	320	E400	320	E400	
7	300	E000	300	E000	
8	2EO	DC00	2E0	DC00	
9	2CO	D800	2C0	D800	
A	2AO	D400	2A0	D400	
B	280	D000	280	D000	
C	260	CC00	260	CC00	
D	240	C800*	240	C800*	
E	220	C400	220	C400	
F	200	C000	200	C000	

Remark

1. When I/O address and memory address overlap with an area used in other driver, PC will down. So set it in order not to overlap.
2. It is recommended that memory address is used within C800-DBFF address.
3. To use computer memory not as extended or expanded area but as this module's area, set to DEVICE=C:\WINDOWS\EMM386.EXE NOEMS X=C800-DBFF(when setting address to No.D, C800) in CONFIG.SYS.

A3 STATUS code value and description for *Function block*

A3.1 Error received from communication module

Error No. (Decimal)	Description
0	OK(Success : No error)
1	Physical layer error of link side(Tx/Rx impossible) – Cause of self error and other station's power off, other station No. writing error, and failure, etc.
3	There is no identifier of *function block* to be received in communication channel. – Value not used in our company.
4	Data type mismatch
5	Reset received from other station – Value not used in our company.
6	Communication command of other station not ready – Value not used in our company.
7	Device state of remote station in wrong state – Value not used in our company.
8	Access denied to remote object
9	Communication commands of other station unable to process due to receiver overrun – Value not used in our company.
10	Time out for response waiting – When response has not been received from other station within a given time.
11	Structure error
12	Abort(Local/Remote) – Disconnected by serious error
13	Reject(Local/Remote) – Type unfitted to MMS, error caused by noise.
14	Communication channel setting error(Connect/Disconnect) – Error related to logical communication channel setting required during communication with service for PI/DOMAIN/GEN and other communication module(for Mini-MAP only)
15	High speed communication and connection service error
33	Cannot find variable identifier – Not identified in the range of access variable
34	Address error – Error of structure and range specified in specifications of communication module
50	Response error – When response not received as required or other station's CPU error

113	Object access unsupported – Out of VMD specific and symbolic address or exceeded max. value of data length
187	Received via another error code than specified code(Other company's communication code value) – Receiving another error code value than specified.

A3.2 STATUS values indicated in CPU

1) Error processed within communication commands

Error No. (Decimal)	Description
16	When position of computer communication module is wrongly specified.
17	Initialization error of communication module mounted in SLOT_NO
18	Input parameter setting error
19	Variable length error
20	Wrong response receiving from other station
21	When no response received from computer communication module (Out of waiting time - Time out)

2) Status error related to remote(FSM) *Function block*

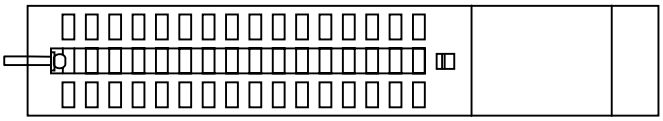
Error NO. (Decimal)	Description
128	FSM power error
129	BASE(Rack) No. error
130	Slot No. error
131	Module information error
132	Data range error(Invalid range)
133	Data type mismatch
136	Access failure(BUS access error)
137	Another error than specified code

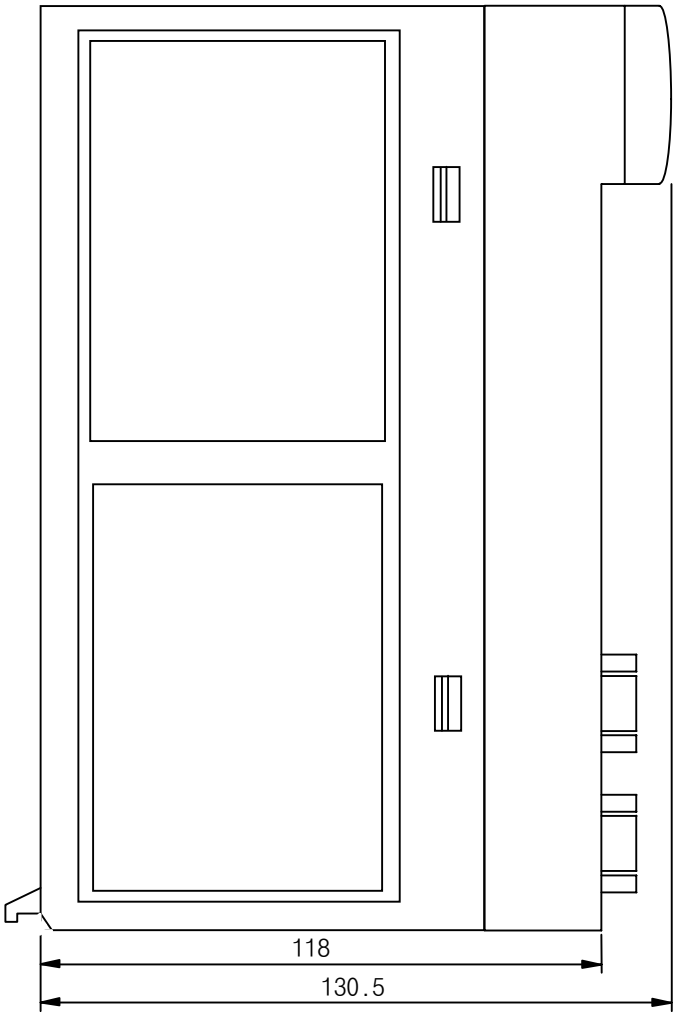
A4 Outward dimension

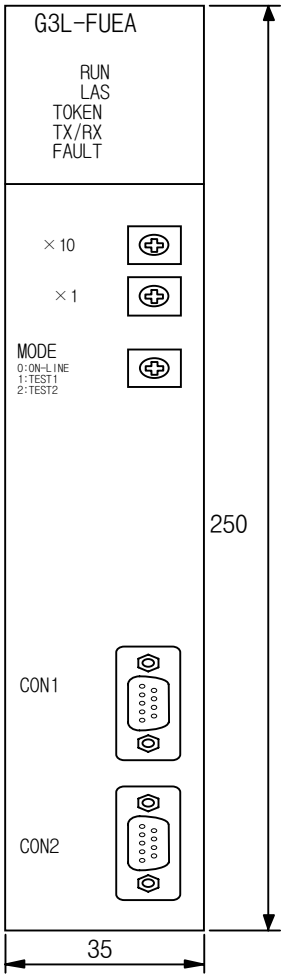
A4.1 For mounting GM1/2/3

1) Fnet units to be applied

G3L-FUEA, G3L-FUOA, G3L-RBEA, G3L-RBOA



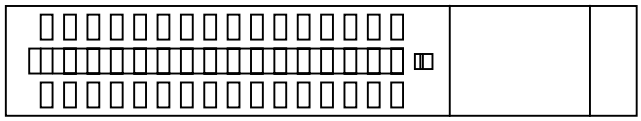


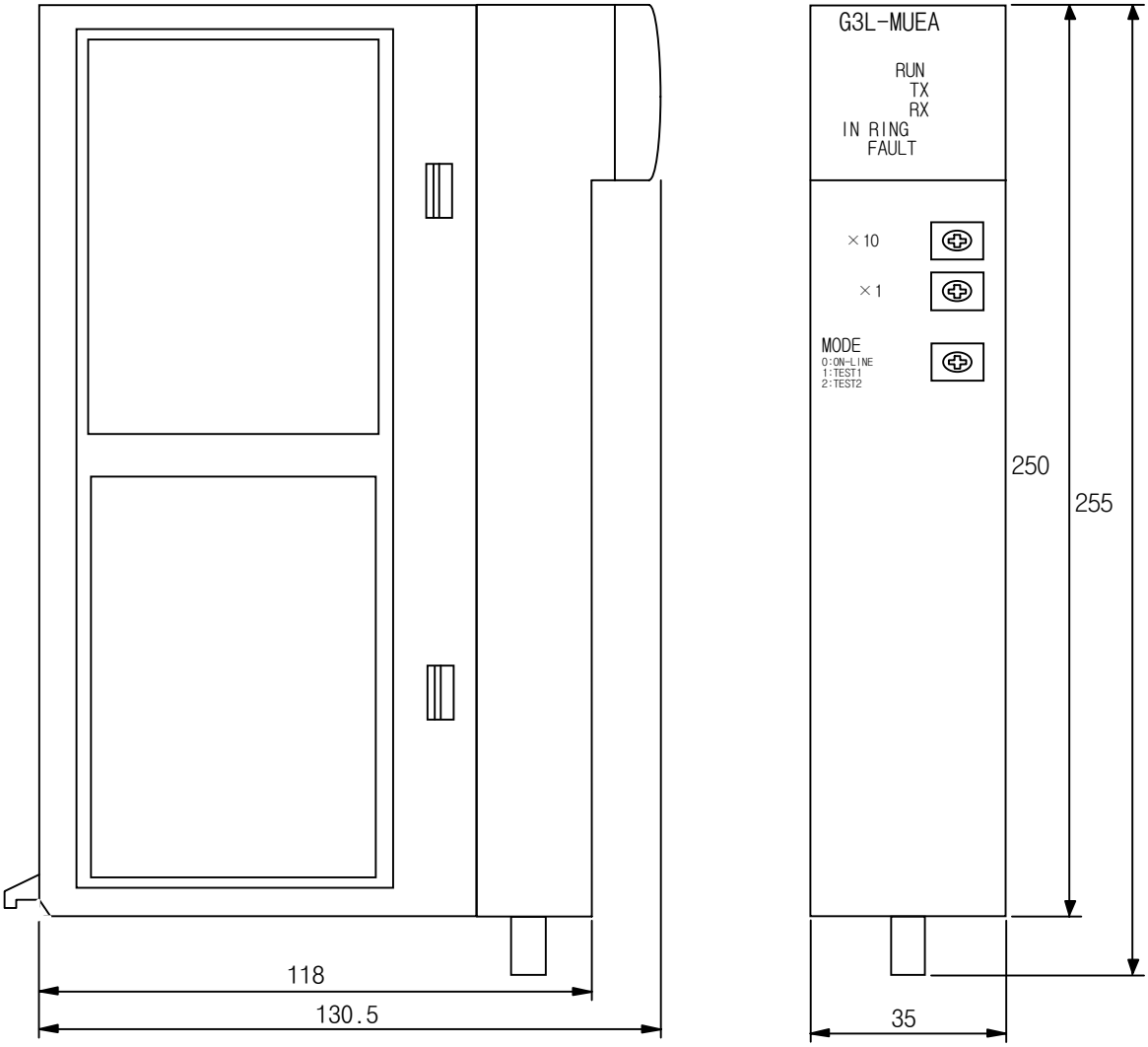


Unit : mm

2) Mnet units to be applied

G0L-MUEA



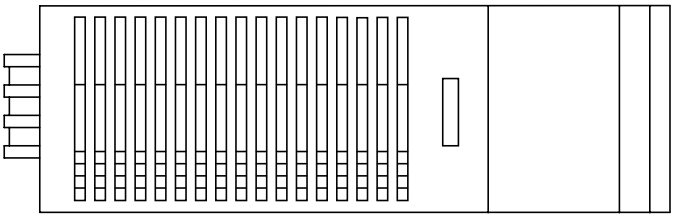


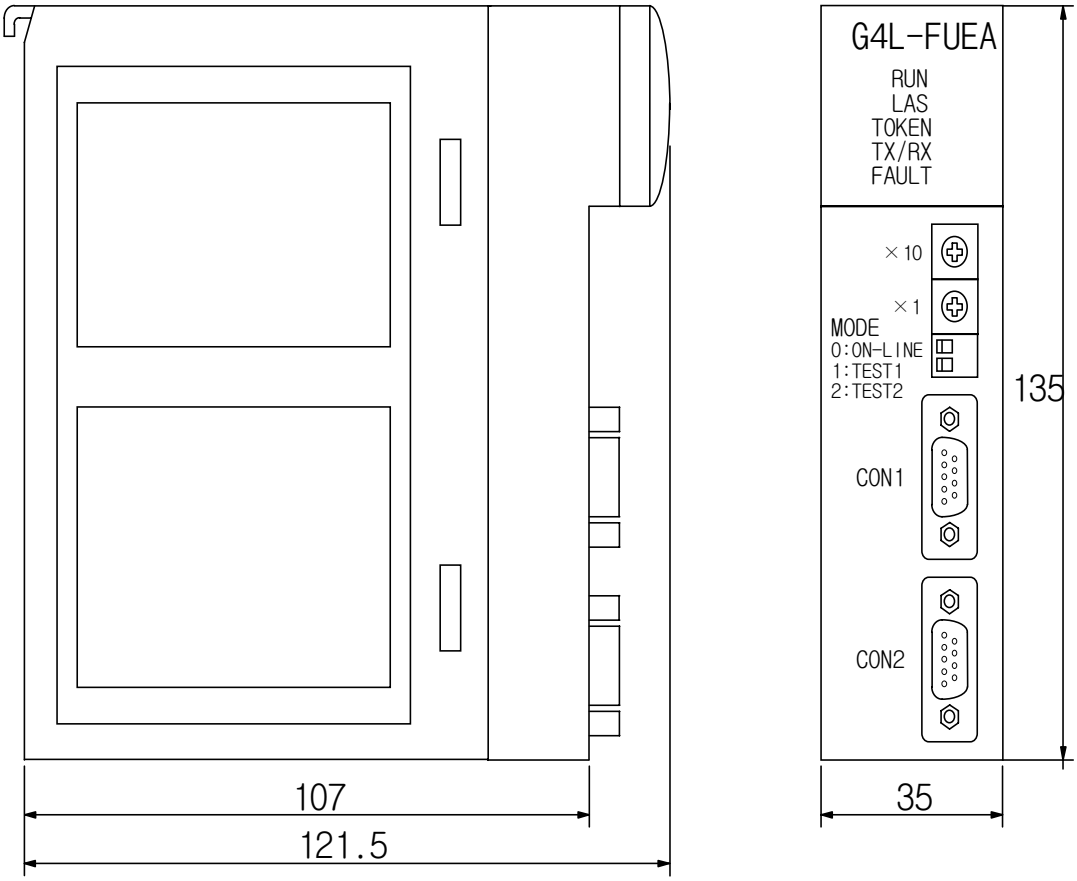
Unit : mm

A4.2 For mounting GM4

1) Fnet

G4L_FUEA, G4L-RBEA



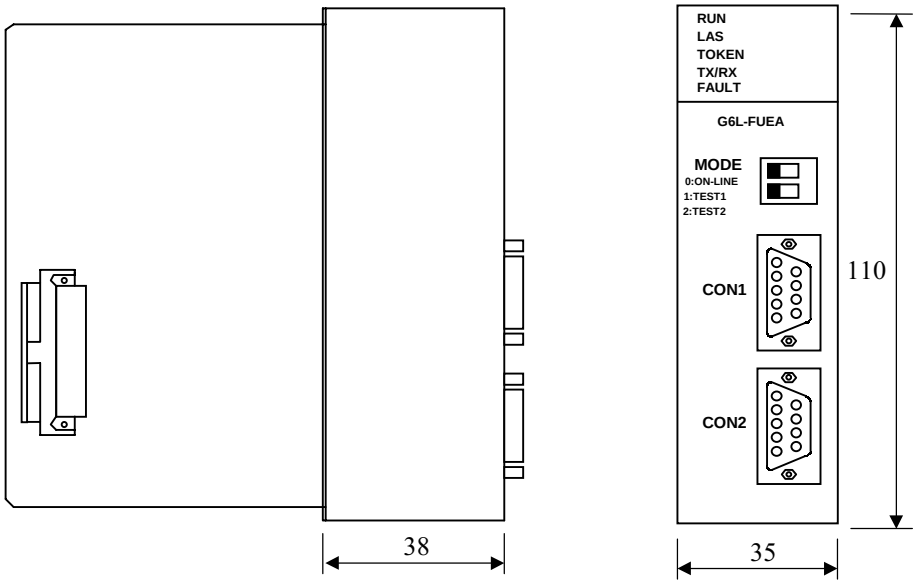


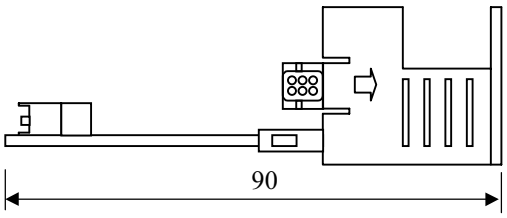
Unit : mm

A4.3 For mounting GM6

1) Fnet

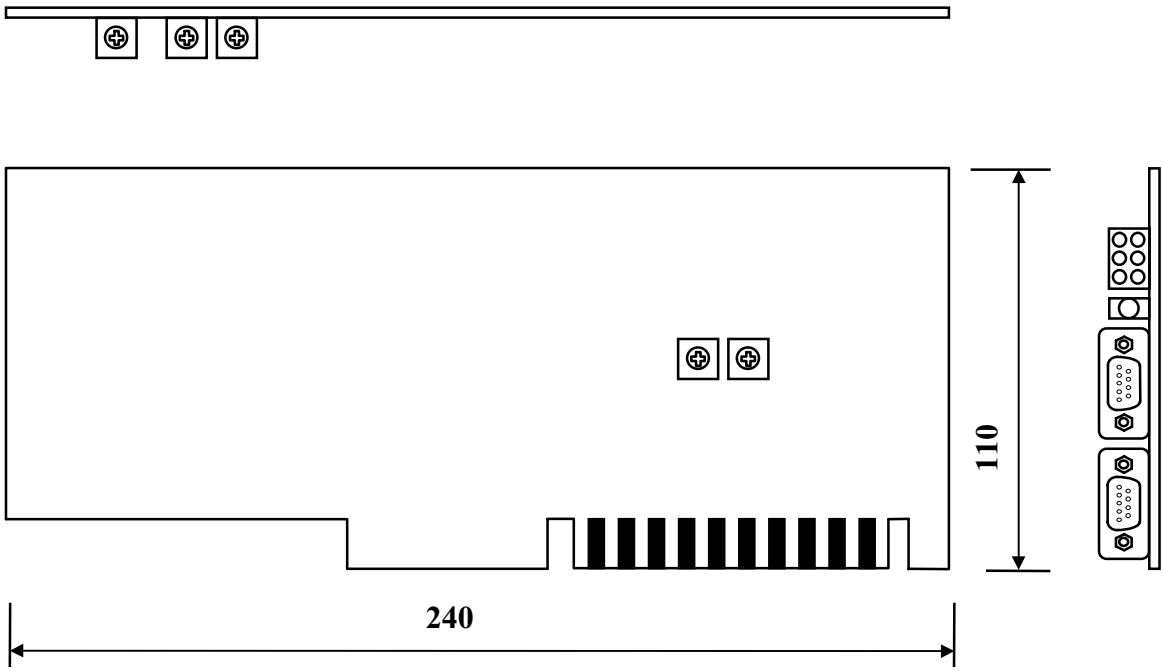
G6L-FUEA



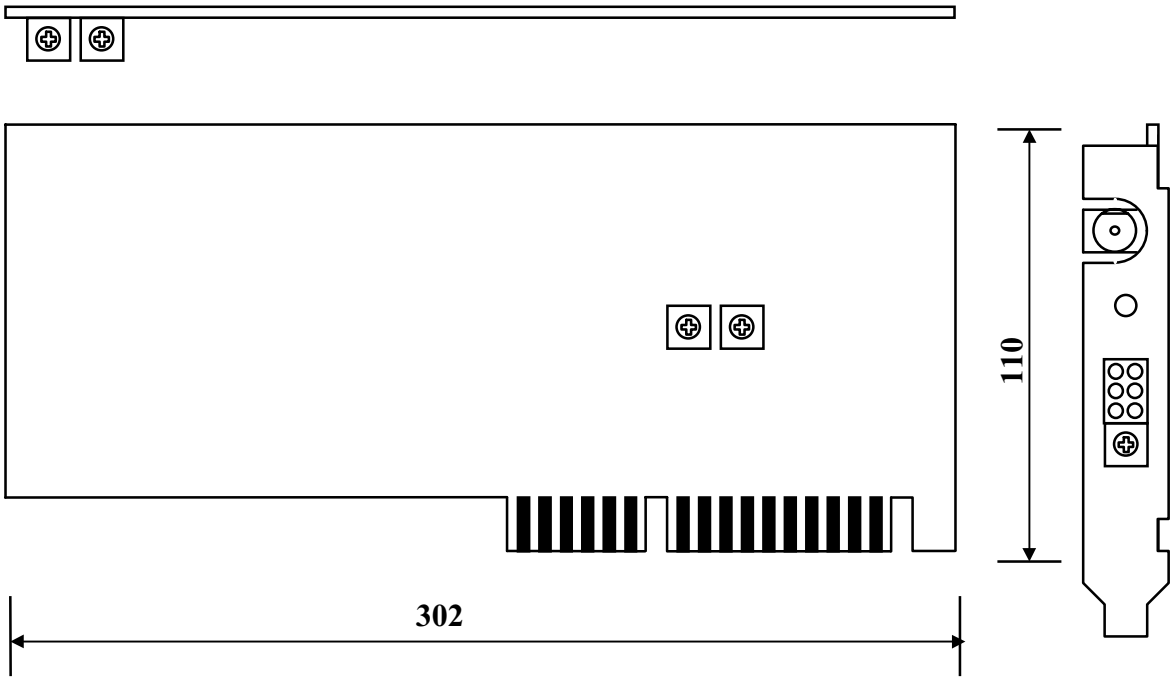


A4.4 For mounting on PC(computer)

1) G0L-FUEA



2) G0L-MUEA

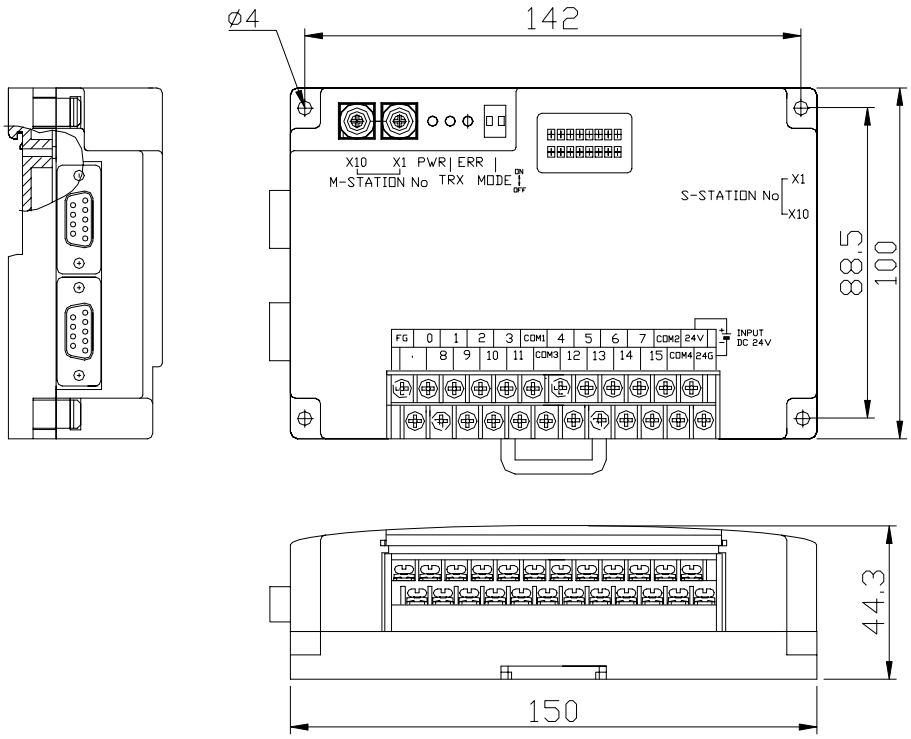


Unit : mm

A4.5 Fnet option module

1) Units to be applied

- Stand-alone remote (G0L-SMQA/G0L-SMIA/G0L-SMHA)
- Repeater(G0L-FREA)
- Optical, electric signal switching module(G0L-FOEA)



- Active coupler(with G0L-FAPA/G0L-FABA/G0L-FACA assembled)