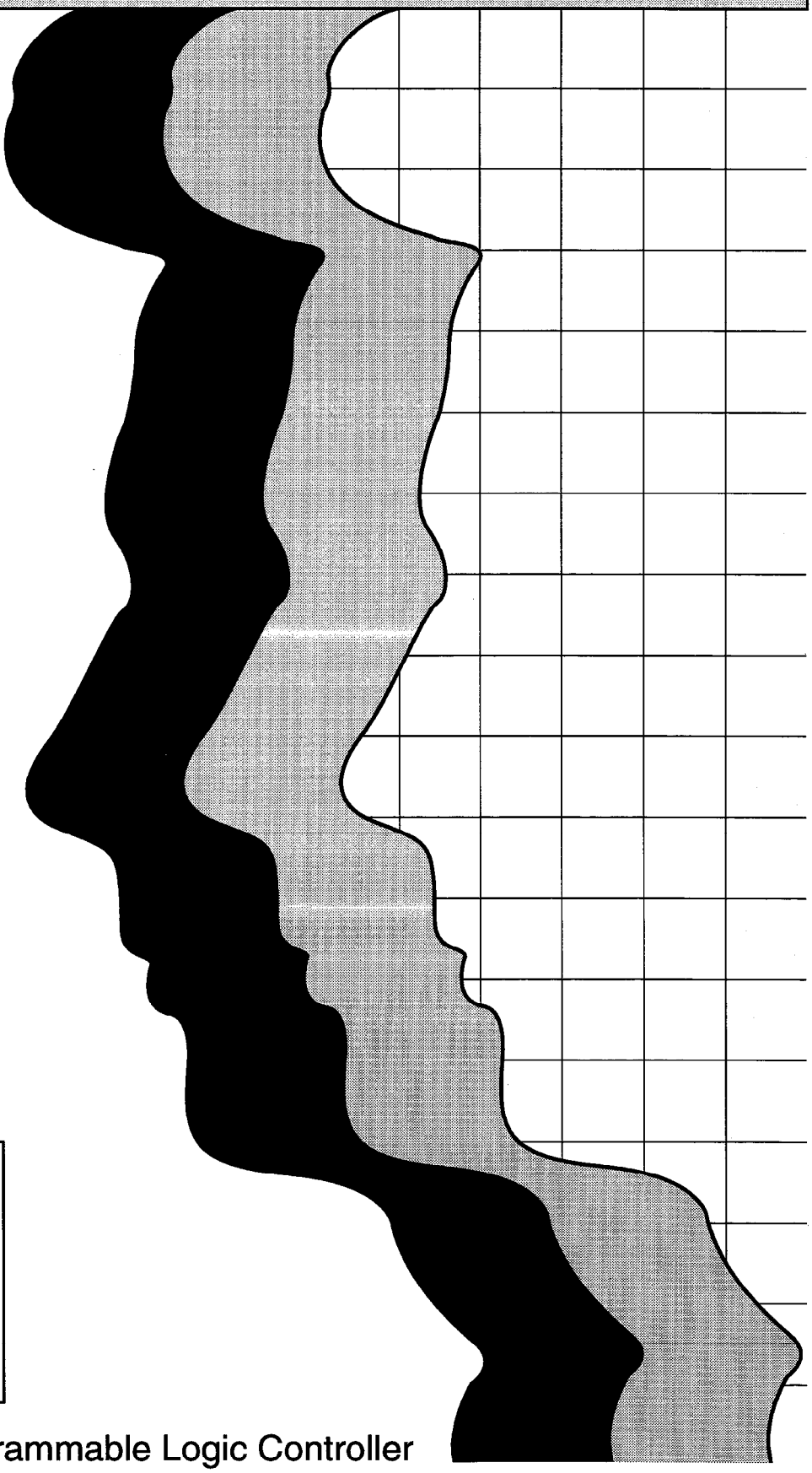
MITSUBISHI

Graphic operation terminal type A64GOT-L(T21B)

User's Manual



A

MELSEC

Mitsubishi Programmable Logic Controller

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Mar., 1994	IB (NA) 66415-A	First edition

INTRODUCTION

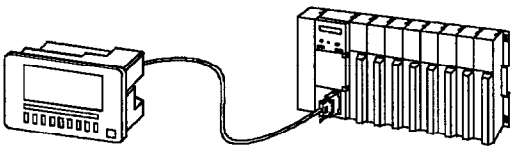
Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers. Please read this manual carefully so that the equipment is used to its optimum. A copy of this manual should be forwarded to the end User.

CONTENTS

1. GENERAL DESCRIPTION

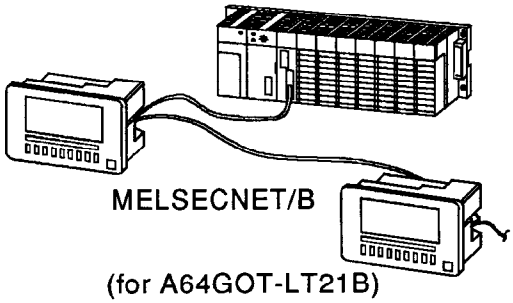
This User's Manual describes the specifications, switch setting and installation of A64GOT-L and A64GOT-LT21B.
(When A64GOT-L is used, ignore the contents of MELSECNET/B.)
When A64GOT-L(T21B) is used, refer to the following manual first.
A64GOT-L(T21B) type Graphic Operation Terminal
Reference Manual
A64GOT-L(T21B) is a graphic operation terminal by which data handled by a PC can be monitored and changed without a program.
This can connect with a PC CPU or the MELSECNET/B data link system.
A flexible monitoring system can be constructed by installing in a control panel or in a machine as an electronic control terminal.

(Connection to the PC CPU)



RS-422

(Connection to MELSECNET/B)



MELSECNET/B

(for A64GOT-LT21B)

After unpacking A64GOT-L(T21B), confirm the following products.

Product name	Number
A64GOT-L(T21B) type graphic operation terminal	1
Installation fitting	2
MELSECNET/B terminal resistance (110 Ω, 1/2 W) (for A64GOT-LT21B)	1

The outline procedure for executing monitoring by A64GOT-L(T21B) is as follows.

(1) Installation of a software package to the device to be used

Install the following software package to IBM PC/AT.

- DOS
- Software package for drawing and monitoring condition setting and monitoring data transfer

(2) Draw of the canvas screen and the parts on the monitor screen

Draw the canvas screen (static image part) and the parts that are used by a part display on the monitor screen and create each file.

(3) Registration of monitoring condition to the canvas screen

Draw the text canvas (character-string part of a static image) and set animation part monitoring condition on the canvas screen of the monitor screen.

(4) Creation and transfer of monitor screen data for A64GOT-L(T21B)

Convert monitor screen data drawn and to which monitoring condition was set into data for A64GOT-L(T21B), and create monitoring data. And, transfer (down load) monitoring data from the peripheral device for GOT*1 to A64GOT-L(T21B).

(5) Start of monitoring

Connect A64GOT-L(T21B) to MELSECNET/B or a PC CPU, and start monitoring.

REMARK

*1: The "peripheral device for GOT" means an IBM PC/AT with which the following operations can be conducted.

- Creation of monitor screen for A64GOT-L(T21B)
- Setting of monitoring condition
- Transfer of monitoring data to A64GOT-L(T21B)

2. SPECIFICATIONS

2.1 General Specificaitons

Table 2.1 General Specifications

<table>
<tr><th>Item</th><th colspan="5">Specifications</th></tr>
<tr><td rowspan="5">Operating ambient temperature
Storage ambient temperature
Operating ambient humidity
Storage ambient humidity</td><td colspan="2"></td><td>LCD indicator</td><td colspan="2">Other than LCD indicator</td></tr>
<tr><td colspan="2">Operating ambient temperature</td><td>10 to 40 °C</td><td colspan="2">0 to 55 °C</td></tr>
<tr><td colspan="2">Storage ambient temperature</td><td>–20 to 60 °C</td><td colspan="2">–20 to 75 °C</td></tr>
<tr><td colspan="2">Operating ambient humidity</td><td colspan="3">10 to 90% RH, no condensation</td></tr>
<tr><td colspan="2">Storage ambient humidity</td><td colspan="3">10 to 90% RH, no condensation</td></tr>
<tr><td rowspan="3">Vibration resistance</td><td rowspan="3">* Conforms to JIS C 0911</td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Sweep Count</td></tr>
<tr><td>10 to 55 Hz</td><td>–</td><td>0.075 mm (0.003 inch)</td><td rowspan="2">10 times (1 octave/ minute)</td></tr>
<tr><td>55 to 150 Hz</td><td>9.8 m/s^2 (1 g)</td><td>–</td></tr>
<tr><td>Shock resistance</td><td colspan="5">* Conforms to JIS C 0912 [98 m/s^2(10 g) × 3 times in 3 directions]</td></tr>
<tr><td>Noise resistance</td><td colspan="5">Noise voltage 500 V.P.P, 1 μs noise width and 25 to 60 Hz noise frequency by noise simulator</td></tr>
<tr><td>Dielectric withstand voltage</td><td colspan="5">500 V AC for 1 minute across DC external terminals and ground</td></tr>
<tr><td>Insulation resistance</td><td colspan="5">5 MΩ or larger by 500 V DC insulation resistance tester across DC external terminals and ground</td></tr>
<tr><td>Grounding</td><td colspan="5">Class 3 grounding; grounding is not required when it is impossible.</td></tr>
<tr><td>Operating ambience</td><td colspan="5">No corrosive gases or dust.</td></tr>
<tr><td>Cooling method</td><td colspan="5">Self-cooling</td></tr>
</table>

* JIS = Japanese Industrial Standard

2.2 Performance Specifications

2.2.1 A64GOT-L(T21B) Performance specifications

Table 2.2 A64GOT-L(T21B) Performance Specifications

Item		Specifications	
Memory	Type	Built-in memory (ROM) *1	
	Use	For storing monitoring data	
	Capacity	256 Kbytes	
Indicator	Type	Blue mode liquid crystal with a back light (LCD) (The contrast can be adjusted by using the volume.)	
	Display employment	Monochrome (blue and white) No gradation (It is possible to switch normal/reverse display.)	
	Effective display area	Vertical : 60.12 mm, Side : 120.28 mm	
	Resolution	Horizontal (X axis) : 256 dots Perpendicular (Y axis) : 128 dots	
Back light	—	Cold cathode pipe back light (The time of automatic back light OFF can be set.)	
Touch panel	Number of touch keys	32 points (8 lines × 4 lines)	
	Key size	32 dot × 32 dot (per key)	
	Touch mode	Change point mode (Valid when a key changes.)	
	Repeat function	Provided	
Function key	Number of keys	8 points (sheet key)	
	Type	F1 to F3, arrow keys (4 directions) and CR	
Keyboard panel interface		For connecting A64GT-KP	
MELSECNET/B interface		For connecting MELSECNET/B (for the specifications, refer to the next page)	
RS-422 interface-1		For connecting a PC CPU (AC30R4/AC300R4 is used.)	
RS-422 interface-2		For connecting the peripheral device(IBM PC/AT, A6GPP, A6PHP) which supports the GPP function	
Emergency stop button		One (Rated contact capacity : 30 V DC 3 A (resistance load)) B points contact outputs	
Buzzer		Single tone (5 V, Sound length and sound volume can be adjusted.)	
Life *2	Built-in memory	10,000 times (number of times of writing)	
	Blue mode LCD	80,000 Hr	Reference value when a operating ambient temperature is 25 °C and an operating ambient temperature is 60 % RH or less
	Back light	15,000 Hr	
	Touch key	1,000,000 times or more (Operating force is 100 g or less.)	
	Emergency stop button	Electrically 200,000 times or more (mechanically 1,000,000 times or more)	
Power supply voltage		24 V DC (-35% to +30%)	
Allowable momentary power failure time		Within 1 ms	
Current consumption		400 mA(Same value when A64GT-KP is connected)	
Outside dimensions mm(inch)		147 (H) × 194 (W) × 93.5(D) (5.79 × 7.64 × 3.68)	
Weight kg(lb)	A64GOT-L	1.3 (2.86)	
	A64GOT-LT21B	1.3 (2.86)	

*1 A built-in memory is the ROM to which new data can be overwritten without erasing the written data. (The power supply for backup of data is unnecessary.)

*2 When it is necessary to replace parts, consult nearest Mitsubishi representative with details.

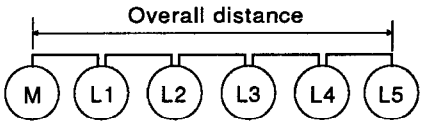
2.2.2 MELSECNET/B Performance specifications

Table 2.3 MELSECNET/B Performance Specifications

Item			Specifications
Model name			A64GOT-L(T21B)
The maximum number of points allowed for link per station	Input (X)		0 point
	Output (Y)		0 point
MELSECNET mode	The maximum number of link points per system	B	1024 points (128 bytes)
		W	1024 points (2048 bytes)
	The maximum number of link points per station		$\frac{Y(points) + B(points)}{8} + 2 \times W(points) \leq 1024$ bytes
MELSECNET II mode	The maximum number of link points per system	B	4096 points (512 bytes)
		W	4096 points (8192 bytes)
	The maximum number of link points per station		$\frac{Y(points) + B(points)}{8} + 2 \times W(points) \leq 1024$ bytes (First half of a link parameter) $\frac{B(points)}{8} + 2 \times W(points) \leq 1024$ bytes (Latter half of a link parameter)
MELSECNET II composite mode	The maximum number of link points per system	B	4096 points (512 bytes)
		W	4096 points (8192 bytes)
	The maximum number of link points per station		$\frac{Y(points) + B(points)}{8} + 2 \times W(points) \leq 1024$ bytes (First half of a link parameter) $\frac{B(points)}{8} + 2 \times W(points) \leq 1024$ bytes (Latter half of a link parameter)
Station number that can be set			01 to 31 (can be linked as a local station)
Timing of link refresh			Refreshing every 200 ms
Detection of a link error			Confirm by the communication confirmation item of the system menu.
Coefficient of A64GOT-LT21B at the time of calculating the transmission delay time and link refresh time			L : 200 ms *1 α2 : 20 ms(Standard value)
Communication speed			125 kbps/250 kbps/500 kbps/1 Mbps *2
Communication method			Half-duplex bit serial method
Synchronous method			Frame synchronization method
Transmission path			Bus method
Overall distance			Changes according to a communication speed. *2
Modulation method			NRZI method
Transmission format			Conforms to HDLC. (Frame format)
Error control system			Retry by CRC (generation polynomial $X^{16} + X^{12} + X^5 + 1$) and time over
RAS function			Diagnosis function such as a link line check of the self station
Connector			Terminal block
Designated cable			Shielded twisted-wire pair cable (KNPEV-SB 0.5SQ × 1P) *3

*1 This is a coefficient when calculating according to the MELSECNET and MELSECNET/B Data Link System Reference Manual.

*2 1) The overall distance is the distance between the stations of the both ends of the MELSECNET/B data link system.



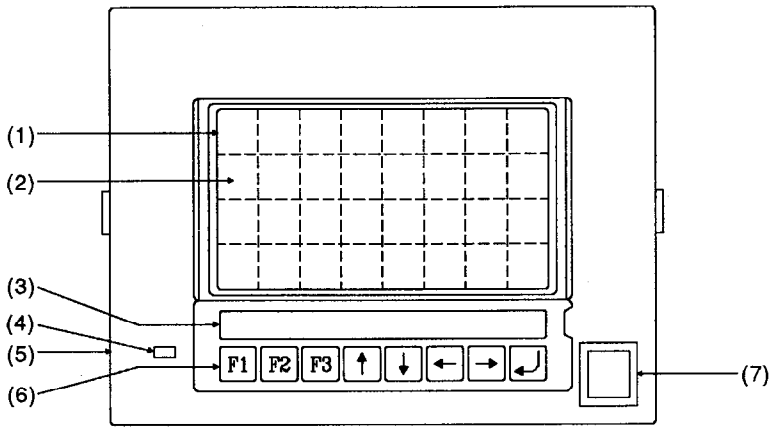
2) Relationship between communication speeds and the overall distance is shown in the following table.

	Communication speed			
	125 kbps	250 kbps	500 kbps	1 Mbps
Maximum overall distance	1,200 m	600 m	400 m	200 m

*3 Consult nearest Mitsubishi representative with shielded twisted-wire pair cable.

3. NOMENCLATURE AND SETTING

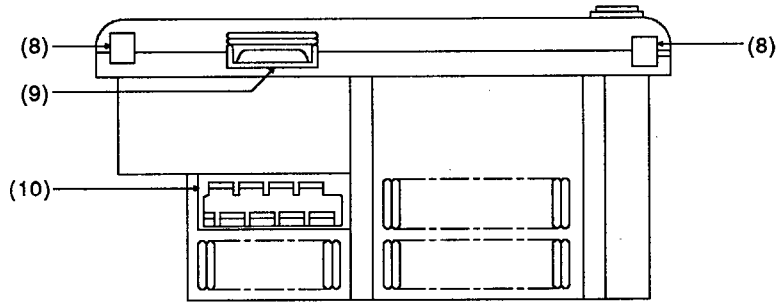
3.1 A64GOT-L(T21B) Front Side View



Number	Name	Contents	
(1)	Blue mode liquid crystal (LCD)	The monitor screen is displayed.	
(2)	Touch panel	With 32 points (8 lines × 4 lines) touch keys	
(3)	Label	The use of each function key (6) is entered.	
(4)	POWER LED	Turns ON by supplying 24 V DC.	
(5)	Contrast adjustment volume	The contrast of LCD is adjusted. (It is on the left side.)	
(6)	Function key	F1	For switching a system menu during monitoring
		F2	For switching monitor mode and bypass mode during monitoring (Switching is enabled when connected to a peripheral device.)
		F3	Reset of the error alert that occurs during monitoring or for operation of the above system menu function
	Cursor key	↑	The cursor is moved to an arrow direction.
		↓	
		→	
	Return key		CR key (The code of ODH is returned.)
(7)	Emergency stop button		Operation of A64GOT-L(T21B) is stopped. Connected directly with an output terminal for the emergency stop button of terminal block 16). (Can be used for an emergency stop of a system.) Button (B contact) To terminal block (16)

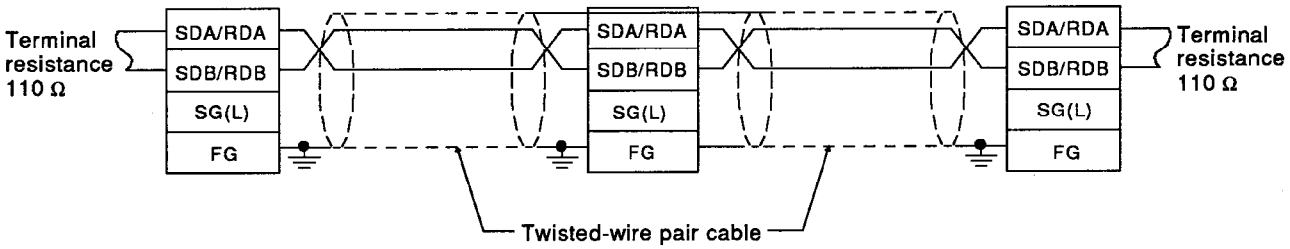
*1 The time that a back light turns OFF when not inputting a key can be set by the system menu function.
When a back light turns OFF, a back light turns ON by starting a key operation.

3.2 A64GOT-L(T21B) Bottom Side View

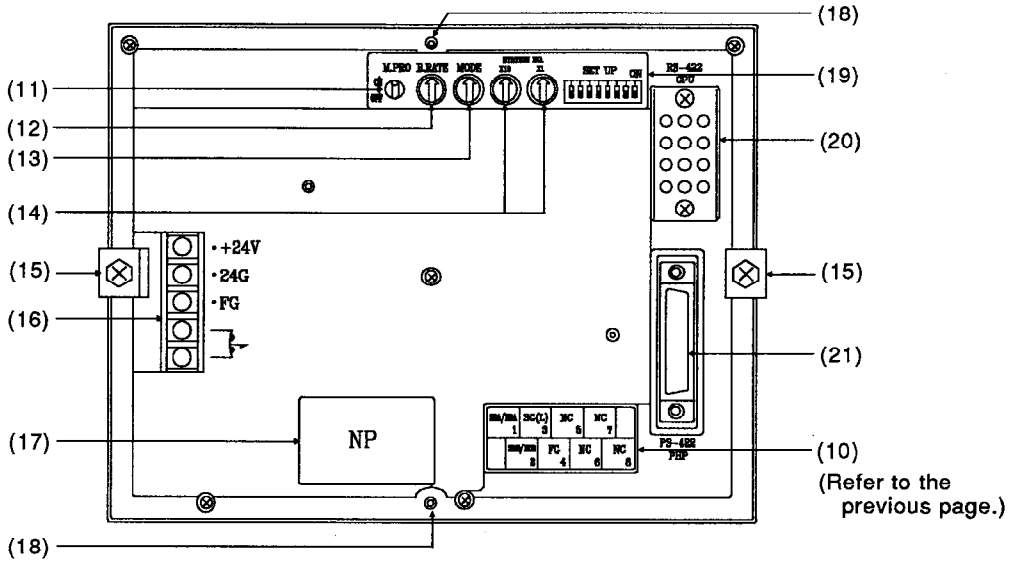


Number	Name	Contents		
(8)	Keyboard panel installation hole	A64GT-KP installation hole (The hook of A64GT-KP is inserted.)		
(9)	Connector for keyboard panel	Connector to connect A64GT-KP (with a protection cap)		
(10)	Terminal block for the MELSECNET/B communication (for A64GOT-LT21B)	Terminal block for connecting MELSECNET/B		
		Terminal number	Use	
		1	SDA/RDA	For connecting *2 MELSECNET/B
		2	SDB/RDB	
		3	SG	
		4	FG	
		5	NC	–
		≀	≀	
		8	NC	

*2 Method of the wiring of MELSECNET/B
Install the terminal resistance of attachment in the terminal blocks of the both end stations.



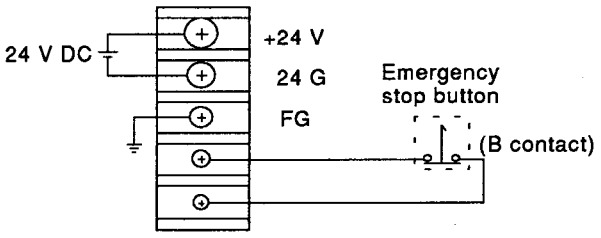
3.3 A64GOT-L(T21B) Back Side View

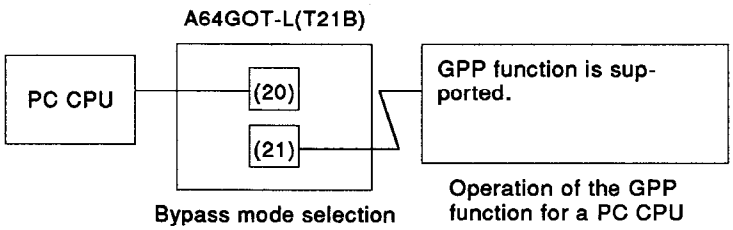


Number	Name	Contents
(11)	Write-protected switch	Write enabled/disabled to built-in memory is set. Disabled  Enabled  (Disabled is factory-set.)
(12)	MELSECNET/B baud rate switch (for A64GOT-LT21B)	A communication speed at the time of connecting MELSECNET/B is set.

Setting number	Baud rate	Maximum overall distance
0	125 kbps	1,200 m
1	250 kbps	600 m
2	500 kbps	400 m
3	1 Mbps	200 m
4 to 9	Unused When 4 to 9 is set, it becomes an offline state.	

(0 is factory-set.)

<table>
<tr><th>Number</th><th>Name</th><th colspan="3">Contents</th></tr>
<tr><td rowspan="11">(13)</td><td rowspan="11">MELSECNET/B mode changeover switch (for A64GOT-LT21B)</td><td colspan="3">The mode at the time of connecting MELSECNET/B is set.</td></tr>
<tr><td>Setting number</td><td colspan="2"></td></tr>
<tr><td>0</td><td>Online (A, R)</td><td>In case of a usual operation. automatic online return is enabled.</td></tr>
<tr><td>1</td><td>Online (U, R)</td><td>In case of a usual operation. automatic online return is disabled.</td></tr>
<tr><td>2</td><td>Offline</td><td>The self station is made to a disconnected state.</td></tr>
<tr><td>3 and 4</td><td>–</td><td>Unused</td></tr>
<tr><td>5</td><td>Test 1 (B, M)</td><td>Station-to-station test mode (Master station)</td></tr>
<tr><td>6</td><td>Test 2 (B, S)</td><td>Station-to-station test mode (Slave station)</td></tr>
<tr><td>7</td><td>Test 3 (S, R)</td><td>Self-loopback test</td></tr>
<tr><td>8 to F</td><td>–</td><td>Unusable</td></tr>
<tr><td colspan="3">(0 is factory-set.)</td></tr>
<tr><td>(14)</td><td>MELSECNET/B station number setting switch (for A64GOT-LT21B)</td><td colspan="3">A station number at the time of connecting MELSECNET/B is set in the range of 01 to 31. (Available only as a local station.)
Left side × 10 Right side × 1
The 1s digit of a station number is set.
The 10s digit of a station
(00 is factory-set.)</td></tr>
<tr><td>(15)</td><td>Body installation fitting hole</td><td colspan="3">When installing A64GOT-L(T21B) in a control panel, etc. by using installation fittings, insert and fix the hook of installation fittings.
Tightening torque range (N·cm) is 62 to 83.5 (6.3 to 8.5 kg·cm).</td></tr>
<tr><td>(16)</td><td>Terminal block for power supply</td><td colspan="3">For the 24 VDC power supply input
For external output of emergency stop button 7)
 
</td></tr>
<tr><td>(17)</td><td>Rating and name plate</td><td colspan="3">–</td></tr>
<tr><td>(18)</td><td>Body installation screw hole (For M4)</td><td colspan="3">When installing A64GOT-L(T21B) in a control panel, etc. only by using screws, fix the body by using screws (M4).
Tightening torque range (N·cm) is 62 to 83.5 (6.3 to 8.5 kg·cm).</td></tr>
</table>

<table>
<tr><th>Number</th><th>Name</th><th colspan="3">Contents</th></tr>
<tr><td>(18)</td><td>Body installation screw hole
(For M4)</td><td colspan="3">When installing A64GOT-L(T21B) in a control panel, etc. only by using screws, fix the body by using screws (M4).
Tifhtening torque range(N·cm) is 62 to 83.5(6.3 to 8.5 kg·cm).</td></tr>
<tr><td rowspan="11">(19)</td><td rowspan="11">System setting switch
(set-up switch)</td><td colspan="3">System information so that A64GOT-L(T21B) executes monitoring is set.
• SW1, SW7</td></tr>
<tr><td rowspan="2">SW1</td><td>ON</td><td>Connected to MELSECNET/B.</td></tr>
<tr><td>OFF</td><td>Connected to a PC CPU.</td></tr>
<tr><td rowspan="2">SW6</td><td>ON</td><td>The operation of special-key set to F1 to F3 are invalid.</td></tr>
<tr><td>OFF</td><td>The operation of special-key set to F1 to F3 are valid.</td></tr>
<tr><td rowspan="2">SW7</td><td>ON</td><td>Clock data are collected.</td></tr>
<tr><td>OFF</td><td>Clock data are not collected.</td></tr>
<tr><td rowspan="2">SW8</td><td>ON</td><td>Message displayed in English</td></tr>
<tr><td>OFF</td><td>Message displayed in Japanese</td></tr>
<tr><td colspan="3">• SW1 is set to OFF when A64GOT-L is used.
(SW1 to SW8 are factory-set to OFF.)</td></tr>
<tr><td>(20)</td><td>RS-422 connector-1</td><td colspan="3">RS-422 connector for connecting a PC CPU (For AC30R4/AC300R4)</td></tr>
<tr><td>(21)</td><td>RS-422 connector-2
(25 pin D sub (female) screw fixing type is used.)
*3</td><td colspan="3">RS-422 connector for connecting of a peripheral device for GOT (Connect at the time of transferring monitoring data)
The GPP function can be operated by a peripheral device by connecting a peripheral device to this connector and selecting the bypass mode with the [F2] key when the RS-422 connector-1 (20) and a PC CPU are connected.
 
</td></tr>
</table>

*3 Specifications of the RS-422 connector-2

Pin number	Signal abbreviation	Signal name	Pin number	Signal abbreviation	Signal name
2	RXD(+)	Received data	15	RXD(−)	Received data
3	TXD(+)	Send data	16	TXD(−)	Send data
4	DSR(+)	Data equipment ready	17	DSR(−)	Data equipment ready
5	DTR(+)	Ready information of a terminal	18	DTR(−)	Ready information of a terminal
7	SG	Signal ground	20	SG	Signal ground
−	−	−	21	−	−

Pin number 21 is used for a signal input to confirm a connection of the other device.
(Confirm a connection with the Low level.)

4. INSTALLATION

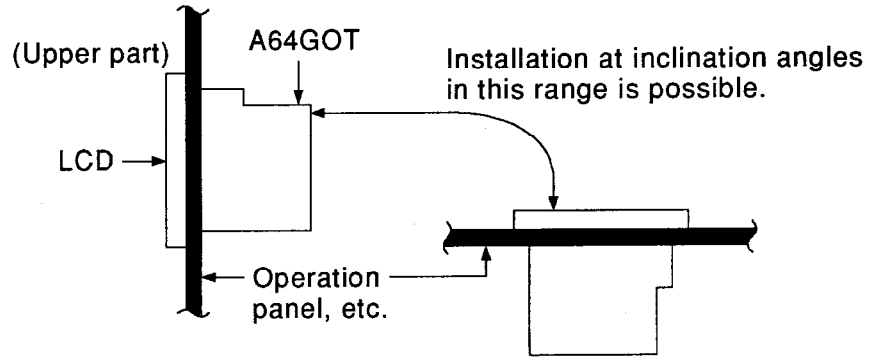
4.1 Handling Instructions

(1) Since the body case is made of plastic, protect the A64GOT-LT21B from dropping and sudden impacts.

(2) Do not remove the printed circuit boards from the housing.

(3) Ensure that no conductive debris can enter the module. If it does, make sure that it is removed. Guard particularly against wire offcuts.

(4) When installing the body in the control board, etc, make sure that LCD is horizontal.



(5) Tighten the screws of terminal block as specified below:

Screw	Tightening Torque Range N·cm [kg·cm] (lb·inches)
See Sections 3. and 6.	42 [4.3] (3.71) to 58 [5.9] (5.13)

4.2 Installation Environments

The following installation environments are unsuitable for this equipment;

(1) Ambient temperature outside the range 10 to 40 °C (LCD indicator) and 0 to 55 °C (other than LCD indicator).

(2) Ambient humidity outside the range 10 to 90%RH.

(3) Excessive condensation (e.g. due to sudden temperature changes)

(4) Corrosive and/or combustible gases.

(5) Excessive amounts of conductive powder such as dust, iron filings, oil mist, salt, or organic solvent.

(6) Direct exposure to sunlight.

(7) In the vicinity of strong power and magnetic fields.

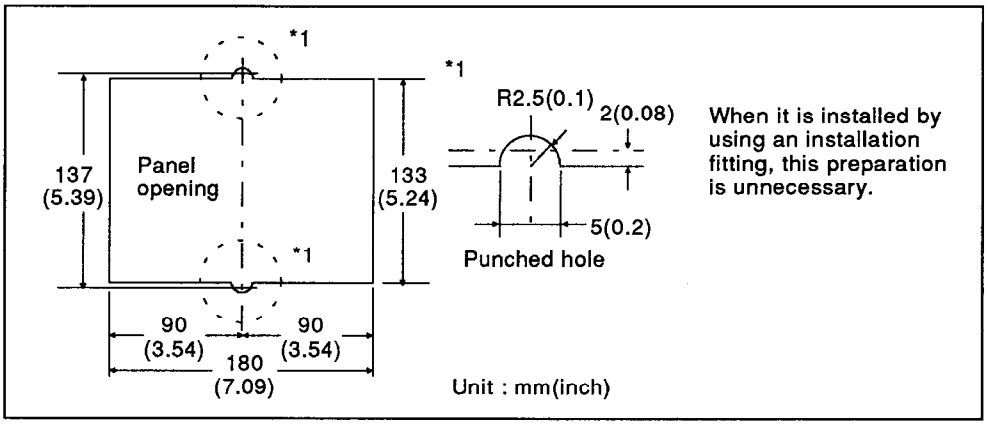
(8) Excessive vibration and shock transmitted directly to the main module.

4.3 Installation

The A64GOT unit can be installed by using body installing screws(prepared by the user) or by using installation fittings.

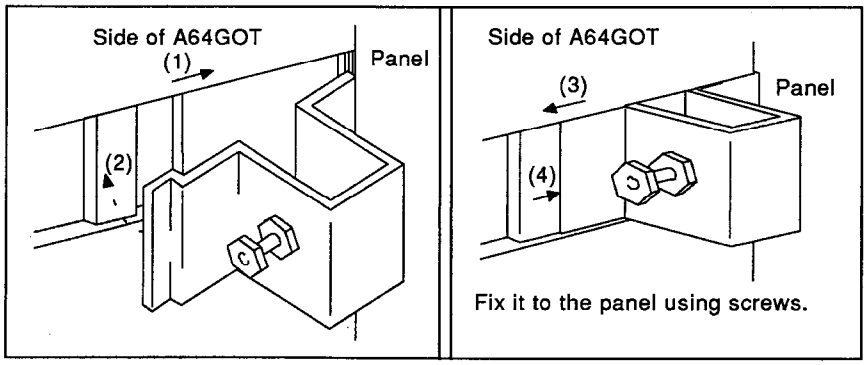
(1) Installation panel preparation method

When it is installed to the door panel of a control panel or a mount base prepared by uthe user, it is necessary to prepare the door or mount base.



(2) Installation method

Put the body from the front side of the panel. Then, tighten the body installing screws(M4 × (4 + panel width)) from the back side. Or install it by using installation fittings from the back side inthe order of the numbers shown in the figure below.



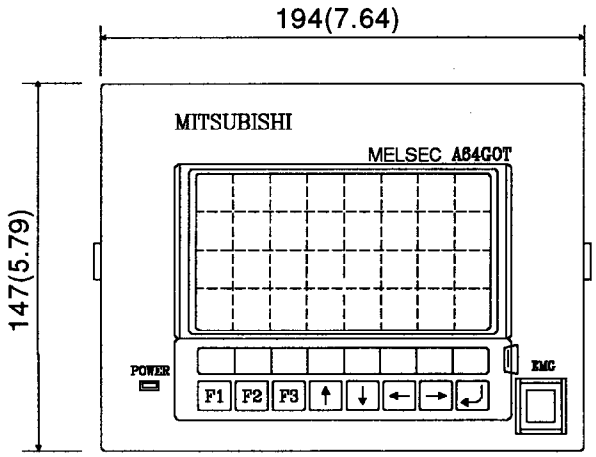
5. MELSECNET/B SELF-DIAGNOSTIC TEST

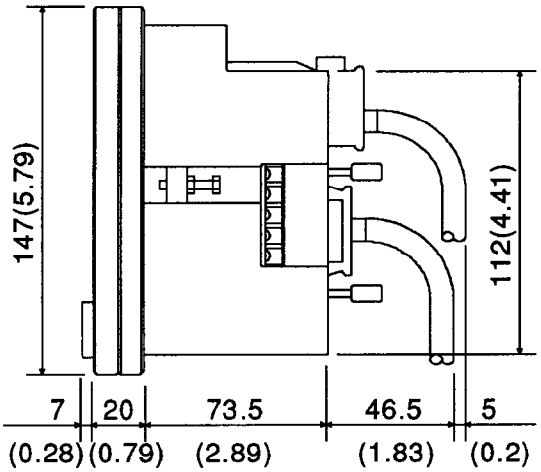
(1) The self-diagnostic test is used to check the hardware of A64GOT-LT21B, disconnection, of a twisted-wire pair cable, etc.
The following 3 items can be selected by the MELSECNET/B mode changeover switch.

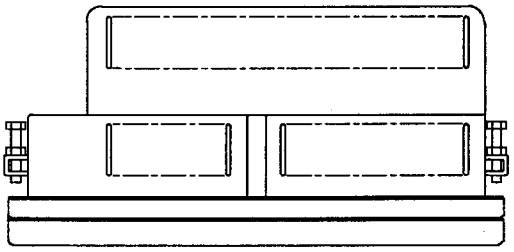
Switch Setting	Name	Contents
5	Mode test between stations (Master station)	The mode used to check a line between two stations The check is executed by setting one to a master station and setting the other to a slave station.
6	Station-to-station test mode (Slave station)	
7	Self-loopback test mode	The check of hardware is executed by A64GOT-LT21B.

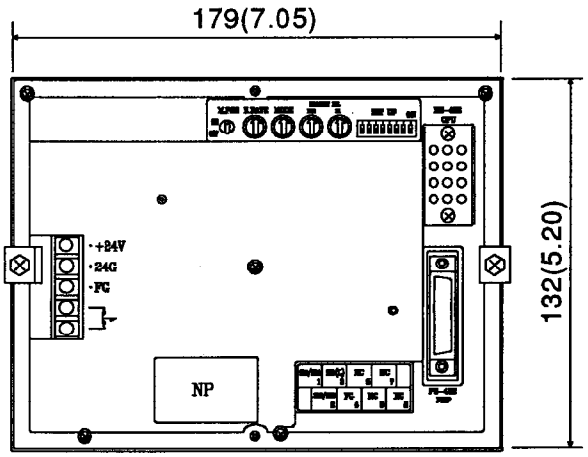
(2) When A64GOT-LT21B is connected to MELSECNET/B, the self-diagnostic test can be performed by the system menu function.
The following manual explains the method of operating the self-diagnostic test. Refer to the manual, and perform the self-diagnostic test. (Explanation manual of the self-diagnostic test)
A64GOT-L(T21B) type Graphic Operation Terminal Reference Manual

6. DIMENSIONS









(Rear view)

Unit : mm(inch)

MEMO

IMPORTANT

(1) Design the configuration of a system to provide an external protective or safety inter locking circuit for the PCs.

(2) The components on the printed circuit boards will be damaged by static electricity, so avoid handling them directly. If it is necessary to handle them take the following precautions.

(a) Ground human body and work bench.

(b) Do not touch the conductive areas of the printed circuit board and its electrical parts with and non-grounded tools etc.

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.

All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.

Graphic operation terminal type A64GOT-L(T21B)

User's Manual

MODEL	A64GOT-L(T21B)-UE
MODEL CODE	13JE40
IB(NA)-66415-A(9403)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-8310 TELEX : J24532 CABLE MELCO TOKYO
NAGOYA WORKS : 1-14 , YADA-MINAMI 5 , HIGASHI-KU, NAGOYA , JAPAN