MITSUBISHI

Q6TEL Modem Interface Module

Mitsubishi General Purpose PC
User's Manual

Thank you for choosing the Mitsubishi General Purpose PC MELSEC-QnA series.
To ensure correct use of this equipment, please read this manual carefully before
operating it.

MODEL	Q6TEL-U-E
MODEL CODE	13JL21

IB-NA-66778-A (9707) MEE

●SAFETY PRECAUTIONS●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.

These ●SAFETY PRECAUTIONS● classify the safety precautions into two categories: "DANGER" and "CAUTION".

◇DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by ⚠CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

◇DANGER

● When performing the data change, program change, and status control of the PC in operation, configure an interlock circuit in a sequence program so the safety of the overall system is always maintained.
  Also, determine the troubleshooting method when data communication error occurs between the peripheral device and the PC CPU.

⚠CAUTION

● Do not place a modem or RS-232C cable in the proximity of load carrying wire except for the main circuit, high-voltage wire, and PC.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Do not directly touch the conducted area and electric parts of this module. It may cause malfunctioning or breakdowns.
- Tighten the add-on connecting screws with the specified torque. If the add-on connecting screws are loose, it may result in fallout or malfunctions.
- Tightening the add-on connecting screws too far may cause damages to the screws and/or the module, resulting in fallout or malfunctions.

[WIRING PRECAUTIONS]

⚠ CAUTION

- Installing a modem on the power distribution panel may cause malfunctioning due to a noise. It is recommended to install modems to outside the power distribution panel.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠ CAUTION

- Never disassemble or modify the module. This may cause breakdowns, malfunctioning, injury, and/or fire.
- When performing on-line operations to the PC CPU moodule in operation with the peripheral device connected (especially changing the program or changing the condition of forceful output), an extreme caution is needed with careful reading of the manuals, especially during remote accessing. Mis-operation will cause a hardware damage or an accident.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

Revisions

Table of Contents

About This Manual

The following product manuals are available. Please use this table as a reference to request the appropriate manual as necessary.

Detailed Manual

Manual Name	Manual No.
Type SW2IVD-GPPQ GPP Software Package Operating Manual (Q6TEL)	IB-66777

Related Manual

Manual Name	Manual No.
Type SW2IVD-GPPQ GPP Software Package Operating Manual (Offline)	IB-66774
Type SW2IVD-GPPQ GPP Software Package Operating Manual (Online)	IB-66775
Type SW2IVD-GPPQ GPP Software Package Operating Manual (SFC)	IB-66776
type SW3IVD-GPPA Operating Manual (GPP)	IB-66693
type SW3IVD-GPPA Operating Manual (A6TEL)	IB-66506

1. Overview

This manual describes the functional overview of the Q6TEL Modem Interface Module (abbreviated as Q6TEL in the rest of this manual), the specification of supported modems and the Q6TEL booting.

Q6TEL is a modem interface module used for connecting a QnA/A series PC CPU and a modem.

When it is connected to an A-series PC CPU, the same performance as A6TEL modem interface module (abbreviated as A6TEL in the rest of this manual) can be achieved.

1.1 Q6TEL Functional Overview

The followings can be performed by Q6TEL:

1. Remote access (circuit monitoring and circuit read/write operations are performed by the GPP function.)
2. Pager transmittance
3. Communication between Q6TEL's
4. Connection between peripheral device and Q6TEL (proximity connection)
5. Use the Q6TEL as an A6TEL equivalent module. (When A/QnA select switch is set to "A")
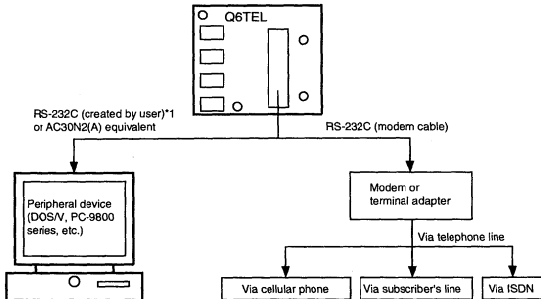
*1: Refer to Section 2.2.1 in the Type SW2IVD-GPPQ GPP Software Package Operating Manual (Q6TEL) for the details of RS-232C cable.

1.2   Functional Comparison between Q6TEL and A6TEL

Function		Q6TEL		A6TEL
		A/QnA switch is set to "QnA"	A/QnA switch is set to "A"	
Remote access		○	○	○
Proximity connection		○	○	○
Pager trans-mittance	Fixed message	○	○	○
	Variable message	○	×	×
Communications between two Q6TEL's		○	×	×

The software packages used by Q6TEL and A6TEL are shown in comparison.

		Software Package Used
Q6TEL	A/QnA switch is set to "QnA"	● SW2IVD-GPPQ GPP Software Package
	A/QnA switch is set to "A"	● SW3IVD-GPPA GPP Software Package
A6TEL		● SW3IVD-GPPA GPP Software Package

1.3   Supplied Parts

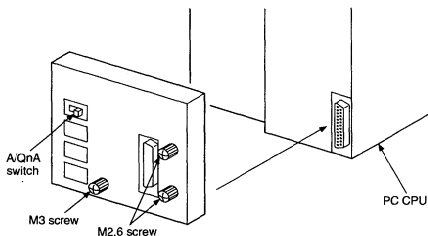Confirm the following products are included when the Q6TEL shipment box is opened:

Product	Quantity
Q6TEL Modem Interface Module	1
Q2AS(H)CPU(S1) Support Screws	1

1.4   Installing Q6TEL

Attach Q6TEL to PC CPU.
The "READY" LED flashes approximately 3 seconds after installation.

Procedures:
① Set the A/QnA switch to "A" or "QnA" depending on the type of PC
   CPU installed.
② Connect Q6TEL's RS-422 connector to the PC CPU's RS-422 connector.
③ Tighten the add-on connection screws(M3), (M2.6) at three points.
   Tightening torque: M3 Screw; 36 to 48N·cm (3.7 to 4.9 kg·cm
                                  [3.2 to 4.2 lb·inch])
                         M2.6 Screw; 20 to 28N·cm (2.1 to 2.9 kg·cm
                                  [1.8 to 2.5 lb·inch])

Reference:
The proximity connection should be made as follows when the data for
Q6TEL or A6TEL is not written to Q6TEL:
① Attach Q6TEL to PC CPU with the MODEM/PRG switch tilted to the
   right when viewed from the front (do not release the switch yet).
② After confirming the READY LED and "PRG" LED turned on (takes
   about 3 seconds to turn on), release the switch.

Points

Refer to Type SW2IVD-GPPQ GPP Software Package Operating Man-
ual (Q6TEL) for the operation to create data and establish the line con-
nection when the A/QnA switch is set to "QnA."
For the above operations when "A" is selected with the switch, refer to
Type SW3IVD-GPPA Operating Manual (A6TEL).

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This section describes how to set the Q6TEL connected to the PC CPU to the proximity connection mode.

RESET switch

PC CPU

Procedures:
① Press the RESET switch while tilting the "MODEM/PRG" switch to the right when viewed from the front.
② Release only the RESET switch.
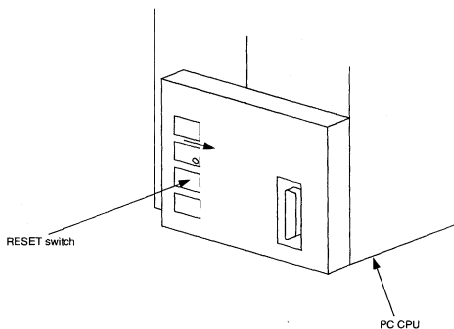③ After confirming the "READY" LED and "PRG" LED turned on (takes about 3 seconds to turn on), release the switch.
   The mode will be set to proximity connection by the operation procedure mentioned above.

Attach the Q2AS(H)CPU(S1) support to the Q6TEL's add-on connection screw only when connecting the Q2AS(H)CPU(S1) to PC CPU.
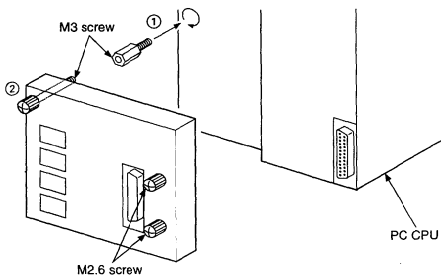
Procedures:

① Attach the Q2AS(H)CPU(S1) support screws to the power supply module.

Tightening torque: M3 Screw; 36 to 48N·cm (3.7 to 4.9 kg·cm [21 to 27 lb·inch])

② Tighten the add-on connection screws (M3) (M2.6).

Tightening torque: M3 Screw; 36 to 48N·cm (3.7 to 4.9 kg·cm [21 to 27 lb·inch])
M2.6 Screw; 20 to 28N·cm (2.1 to 2.9 kg·cm [12 to 16 lb·inch])

1.7   Terminology in This Manual

Model names are indicated only when it is necessary to identify specific models.

Terminology	Description
Subscriber's Line	Conventional public line
SW2IVD-GPPQ	SW2IVD-GPPQ GPP Software Package
SW3IVD-GPPA	SW3IVD-GPPA GPP Software Package

2. Description of Each Function

(1) Remote Access to Q6TEL by GPP Function

Peripheral device that have registered the GPP functions can perform remote operations to the QnA or A-series PC to which Q6TEL is installed via telephone line, such as read/write of the monitor test program.

Thus, even when trouble occurs at the PC, there is no need to go to the place where the system is installed, but checking the system status and modifying the program can be performed from a remote site.
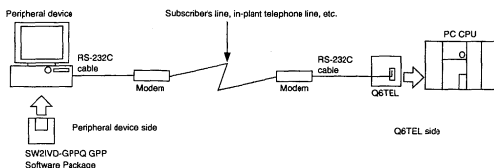
(2) Message Transmittance to Pager from Q6TEL

If data is set in Q6TEL for pager, Q6TEL will transmit the data by means of beep sound or message transfer when specified transmittance conditions are met.

(Local device can be used for neither message transfer nor trigger conditions.)

The data used for beep sound should be written to Q6TEL from the peripheral device connected.

The number of data that can be registered are maximum of ten, including communications between two Q6TEL's (When A/QnA select switch is set to "A", total of six data, one for self-diagnosis and the rest for free usage, can be registered).
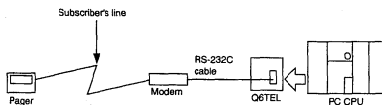
The following is the number of characters that SW2IVD-GPPQ can transmit:

    Fixed message ····· 10 characters

    Variable message ··· 960 characters (message must be set by two characters per word.)

(3) Communication between two Q6TEL's

When the conditions for a device set in the transmitting Q6TEL are met, the word device with a maximum of 480 words can be transmitted to the device designated in the receiving PC CPU. (Local device can be used for neither transfer nor trigger conditions.)

Yet, if the transmitting device is used for trigger or status control, configure an interlocking circuit outside the sequence program so that the safety of the overall system is always maintained.

The Q6TEL data should be written to Q6TEL from the peripheral device (in which SW2IVD-GPPQ is installed).
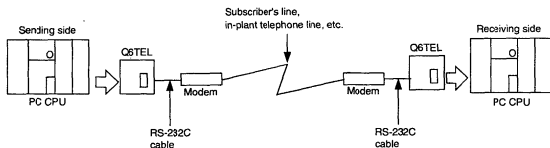
Note
When A/QnA select switch is set to "A", it cannot be communicated between Q6TELs.

(4) Connection between peripheral device and Q6TEL (proximity connection)

When connecting Q6TEL to a peripheral device by means of RS-232C cable (user creation *1 or AC30N2(A) equivalent), the Q6TEL serves as the converter between RS-232C and RS-422.
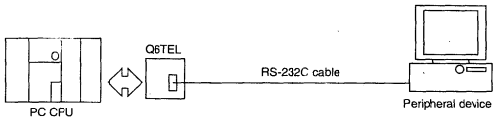
*1: Refer to Section 2.2.1 in the Type SW2IVD-GPPQ GPP Software Package Operating Manual (Q6TEL) for details of RS-232C cable.

(a) Turning ON the DIP switch 1 of Q6TEL sets the Q6TEL data setting mode.
(b) Turning OFF the DIP switch 1 of Q6TEL sets the GPP function (proximity connection mode.)

(5) Use the Q6TEL as an A6TEL equivalent module.

Q6TEL can be used as an A6TEL.

If Q6TEL is connected to the A-series CPU and the following conditions are met, the same performance as the A6TEL can be achieved.

Conditions:
   (1) When PC CPU connected to Q6TEL is A series CPU
   (2) When SW3IVD-GPPA is running in the peripheral   device
   (3) When "A" is set for the A/QnA switch of Q6TEL

• SW3SRXV/IVD-GPPA

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3. Specifications

3.1 General Specifications

This section explains the A1SJ71PB92D general specification.

Table 3.1 General Specification

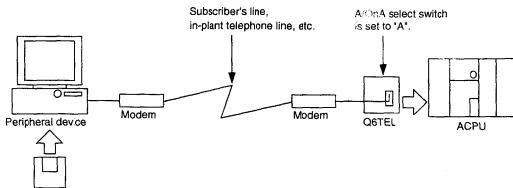| Item	Specifications					
Ambient operating temperature	0 to 55°C					
Ambient storage temperature	-20 to 75°C					
Ambient operating humidity	10 to 90% RH, Non-condensing					
Ambient storage humidity	10 to 90% RH, Non-condensing					
Vibration resistance	Conforming to JIS B 3501, IEC 1131-2		Frequency	Acceleration	Amplitude	No. of sweeps
		Under intermittent vibration	10 to 57Hz	—	0.075mm (0.003inch)	10 times each in x, y, z directions (for 80 min.)
			57 to 150Hz	9.8m/s²{1G}	—	
		Under continuous vibration	10 to 57Hz	—	0.035mm (0.001inch)	
			57 to 150Hz	4.9m/s²{0.5G}	—	
Shock resistance	Conforming to JIS B3501, IEC 1131-2 (147m/s²{15G}, 3 times in each of 3 directions X Y Z)					
Operating ambience	No corrosive gases					
Operating elevation	2000m (6562 feet) max.					
Installation location	Control panel					
Over voltage category *1	II max.					
Pollution level *2	2 max.					

*1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises. Category II applies to equipment for which electrical power is supplied from fixed facilties. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.

*2: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution level 2 is when only non-conducitve pollution occurs. A temporary conductivity caused by condensation must be expected occasionally.

3.2 Performance Specification

The performance specification for Q6TEL is shown below:

Item		Specification
Connecting CPU		All A/QnA series CPU's Yet, as for A2CCPU and A2CJCPU, use the AC30R4-PUS cable to connect.
RS-232C cable		Peripheral device ↔ Q6TEL User creation *1 or AC30N2(A) equivalent
		Modem ↔ Q6TEL Supplied modem cable or specified cable
Connection type		Add-on (no cable connection)
Interface	RS-232C	For connection with modem, DOS/V PC
Telephone line used		Analog two-wire system
Number of registered conditions for transmittance		10
E²PROM write instruction		100 thousand times
Power consumption (5VDC)(A)		0.15 (from CPU module)
External dimensions (mm[inch])		102 [4.02] (H) × 109 [4.29] (W) × 21 [0.83] (D)
Weight (Kg)		0.20

*1: Refer to Section 2.2.1 in the Type SW2IVD-GPPQ GPP Software Package Operating Manual (Q6TEL) for details of RS-232C cable.

3.3 Modem Specification

(1) Modem Specification
   If a modem is used, choose one with the following specification:
   Communication   : ITUT-T V.34/V.32bis/V.32/V.22bis/V.22/V.21/V.fc
   standards   : Bell   212A/103
   Error correction   : Compliant with MNP class 4/10 or ITUT-T V.42
   Data compression   : Compliant with MNP class 5 or ITUT-T V.42bis

   [Q6TEL Connector Specification]

Pin number	1	2	3	4	5	6	7	8	20
Signal	FG	SD	RD	RS	CS	DR	SG	CD	ER

(2) The connection between Q6TEL and a modem can be performed with an RC-232C cable which comes with the modem or the specified cable.

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- The following must be set for the DTR control, echo back, and reception in the device initialization command to write in the Q6TEL or the modem attached to the peripheral device:

Table 2.1

	Modem of Q6TEL side		Modem Attached to Peripheral Device	
	Q6TEL		**Peripheral device SW2IVD-GPPQ**	**Peripheral device SW3IVD-GPPA**
	A/QnA select switch is set to "QnA"	**A/QnA select switch is set to "A"**		
Disconnection	Disconnects when ER(DTR) : ON → OFF	Disconnects when ER(DTR) : ON → OFF	ER(DTR) is always ON.	Disconnects when ER(DTR) : ON → OFF
Echo back	Available	Available	Available	Not available
Reception — Automatic	S0=1	S0=1	S0=1	S0=1
Reception — Manual	S0=0	S0=0		

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4. Precautions for Use

(1) Power Supply Selection
Power to the Q6TEL is supplied from CPU. If a power module is used as another source, consider the 0.15A consuming current required by Q6TEL.

(2) Connection between Q6TEL and the CPU module
Q6TEL can be connected to the every PC CPU of A/QnA series. However, as for A2CCPU and A2CJCPU, add-on connection cannot be made.

(3) Telephone Line Restrictions
- The line with call waiting should not be used because the signal of second call may disturb or even disconnect the original connection.
- Use of another telephone on the same line should be avoided because picking up the other handset may disconnect the line connected.

(4) Precautions when wiring
- If the modem is set inside the power distribution box, it may be disturbed by noise. It is recommended to set the modem outside of the power distribution box.
- The modem and its RS-232C cable should not be placed near main telephone line, high voltage cable or load line other than PC. Noise or surge may disturb the operation.
- Data may be damaged by alarm which is periodically sent from the switchboard to prevent long-term conversations. When a PC communication error occurs due to alarm, etc., perform retry from the modem (set in the initialization command).

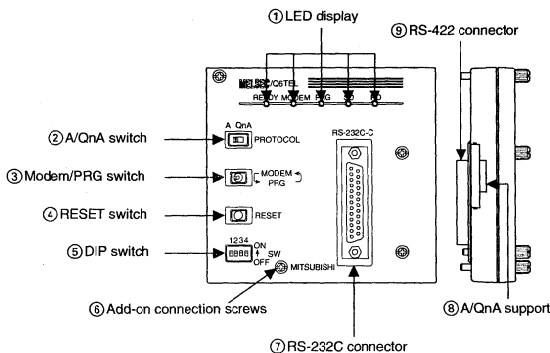(5) Precautions for Q6TEL data change when the telephone line connection is made
When a telephone line connection is made, only the trigger setting data for pager transmission and Q6TEL communication can be changed.

(6) Precautions of Remote Access
Every switch on Q6TEL should be untouched during the operation. Normal operation results are not guaranteed if the switch setting is changed during the operation.

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5. Name of Each Part

① LED display
⑨ RS-422 connector
② A/QnA switch
③ Modem/PRG switch
④ RESET switch
⑤ DIP switch
⑥ Add-on connection screws
⑦ RS-232C connector
⑧ A/QnA support

| No.	Name	Description	
①	LED display	Displays the Q6TEL status.	
		Name	Description
		READY	Displays the Q6TEL status. ON : Normal OFF : Power is off. Flash : • Initialization command is not properly written. • Error that CPU stops occurred.
		MODEM (ONLINE)*	Displays the telephone line connection status. ON : Normal remote access OFF : Disconnected Flash : • Error in Q6TEL data pager point setting • A/QnA switch was changed after Q6TEL and CPU connection was made. • PC CPU other than A/QnA switch setting is connected. • Modem initialization faulty (when A/QnA select switch is set to "A"). • Unmatched password communication error when communicating between Q6TELs.
		PRG	RS-232C connection (proximity connection)
		SD	ON when sending data
		RD	ON when receiving data

* : It is corresponded to A6TEL LED.

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②	A/QnA switch	ACPU/QnACPU switch		
		Setting	Description	
		QnA	Add-on connection CPU is QnACPU.	
		A	Add-on connection CPU is ACPU.	
③	Modem/PRG switch [*1]	Proximity connection/remote access switch. LED tells the switch setting (MODEM or PRG). Default is MODEM (remote access).		
④	RESET switch	Resets Q6TEL. (CPU is not reset.)		

⑤	DIP switch	Set for ②	Switch No.	Setting	Description
		QnA	1	OFF	Telephone line connection mode/proximity connection mode
				ON	Q6TEL data (E^2PROM write) mode (initial setting, password, for writing pager data).
			2	—	Unused (OFF)
			3	—	Unused (OFF)
			4	—	Unused (OFF)
		A	1	OFF	Telephone line connection mode/proximity connection mode
				ON	A6TEL data (E^2PROM write) setting mode (initial setting, password, for writing pager data)
			2	OFF	Pager processing execution mode
				ON	Proximity connection enable mode
			3	OFF	Remote access enable mode (When connection is ready for telephone line from the peripheral device.)
				ON	Remote access disable mode (Pager processing can be executed.)
			4	—	Unused (OFF)

*1 Confirm that LED changes along with the MODEM/PRG switch operation.

⑥	Add-on connection screws	Connection screws used for CPU attachment.
⑦	RS-232C connector	Modem/peripheral device connector.
⑧	A/QnA support [2]	Stick up the support when large-size PC CPU (A/QnA series) is connected. (Not used when AnS(H)CPU(S1) or Q2AS(H)CPU(S1) is connected.)
⑨	RS-422 connector	Connector used for CPU connection.

*2   How to use the A/QnA support:
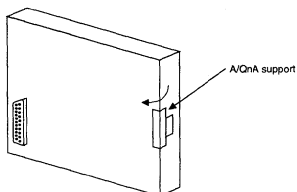
A/QnA support

Stick up the A/QnA support in the arrow's direction as the diagram depicted above.

6. Handling Precautions

This section describes handling precautions from unpacking to installation, and setting environment of Q6TEL.

(1) The Q6TEL's case is made of resinous materials, and should be protected from strong shock or impact.

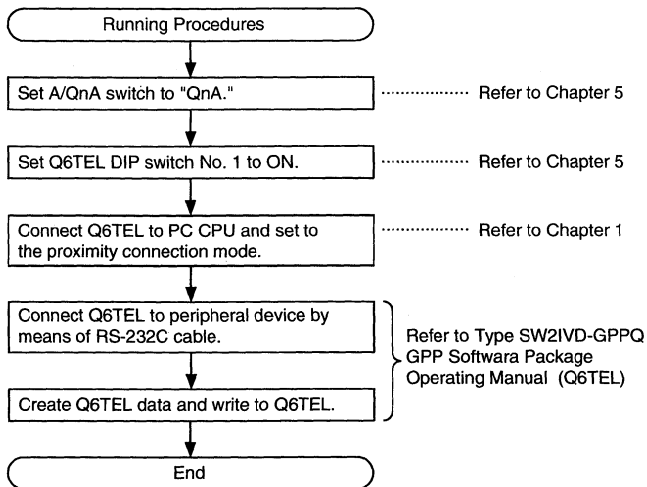(2) Tighten the add-on connection screws and Q2AS(H)CPU(S1) support screws with the following torque:

Item	Tightening torque range
Add-on connecting screws (M3)	36 to 48 N·cm {3.7 to 4.9 kg·cm [21 to 27 lb·inch]}
Add-on connecting screws (M2.6)	20 to 28 N·cm {2.1 to 2.9 kg·cm [12 to 16 lb·inch]}
Q2AS(H)CPU(S1) support screw(M3)	36 to 48 N·cm {3.7 to 4.9 kg·cm [21 to 27 lb·inch]}

(3) Be careful never to let foreign matter such as wiring scraps get inside the module.
Remove such unnecessary wiring waste if present.
These can cause fire, breakdowns, and malfunctioning.

(4) Never disassemble or modify the module. This may cause breakdowns, malfunctioning, injury, and/or fire.

(5) Do not directly touch the conducted area and electric parts of this module.
It may cause malfunctioning or breakdowns.

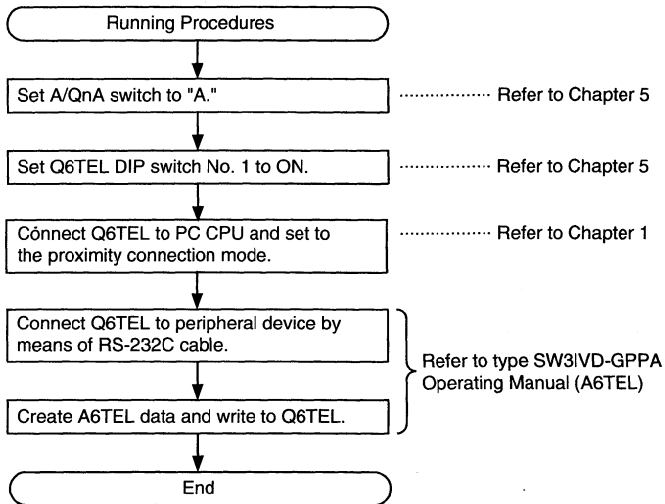(6) When disposing of this product, treat it as industrial waste.

7. Booting Q6TEL

This section describes how to boot Q6TEL (from installation to data write).

(1) When Q6TEL is connected to QnACPU:
Refer to the SW2IVD-GPPQ GPP Software Package Operation Manual (Q6TEL) for details.

```
┌──────────────────────────────────────┐
(     Running Procedures                 )
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│ Set A/QnA switch to "QnA."            │  ················· Refer to Chapter 5
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│ Set Q6TEL DIP switch No. 1 to ON.     │  ················· Refer to Chapter 5
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│ Connect Q6TEL to PC CPU and set to    │  ················· Refer to Chapter 1
│ the proximity connection mode.        │
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│ Connect Q6TEL to peripheral device by │   ⎫
│ means of RS-232C cable.               │   ⎪  Refer to Type SW2IVD-GPPQ
└──────────────────────────────────────┘   ⎬  GPP Softwara Package
┌──────────────────────────────────────┐   ⎪  Operating Manual  (Q6TEL)
│ Create Q6TEL data and write to Q6TEL. │   ⎭
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
(                 End                    )
└──────────────────────────────────────┘
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(2) When Q6TEL is connected to ACPU:
Refer to type SW3IVD-GPPQ GPP Software Package Operation Manual (A6TEL) for details.

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╭─────────────────────────────────────╮
│          Running Procedures           │
╰─────────────────────────────────────╯
                    │
┌─────────────────────────────────────┐
│ Set A/QnA switch to "A."              │ ················· Refer to Chapter 5
└─────────────────────────────────────┘
                    │
┌─────────────────────────────────────┐
│ Set Q6TEL DIP switch No. 1 to ON.     │ ················· Refer to Chapter 5
└─────────────────────────────────────┘
                    │
┌─────────────────────────────────────┐
│ Connect Q6TEL to PC CPU and set to    │ ················· Refer to Chapter 1
│ the proximity connection mode.        │
└─────────────────────────────────────┘
                    │
┌─────────────────────────────────────┐
│ Connect Q6TEL to peripheral device by │
│ means of RS-232C cable.               │   Refer to type SW3IVD-GPPA
└─────────────────────────────────────┘   Operating Manual (A6TEL)
                    │
┌─────────────────────────────────────┐
│ Create A6TEL data and write to Q6TEL. │
└─────────────────────────────────────┘
                    │
╭─────────────────────────────────────╮
│                  End                   │
╰─────────────────────────────────────╯
```

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8. Troubleshooting

This section describes errors that may occur during operation and the troubleshooting.

(1) When READY is flashing:

Cause	Corrective Action
Failure in transmitting the initializing command to the modem (when QnA of the A/QnA switch is selected).	Check the modem and reset Q6TEL.
PC CPU detects self-diagnosis error (when error that causes CPU to stop occurs).	Power supply : OFF → ON
Initialization command is not properly written.	Write initialization command properly.
PC CPU other than A/QnA switch setting is connected.	Reconnect after A/QnA switch is set.
Q6TEL does not recognize the type of PC CPU.	Reset both PC CPU and Q6TEL.

(2) When the MODEM LED is flashing:

Cause	Corrective Action
Failure in transmitting pager signal. [1]	• Increase the number of retry. • Reset and run PC. Reset Q6TEL.
Failure in communicating between Q6TEL's. [1]	• Increase the number of retry. • Reset and run PC. Reset Q6TEL.
Failure in sending initialization command to modem (when A of the A/QnA switch is selected).	• Set the modem initialization command to echo back on. • Check the modem and reset Q6TEL.
Failure in communicating with PC.	Reconnect the line.
Error in the pager transmittance setting.	Correct the pager transmittance setting data.

[1] History is kept for pager transmittance and Q6TEL communications.

(3) Others

Cause	Corrective Action
Automatic reception fails.	• Check if the modem initialization command or the switch is set to automatic reception. • Check if the line is two-wire system.
Line is sometimes disconnected during communication via modem.	• Prolong the carrier detection time by the modem initialization command. • Decrease the baud rate by the modem initialization command.
Disconnection/breaking of cable.	Connect or replace the cable.

Appendix

External Dimentions Diagram

(Unit : mm(inch))

When exported from Japan, this manual does not require application to the Ministry of International Trade and Industry for service transaction permission.

Specifications subject to change without notice.