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FURUNO

USER'S MANUAL

MODEL: **finpad 500f**

FURUNO SYSTEMS CO., LTD.

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FOREWORDS

Congratulations and thank you for deciding and purchasing this unit.

Before start using the unit, read this manual carefully to operate it properly and derive full performance.

This manual explains very basic usages and important information (cautions, etc.) required when using the unit. For daily operations (key strokes for dialog with screen, etc.) specific to application programs, refer to the documentation for those programs which are published by the application vendors.

Always keep this manual in the place accessible from the operators.

Before start using the unit, charge the Li-ion battery pack as explained in “5. Charging Li-ion Battery Pack”.

Recycle wasted Li-ion battery pack

Li-ion

The battery pack contains recyclable Li-ion battery cells. Please reserve natural resource by recycling wasted battery packs. Return wasted battery packs to the vendor of your terminal unit. When shipping a battery pack, insulate its electrodes sufficiently with vinyl tape to prevent overheating/burning by short circuit. It is always a good practice to contain it in plastic bag. Feel free to contact the vendor of your terminal unit for any inquiry on this matter.

DISCLAIMER

This manual was edited very carefully and the information contained in this manual is thought to be correct in every respect, however, in no event FURUNO SYSTEMS be liable to you for any damages, including any lost profits, lost savings or consequential damages arising from incorrect and/or insufficient information in this manual. The entire risks are assumed by you.

The information in this manual may be revised without notice.

PRECAUTIONS ON USING WIRELESS LAN

1. It is strictly prohibited to modify the transceiver circuit or antenna of this unit. (The transceiver circuit built in this unit is so designed to prevent modification.)
2. Never change the transmission frequency or transmission power locally. Never replace the transceiver circuit locally. Never replace or deform the antenna. Any attempt to change the original feature or performance is strictly prohibited.
3. Take care not to interfere with other wireless communication services. When any interference is found, immediately stop using this unit. Do not use it until right countermeasure is taken.
4. When using a micro-power device like this unit, always bear in mind that interferences from various wireless services or industrial/scientific/medical equipment are inevitable.
5. Do not use this unit in the neighborhood or within an airport.

Never use device driver software other than the one supplied from FURUNO SYSTEMS. When any failure is suspected, call the vendor of this unit immediately.

Security on using wireless LAN

(IMPORTANT: This concerns your privacy protection.)

Wireless LAN uses radio signal (rather than wired one) for communication between equipment like PC and a wireless access point. This is great advantage in that you may LAN-connect to any station so long as you are within the wireless communication range. Because radio signal can sometimes reach outside beyond obstacles (wall,) this may cause below-listed problems unless security settings are done properly:

Outsider may spy your communication

Outsider may intentionally receive radio signal emitted from your equipment to spy invaluable information including various ID's, passwords, personal information like credit-card numbers, e-mails, etc.

Outsider may invade/hack into your personal or company's network to:

- Steal personal or secret information. (Leakage of Information)
- Impersonate someone else to communicate with another, and distribute harmful information. (Impersonation)
- Falsify intercepted information and distribute it. (Falsification)
- Destroy data/system by distributing computer virus, etc. (Destruction)

Generally security system is built in wireless LAN equipment or wireless access point, and proper setting of the security system minimizes the possibility of these problems.

Wireless LAN equipment is sometimes shipped without setting the built-in security system. For this reason it is vitally important to complete security settings on wireless LAN equipment before start using its LAN capability.
Due to the nature of wireless LAN, security may be broken by unpredictable special manner. Always bear this in mind when using wireless LAN equipment. If you have any question/problem in security settings, do not hesitate to call the vendor of this unit.

Always do security settings after you have understood everything completely. Again, the entire risks are always assumed by you.

FCC Manual Statement

FCC WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Part 15 Subpart B Class B Statement
NOTICE
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

Properly shielded a grounded cables and connectors must be used for connection to host computer and / or peripherals in order to meet FCC emission limits.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

FCC Manual Statement for Bluetooth：

This equipment complies with FCC radiation exposure limits set forth for uncontrolled equipment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65. This equipment has very low levels of RF energy that it is deemed to comply without testing of specific absorption ratio (SAR).

FCC Manual Statement for 802.11b：

The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure to low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. [Handy Terminal (PI-13500-W)] has been tested and found to comply with FCC radiation exposure limits set forth for an uncontrolled equipment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65. The maximum SAR levels tested for [Handy Terminal (PI-13500-W)] has been show to be 0.564W/kg W/kg at Body.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

802.11b Module and Bluetooth module do not transmit simultaneously.

SAFETY LEVELS & MARKS

The following indications are used throughout this manual to show safety levels:

⚠ **DANGER**	Disobedience to the instructions in this column may directly result in serious injury or death.
⚠ **WARNING**	Disobedience to the instructions in this column may result in serious injury or death.
⚠ **CAUTION**	Disobedience to the instructions in this column may result in injury or damage of this unit.
NOTE	Notes or tips in using this unit fully.

The following marks clearly indicate if you must do something or if you must not do something:

You must do something indicated by this mark.

Action indicated by this mark is prohibited.

HANDLING PRECAUTIONS FOR THIS UNIT

When using this unit, follow the instructions given in this section. They will prevent danger to yourself or the people around you. They will also prevent failure of this unit. For the Li-ion battery pack, battery charger and laser scanner, refer to the instructions given in "3. Controls & Switches", "4. Li-ion Battery Pack Handling Precautions" and "12. Using Laser Scanner," respectively.

Again, the instructions given in this section are vitally important. Do not use the unit before you understand all.

⚠ DANGER	
	Never short-circuit the connector pins or electrodes of this unit or Li-ion battery pack. Short circuit may result in burst or burning.
	If the battery pack is replaced with wrong type, it may explode. Used battery pack must be handled as explained in its instruction manual.
⚠ WARNING	
	Never use the unit near flammable material such as gas, gunpowder, etc. The material may explode and the unit may burst or burn.
	Never use the unit in the environment where strong shock or vibration is anticipated. The unit may burst or burn.
	When the liquid from the LCD display splashes into your eyes, wash the eyes with clean water then rush to a doctor.
⚠ CAUTION	
	Never attempt to disassemble or modify the unit or antenna.
	Never use the unit in the environment where splash or rain is anticipated. The unit may be damaged, performance may lower, or life may shorten.
	Never use or store the unit in abnormally hot environment such as in direct sunlight or near heater. The unit may be damaged, performance may lower, or life may shorten.
	Never use the unit in the place where temperature changes frequently and condensing is anticipated. The unit may be damaged, performance may lower or life may shorten.

(Cont'd)

⚠ CAUTION
Never use the unit in strong magnetic field. The unit may be damaged, performance may lower or life may shorten.
To avoid radio interference, make sure that obstacles (metallic objects, etc.) are not placed around the antenna of this unit.
This unit is intended to use in walker's hand. This unit can not be used on vehicles like cart, forklift, car, etc. Abnormal shocks or continuous vibrations may damage this unit or lower the performance. To use the unit in such environment, sufficient measures (prevention of drop, cushion, shock absorber, etc.) must be taken to meet the environmental requirements. Consult the vendor of this unit.
Never use the unit in the environment where repeated shocks exceeding 20G and/or continuous vibration of 1G is anticipated. Take note that use on cart, forklift, etc. sometimes exceeds these limitations. To use the unit in such environment, specific countermeasures must be taken.
Never leave the unit in dusty environment like desert or in the atmosphere of corrosive gas (such as exhaust gas). Metallic parts such as connector pins or electrodes may deteriorate, resulting in poor charging, communication errors, etc.
Keep the terminals, connector pins, electrodes clean. Stain may cause poor contact, resulting in poor charging, power failure, etc.
Wipe off the dirt on the plastic surface with soft cloth damped with a bit of solution of neutral cleanser thinned with clean water. Never use solvent such as alcohol, thinner, benzene, toluene, acetone, etc., or plastic parts (LCD screen, housing, keyboard, etc.) may melt, deform, whiten, etc.
Never hit the keyboard keys or laser triggers with objects like ball-point pen, pencils, etc. Key tops may be scratched and key closures may be damaged.
To avoid radio interference, make sure that obstacles (metallic objects, etc.) are not placed around the antenna of this unit.

NOTE

Communication range of this unit subject to environmental condition including existence of obstacles. Wireless LAN of this unit uses 2.4 GHz ISM (Industry Science Medical) band which is shared by various kinds of ISM equipment including microwave ovens, high-frequency medical equipment, etc. For this reason, communication by this unit may be interfered from them.

Also, communication by this unit may be interfered from adjacent electric/electronic equipment emiting radio wave or generating magnetic field, office equipment, or home electric appliances like TV.

This unit is provided with privacy-protection capability by means of SS system. However, this does not always mean that privacy is protected perfectly. Because radio wave is used for communication, outsider may spy your communication by using specially-designed equipment. When using this unit, always bear this in mind.

TRADEMARKS

Product names used in this document are for identification purposes only and may be trademarks of their respective companies.

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1. Features

finpad 500f offers basic performance as communication terminal i.e. operability, applicability and expandability. In addition it features:

- Easy-to-operate, compact/light-weight body

  Barcode scanner built in the head of the body reads a wide variety of barcodes. Built-in structure eases operation in the field.
  The compact body houses a large LCD panel, laser scanner and SS transceiver, but weighs only 230 g approx.
  It fits in hand, and may be used for many hours comfortably without strain.

- Keyboard layout intended for single-hand manipulation and supports for service-oriented applications

  - Enter and laser-trigger keys placed closely each other
  - Three laser trigger keys provided on the top/left/right sides respectively to allow right/left-handed or normal/reverse-handed operations.
  - Flexible key assignment for various services
  - Function keys: [F1]/[F2]/[F3]/[F4]
    Quick keys: [Q1]/[Q2]
    Page-up/down keys: [▲]/[▼]

- LCD screen designed with service environment in mind

  - 160x160-dot, large LCD screen
  - 16-grayscale graphic presentation
    (All 16 gradations are not always visible, depending on environmental lighting condition, etc.)
  - 4-grayscale text presentation
    (4-grayscale presentation may be applied to both text and background.)
  - Four fonts for rich expression and readability

- Service-minded environmental specifications

  - Most light-weight in the class of this screen size
  - Durability against adverse environment and harsh handling:
    * Free fall from 2-meter height
    * Repeated drops from lower heights
    * Splash-proof complies with IEC529 IPX4
    * Static discharge of ±20 kV

- Power management for long-lasting operation

  One full charge offers day's work of about 12 hours, where scanning and wireless data transfer of 0.5 sec is assumed every 20 sec.

- Vibration signal and buzzer ensure error-free operation

  Vibration acknowledges input operation to eliminate possible mistakes. Vibration pattern may be selected case-sensitively.

  Three buzzer volume levels and multiple pitches are available to applications. Sound may be also programmed to acknowledge barcode scanning or other operations.

- Versatile peripheral interfaces

  - Bluetooth

- SS Communication System (complies with IEEE802.11b)

  2.4 GHz band spectrum-spread communication system offers:
  - Long communication range up to 100 m (indoor) or 200 m (outdoor)
  - High transmission speed up to 11 Mbps per channel, and multi-channel concurrent communication
  - Auto-switchover of wireless-LAN access point according to movement of terminals

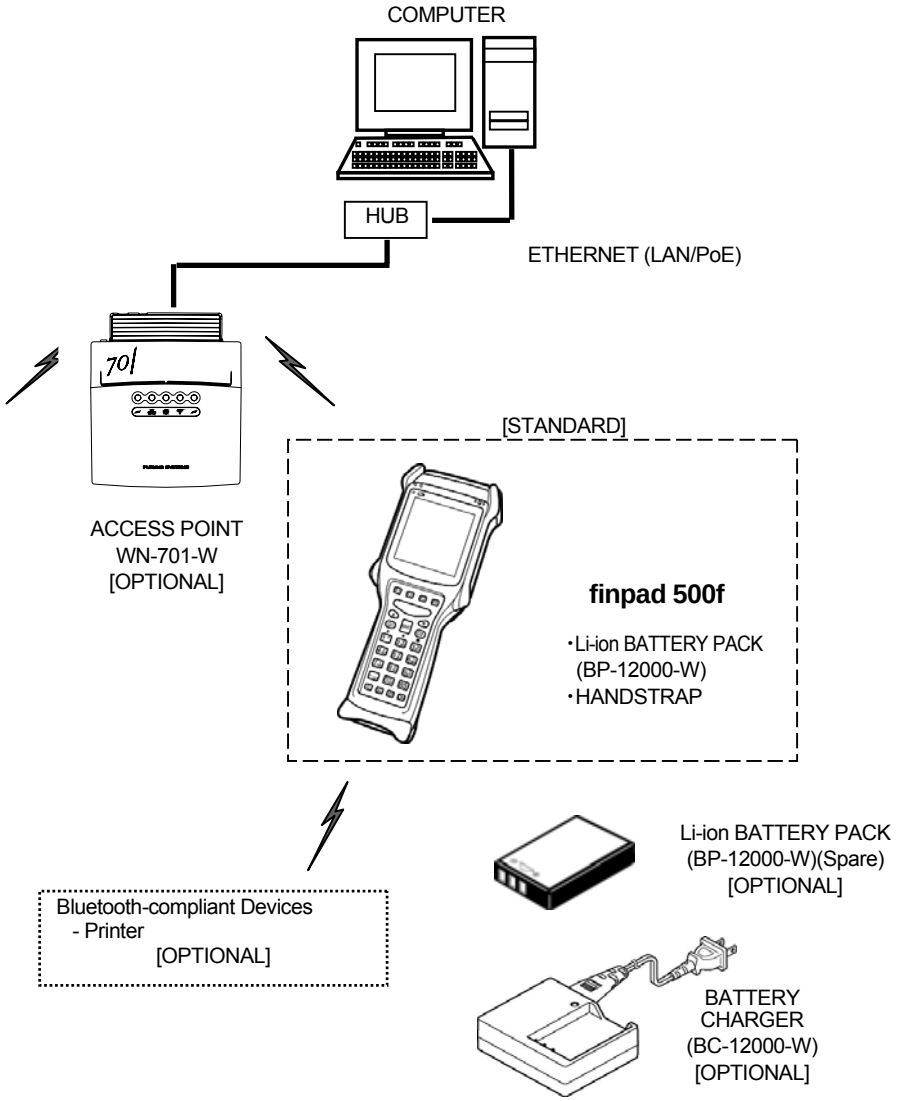
  This unit is classified as specified low-power radio equipment which does not require license.

- Easy-to-use Application Developing Environment

  Various middleware which finpad provides offers high-level wireless communication, developing tools, etc. For further details refer to the documentations for the finpad-family middleware.

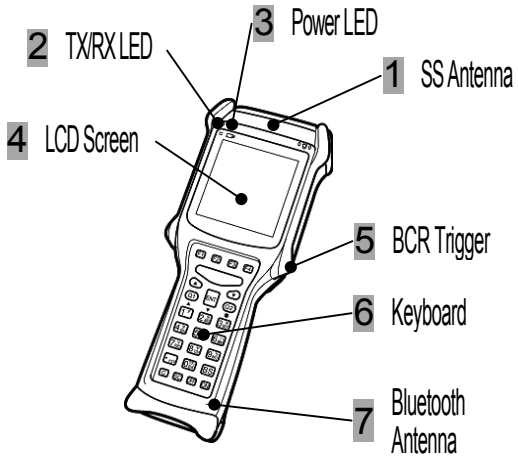
2. System Configuration

This unit was designed considering expandability, flexibility and mobility so that it may be used in a wide variety of services. Typical configuration is shown below.



3. Controls & Switches

Terminal Unit
(Top View)



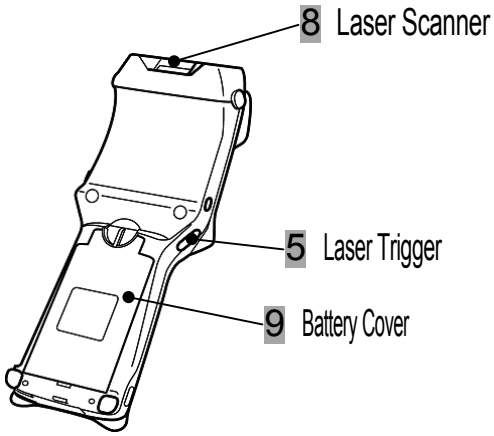
NO.	NAME	FUNCTION
1	SS Antenna	Antenna for spread-spectrum communication is built in.
2	TX/RX LED	Wireless reception: Lit GREEN Wireless transmission: Lit ORANGE
3	Power LED	LCD screen OFF: Blinks GREEN Low battery power: Blinks RED Rewriting ROM: Blinks ORANGE
4	LCD Screen (with backlight)	Displays text and graphics images.
5	Laser Trigger	Press to start barcode reading. (Three triggers are available on the top, left and right sides of the unit, respectively. Press either.)

(Cont'd)

NO.	NAME	FUNCTION
6	Keyboard	Press keys to enter data or activate functions. Press [ON] and [OFF] keys for power-on and off, respectively. Press [ON]+[1] ([ON]+[2]) to make the LCD screen contrast weak (strong) Press [ON]+[3] repeatedly to adjust the backlight through 4 steps including OFF.
7	Bluetooth Antenna	Antenna for Bluetooth communication is built in.

⚠ DANGER
Never short-circuit connector pins. Short can cause burst or burning.
⚠ CAUTION
While ROM is rewritten (the power LED blinks in orange color,) never remove the Li-ion battery pack from the unit. If so done, program will be lost and your unit may not be started any more.

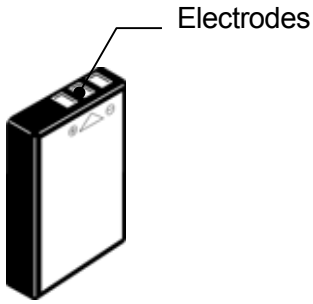
Terminal Unit
(Bottom View)



NO.	NAME	FUNCTION
8	Laser Scanner	Laser scanner for the barcode reader (BCR) is built in.
9	Battery Cover	Li-ion battery pack is stored under this cover. When removing the battery pack, unlock the knob then open the cover.

Li-ion Battery Pack

When handling the battery pack, never short-circuit its electrodes illustrated below. It is best to carry it stored in the terminal unit or plastic bag.



⚠ DANGER
Never short-circuit the electrodes of the battery pack. Short can cause burst or burning.
If the battery pack is replaced with wrong type, it may explode. Used battery pack must be handled as explained in its instruction manual.

4. Li-ion Battery Pack Handling Precautions

Improper handling may cause overheating, burning or burst, resulting in injury or failure of the terminal unit and/or battery pack. Always obey the following instructions.

⚠ DANGER
Never short-circuit across (+) and (-) electrodes with conductor. Do not hold or store the battery pack together with conductor such as necklace or hairpins. Short between the electrodes causes overcurrent, resulting in overheating, burst, burning, etc. Short-circuiting conductor will also be overheated.
Never put the battery pack in fire or heat it, or internal insulating material will melt and gas will damage internal valves and/or safety mechanism. Also, internal electrolytic material may catch fire, resulting in overheating, burning, burst, etc.
Never use/leave the battery pack in the environment hotter than 60°C (near to fire, heater, in direct sunlight, etc). If internal plastic separator is damaged by heat, the battery pack is short-circuited internally, resulting in overheating, burning, burst, etc.
Never put the battery pack in water or wet environment. If so done, the internal protection may be damaged, resulting in overheating, burning, burst, etc.
Never sting the battery pack with a sharp object like a pin or nail. Never hit or press it strongly. If so done, it may be stressed, distorted or damaged, resulting in internal short i.e. overheating, burning, burst, etc.
Never attempt to disassemble or modify the battery pack. The battery pack contains various safety measures and protectors. Damage to those parts will cause overheating, burning, burst, etc.
Never charge the battery pack in high-temperature environment such as the place near to heater, under direct sunlight, etc. When heated, internal protector stops charging. If the protector is damaged, the battery pack is charged with overcurrent or overvoltage and abnormal chemical reaction occurs internally, resulting in overheating, burning, burst, etc.

(Cont'd)

⚠ DANGER	
	Never add strong shock to the battery pack. Never throw it. If internal protection is damaged, the battery pack will be charged with abnormal voltage/current and abnormal chemical reaction will occur internally, resulting in overheating, burning, burst, etc.
	If any sign of damage or deterioration (flaw, crack, coloration, etc.) is found on the battery pack, never keep on using it. If so done, it may overheat, burn, burst, etc.
	Never solder leads to the battery pack directly. If so done, heat will melt internal insulation material, heat will damage gas-release valve, safety measures, etc., resulting in overheating, burning, burst, etc.
	Never set the battery pack with (+) and (-) poles reversed. If it is charged with the poles reversed, abnormal chemical reaction will occur internally or abnormal current flows when discharging, resulting in overheating, burning, burst, etc.
	Never connect the battery pack to AC power outlet or car cigarette lighter. If high voltage is added, overcurrent may flow or the battery pack will be damaged, resulting in overheating, burning, burst, etc.
	Never use the battery pack for devices other than this unit. If so done, performance of the battery pack may deteriorate, life is shorten, and in bad case abnormal current may cause damage, resulting in overheating, burning, burst, etc.
	For charging of the battery pack, always use the genuine battery charger and the method specified by FURUNO SYSTEMS. Use of improper battery charger (modified one, etc.) or charging method (abnormal ambient temperature, abnormal charging voltage/current, etc.) may cause overcharging, abnormal chemical reaction, etc., resulting in overheating, burning, burst, etc.
	The battery pack can not fit the holder within the terminal unit or battery charger if polarity (+/-) is reversed. If it does not fit, do not attempt to set it by force. Check polarity first. Reversed polarity causes abnormal chemical reaction, resulting in overheating, burning, burst, etc.
	When liquid leaked from the battery pack splashes into eyes, wash the eyes with abundant clean water without rubbing then rush to a doctor. Eyes may be injured if left without cure.

⚠ WARNING
Never put the battery pack in a microwave oven, dryer, high-pressure container, etc. If so done, it will heat up quickly, seal is damaged, etc., resulting in overheating, burning, burst, etc.
Never use the battery pack near or in flammable material such as gas, gunpowder, etc.
If unusual signs (overheating, coloring, deforming, smelling, etc.) are observed when operating/charging/storing the battery pack, remove it from the terminal unit or battery charger. Never use it. If used, it may overheated, burn, burst, etc.
If the battery pack can not be charged up within rated time, stop charging it. Further charging may result in overheat, burning, burst, etc.
When liquid leaks from the battery pack or odd smell is felt, immediately make sure that there is no fire nearby. Liquid or gas may catch fire, resulting in burning, burst, explosion, etc.
If any abnormality is found with the battery pack, insulate its (+) and (-) electrodes with vinyl tape, etc. Do not use it any more.
⚠ CAUTION
Do not leave the terminal unit for a long time with the battery pack removed. If so done, the backup battery within the unit will be used up, resulting that date/time setting may be lost, etc.
When handling the battery pack, never short-circuit its electrodes. It is best to carry it stored in the terminal unit or in a plastic bag.
NOTE
When storing the battery pack for a long term (such as 3 to 4 months or longer,) keep it in dry and cool place. To prevent deterioration, it is recommendable to use it from time to time (such as several times a year).
When charging the battery pack, you may feel it warm. This is not fault.
If you feel that the battery pack discharges extremely quickly, it may be wasted (deteriorated). Replace it with new one.
Life of the battery pack shortens if it is used in adverse condition, such as ambient temperature below 0°C or above +40°C.

5. Charging Li-ion Battery Pack

When you start using this unit or when battery power becomes low (power LED blinks in red color in this case,) the battery pack must be charged.

First you remove the battery pack out of the unit, and then charge it with the battery charger (BC-12000-W). (For battery pack removal, see "7. Replacing Li-ion Battery Pack".)

⚠ WARNING
Use the battery charger for specified Li-ion battery pack only. Never use the battery charger for another rechargeable batteries or dry cells.
Never charge the battery pack with its (+) and (-) electrodes reversed.
Never short-circuit across the (+) and (-) electrodes.
To avoid electric shock, never handle the battery charger when it is wet or splashed.
Never attempt to disassemble or modify the battery charger.
Take care so that foreign objects (conductive material, dust, etc.) may not enter inside.
⚠ CAUTION
Do not drop the battery charger. Do not add strong shock to it.
Do charging in ambient temperature rage from +5° to +30°C. In extremely low or high ambient temperature, charging may not complete within rated time, and in addition the battery pack may be deteriorated.
When the battery pack is charged up, remove the battery pack from the battery charger.
NOTE
When charging, you may feel the battery charger or battery pack warm. This is not fault.

Charging Procedure

You will remove the battery pack from the terminal unit, and charge it by using the BC-12000-W battery charger as follows:

1 Shut down the power of the terminal unit.

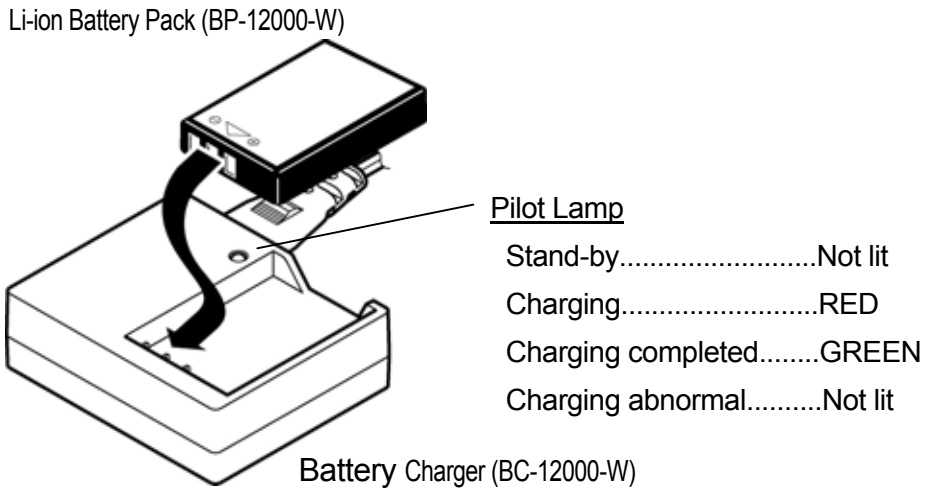
2 Remove the battery pack from the unit as explained in “7. Replacing Li-ion Battery Pack”.

3 Insert the input plug of the battery charger into the AC outlet.

4 Set the battery pack in the battery charger, and the pilot lamp on the battery charger will illuminate in red color.

5 When charging completes, the color of the pilot lamp turns green. Now, remove the battery pack from the battery charger.

6 Unplug the input cord of the battery charger from the AC outlet.



⚠ CAUTION
If the pilot lamp light is extinguished, the battery pack will be faulty. Stop charging immediately.

6. Charging Backup Battery

This unit contains a rechargeable Lithium battery which backs up the real-time clock when the Li-ion battery pack is discharged or removed.

When start using this unit for the first time or after a long unused time, charge the backup battery as instructed below. It should be noted that the unit is shipped from the factory without charging.

Charging Procedure

Set a charged, ready-to-use Li-ion battery pack into the unit. In normal room temperature of 25°C, the backup battery is charged up to 70% in 24 hours and 100% in 72 hours.

NOTE: The backup battery could be charged even if the voltage of the Li-ion battery pack in use is lower than the normal operating voltage. Nevertheless make it a rule to use well-charged Li-ion battery pack.

Typical Backup Period by Backup Battery

Li-ion Battery Pack	Backup Period
Not used	About 2 weeks
Used (fully charged)	About 2 months

NOTE: In order to prevent discharge of the backup battery, always set the Li-ion battery pack in the unit.

7. Replacing Li-ion Battery Pack

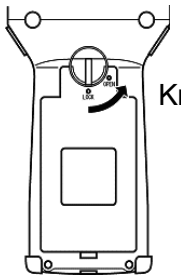
When charging the Li-ion battery pack with the battery charger or when replacing it, remove it from the unit as instructed below. If you feel that the battery pack discharges extremely soon, it should be wasted or deteriorated. Replace it with new one.

BEFORE HANDLING THE BATTERY PACK, READ "4. Li-Ion Battery Pack Handling Precautions" CAREFULLY.

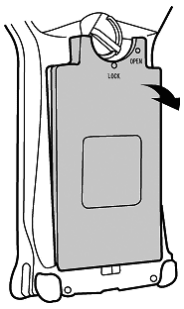
Replacement Procedure

1 Shut down the power of the unit.

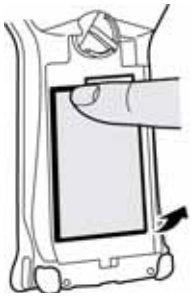
2 Unlock the knob as illustrated below.



3 Remove the battery cover.



4 As the following figure illustrates, after pressing one end of battery pack with a finger, withdraw the battery pack in the arrow direction.



5 Install a charged battery pack in the reverse order (**4 3 2**). When installing a battery pack, set it in the unit with its name plate faced upward (visible) and electrodes mated to the receptacles within the unit.

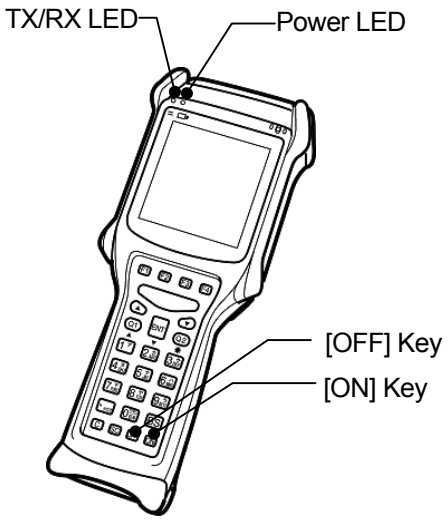
If necessary, charge the removed battery pack as explained in “5. Charging Li-ion Battery Pack”.

⚠ CAUTION
When handling the battery pack, do not touch its electrodes or do not add strong force to it. Stain, flaw or deform of the electrodes cause poor contact. Also, be careful about reverse polarity when installing it in the unit.

8. Power-ON/OFF

To turn the unit ON, press the [ON] key. Both the power and TX/RX LED's will illuminate in orange color, and the buzzer will beep. Normally, unit's serial number and program version number will display, and then the application program runs.

NOTE: An application program may start in another way. It is up to application program.



To turn the unit OFF, press the [OFF] key.

NOTE: Depending on the application program, [OFF] key is disabled and another key (or key combination) is assigned to power shut-down. Also, power may be shut down automatically if the unit is left without operation. Everything is up to application program.

For exact information on power-on/off procedure, refer to the manual of the application program.

9. Setup Utility

This unit incorporates setup utility which sets various functions

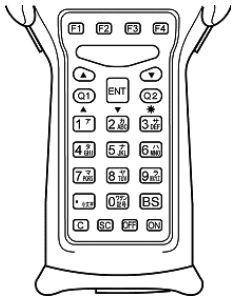
⚠ CAUTION
Do not use the setup utility without understanding its function well. If the setup utility is used in improper manner, programs and/or data may be lost.

Starting Setup Utility

While holding both [7] and [ENT] keys down, keep on pressing the [ON] key (for a few seconds) until the following main menu displays:

MAIN MENU Screen

Setup Utility
1.View param settings
2.Set date/time



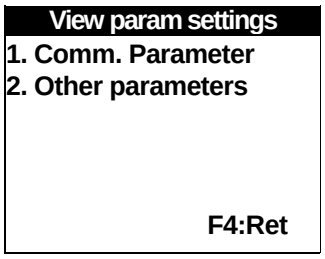
Keep on pressing
[7]+[ENT]+[ON].

To terminate the setup utility, press the [OFF] key.

Among various setup items, only “1. View param settings” and “2. Set date/time,” (intended for users) are explained here. The other setting items are covered by the SETUP & UTILITY MANUAL that is published separately for developers.

1. View param settings

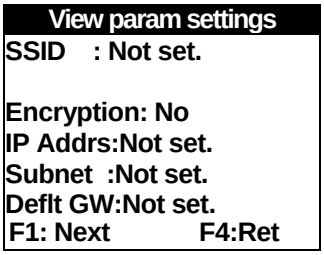
With the “Setup Utility” main menu displayed, press the [1] key to select “1. View param settings”. Soon, you will see the “View param settings” sub-menu displayed as shown below:



NOTE: If you want to return to the higher hierarchy-level menu e.g. the “Setup Utility” main menu, press the [F4] key.

1-1. Communication Parameters

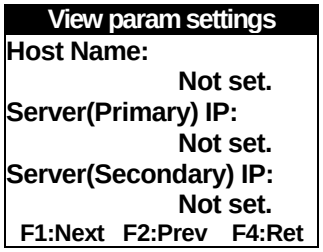
With the “View param settings” sub-menu displayed, press the [1] key to select “1. Communication Parameter”. The communication parameters are listed over several pages of screen, and you navigate them by pressing function keys as shown below.



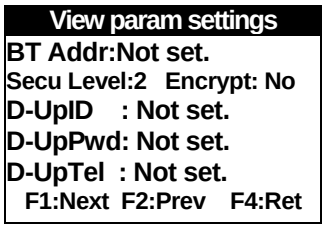
*1
*2

*1 *2: Abbreviated:
*1.Subnet = Subnet MASK
*2.Deflt GW = Default Gateway

Press [F1] to go to the succeeding page.



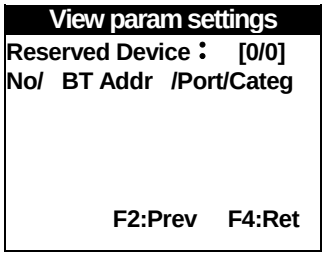
Press [F1] ([F2]) to go to the succeeding (preceding) page.



*3
*4
*5
*6

*3,*4,*5,*6: Abbreviated:
*3.Secu Level = Security Level
*4.D-UpID = Dial-up ID
*5.D-UpPwd = Dial-up Password
*6.D-UpTel = Dial-up TEL №

Press [F1] ([F2]) to go to the succeeding (preceding) page.

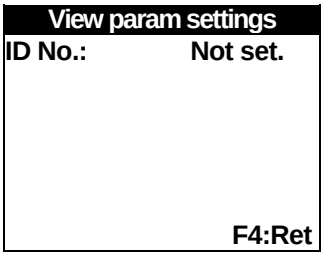


Press [F4] when you are finished.

Pressing the [F4] key on each page recalls the higher hierarchy-level menu e.g. the “View param settings” sub-menu.

1-2. Other parameters

With the “View param settings” sub-menu displayed, press the [2] key to select “2. Other parameters”. Other parameter(s) are displayed as shown below:

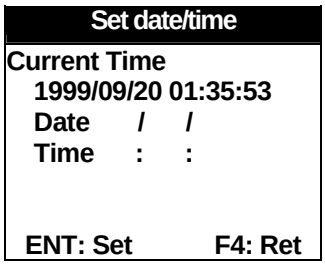


When you are finished with the screen, press [F4] to recall the higher hierarchy-level menu e.g. the “View param settings” sub-menu.

Pressing [F4] on the “View param settings” sub-menu recalls the “Setup Utility” main menu.

2. Set date/time

With the “Setup Utility” main menu displayed, press the [2] key to select “2. Set date/time”. You will see the “Set date/time” screen displayed like this:



Enter date and time by pressing numeral keys ([0] to [9]). When everything is ok on the screen, press the [ENT] key. The “Setup Utilities” main menu will redisplay.

10. Adjusting Screen Contrast

The contrast of the LCD screen varies depending on ambient temperature, view angle, lighting condition, etc. Before start using the unit, adjust the contrast for best recognition of screen image.

Contrast Adjustment Procedure

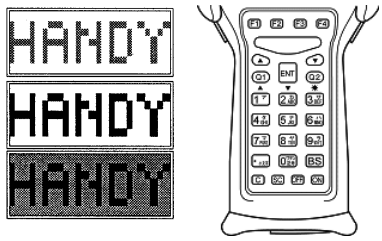
1 Turn the unit ON.

2 While holding the [ON] key down, tap the [1] ([2]) key. The contrast will get stronger (weaker).

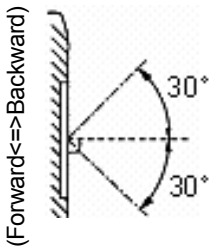
Too thin: [ON]+[2]

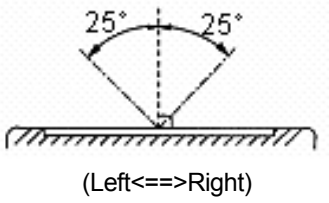
Appropriate!

Too dark: [ON]+[1]



NOTE: The LCD screen is visible clearly when viewed within the angle illustrated below. If viewed out of these ranges, the contrast adjustment may not help visibility.





In dark places, the LCD screen is difficult to read. Adjust the LCD backlight, referring to “11. LCD Backlight ON/OFF”.

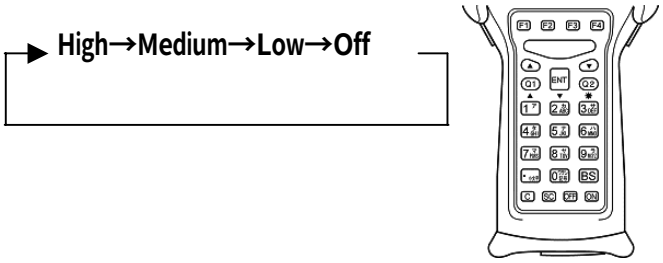
11. LCD Backlight ON/OFF

In dark environment, turn the LCD backlight ON and adjust its brightness for best LCD screen visibility. When you use the unit in lighted environment, it is recommended to turn the LCD backlight OFF to save battery power.

Procedure

1 Turn the unit ON.

2 While holding the [ON] key down, tap the [3] key. The backlight brightness will change in the following cycle:



NOTE: In some cases the LCD backlight is controlled by application program to light up a certain time after key pressing. This function works when the LCD backlight is set to the positions other than “Off”.

12. Using Laser Scanner

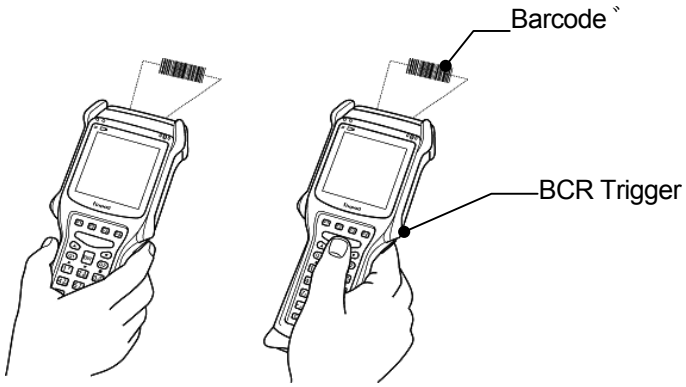
A barcode comprises a series of black stripes representing alphanumeric letters. To read this information properly, follow the instructions below:

⚠ WARNING
Laser beam is harmful to eyes. Never look into the laser beam aperture (head portion) of the unit. Never direct the aperture to somebody.
When scanning labeled bottles or tubes containing medical material (such as medicine, reagent, or blood,) the barcode readout is vital. Always verify that the readout by the scanner agrees with the literal information on the label.
⚠ CAUTION
The laser scanner is a precision device. When strong mechanical shock is added by mistake (dropped, hit etc..,) stop using it and call the vendor of this unit for checking/repair. Such a scanner may cause frequent read errors or may become completely inoperative while you are using it.
Do not scan barcodes with labels laid on striped pattern such as paper on which stripes are printed or grained wood, because the scanner may recognize them as barcodes.
When using an external scanner connected to this unit, do not damage its cord by pulling it or winding it round anything. The cord may be broken.
If a barcode label is inside of a plastic bag, take it out before scanning.
Scan a barcode with the label stretched properly. Before scanning, make label surface clean.

Scanning Procedure

When the laser trigger is pressed, the following sequence is performed automatically:

1 The built-in BCR scanner is powered automatically.
2 Red laser beam is emitted from the laser beam aperture arranged on the head of the unit.
3 The beam scans the barcode to read.
4 When the barcode is read out successfully, the unit beeps once. If failed, it beeps twice.



If you do not scan a barcode for a long time, scanner power is shut down automatically.

The key assigned for laser trigger and/or alarm by buzzer may differ, depending on application program in use.

NOTE: The scanner may not read barcodes in direct sunlight or in extremely bright environment.

The scanner will read barcodes without problem if the labels are oriented upside down.

The scanner may not read barcodes if the laser beam hits labels in extremely squint angle or in exactly right angle. It is best to scan a barcode in a little squint angle as the above figure illustrates.

13. Bluetooth Communication

This unit is provided with Bluetooth interface to communicate with Bluetooth-compliant equipment.

NOTE: Use Bluetooth-compliant equipment approved by FURUNO SYSTEMS only. For information of specific Bluetooth-compliant equipment, refer to the vendor of this unit.

Bluetooth-compliant Equipment
- Printer
[Optional]

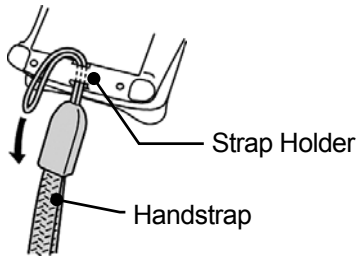
⚠ CAUTION

Place this unit within 5-meter away from Bluetooth-compliant equipment. Make sure that there is no obstacle (such as wall) between the two. Communicating capability subjects to the distance or angle between them.

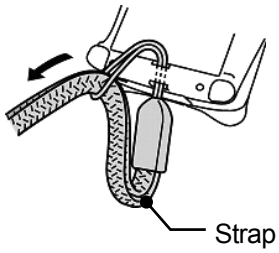
14. Attaching Handstrap

You may use a handstrap to prevent dropping the unit. It can be attached to the unit as follows:

1 Pass the lead of the handstrap through the strap holder of the unit as illustrated below.



2 Pass the strap through the lead (loop) as illustrated below.



⚠ CAUTION
Do not swing the unit by handstrap.

15. Daily Maintenance

Daily maintenance is essential to keep the unit ready for operation at full performance. Do maintenance from time to time as instructed below.

Body, Keyboard & Laser Scanner Aperture

⚠ CAUTION	
⊘	Never use solvent such as thinner, benzene, toluene, acetone, etc., or plastic body may melt, deform, whiten, etc.
⊘	Do not rub the laser scanner aperture with hard cloth (gauze, etc.) strongly. Flaw on the aperture may cause errors in barcode reading.
⊘	Do not rub the keyboard too strongly. Keytop marks may fade or key closure contact may deteriorate.
⊘	When wiping the body with damp cloth, squeeze out water well. If not, metallic parts such as connector pins or switch contacts may deteriorate, resulting in poor contact.

Maintenance Directions

Gently wipe off dirt or stain from the body by using soft cloth damped with a bit of water. To clean the surface of laser scanner aperture or keyboard, use soft cloth damped with a bit neutral cleanser thinned with water.

Connectors

Maintenance Directions

If the unit is left in high-humidity or corrosive atmosphere for a long time, connectors may be corroded, resulting in poor contact. To refresh the contacts, repeat plug-in and out several times. (Note that too many plug-in/out operations may waste the contacts.)

Terminals/Electrodes (Terminal Unit & Li-ion Battery Pack)

⚠ CAUTION
Always keep the terminals and electrodes clean. Stained terminals or electrodes may cause poor contact, open-circuit, insufficient charging, etc.

Maintenance Directions

If the terminals or electrodes on this unit or battery pack are stained, wipe the stain off by using dry cloth, cotton swab, etc. If stain is too stubborn to remove, damp the cloth or swab with slight alcohol. In this case take care so that plastic parts may not wet with alcohol.

Do not use force when cleaning the terminals or electrodes, or they may be deformed. Wipe them repeatedly by small force.

16. Before calling service

This unit is designed and manufactured carefully for trouble-free operation. However, if you think the unit is faulty, first perform the following checks. If the checks can not solve your problem, call the vendor of this unit for service.

⚠ DANGER
Never disassemble this unit or touch internal electronics.

Symptoms & Checks

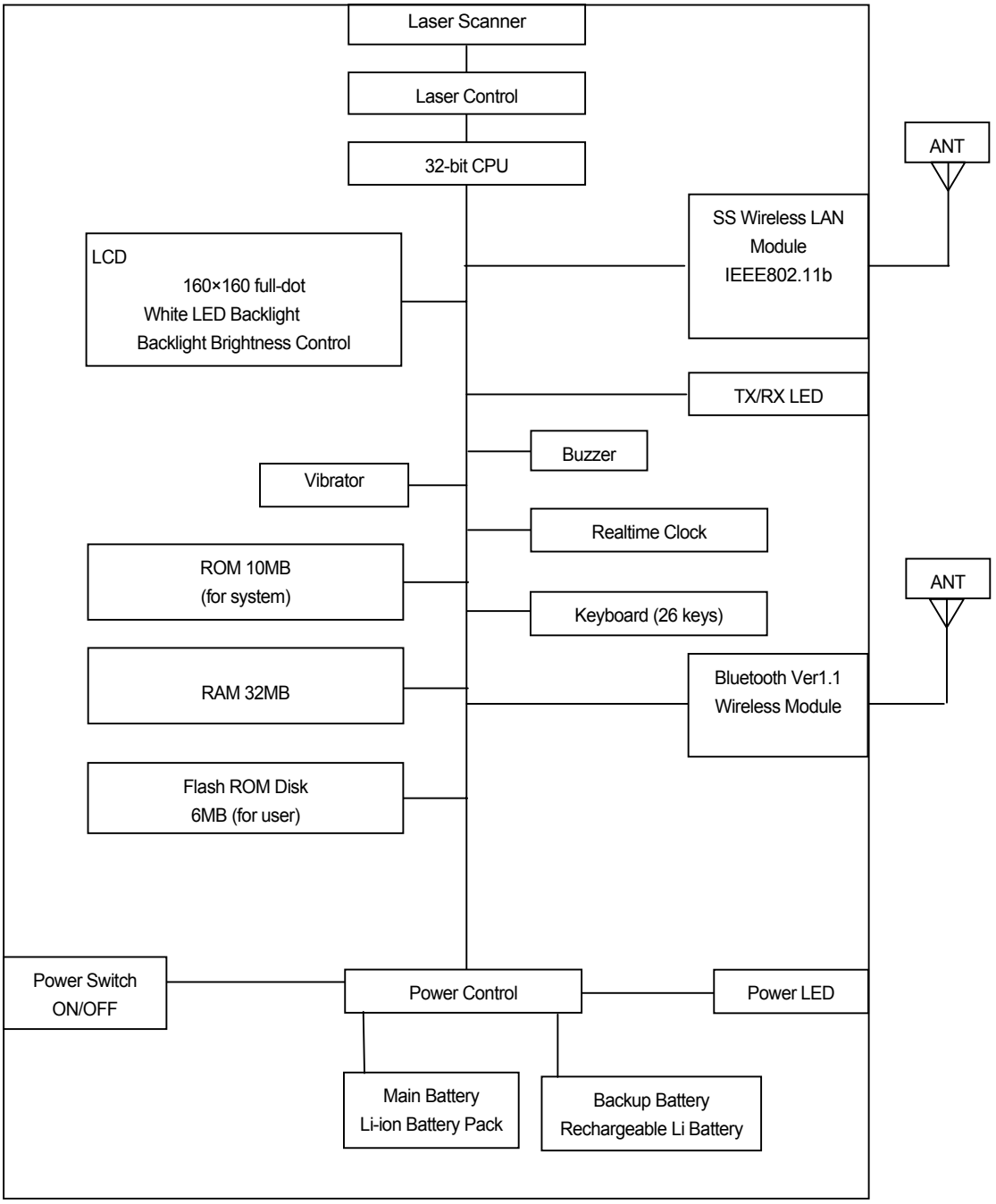
Symptom	Check
Unit does not work at all. (No display/sound)	Did you press the [ON] key firmly? (In order to prevent unintended power-ON, this unit ignores a momentary pressing of the [ON] key. You have to press the key firmly until the unit is powered.)
	Is Li-ion battery pack installed in the unit?
	Is Li-ion battery pack charged sufficiently?
	Is application program loaded in the unit?
Nothing displayed, or poorly displayed.	Is screen contrast adjusted properly?
	Isn't the LCD screen viewed in extremely squint angle?
	If you are using the unit in dark place, is the LCD backlight turned ON?

(Cont'd)

Symptom	Check
No communication	Are communication parameters (IP address, SSID, encryption) set properly?
	Are you operating the unit as instructed in the manual for application program?
	Isn't the unit used out of the communication range of the access point?
	Isn't there any obstruct (metallic object, etc.) around the antenna of this unit?
Cannot read barcode	Isn't the aperture of the laser scanner stained?
	The barcode in question is the type that the application program accepts?
	Isn't barcode label stained? Is barcode printed clearly?
Power can not be shut down. ([OFF] key does not work.)	Is power shut-down allowed now by the application program? (Some application intentionally disables power shut-down in some situation.)
Power shuts down by itself during operation.	Is Li-ion battery pack charged sufficiently?
	Wasn't automatic power shut-down performed? (Some application program shuts down the power automatically in some situation in order to save battery power.)

17. Functional Block Diagram

finpad 500f



18. Specifications of finpad 500f

Mainly hardware specifications are given in this section.
Some functions may be unavailable due to the limitations imposed by middleware in use.

GENERAL

Processor & Memories

CPU		32-bit RISC CPU
Operating System		µITRON
Memories	ROM	10 MB (used by system)
	RAM	32 MB
Flash ROM Disk		6 MB (used by application) (including the files for settings, etc.) NOTE: Entire disk data may be lost if power fails due to abnormal shock like drop of the unit. When designing your system, make it a rule to save important data in the host machine.

Realtime Clock

Setting & Reading	By setup utility or application software
Items to set/read	Year/Month/Day/Hour/Minute/Second/Day of Week (24-hour format, automatic Christian calendar)
Accuracy	±50 ppm (Daily Rate: about ±5 sec/day)
Other features	Leap Year 30-day and 31-day months

Wireless LAN

Compliance	IEEE802.11b
Spectrum Spreading	DS (Direct-Spread)
Baseband Modulation	BPSK/QPSK (CCK)
Radio Frequency	2400 to 2462 MHz

(Cont'd)

No. of Wireless Channels	11 channels
Communication Range	Outdoor: Max. 200 m (Outdoor. No obstacle on line of sight) Open: Max. 100 m (Indoor. No obstacle on line of sight) Semi-open: Max. 50 m (Indoor. Medium between “Open” and “Closed”) Closed: Max. 20 m (Indoor. Enclosed in a compartment which reaches ceiling.)
Antenna	Built in.
Communication Control	CSMA/CA
Communicating Direction	Simplex
Transmission Speed	1 Mbps/2 Mbps/5.5 Mbps/11 Mbps (complies with IEEE 802.11b.)
Security	WEP (64/128bit)

Bluetooth

Compliance	Bluetooth Ver1.1
Spectrum Spreading	FH (Frequency-Hopping)
Baseband Modulation	BT=0.5 GFSK
Radio Frequency	2402 to 2480 MHz
Communication Range	Max. 5 m
Antenna	Built in.
Communication System	Time-sharing
Transmission Speed	Max. 460 kbps
Security	Link Key: 128 bits Encryption Key: 8 to 128 bits (changeable with 8-bit step)

Display

Display Device	Semi-translucent black-and-white LCD (Full Dot)
Display Size	47.985 (Ver) x 47.985 (Hor) mm
Display Resolution	160 × 160 dots Dot Pitch: 0.30 × 0.30 mm
Backlight	White LED (OFF and 3-step dimmer by software)
Contrast Control	Automatic temperature-tracking compensation
Fonts	GB2312-80, Alphabets, Numerals, Symbols (Proprietary codes of FURUNO SYSTEMS are used.) User-definable Fonts
Line/Column Numbers	KANJI: 13 columns × 13 lines (12 × 12 dots/char) 10 columns × 10 lines (16 × 16 dots/char) NOTE: Number of columns and coexistence of different font sizes subject to middleware specification.

Keyboard

Number of Keys	28 keys (total) 2 Power OF/OFF Keys 23 Numeral/Edit Keys 3 Laser Trigger Keys
Key Contact	Tact Key (Rubber Key + Contact Sheet)
Key Click Peep	Enabled/disabled by software. (Peep duration is also adjustable by software.)

Buzzer

Type	Magnetic
Frequency	Multi-pitch (set by software)
Volume	3 steps (High/Medium/Low) (set by software)

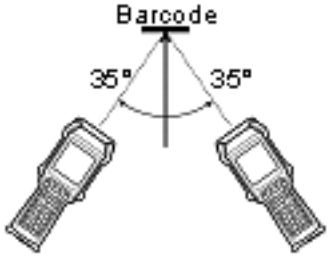
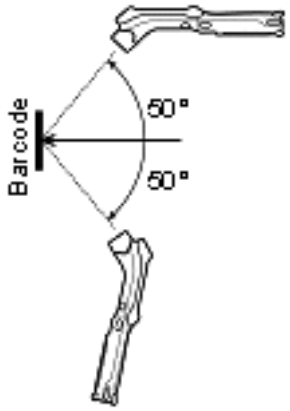
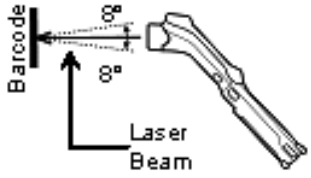
LED Indicators

Wireless Communication Indicator	Green (Receiving) Orange (Transmitting) (Located on left side)
Battery Power Indicator	Green (Blinks when display is OFF for power-saving) Red (Blinks when battery power is low.) Orange (Blinks when rewriting ROM.) (Located on right side)

Laser Scanner

Light Source	Wavelength: 650 nm Visible semiconductor laser
Compliance	IEC60825 Class 2
Laser Emission Time	7 sec max. (Software-adjustable from 1 to 7 sec with step of 1 sec.)
Scanning Rate	100±20 scannings/sec
Scanning Direction	Bi-directional
Scanning Resolution	Bar width of 0.127 mm or more
Barcode Types ( ) indicates maximum-readable digits for variable-length barcode.	UPC-A, UPC-E, EAN/JAN-8, EAN/JAN-13 CODE39 (30 digits) CODE39 Full ASCII Lower-case alphabet etc. requires 2 digits. Therefore, the number of characters will half if all digits are converted to ASCII. Reading of CODE39 and CODE39 Full ASCII can not be enabled simultaneously, and logically they can not be distinguished each other automatically. CODE93 CODE128 (38 digits) By using code set C, you may cover 2 numerals with one digit. In this case, up to 76 digits are readable if all digits are numeral. CODABAR[NW-7] ITF/DTF Reading of both code types may be enabled simultaneously. For both code types, number of digits is <u>not</u> variable but must be fixed to some digit number between 0 and 50. Exactly the specified number of digits are decoded. If number of digits is set to zero for both ITF and DTF, code type will be identified automatically. <u>NOTE</u>: The above-listed digit numbers are for reference only. They were all obtained by factory-experiment using our standard barcodes (0.25-mm resolution). Actual digit number subjects to decoder software, optical condition, print quality of barcode label, environmental condition (lighting), etc. Sometimes the above-listed digit numbers may not be read. Actual digit numbers should be determined locally by experiment using actual barcode labels.
Acknowledgement Beep	Succeeded: 1 beep Failed: 2 beeps

(Cont'd)

Pitch Angle	±35° (A barcode must be placed within ±35°from the right angle in the horizontal section illustrated below.) 
Skew Angle	±50° (A barcode must be placed within ±50° from the right angle in the vertical section illustrated below.) 
Blind Angle	±8° (Due to regular reflection, a barcode can not be read if it is placed within ±8° from the right angle in both horizontal and vertical sections.) 

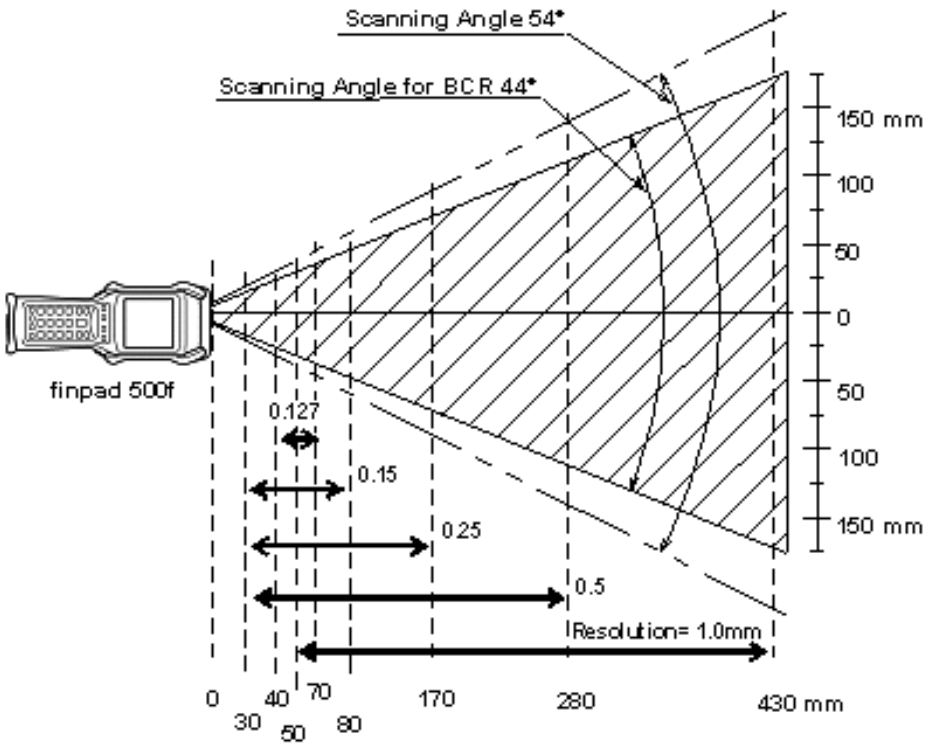
(Cont'd)

Decode Zone

Decode zone is the range available for barcode reading. Generally decode zone reduces as barcode resolution (unit of bar width) becomes fine.

RESOLUTION (mm)	STANDARD BARCODE USED FOR DECODE ZONE MEASUREMENT (The barcode images below are illustrated ones.)	DECODE ZONE (mm)
0.127	CODE39 (4 digits) 0.127mm	40 to 70
0.15	CODE39 (10 digits) 0.15mm	30 to 80
0.25	CODE39 (8 digits) 0.25mm	30 to 170
0.5	CODE39 (4 digits) 0.5mm	30 to 280
1.0	CODE39 (1 digit) 1.0mm	50 to 430

(PCS=0.9)



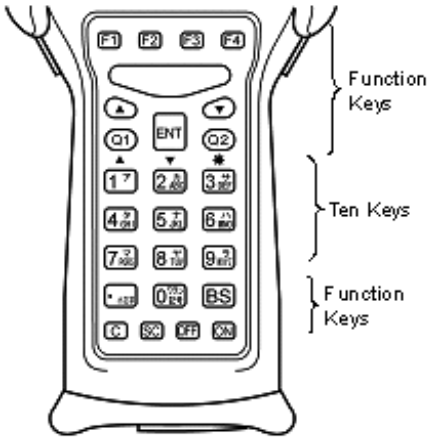
Main Battery

Type	Rechargeable L-Ion Battery Pack
Voltage	3.7 V (Nominal)
Capacity	1800 mAh (Nominal)
Low-power Detection	Battery-power indicator blinks in red color when the battery power is below 5%. Blinking period varies in two steps: - 1st Step 0.5 sec ON – 0.5 sec OFF - 2nd Step 0.3 sec ON – 0.3 sec OFF NOTE: Operational time after the low-power indication varies widely depending on operating condition. When the low-power indication begins, the unit will operate for another 20 minutes approximately if any device (such as wireless/cable communication, laser scanning, etc.) is not driven but only keyboard/LCD are activated.
Battery Life	About 12 hours (Typical Operational Pattern) NOTE: "Typical Operational Pattern" is repetitions of the following functional pattern (20 sec) with the LCD backlight turned OFF: 1 Laser scanning 1.0 sec 2 Wireless LAN (TX/RX) 0.5 sec 3 Wireless LAN (RX) 1.0 sec 4 Idle 17.5 sec (Waiting with all devices except for LCD turned off.) (For details see "20. Battery Life Calculation" on later page.)

Backup Battery

Type	Rechargeable Lithium Battery
Voltage	3.0 V (Nominal)
Capacity	5.5 mAh (Nominal)
Charging Time	24 hours for 70% capacity 72 hours for full capacity (Charged from the main battery internally.)
Backup Period	About 2 weeks (in ambient temperature 25 ° C) (The backup battery was fully charged initially, and the backup period was measured with the main battery removed.) (If main battery is installed, backup battery does not discharge.)

Physical Specifications

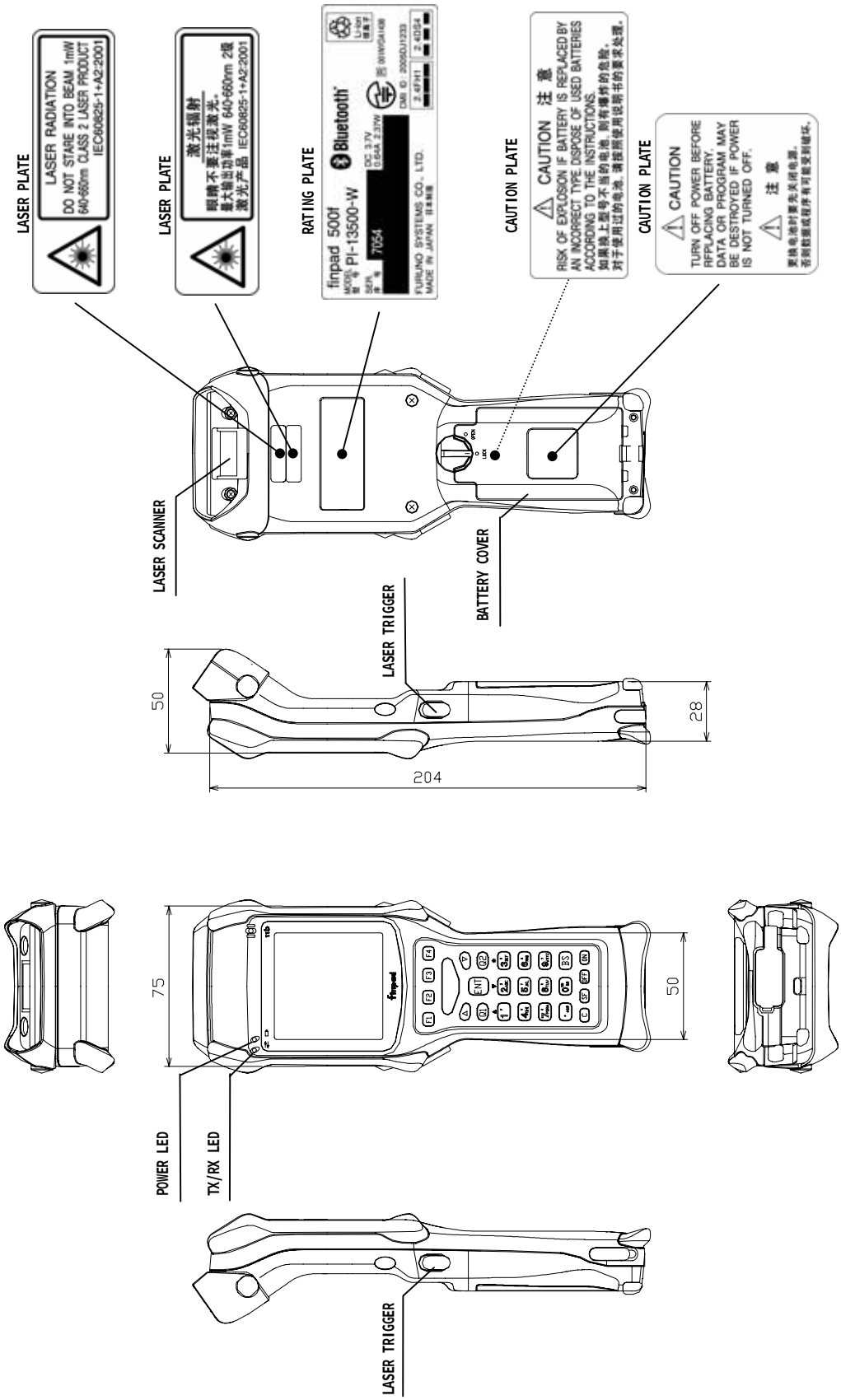
<table>
<tr><td>Dimensions</td><td colspan="2">204 (H) × 75(50) (W) × 50(28) (D) mm
Values in ( ) are the size of gripping portion excluding extruded objects.</td></tr>
<tr><td>Weight</td><td colspan="2">About 280 g</td></tr>
<tr><td>Outline</td><td colspan="2">See the Outline Drawing on later page.</td></tr>
<tr><td>Material</td><td colspan="2">Housing
Material: ABS
Color: Mint Green
Scanner Aperture
Material: Acryl
Color: Red</td></tr>
<tr><td>Lifetime of Contacts</td><td colspan="2">Li-ion Battery Pack: 5000 times of plugging
Rubber Keys: 1500000 times of pressings
(These data are referred from the test reports from the manufacturers of the components.)</td></tr>
<tr><td>Keyboard</td><td> 
</td><td>Keys — Size of Keytop
Ten Keys
[0]-[9]/[.] 5.8 (V) x 8 (H) mm
Function Keys
[ENT] 9 (V) x 8 (H) mm
[▲]/[▼] 4.8 (V) x 8 (H) mm
[BS] 5.8 (V) x 8 (H) mm
Fn Keys
[F1]-[F4] 5 (V) x 6 (H) mm
Quick Keys
[Q1]/[Q2] 4.8 (V) x 8 (H) mm
Power Keys
[ON]/[OFF] 4 (V) x 6 (H) mm</td></tr>
</table>

Current Consumption, Environment & Reliability

Current Consumption	About 100 mA (Basic Current Consumption) About 540 mA (Transmitting/receiving via wireless LAN) (For details see "20. Battery Life Calculation" on later page.)
Ambient Temperature	- 5 to +45°C (Operating) -10 to +60°C (Storage) 0 to +40°C (Charging)
Humidity	20 to 85%RH (Without condensing) (Operating) 20 to 85%RH (Without condensing) (Storage) Once that condensed, performance can not be assured even if the unit is dried.
Vibration	9.8 m/s^2 (10 to 55 Hz, 5.0 to 0.17 mm) (Operating) 9.8 m/s^2 (10 to 55 Hz, 5.0 to 0.17 mm) (Storage)
Mechanical Shock	Withstands one time of free fall from 2.0 m height. (Without package) (Unit may be used continually for the time being.)
Static Discharge	±20 kV (Connector pins are excluded.) (Air Discharge) ±10 kV (Connector pins are excluded.) (Contact Discharge) Complies with: IEC 1000-4-2
Dusts	**General shops or warehouses for logistics**
Corrosive Gas	**General shops or warehouses for logistics**
Flammability	**Similar to: UL94 HB (Outer housing only)** (Flammability similar to UL94 HB is expected when considering the material or design employed in the unit.)
Splashproof	Complies with: IEC529 IPX4
Compliance	IEC60950
MTBF	About 13000 hours (By calculation) Substitutional modules (laser module, LCD and SS wireless LAN module) are excluded from the calculation.

NOTE: The above-listed data are not guaranteed values but the ones obtained by factory test.

The above-listed data may not be obtainable locally if test is performed in the environment (test facilities etc.) different from the factory.



ITEM	NAME	MATERIAL	Q'TY	DWG.No.	REMARKS
THIRD ANGLE PROJECTION		TITLE Outline Drawing Mobile Information Terminal finpad 500f			
SCALE	2/3				
MASS	280g approx	DWG.No.			

UNIT=mm

19. Battery Life Calculation

The following data are provided in this section:
- *Basic Current Consumption*
  This is the current consumption with all devices or functions (except for LCD) disabled. This is equivalent to the condition when the unit is turned ON and waiting for key pressing.
- *Additional Current Consumption*
  This is increase in current consumption when a built-in device or function is activated additionally.

Current consumption with a device activated is given as the sum of Basic Current Consumption and Additional Current Consumption. The goal of this subsection is to calculate battery life by using these data. Example of battery life calculation (in Typical Operational Pattern) is also given at the back of this section.

BASIC CURRENT CONSUMPTION = 100 mA
Condition: LCD=ON, Backlight=off, Vibrator=off, Bluetooth=off, Wireless LAN=off
NOTE: The wireless LAN (SS transceiver) can take three states: transception (TX/RX), reception (RX) and intermittent reception (off). When the wireless LAN has no data to transmit or receive, it repeats reception intermittently for power saving. "Wireless LAN=off" means this condition.

ADDITIONAL CURRENT CONSUMPTION

ADDITIONALLY-DRIVEN DEVICE	ADDITIONAL CURRENT CONSUMPTION
Laser Scanner	30 mA
Wireless LAN (RX)	280 mA
Wireless LAN (TX/RX) NOTE: Each time "Wireless LAN (TX/RX)" completes, "Wireless LAN (RX)" is performed for one second automatically.	440 mA
Buzzer (Volume=High)	50 mA
Bluetooth (Communicating)	100 mA
Bluetooth (Linked)	15 mA
LCD Backlight (High)	100 mA
LCD Backlight (Medium)	60 mA
LCD Backlight (Low)	30 mA
Vibrator (Activated)	110 mA

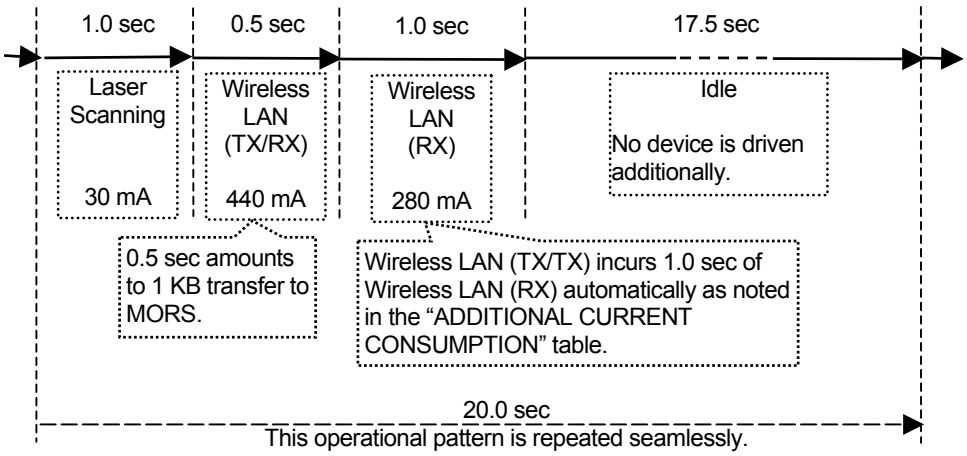
NOTE: The above-listed data were collected by factory-test under the following conditions:
- Ambient Temperature: 20 to 25°C
- Battery Pack used: Brand-new BP-12000-W battery pack which was fully charged in 20°C
  by using BC-12000-W battery charger.

CAPACITY OF BATTERY PACK = 1620 mAh

Capacity is 1800 mAh. However, power is shut down automatically before the battery power is used up completely. For this reason, 90% of the capacity is assumed as effective capacity.

BATTERY LIFE CALCULATION (TYPICAL OPERATIONAL PATTERN)

Q. Calculate battery life when the terminal is operated with the typical operational pattern given in the following time chart. (This pattern simulates a routine to scan a barcode and transfer the read data to the host.)



A. Battery life can be calculated as follows. Bear in mind that the calculated battery life is not always guaranteed, but it is estimation only.

Capacity of Battery Pack	= 1620 (mAh, milliampere hour)	
Basic Current Consumption	= 100 (mA)	
Additional Current Consumption	= (30x1.0 + 440x0.5 + 280x1.0) / 20.0 = 26.5 (mA)	(Average)
Battery Life	= 1620 / (100 + 26.5) = 12.8 (hours)	

NOTE: Within the battery life (12.8 hours), 20 seconds of operational pattern can be repeated 2304 times (=12.8x60x60 / 20).

The above-calculated battery life is the one with the LCD backlight turned off.
If the backlight is ON, the battery life is calculated as follows:

BACKLIGHT	CURRENT CONSUMPTION (AVERAGE) (mA)	BATTERY LIFE (hours)
High	100 + 26.5 + 100 = 226.5	1620 / 226.5 = 7.2
Medium	100 + 26.5 + 60 = 186.5	1620 / 186.5 = 8.7
Low	100 + 26.5 + 30 = 156.5	1620 / 156.5 = 10.4

20. Specifications of Li-ion Battery Pack BP-12000-W

⚠ DANGER
For charging of the battery pack, always use the genuine battery charger (BC-12000-W) and the method specified by FURUNO SYSTEMS. Use of improper battery charger (modified one, etc.) or charging method (abnormal ambient temperature, abnormal charging voltage/current, etc.) may cause overcharging, abnormal chemical reaction, etc., resulting in overheating, burning, burst, etc.

General

Type	Rechargeable Li-ion Battery
Voltage	3.7 VDC (Nominal)
Capacity	1800 mAh (Nominal)
Battery Charger	Use BC-12000-W only.

Protections

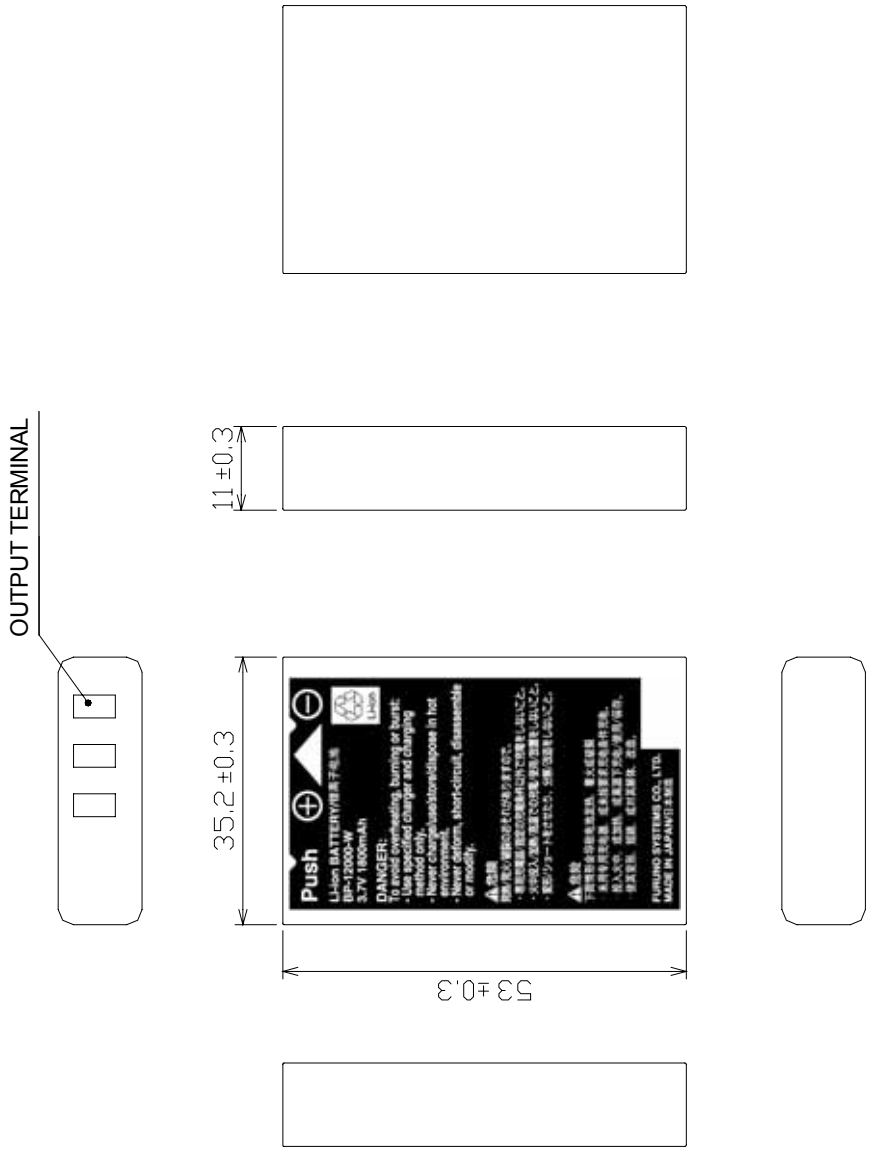
Over-current Protection	Operated when load current exceeds 3A approx. (Reset when the load is removed.)
Over-discharge Protection	Operated when internal cell voltage drops below 2.40±0.10 **V.** (Reset when the battery pack is set in the battery charger.)
Over-charge Protection	Operated when internal cell voltage rises above 4.25±0.05 **V.** (Reset when the voltage drops due to discharge.)

Physical Specifications

Dimensions	53 (H) × 35.2 (W) × 11 (D) mm
Weight	About 43 g
Outline	See the Outline Drawing on later page.

Environment

Ambient Temperature	0 to 40 ° **C** **(Charging)** **-10 to +60 ° C** **(Discharging)**
Vibration	22 m/s^2 (16.7 Hz, 4.0 mm)
Mechanical Shock	Withstands free fall from 100 cm height. (No hazard)



ITEM	NAME	MATERIAL	Q'TY	DWG.No.	REMARKS
THIRD ANGLE PROJECTION		TITLE	Outline Drawing Li-ion Battery Pack BP-12000-W		
SCALE	✕				
MASS	43g approx	DWG No.			

UNIT=mm

21. Specifications of Battery Charger BC-12000-W

GENERAL

AC Input	90 to 240 VAC 50/60 Hz 4.5 W
DC Output	4.2 ± 0.1 VDC, 630 ± 70 mA (Rated) Charging is initiated when AC input is applied with BP-1200 battery pack set. Charging is terminated automatically when abnormal charging condition or completion of normal charging is detected.
Charging Time	3 to 3.5 hours approx.
Pilot Lamp	Stand-by: Not lit Charging: RED Charging completed: GREEN Charging abnormal: Not lit

Physical Specifications

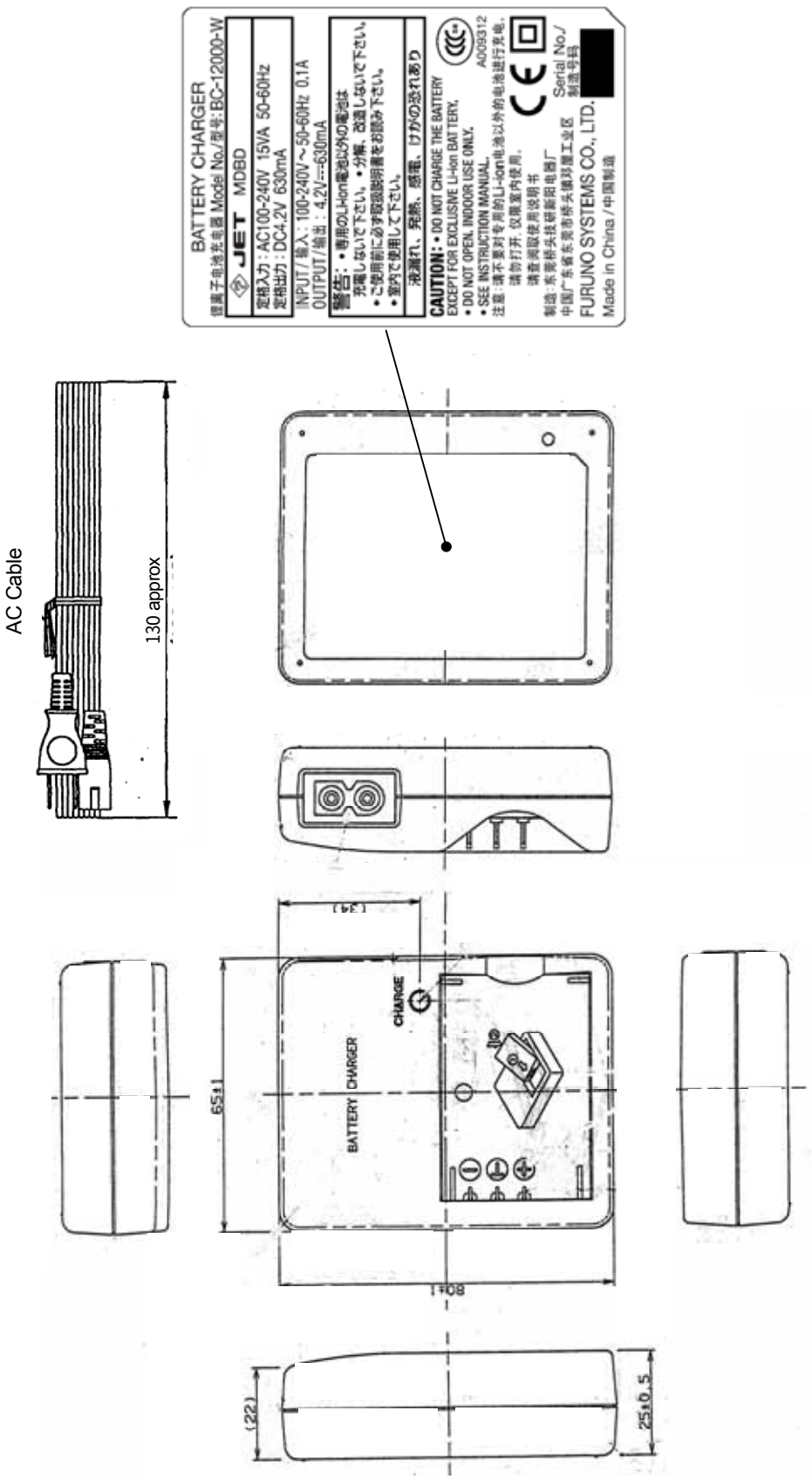
Dimensions	65 (H) × 80 (W) × 25 (D) mm
Weight	About 75 g
Outline	See the Outline Drawing on later page.

Environment

Ambient Temperature	0 to +40°C (Operating) +5 to +30°C (Operating) (Recommended) -10 to +60°C (Storage)
Humidity	20 to 85%RH (Without condensing) (Operating) 20 to 85%RH (Without condensing) (Storage) Once that condensed, performance can not be assured even if the battery charger is dried.
Vibration	19.6 m/s^2 (10 to 55 Hz)
Mechanical Shock	Withstands one time of free fall from 75 cm height. (No hazard)
Dusts	**General shops or warehouses for logistics**
Corrosive Gas	**General shops or warehouses for logistics**
Insulation Resistance	**10 M ohms or more (500 VDC)**
Dielectric Strength	**1500 VAC (1 minute)**
Compliance	IEC60950

NOTE: The above-listed data are not guaranteed values but the ones obtained by factory test.

The above-listed data may not be obtainable locally if test is performed in the environment (test facilities etc.) different from the factory.



ITEM	NAME	MATERIAL	Q'TY	DWG.No.	REMARKS
THIRD ANGLE PROJECTION		TITLE	Outline Drawing Battery Charger BC-12000-W		
SCALE	⊁				
MASS	75g approx	DWG. No.			

UNIT=mm

22. Equipment List & Replacement Parts

Equipment List

	ITEM	MODEL	Q'TY	NOTE
Standard	Mobile Information Terminal	finpad 500f	1	With Hand strap
	Li-ion Battery Pack	BP-12000-W	1	
Optional	Li-ion Battery Pack	BP-12000-W	1	Spare
	Battery Charger	BC-12000-W	1	With AC cord
	Printer Cable	46S0524	1	For connection to Petit Lapin
	Data-transfer Cable	46S0358	1	Between two terminal units
	Access Point	WN-701-W	1	
	Hand strap	N-02 Black L=185	1	Spare
	Neck strap		1	

Replacement Parts

ITEM	MODEL	NOTE
Li-ion Battery Pack	BP-12000-W	Max. times of recharging: 500 times (reference only) IMPORTANT: If any abnormality is found with the battery pack, insulate its (+) and/or (-) electrodes with vinyl tape, etc. Do not use it any more.

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