Chapter 4

Monitoring Setup

Describes the procedures to set the monitor according to the monitoring purpose.

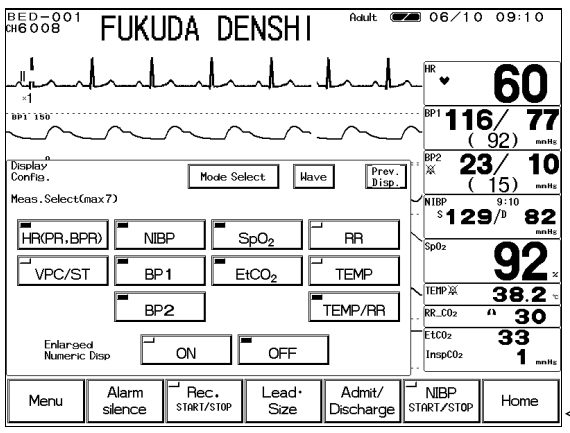
— Display Configuration — For Easier View ····· 2
To Configure the Display ····· 2
●To Enlarge the Numeric Data ····· 2
●To Configure the Display ····· 3
●To Display the Short Trend ····· 5
Description of the Display ····· 6
●ECG1, ECG2, BP, SpO_2, Impedance RESP, CO_2 Waveform Display ····· 6
●HR, BP, VPC/ST, BP1, BP2, NIBP, SpO_2, TEMP, RR, CO_2 Numeric Display ····· 8
●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Enlarged Numeric Data Display ····· 10
●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Alarm Limit Display ····· 10
●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Short Trend Display ····· 11
Parameter Key Frame Display ····· 11
Description of Alarm Message and Alarm Sound ·12
●Vital Alarm Message ····· 12
●Equipment Status Alarm Message ····· 14
●Lead-Off Message ····· 15
— Key Setup — For Easier Use ····· 16
To Set the User Keys ····· 17
To Set the Menu Keys ····· 19
— Recording Setup — To Record the Waveform and Numeric Data ·20
Manual Recording ····· 20
●To Start / Stop the Recording ····· 20
●To Set the Manual Recording ····· 20
Periodic Recording ····· 21
Alarm Recording ····· 22
Freeze Recording ····· 24
Graphic Recording (Graphic/Tabular Trend, etc.) 25
Recorder Operation (QRS Symbol, etc.) ····· 26
— Volume Setup — Pulse Tone, Alarm Sound, etc. ····· 27
— Color / Brightness Setup — ····· 28
Color Setup (Numeric Data, Waveform) ····· 28
Brightness Setup ····· 29
— Telemetry Setup — (DS-7141, DS-7101LT) ··· 30
Transmitting Waveform Setup ····· 32
— Wired Network Connection — (LAN Communication) ····· 33
Room / Bed ID Setup ····· 33
— Alarm Pole Setup — Notifying the Alarm by Light ····· 35
Alarm Level Setup ····· 35
Alarm Pole Flash Pattern Setup ····· 38
— Alarm Setup — To Set the Alarm Condition ····· 39
To Set the System Alarm ····· 39
To Turn ON the System Alarm ····· 40
To Suspend the System Alarm ····· 40
To Silence the System Alarm ····· 40
●Precautions about Silencing the Alarm ····· 40
Alarm Setup for Each Parameter ····· 41
Arrhythmia Alarm Setup ····· 43
●To Set ON/OFF of Arrhythmia Alarm ····· 44
●To Set the Arrhythmia Detection Level ····· 44
●Alarm Limit for TACHY, BRADY ····· 45
SpO_2 SEC Alarm Setup ····· 45
Alarm Suspend / Alarm Silence Time ····· 47
ON / OFF of Alarm Limit Display ····· 48

— Display Configuration — For Easier View

The waveform and numeric data display can be configured according to the monitoring purpose.

To Configure the Display

The display can be configured by selecting the waveforms and numeric data to be displayed. Also, the numeric data display can be enlarged, or graphic trend data can be displayed with the waveform and numeric data.



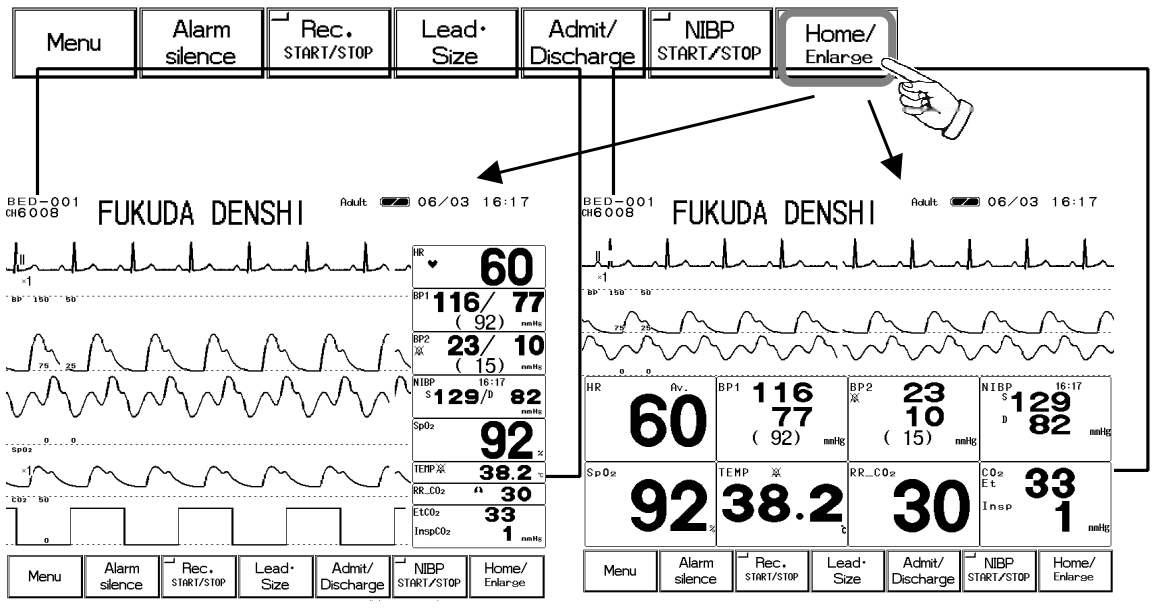
＜Display Configuration Menu＞

●To Enlarge the Numeric Data

The numeric data can be enlarged for easier view.
Pressing the Home / Enlarge key of the menu key will switch the display between standard display and enlarged numeric data display.

Reference

The home key function can be selected from Home / Enlarge or Home on the hospital setup menu. The default setting is Home.
Refer to “8. System Configuration Hospital Setup” for details.



Standard Display

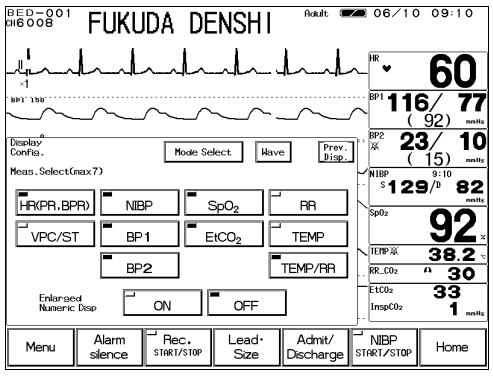
Enlarged Numeric Display

●To Configure the Display

The waveforms and numeric data to be displayed can be selected as desired.

⚠CAUTION	When performing telemetry transmission, the numeric data corresponding to the waveform should be selected for display. Otherwise, the displayed waveform or numeric data may not be transmitted.

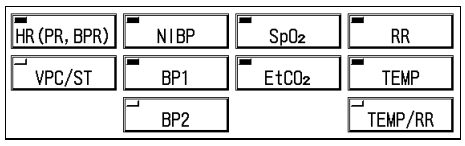
1. Press the [Menu] → [Display Config.] keys.



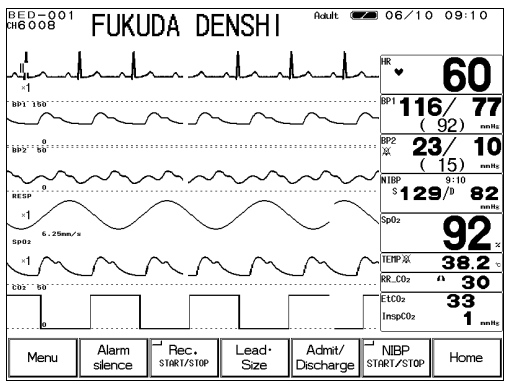
The display configuration menu will be displayed.

＜Display Config. / Meas. Selection＞

2. Select the parameters for numeric data display.



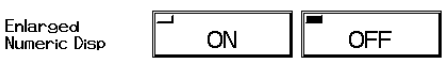
Up to 7 parameters can be selected. The displaying order can not be selected.
It will be automatically positioned in the order of [HR (PR, BPR)], [VPC/ST], [BP], [NIBP], [SpO_2], [TEMP], [RR], [TEMP/RR], [$EtCO_2$] from the top.
The displayed size of each parameter will be determined by the number of selected parameters.
If HR display is not selected, [VPC/ST] will be displayed at the bottom row.



Selecting [TEMP/RR] will display TEMP and RR numeric data in half size inside one parameter box which allows to display up to 8 numeric data.
To display 8 numeric data, select [TEMP/RR] and 6 other parameters.

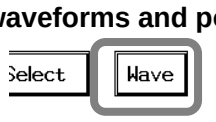
＜8 Numeric Data Display＞

3. Select [ON] or [OFF] to enlarge the numeric data display or not.

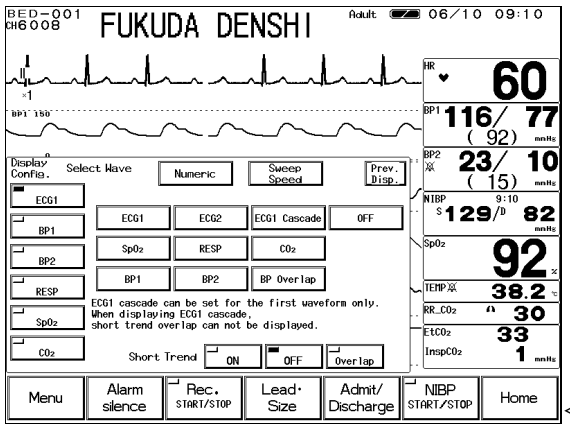


Select [ON] to have the numeric display enlarged on the first display when the power is turned ON.
Selecting [OFF] will display the numeric data in a standard size.

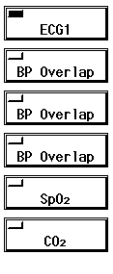
4. Select the waveforms and positions for display.



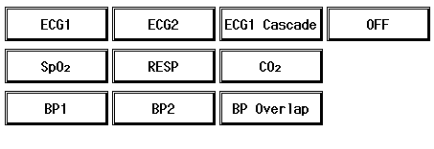
Press the [Wave] key to display waveform selection menu.



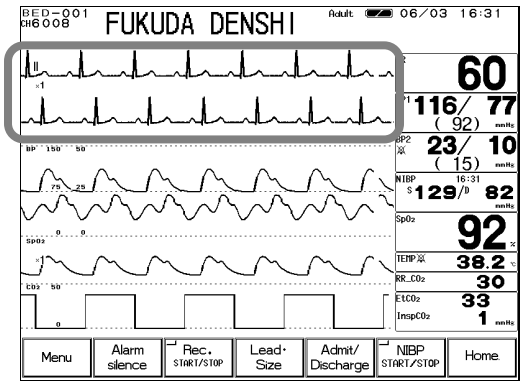
＜Waveform Selection Menu＞



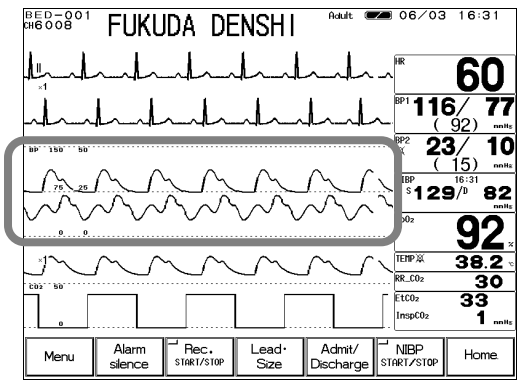
First, select the position to display the waveform.
By selecting the same waveform successively, the waveform display area can be enlarged.



Next, select the waveform to be displayed.
The selected parameter will be displayed inside the selected position key



ECG1 Cascade displays the ECG in long duration.



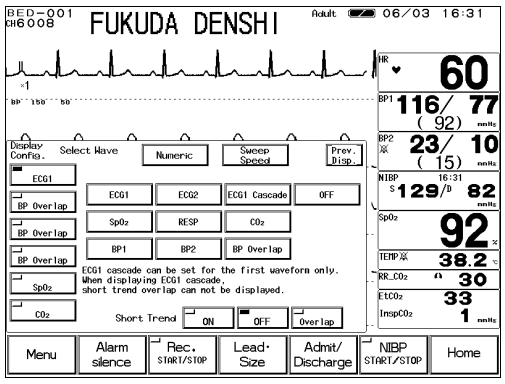
BP Overlap overlaps the BP1 and BP2 waveforms display.
By selecting BP Overlap successively, the BP waveform display area can be enlarged.

NOTE	After configuring the display, press the Home or Home / Enlarge key and verify the programmed display configuration.

●To Display the Short Trend

The short trend data can be displayed with the waveform and numeric data.

1. Press the [Menu] → [Display Config.] → [Wave] keys.

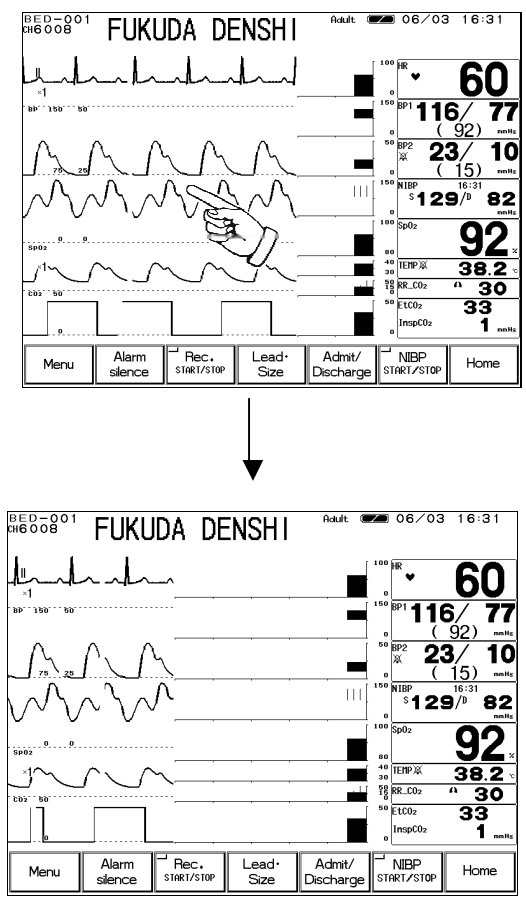


The waveform selection for the display configuration will be displayed.

＜Display Configuration / Waveform Selection＞

2. Select ON/OFF/Overlap for short trend display.

[ON] will display the short trend on the home display.
[OFF] will not display the short trend on the home display.
[Overlap] will display the waveform and short trend overlapped.

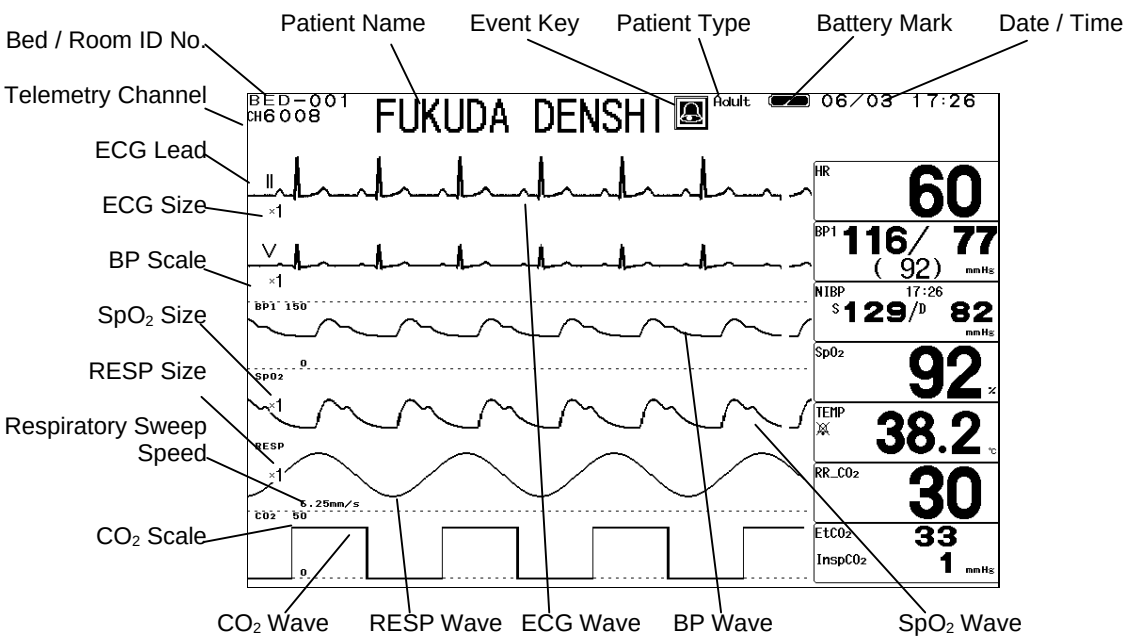


The home display with the short trend is shown on the left. The short trend can be displayed 5 ~ 30 min. in 5-minute increments.
By pressing a point on the displayed waveform, the displayed time of short trend will change according to the pressed position.

Description of the Display

This section explains the displayed item on the home display.

●ECG1, ECG2, BP, SpO_2, Impedance RESP, CO_2 Waveform Display



Bed / Room ID No.

Displays the 4-digit Bed ID and 3-digit (000~999) Room ID.

Telemetry Channel (DS-7141, DS-7101LT)

Displays the telemetry channel ID.

Battery Mark

This mark will be displayed when the monitor is operated with the optional battery. It will be displayed in 3 levels (Full / Medium / Empty).

Battery Mark	***Charged Condition***	***Indication of Operating Time***	
		Standard Mode	***Power Saving Mode***
	Full	3 hours ～2 hours 20 min.	3 hours 30 min.～2 hours 40 min.
	Medium	2 hours ～10 min.	2 hours 40min. ～10 min.
	Empty	10 min.	10 min.

Reference For power saving mode, refer to “8. System Configuration Monitor Setup”

⚠CAUTION	The above specification applies when measuring ECG and NIBP (5-min. interval) using a new battery pack. The battery pack will degrade with the repeated use, which shortens the usable time.

Date / Time

Displays the current date (month, day) and time (hour, minute).

Patient Name / Patient Type

Displays the patient name and patient type (adult / child / neonate) selected on the admit menu.

Respiratory Sweep Speed

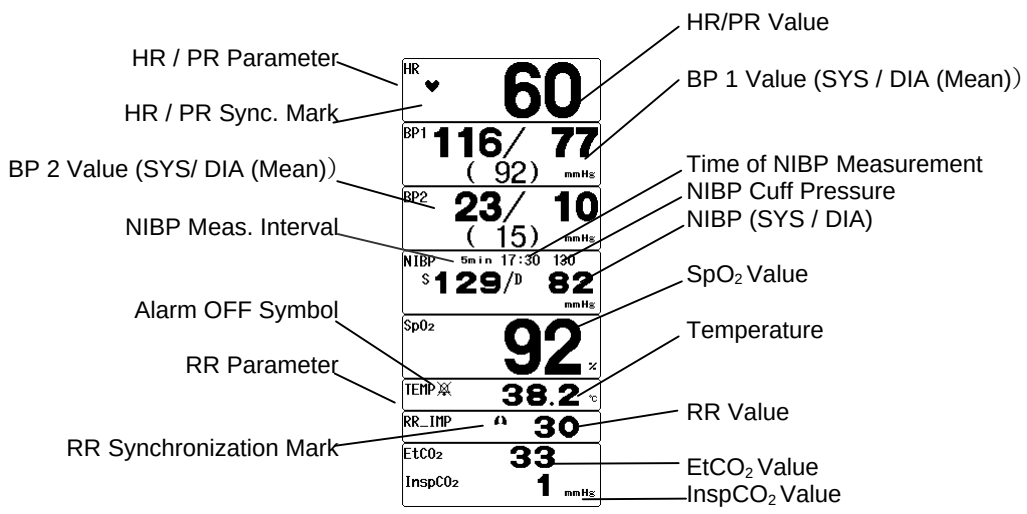
Indicates the displaying sweep speed for impedance respiration waveform and CO_2 waveform.

Event Key

This touch key will be displayed at alarm occurrence. Even when the alarm is resolved, this key will be remained to be displayed until it is pressed. Pressing this key will silence the alarm and display recall display. The event key display can be selected ON or OFF.

Reference For ON/OFF of event key, refer to “8. System Configuration Ward Setup”

●HR, BP, VPC/ST, BP1, BP2, NIBP, SpO_2, TEMP, RR, CO_2 Numeric Display



HR / PR Parameter

Displays the parameter measuring the HR/ PR.
By switching the HR synchronization source, selection from heart rate (HR), SpO_2 pulse rate (PR_SpO_2), BP pulse rate (PR_BP) can be made.

HR / PR Synchronization Mark

Displays the synchronization mark corresponding to the HR / PR parameter.

NIBP Measurement Interval

Displays the periodic measurement interval of NIBP. If the periodic measurement is set to OFF, this area will be left blank.

Alarm OFF Symbol

This symbol will be displayed when the alarm is set OFF.

HR / PR Value

Displays the HR / PR measurement value corresponded to the HR synchronization source selection.
When the measurable range is exceeded, "×××" will be displayed.

BP1, BP2

Displays the BP measurement value (SYS / DIA / Mean).
The mean BP display can be set to ON or OFF on the BP configuration menu. When the measurable range is exceeded, "×××" will be displayed. When the transducer is disconnected or when BP zero balance is not performed, "- - -" will be displayed.

Time of NIBP Measurement

Displays the starting time of NIBP measurement.

NIBP Cuff Pressure

Displays the cuff pressure during NIBP measurement.

NIBP Value

Displays the NIBP measurement value (SYS / DIA / Mean).
The mean NIBP display can be set to ON or OFF on the NIBP configuration menu. The value will be displayed as "- - -" when the preprogrammed NIBP erase time has elapsed.

SpO_2 Value

Displays the arterial oxygen saturation measurement value.

Temperature Value

Displays the temperature measurement value. The YSI-400 temperature sensor can be used. When the measurable range is exceeded, "×××" will be displayed. When the YSI-700 is used, "- - -" will be displayed for the measurement value.

RR Value

Displays the impedance RR / CO_2 RR measurement value corresponded to the respiration synchronization source. When the measurable range is exceeded, "×××" will be displayed. When the ECG relay cable for electrosurgical knife is used, or when impedance measurement is set to OFF, impedance RR will not be displayed.

$EtCO_2$ / $InspCO_2$ Value

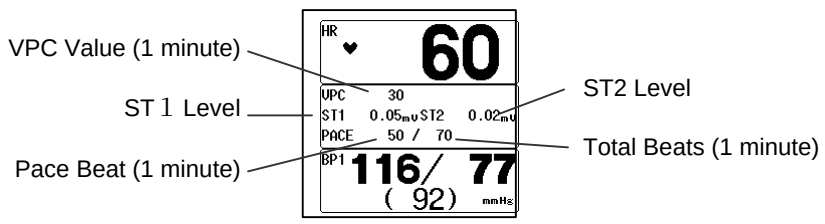
Displays the end-tidal CO_2 concentration and inspiratory CO_2 concentration measurement value. The measurement unit can be selected from mmHg / kPa / % on the CO_2 configuration menu.

RR Parameter

Displays the parameter measuring the RR.
By switching the RR synchronization source, selection from impedance respiration rate (RR_IMP), CO_2 respiration rate (RR_CO_2) can be made.

RR Synchronization Mark

Displays the synchronization mark corresponding to the RR parameter.



VPC Value (1 minute)

Displays the VPC rate for the last 1 minute.
"- - -" will be displayed during arrhythmia learning.

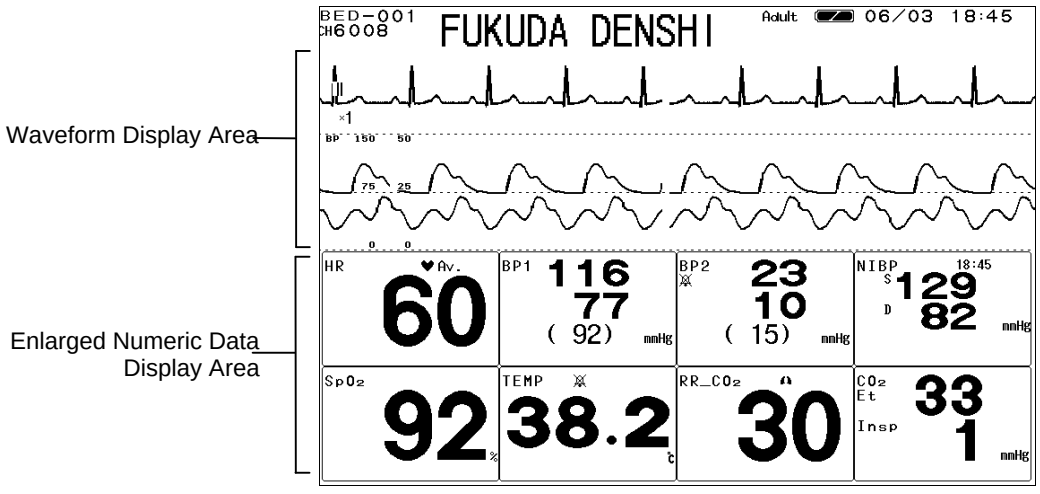
ST1, ST2 Level

ST levels for ECG1 and ECG2 will be displayed.
"- - -" will be displayed during arrhythmia learning, lead-off condition, and when reference waveform is not set for ST measurement.

Pace Beats (1 minute) / Total Beats (1 minute)

Pace beats and total beats for the last 1 minute will be displayed.
"- - -" will be displayed during arrhythmia learning.

●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Enlarged Numeric Data Display



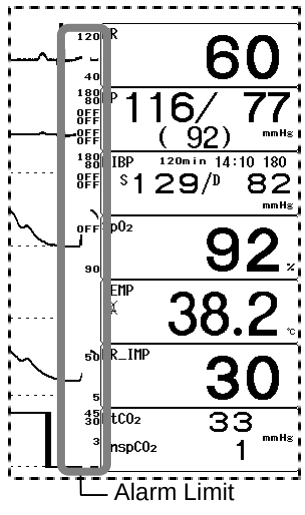
Waveform Display Area

On the enlarged numeric data display, the top 3 waveforms selected on the display configuration will be displayed.

Enlarged Numeric Data Display Area

On the enlarged numeric data display, the numeric data will be located automatically.

●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Alarm Limit Display



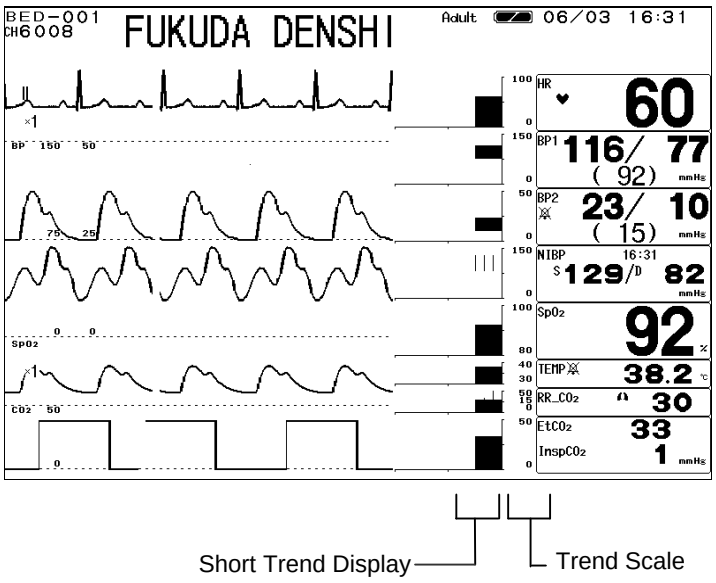
Alarm Limit

The limit will be displayed beside each numeric data. If the individual alarm setup is set to ON, alarm limit will be displayed. The upper and lower limit will be displayed at the upper and lower part respectively. For BP and NIBP, alarm limit will be displayed for SYS / DIA / mean blood pressure from the top. The alarm limit display can be set to ON or OFF.

Reference For ON/OFF of alarm limit display, refer to “4. Monitoring Setup Alarm Setup”

NOTE	If the short trend display is set to ON or Overlap, alarm limit will not be displayed.

●HR, BP, NIBP, SpO_2, TEMP, RR, CO_2 Short Trend Display



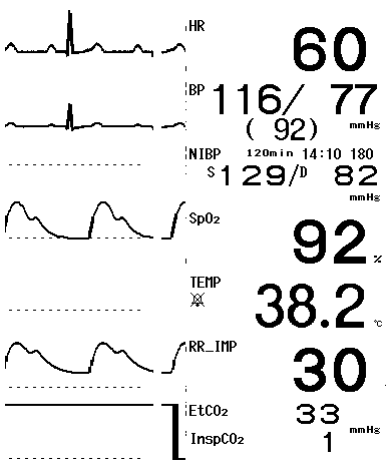
Short Trend Display

Displays the short trend beside each numeric data.
To change the time of displayed short trend, press a point on the waveform. The time of displayed short trend will change to the pressed point. The displayed time can be changed from 0 min. to 30 min. in 5-min. increments.

Trend Scale

The short trend scale will be displayed between the short trend and numeric data. The scale selected on the trend menu will be displayed.

Parameter Key Frame Display



Press the [Menu] → [System Config.] → [Pre-Set] → [Monitor] keys, and select ON/OFF for parameter key frame display.

Selecting [OFF] will erase the parameter key frame.

Description of Alarm Message and Alarm Sound

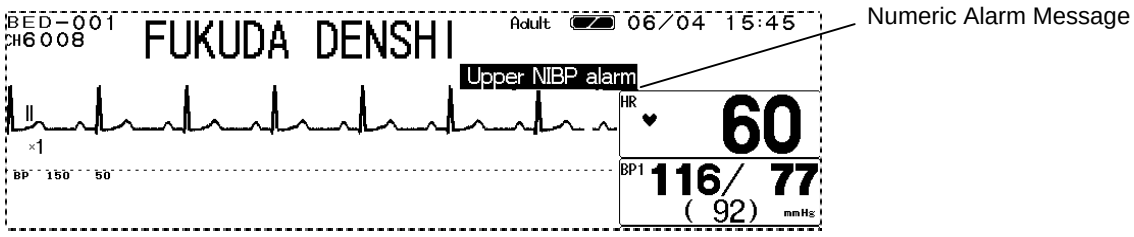
This section explains about the message displayed on the home display.
There are vital alarm message and equipment status alarm message which will be displayed on the top of the home display.
The alarms are classified in level 1, level 2, level 3, level 4, and the alarm message will be displayed according to the priority of level 1＞level 2＞level 3＞level 4.
The color of the displayed messages are red for level 1, yellow for level 2, blue for level 3, and white for level 4.

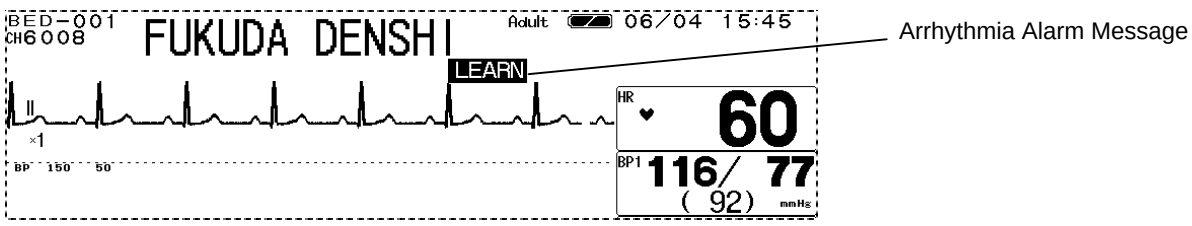
Alarm Level	***Description***	***Tone***	***Displayed Color***
Level 1	Life Threatening Alarm	Continuous beep tone	Red
Level 2	Cautionary Alarm	Beep tone every 5 seconds	Yellow
Level 3	Treatment Needed Alarm	Single beep tone	Blue
Level 4	Notification Alarm	Display Only	White

⚠CAUTION	✍ Alarm messages will be displayed according to the priority. (Level 1 → Level 2 → Level 3 → Level 4) ✍ For the same alarm level, the alarm message for the newer alarm will be displayed.

●Vital Alarm Message

The vital alarm message is generated when a measurement exceeds the alarm limit, or when arrhythmia is detected.





There are 2 types of alarm messages, numeric alarm message and arrhythmia alarm message.
If the 2 types of alarm generate at the same time, the numeric alarm message and arrhythmia alarm message will be alternately displayed for 2 seconds each. The message will be displayed according to the priority of the alarm level. If the alarms of the same level generate, the message for the newer alarm will be displayed.

⚠CAUTION	The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved.

Life Threatening Alarm (Alarm Level 1)

Parameter	*Message*
HR	“Lower HR alarm”
	“Upper HR alarm”
PR (SpO_2, BP)	“Lower PR alarm”
	“Upper PR alarm”
BP1	“Lower BP1 alarm”
	“Upper BP1 alarm”
SpO_2	“Lower SpO_2 alarm”
	“Upper SpO_2 alarm”
Respiration (Impedance, CO_2)	“Apnea alarm”
	“Lower RR alarm”
	“Upper RR alarm”
NIBP	“Lower NIBP alarm”
	“Upper NIBP alarm”
CO_2	“Upper $EtCO_2$ alarm”
	“Lower $EtCO_2$ alarm”
Arrhythmia	“ASYSTOLE”
	“VF”
	“VT”
	“SLOW VT”
	“TACHY”
	“BRADY”
	“RUN”

Cautionary Alarm (Alarm Level 2)

Parameter	*Message*
BP2	“Lower BP2 alarm”
	“Upper BP2 alarm”
ST	“Lower ST alarm”
	“Upper ST alarm”
Temperature	“Upper TEMP alarm”
	“Lower TEMP alarm”
CO_2	“Upper $InspCO_2$ alarm”
Arrhythmia	“PAUSE”
	“COUPLET”
	“BIGEMINY”
	“TRIGEMINY”
	“FREQUENT”

Treatment Needed Alarm (Alarm Level 3)

Parameter	*Message*
None	

Notification Alarm (Alarm Level 4)

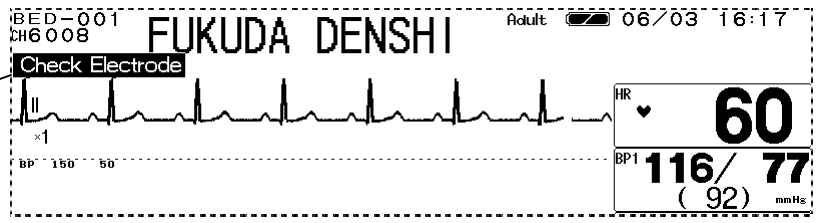
Parameter	*Message*
All Alarm	“Alarm suspend (＊＊＊sec)”
Arrhythmia	“LEARN”
	“ARRHY OFF”

NOTE	✍ (＊＊＊sec) of the “Alarm suspend (＊＊＊sec)” message indicates the remaining time to suspend the alarm. ✍ The “ARRHY OFF” message will be displayed when the ASYSTOLE, VF, VT, SLOW_VT, and HR alarm is OFF.

●Equipment Status Alarm Message

The equipment status alarm message will be displayed when proper monitoring can not be performed. The alarm message will be displayed according to the priority of the alarm level. If more than one alarm with the same level is generated, the alarm message for the newer alarm will be displayed.

Equipment Status Alarm Message



Cautionary Alarm (Alarm Level 2)

Item	*Message*
Battery	“Charge battery”
ECG Impedance Respiration	“Check electrodes
SpO_2	“Check SpO_2 sensor”
	“SpO_2 sensor fault”
CO_2	“Check filter line”
	“CO_2 unit error”
Connector Off	”ECG not connected”
	”BP not connected”
	”SpO_2 not connected”
	”TEMP not connected”
	”CO_2 not connected”

NOTE	The “Connector Off” alarm can be cancelled by pressing the Alarm Silence key. Before silencing the alarm, make sure that the disconnected connector is unnecessary.

Treatment Needed Alarm (Alarm Level 3)

Item	*Message*
NIBP	“Check NIBP hose”
Impedance Respiration	“CVA detected”
SpO_2	“No pulse detect”
ECG	“Pacemaker error”

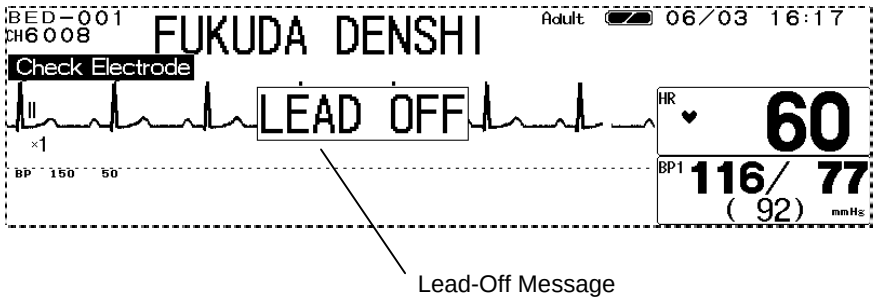
Notification Alarm (Alarm Level 4)

Item	*Message*
Operation	“Wave freeze”
	“Touch key OFF”
	“Night mode”
ECG	“ECG failed”
	“Artifact”
BP	“BP1 transducer OFF”
	“BP1 not zero balanced”
	“BP2 transducer OFF”
	“BP2 not zero balanced”
	“Incorr. BP cable”

Temperature	“Wrong temp probe”
	“TEMP auto check”
	“TEMP unit check”
SpO_2	“Motion artifact”
	“SpO_2 unit error”
CO_2	“CO_2 unit error”
ECG	“ECG unit error”
NIBP	“NIBP unit error”
Recorder	“Recorder error”
	“Paper out”
	“Magazine open”
	“Paper jammed”
	“Recorder busy”
All Alarm	“Alarm Mute”
ECG, Impedance Respiration	“Check electrode”
Telemetry	“Telemetry unit error”

●Lead-Off Message

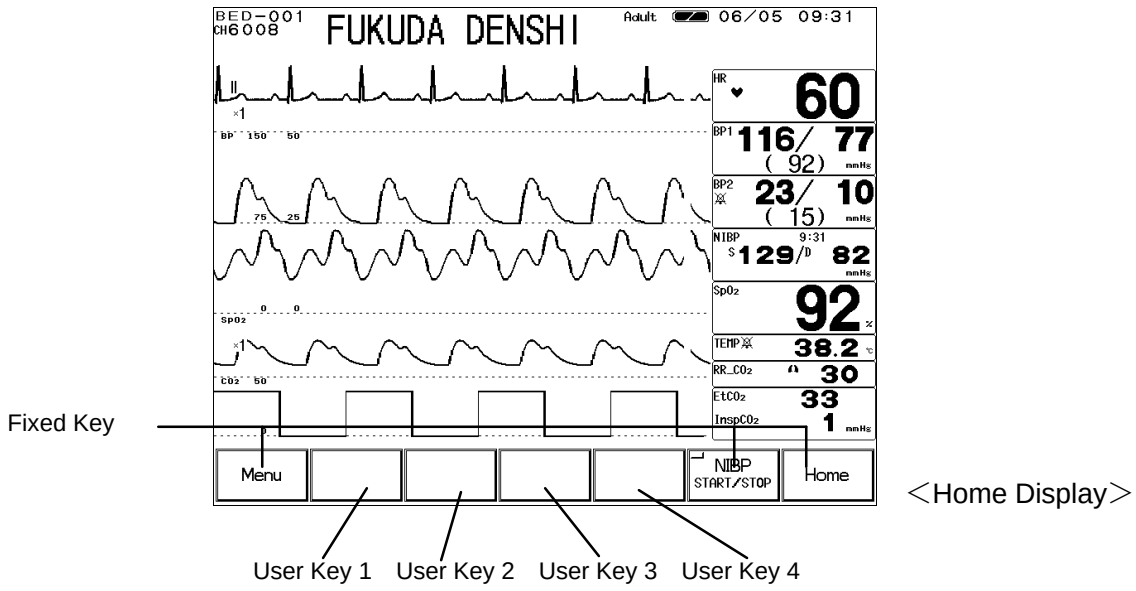
If the ECG electrodes are detached, HR alarm and arrhythmia alarm will not be generated. If this condition is left unresolved, a sudden change of the patient may not be noticed. Take prompt action when the lead-off condition is detected.



Lead-Off Message

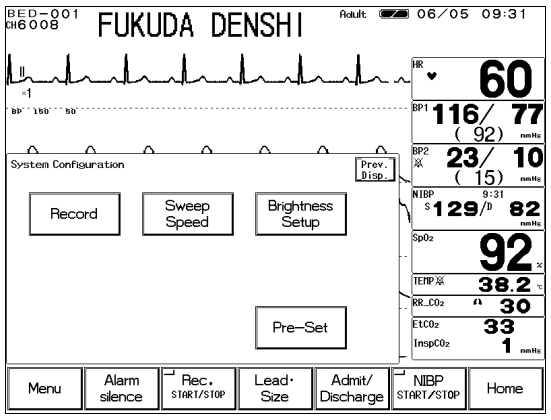
⚠CAUTION	While the “LEAD OFF” message is displayed, HR alarm and arrhythmia alarm will not function. Leaving this condition unresolved may result in missing a sudden change of the patient. Promptly check the electrodes when this message is displayed.

The touch keys on the screen are the only operational keys for the DS-7100 system. The touch keys consist of fixed keys (menu, Home / Enlarge, NIBP Start/Stop) and 4 user keys which can be programmed according to the monitoring purpose.

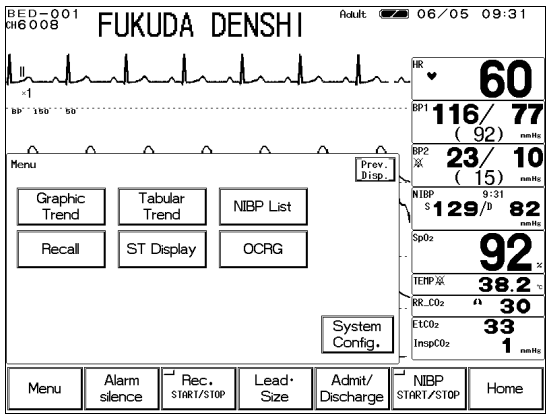


＜Home Display＞

The unnecessary keys on the display can be erased.



＜System Configuration＞

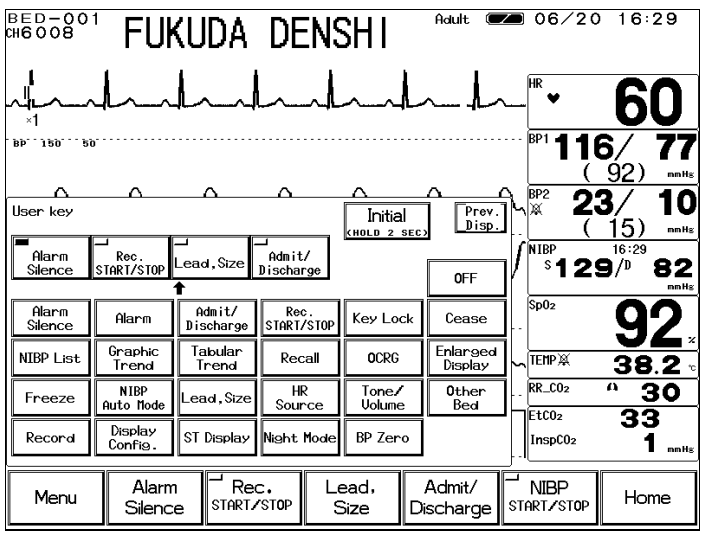


＜Menu Display＞

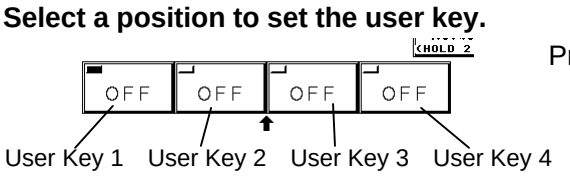
To Set the User Keys

Program the key function to each user key.

1. **Press the [Menu] → [System Config.] → [Pre-Set] → [Ward Setup] → [User Key] keys.**
   The user key setup menu will be displayed.

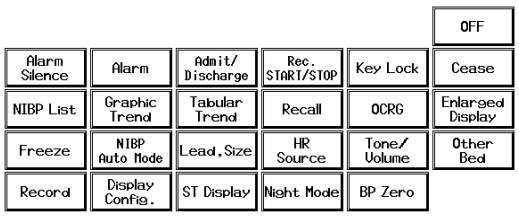


2. **Select a position to set the user key.**



Press the key for the position to set the user key.

3. **Select a parameter for the user key.**



Press the key for the parameter to be set as user key.

User Key	*Function*
Alarm Silence	Silences the alarm for fixed amount of time.
Alarm	Displays alarm setup menu.
Admit / Discharge	Displays admit/discharge menu.
Rec. START/STOP	Starts/stops manual recording.
Key Lock	Turns ON/OFF the touch key operation. This function can be used to make the touch key inoperative when cleaning the screen.
Cease	Displays the confirmation display whether to suspend monitoring or not.
NIBP List	Displays NIBP list.
Graphic Trend	Displays graphic trend.
Tabular Trend	Displays tabular trend.
Recall	Displays recall.
OCRG	Displays OCRG.
Enlarged Display	Enlarges the numeric data display.

Freeze	Temporarily stops the waveform trace. By pressing the [Rec. START/STOP] key during freeze mode, the waveform in freeze mode can be recorded.
NIBP Auto Mode	Displays the NIBP measurement interval setup menu.
Lead • Size	Displays the keys to adjust the size, scale, baseline position of the displayed waveform.
HR Source	Sequentially selects the HR source in the order of ECG → SpO_2 → BP1 → Auto → ECG.
Tone/Volume	Displays the tone/volume setup menu.
Other Bed	Displays the other bed display menu.
Record	Displays the recording setup menu.
Display Config.	Displays the display configuration menu.
ST Display	Displays the ST measurement menu.
Night Mode	Turns ON / OFF the night mode.
BP Zero	Performs zero balance of BP1, BP2.
OFF	User key will not be set.

4. Repeat the procedure 2, 3 and set the remaining user keys.

5. Initialize the user key setup.

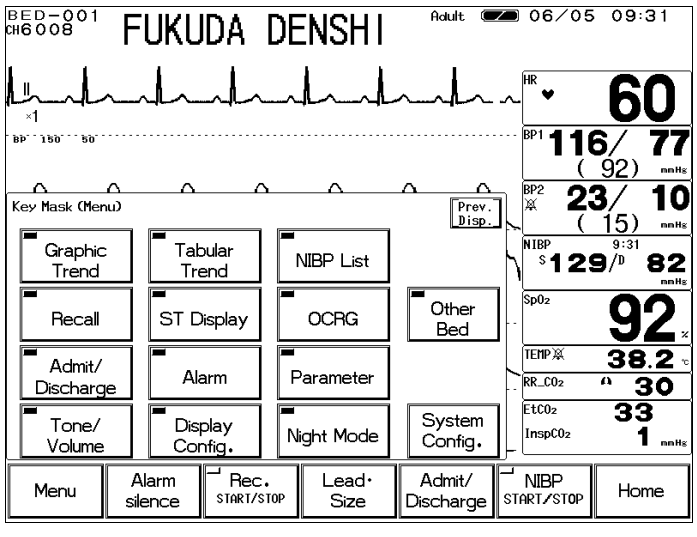
Pressing the [Initial] key for more than 2 seconds will initialize the user key setup to factory setting. The factory setting is as follows.

User Key 1: Alarm Silence
User Key 2: Rec. START/STOP
User Key 3: Lead • Size
User Key 4: Admit / Discharge

To Set the Menu Keys

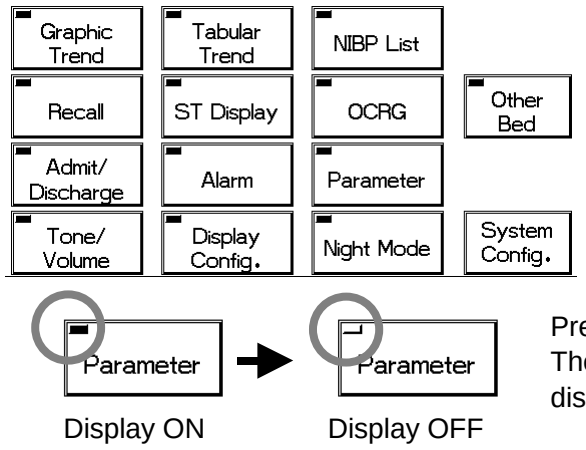
The key display can be erased from the menu display, configuration menu display and preset menu display.

1. **Press the [Menu] → [System Config.] → [Pre-Set] → [Ward Setup] → [Key Mask] keys.**
   Display the key mask setup menu.



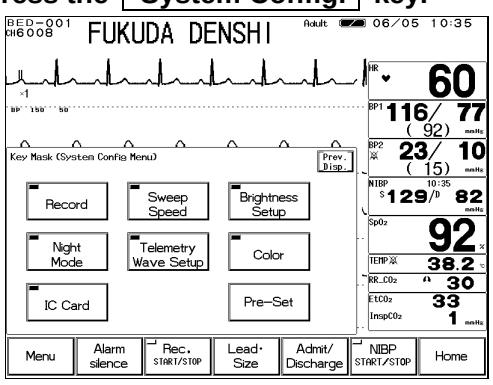
＜Key Mask Display＞

2. **Select the key to erase.**



Pressing the key will extinguish the LED.
The key with the LED extinguished will not be displayed on the menu display.

3. **Press the [System Config.] key.**



Press the key to erase from the display.
Pressing the [Pre-Set] key will also allow erasing the key from the preset menu display.

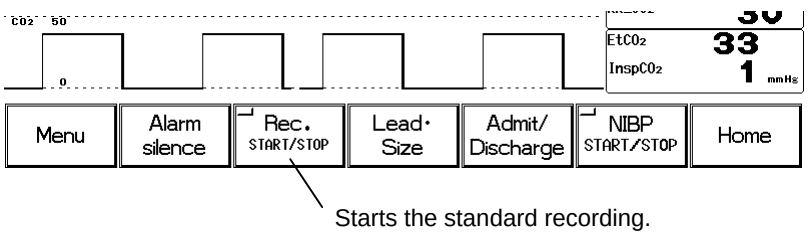
On the DS-7100 system, the waveform recording by manual recording, periodic recording, alarm recording, or freeze recording, and graphic recording of graphic trend, tabular trend can be performed.
This section describes the procedure for the following recording.

- Manual Recording
- Periodic Recording
- Alarm Recording
- Freeze Recording
- Graphic Recording (Graphic Trend, Tabular Trend, Recall, NIBP List)

Manual Recording

●To Start / Stop the Recording

For manual recording (standard recording), pressing the Rec. START/STOP key will start / stop the recording. Pressing this key during periodic recording, alarm recording, or graphic recording will cease the recording in process.



Not recording

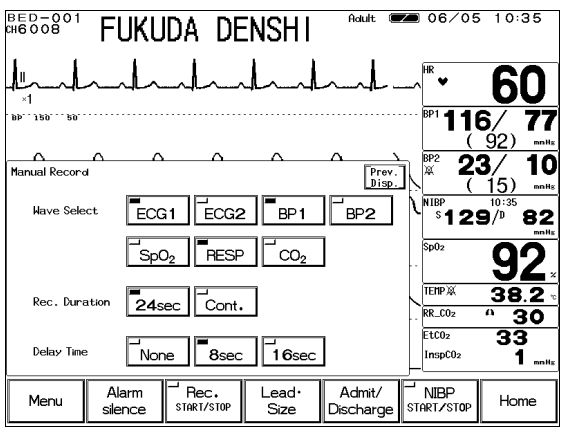
Recording in process

●To Set the Manual Recording

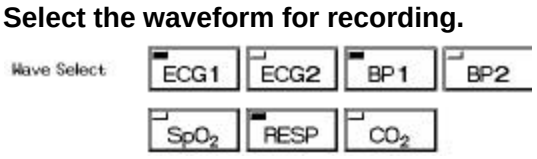
The manual recording can be started from the time the key is pressed, or 8 sec. / 16 sec. prior to the time the key is pressed.
The recording can be set to automatically stop after 24 seconds or continue to record until the Rec. START/STOP key is pressed again.

1. Press the Menu → System Config. → Record → Manual Record keys.

The manual recording setup menu will be displayed.

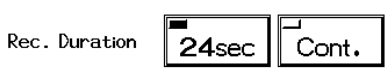


2. **Select the waveform for recording.**



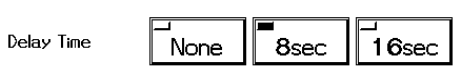
Up to 3 waveforms can be selected.
The waveforms will be automatically located at recording.

3. **Select the duration for recording.**



Select the recording duration from [24sec] or [Cont.].
[24sec] will automatically stop the recording after 24 seconds.

4. **Select the delay time for recording.**

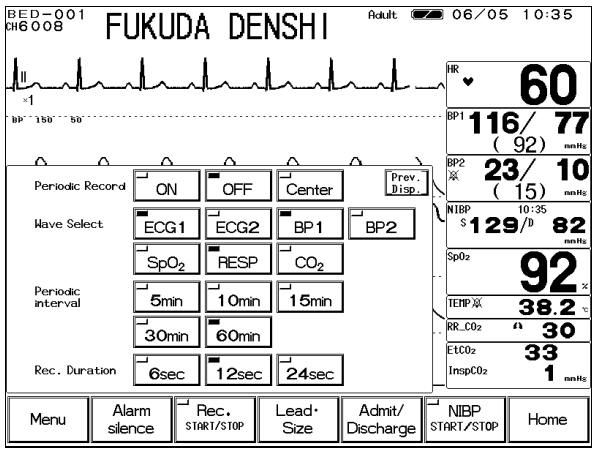


[None] will start the recording from the time the [Rec. START/STOP] key is pressed.
[8sec], [16sec] will start the recording 8 sec. / 16 sec. prior to the time the key is pressed.

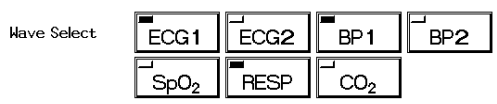
Periodic Recording

The recording will be automatically performed with the selected interval. Periodic recording can be performed on the central monitor connected on the wired network system.

1. **Press the [Menu] → [System Config.] → [Record] → [Periodic Record] keys.**
The periodic recording setup menu will be displayed.



2. **Select the waveform for recording.**



Up to 3 waveforms can be selected.
The waveforms will be automatically located at recording.

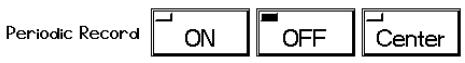
3. **Select the periodic interval.**

Select the periodic interval to automatically start the recording.
If [5min] is selected, the recording will be started at time such as 10:00, 10:05, • • 10:25.
If [60min] is selected, the recording will be started at time such as 10:00, 11:00, 12:00.

4. **Select the recording duration.**

Select the recording duration from [6 sec], [12 sec], [24 sec].
The recording will automatically stop after the selected time.

5. Start the periodic recording.



ON will activate the periodic recording with the selected interval. If periodic recording is not necessary, select OFF.

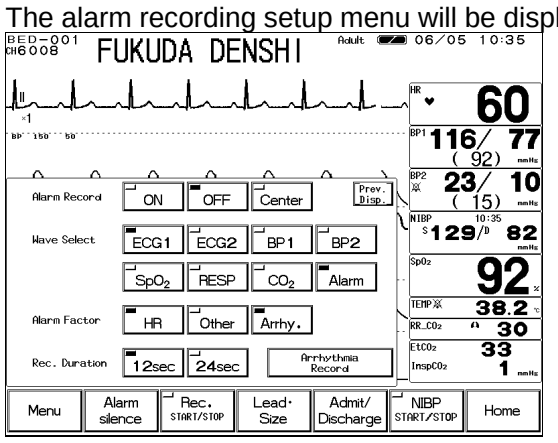
Alarm Recording

The recording will automatically start at occurrence of numeric alarm or arrhythmia alarm.

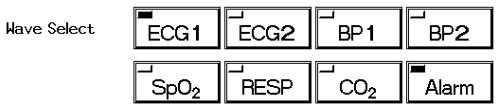
⚠CAUTION	If the alarm with the higher priority occurs during alarm recording, the recording in process will be ceased and starts the alarm recording with the higher priority.

1. Press the Menu → System Config. → Record → Alarm Record keys.

The alarm recording setup menu will be displayed.



2. Select the waveform for recording.

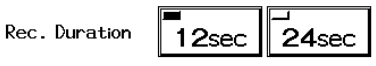


Up to 3 waveforms can be selected. The waveforms will be automatically located at recording.
Alarm will record the waveform which generated the alarm.

3. Select the recording factor.

Select the recording factor for alarm recording.
HR will start the alarm recording when the HR or PR alarm is generated.
Other will start the alarm recording when the numeric alarm other than HR and PR alarm is generated.
Arrhy. will start the alarm recording when the arrhythmia alarm is generated.

4. Select the recording duration.



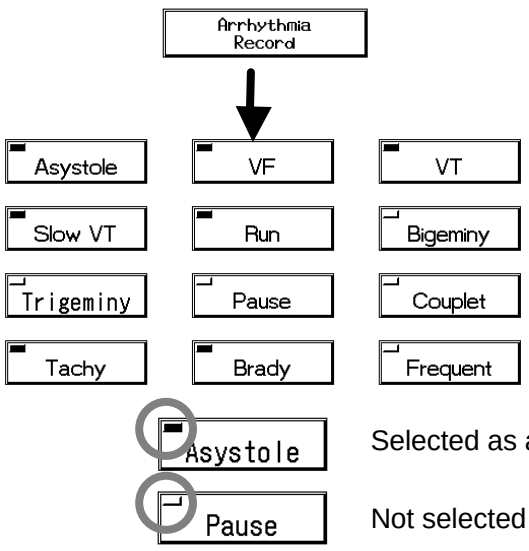
Select the recording duration from 12sec, 24sec. The recording will automatically stop after the selected time.

NOTE	The delay time differs depending on the recording time.

Recording Time	Delay Time			
	Adult	Child	Neonate	
			Numeric Alarm	Arrhythmia Alarm
12 sec.	12 sec.	12 sec.	8 sec.	12 sec.
24 sec.	16 sec.	16 sec.	16 sec.	16 sec.

5. Select the arrhythmia type.

If arrhythmia is selected for the recording factor, select the arrhythmia type.



Pressing the [Arrhythmia Record] key will display the arrhythmia selection window for alarm recording.

<Arrhythmia Recording Setup Menu>

Selected as alarm recording factor.

Not selected as alarm recording factor.

6. Start the alarm recording.

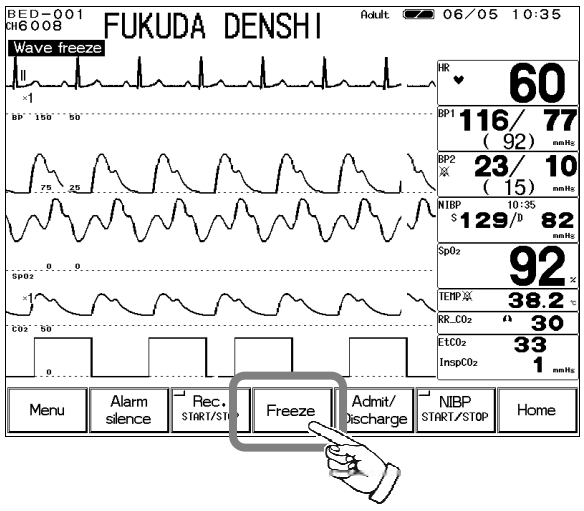
[ON] will automatically start the recording at alarm occurrence.
If alarm recording is not required, select [OFF].
[Center] will start the alarm recording on the central monitor with the smallest monitor ID.

NOTE	The numeric data to be recorded will be the data at alarm occurrence time.

Freeze Recording

The waveform display can be frozen and recorded from 6 seconds prior to the frozen point.
The waveform to be recorded is the one selected for manual recording. The recording duration is fixed as 6 seconds.
To freeze the waveform display, the [Freeze] key needs to be assigned as user key.

1. **Freeze the waveform display.**
   Press the [Freeze] key on the user key.



2. **Start freeze recording.**
   Press the [Rec. START/STOP] key to record the displayed waveform.

Graphic Recording (Graphic/Tabular Trend, etc.)

Graphic trend recording, tabular trend recording, NIBP list recording, and recall recording can be performed.

Reference

Refer to “7. Function Graphic Trend, Tabular Trend, Recall Data, NIBP List” for recording procedure.

Graphic Trend

One parameter from the following can be selected for graphic recording.

Parameter	***Description***
HR	HR, PR (SpO_2, BP)
ST	ST1, ST2
VPC	VPC beats
BP	BP (SYS / Mean / DIA)
NIBP	NIBP (SYS / Mean / DIA)
SpO_2	SpO_2 value
PR	SpO_2 pulse rate
TEMP	Temperature
RR	Respiration Rate (Impedance, CO_2)
APNEA	Apnea Time (Impedance, CO_2)
CO_2	$EtCO_2$ / $InspCO_2$
EVENT1	ASYSTOLE, VF, VT, SLOW_VT, RUN, BIGEMINY
EVENT2	TRIGEMINY, PAUSE, COUPLET, TACHY, BRADY, FREQUENT

Tabular Trend

12 parameters from the following can be displayed / recorded as tabular trend.

Parameter	***Description***
HR	HR, PR (SpO_2, BP)
PR_SpO_2	PR (SpO_2)
VPC	VPC beat
ST1	ST level of ECG1
ST2	ST level of ECG2
RR	RR (Impedance, CO_2)
APNEA	Apnea Time (Impedance, CO_2)
SpO_2	SpO_2 value
BP1	BP(SYS / Mean / DIA)
BP2	BP(SYS / Mean / DIA)
NIBP	NIBP(SYS / Mean / DIA)
TEMP	Temperature
$EtCO_2$	$EtCO_2$ value
$InspCO_2$	$InspCO_2$ value

NIBP List

The numeric data for the following parameters can be recorded.

Parameter	***Description***
HR	HR, PR (SpO_2, BP)
PR	PR (SpO_2)
SpO_2	SpO_2 value
NIBP	NIBP (SYS / Mean / DIA)

Recall

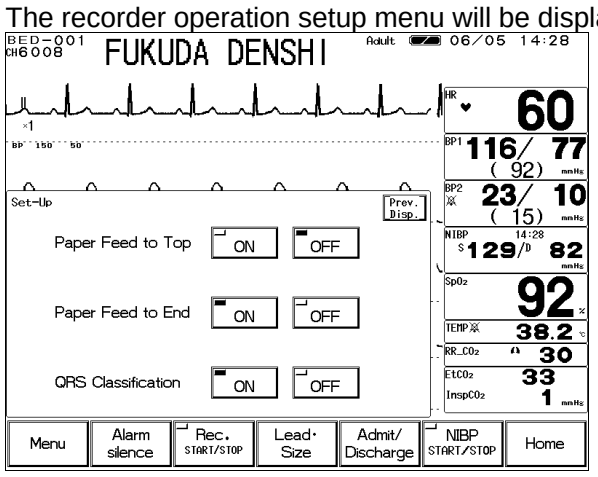
The waveform and numeric data at alarm occurrence will be recorded with the following setup.

Parameter	***Description***
Waveform (Max. 2)	ECG1, ECG2, BP, SpO_2, CO_2, RESP
Numeric Data	HR, ST, RR, TEMP, NIBP, BP, ST1, ST2, SpO_2, PR_SpO_2, APNEA, CO_2
Recording Duration	12 sec.

Recorder Operation (QRS Symbol, etc.)

This menu allows the setup of paper feed operation and ON/OFF of QRS classification symbol recording

1. **Press the [Menu] → [System Config.] → [Record] → [Setup] keys.**
   The recorder operation setup menu will be displayed.



2. **Select ON/OFF of paper feed to top.**

   Paper Feed to Top [ON] [OFF]

   [ON] will feed the paper to start recording from the next perforation.
   [OFF] will not feed the paper and starts recording from the position where the previous recording ended.

3. **Select ON/OFF of paper feed to end.**

   Paper Feed to End [ON] [OFF]

   [ON] will feed the paper after recording to next perforation so that the paper can be easily cut off.
   [OFF] will not feed the paper after recording.

4. **Select ON/OFF of QRS classification symbol recording.**

   QRS Classification [ON] [OFF]

   [ON] will record the QRS classification symbol on to the ECG waveform.

Symbol	*Description*
N (Normal)	Normal QRS beat
V (VPC)	Ventricular Extrasystole
S (SVPC)	Supraventricular Extrasystole
P (Pacing Beat)	Pacing beat
F (Fusion Beat)	Fusion beat of pacing and spontaneous beat.
? (Undetermined beat)	Learning arrhythmia, or beat not matching the pattern

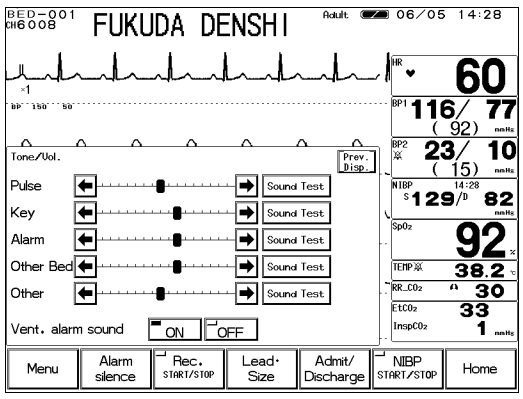
NOTE	✍ The QRS classification symbol can not be recorded for the manual recording without delay time, and for the periodic recording. To record the QRS classification symbol, set the delay time to 8 seconds or 16 seconds for manual recording. ✍ For the freeze recording, the QRS classification symbol may not be recorded if the recording is started immediately after the waveform display is frozen. In such case, start the recording after about 10 seconds from the time the waveform is frozen.

— Volume Setup — Pulse Tone, Alarm Sound, etc.

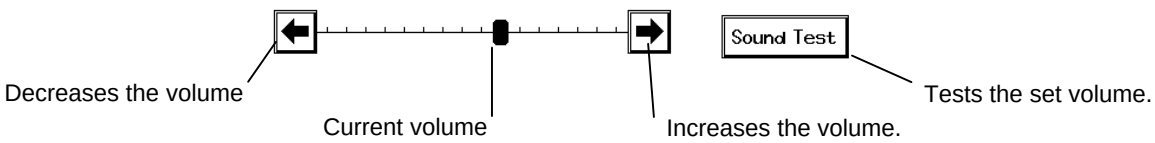
This menu allows volume setup of the pulse tone, alarm sound, key sound and other bed alarm sound.

1. Press the [Menu] → [Tone / Volume] keys.

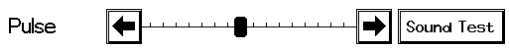
The volume setup menu will be displayed.



<Volume Setup Menu>



2. Set the volume for the pulse tone.



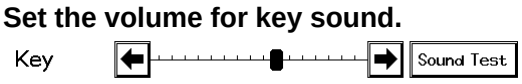
The volume of the HR synchronized tone, SpO_2 synchronous tone, BP synchronized tone can be adjusted.

3. Set the volume for alarm sound.

The volume of the numeric alarm, arrhythmia alarm, equipment status alarm can be adjusted.

⚠CAUTION	A faint sound will be generated when setting a minimum volume for the alarm sound, but be cautious not to miss any alarm. Adjust the volume to a recognizable level.

4. Set the volume for key sound.



The volume of the key sound can be adjusted.

5. Set the volume for other bed alarm sound.

The other bed alarm sound can be adjusted.

6. Set the volume for other sound.

The volume of the sound which notifies the completion of BP zero balance, NIBP measurement, etc. can be adjusted.

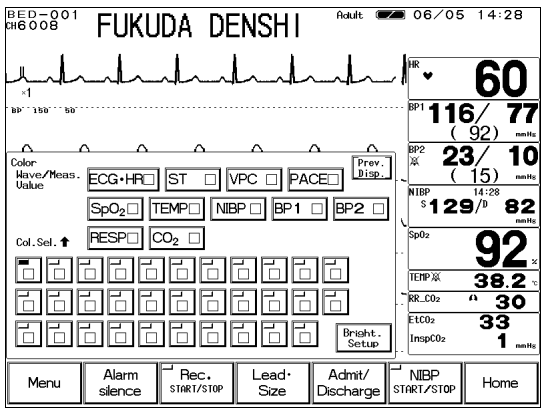
— Color / Brightness Setup —

This menu allows the setup of the colors of numeric data / waveform and brightness of the display.

Color Setup (Numeric Data, Waveform)

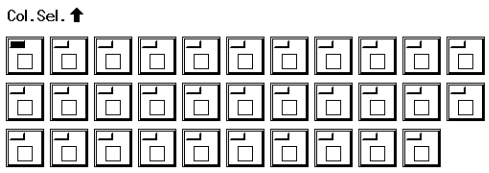
The displayed colors can be set for each parameter.
Assign the color from the 32-color palette to each parameter.

1. Press the [Menu] → [System Config.] → [Color] keys.



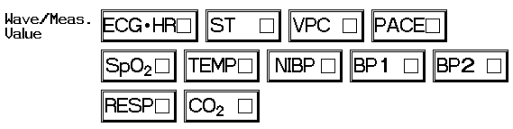
＜Color Setup Menu＞

2. Select the color from the 32-color palette.



Press the key of the desired color.

3. Assign the selected color to the parameter.

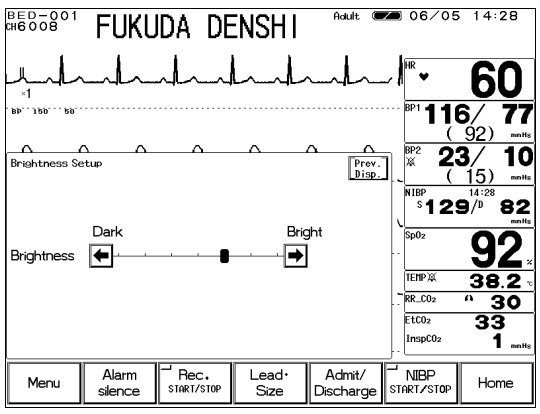


Press the parameter key to assign the selected color. The selected color for the parameter will be applied to the waveform, numeric data, graphic trend, and tabular trend.

Brightness Setup

The brightness of the display can be adjusted.

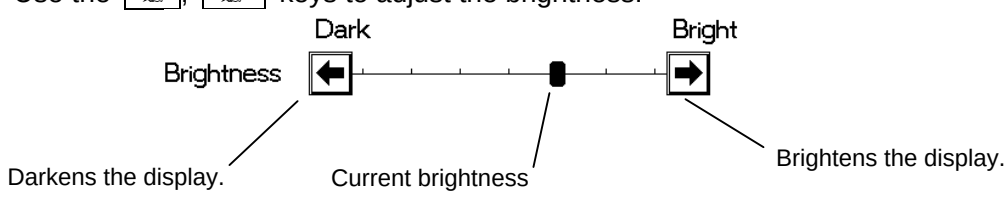
1. Press the [Menu] → [System Config.] → [Brightness Setup] keys.



＜Brightness Setup Menu＞

2. Adjust the brightness.

Use the [✍], [✍] keys to adjust the brightness.



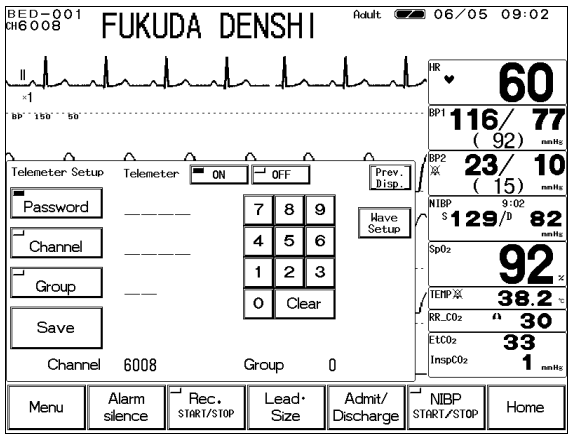
NOTE	The display panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.

― Telemetry Setup ― (DS-7141, DS-7101LT)

This section explains the setup of telemetry transmitting channel.

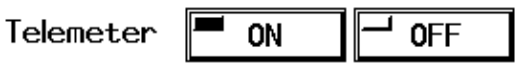
The DS-7141 and DS-7101LT incorporates a telemetry transmitter.
Once the transmitting channel ID and group ID are programmed, these will remain stored even after the main power is turned OFF.
The telemetry function is not supported for the DS-7101L.

1. Press the [Menu] → [System Config.] → [Pre-Set] → [Hospital Setup] → [Telemeter Setup] keys.



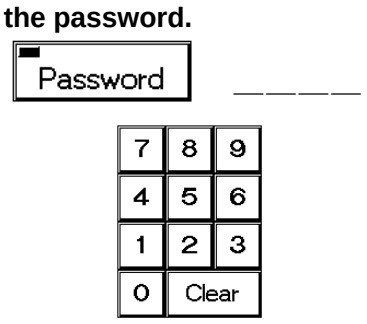
＜Telemetry Setup Menu＞

2. Select ON/OFF of telemetry.



[OFF] will not perform telemetry transmission. The channel ID on the home display will be displayed as "ch OFF"
To perform telemetry transmission, select [ON].

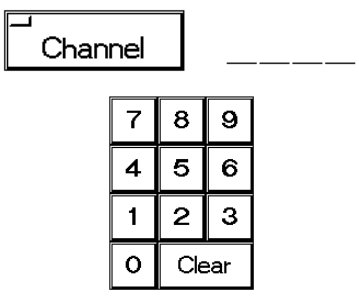
3. Enter the password.



Press the [Password] key, and enter the password.

Use the numeric keypad to enter the password
The entered number will be displayed as "＊＊＊＊".

4. Enter the channel ID.

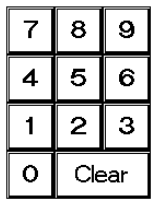


Press the [Channel] key, and enter the channel ID.

Use the numeric keypad to enter the 4-digit medical telemetry channel ID.

5. Enter the group ID.

Press the Group key, and enter the group ID.



Use the numeric keypad to enter the group ID in the range from 00 ~ 63.

6. Save the telemetry channel ID and group ID.

Press the Save key to store the channel ID and group ID. Verify that the "Complete" message is displayed.

If an error is found on the password, channel ID, or group ID, the following message will be displayed.

"Invalid password"	:	The entered password is incorrect. Enter the password again and press the Save key.
"Invalid data"	:	The entered channel ID or group ID is outside the programmable range. Enter the ID within the range and press the Save key.
"Telemetry unit error"	:	Abnormality is found on the telemetry transmitter. Contact our service representative.
"Install Program Card"	:	Install the program card to PC card slot.

7. Verify the stored telemetry channel ID and group ID.

Channel 3400 Group 0

NOTE

When the monitor indicates that the measurement data is out of range ("×××" display), the minimum or maximum value of the range will be displayed at the telemetry center.

	【Out of range】	【Telemetry Center】
HR	301bpm or above	300bpm
RR	151bpm or above	150bpm
BP	-51mmHg or below	-50mmHg
	301mmhg or above	300mmHg
TEMP	-0.1?C or below	0?C
	50.1?C or above	46.1?C

*For temperature, the measurement range is up to 50.1?C. But at the telemetry center, 46.1?C will be the maximum value displayed.

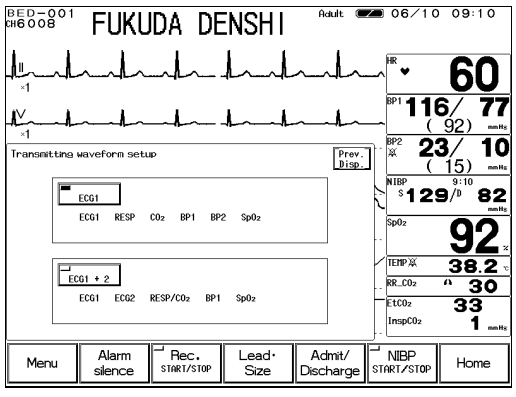
⚠CAUTION

It is necessary to insert the program card to the PC card slot to set the channel ID and program ID.

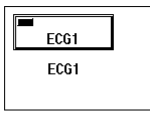
Transmitting Waveform Setup

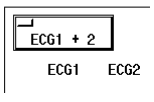
This function allows to select the transmitting waveform.

1. Press the [Menu] → [System Config.] → [Telemetry Wave Setup] keys.



2. Select the waveform to transmit.





Select the waveform to transmit from [ECG1], [ECG1+2].
Selecting [ECG1] will transmit ECG1, CO_2, RESP, BP1, BP2, SpO_2. RESP waveform will be transmitted when “Impedance” is selected for RR source.
Selecting [ECG1+2] will transmit ECG1, ECG2, CO_2/RESP, BP1, SpO_2.
CO_2 and RESP waveform to be transmitted will be in accordance with RR source setup.

NOTE	The waveform not displayed on the home display will not be transmitted even if selected as the transmitting waveform.

⚠CAUTION	✍ If the temperature measurement unit is ?F, or BP measurement unit is kPa, the corresponded waveform and numeric data will not be transmitted. For telemetry transmission, use ?C for temperature unit and mmHg for BP unit. ✍ For telemetry transmission, BP waveform with a scale above the programmed scale can not be properly transmitted. Set the BP waveform below the programmed scale.

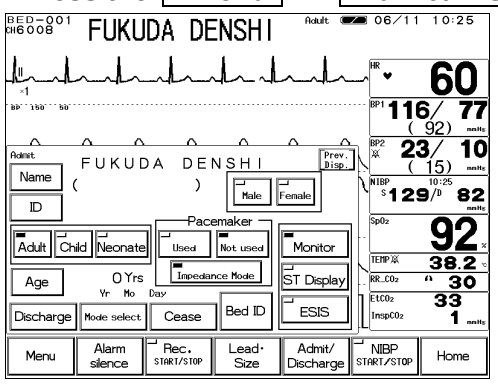
— Wired Network Connection — (LAN Communication)

This section describes the procedure to set the Room / Bed ID.
The DS-7100 system incorporates Ethernet LAN unit.
The set Room / Bed ID will be remain stored even when the power is turned off.

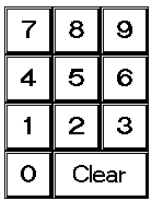
Room / Bed ID Setup

To connect to a wired network, it is necessary to set the Room / Bed ID.

1. Press the [Menu] → [Admit / Discharge] → [Bed ID] keys.

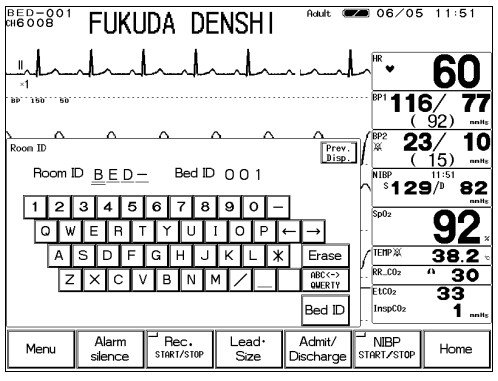


2. Enter the password.



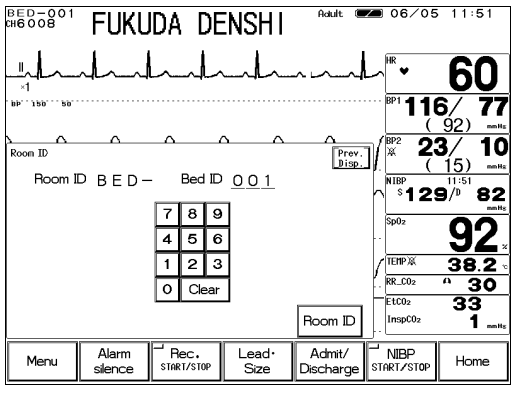
Use the numeric keypad to enter the password
The entered number will be displayed as "＊＊＊＊".

3. Set the Room ID.



Enter the Room ID using the alphanumeric keypad.
The entered ID will be displayed on the upper left of the screen.
Next, press the [Bed ID] key to display the Bed ID menu.

4. Set the Bed ID.



Enter the Bed ID using the numeric keypad.
The entered ID will be displayed on the upper left of the screen.
To connect to the wired network, set the ID in the range from 001 to 048.

⚠CAUTION	✍ The bed ID is factory set to “000”. If connected to the wired network with the bed ID unchanged, monitoring on the central monitor will not be possible. ✍ When connecting to a wired network, make sure that there are no other bedside monitors with the same ID. If there are more than one bedside monitor with the same bed ID, the duplicated bedside monitors can not be monitored on the central monitor. ✍ When connecting to a wired network, set the bed ID in the range from “001” to “048”. ✍ A delay will occur for the communication with the central monitor. The delay is about 1.5 seconds for the waveform, about 1.5~4.0 seconds for the numeric data, and about 1.5~2.0 seconds for the alarm. ✍ There are following restrictions when connecting the DS-7100 system to the DS-LANⅡnetwork. ✍ The DS-7100 system is not corresponded to the AU-5500N 8-channel recorder. The data for the DS-7100 system can not be recorded on the AU-5500N. ✍ When the measurement unit of BP is kPa, BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. These will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor can not be performed. ✍ When the temperature unit is ?F, the temperature data will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor can not be performed. ✍ Arrhythmia alarm of TACHY, BRADY, SLOW_VT, COUPLET, PAUSE will not be transmitted. ✍ For numeric data displayed as “×××”, maximum or minimum value of measurable range will be transmitted. ✍ The numeric data displayed as “———” will be treated as not measured data. ✍ For QRS classification, the “S” printed on the built-in recorder will be printed as “N” on the HR-500 Recorder. ✍ When DS-5800N/NX/NX^{MB} is used as a central monitor, recall, graphic trend, tabular trend, and ST measurement function will not be displayed. ✍ When DS-5700 is used as a central monitor, ST measurement function will not be displayed

— Alarm Pole Setup — Notifying the Alarm by Light

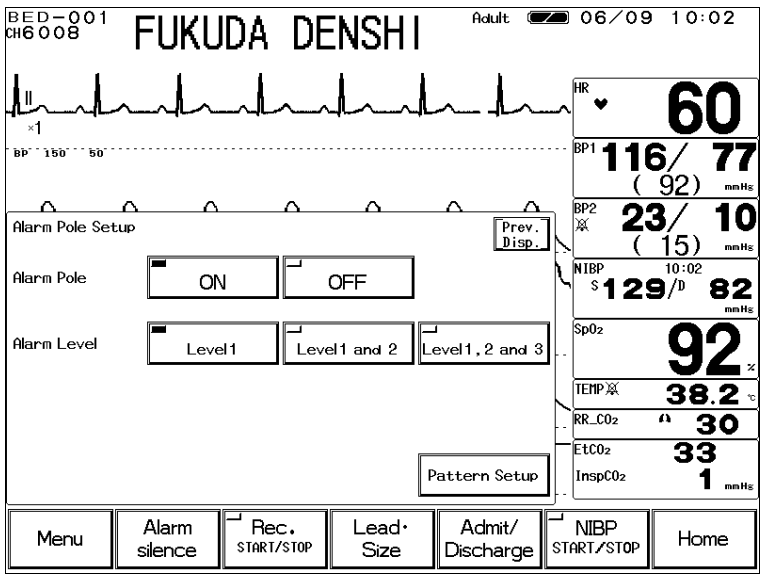
This section describes the use of alarm pole function.

This equipment incorporates an alarm pole.
The alarm generation can be indicated by alarm pole flash so that it can be notified from distance.

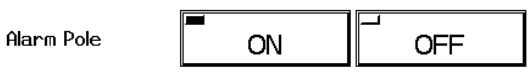
Alarm Level Setup

On the alarm pole setup function, alarm pole function and alarm level can be linked.

1. **Press the [Menu] → [System Config.] → [Pre-Set] → [Ward Setup] → [Alarm Pole] keys.**
   The alarm pole setup menu will be displayed.

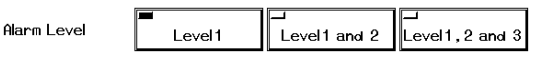


2. **Select ON/OFF of alarm pole function.**



To activate the alarm pole function, select [ON].
If alarm pole function is not necessary, select [OFF].

3. **Select the alarm level.**



Select the alarm level to flash the alarm pole.
Select from [Level 1], [Level 1 and 2], or [Level 1, 2, and 3].

Alarm Level 1 (Life Threatening Alarm)

Parameter	***Message***
HR	“Lower HR alarm”
	“Upper HR alarm”
PR (SpO_2, BP)	“Lower PR alarm”
	“Upper PR alarm”
BP1	“Lower BP1 alarm”
	“Upper BP1 alarm”
SpO_2	“Lower SpO_2 alarm”
	“Upper SpO_2 alarm”
Respiration (Impedance, CO_2)	“Apnea alarm”
	“Lower RR alarm”
	“Upper RR alarm”
NIBP	“Lower NIBP alarm”
	“Upper NIBP alarm”
CO_2	“Upper $EtCO_2$ alarm”
	“Lower $EtCO_2$ alarm”
Arrhythmia	“ASYSTOLE”
	“VF”
	“VT”
	“SLOW VT”
	“TACHY”
	“BRADY”
	“RUN”

Alarm Level 2 (Cautionary Alarm)

Parameter	***Message***
BP2	“Lower BP2 alarm”
	“Upper BP2 alarm”
ST	“Lower ST alarm”
	“Upper ST alarm”
Temperature	“Upper TEMP alarm”
	“Lower TEMP alarm”
CO_2	“Upper $InspCO_2$ alarm”
Arrhythmia	“PAUSE”
	“COUPLET”
	“BIGEMINY”
	“TRIGEMINY”
	“FREQUENT”
Equipment Status	“Charge battery”
	“Check electrode”
	“Check SpO_2 sensor”
	“SpO_2 sensor fault”
	“Check filter line”
	“CO_2 unit error”
	”ECG not connected”
	”BP not connected”
	”SpO_2 not connected”
	”TEMP not connected”
	”CO_2 not connected”

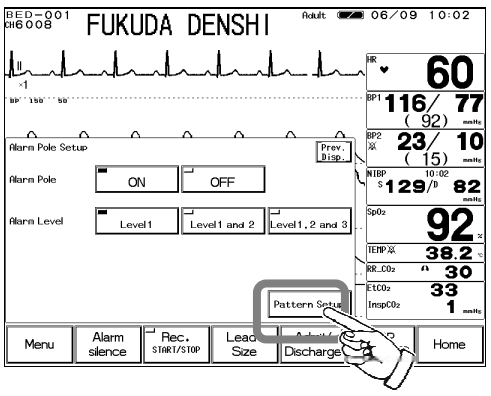
Alarm Level 3 (Treatment Needed Alarm)

Parameter	*Message*
Equipment Status	“Check NIBP hose”
	“CVA detected”
	“No pulse detect”
	“Pacemaker error”

Alarm Pole Flash Pattern Setup

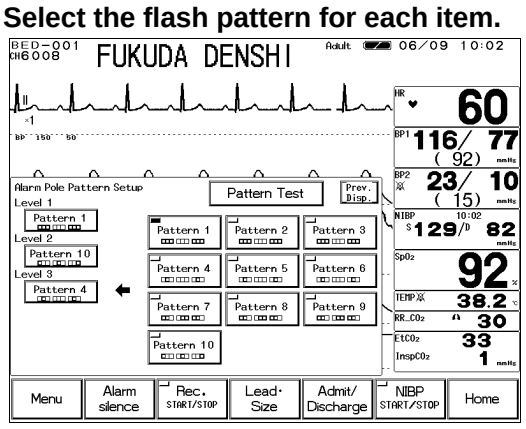
This function sets the alarm pole flash pattern for each alarm.

1. Press the [Pattern Setup] key on the alarm pole setup menu.



The alarm pole flash pattern setup menu will be displayed.

2. Select the flash pattern for each item.



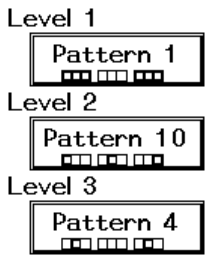
First, select the flash pattern from [Pattern 1] to [Pattern 10].

The alarm pole consists of 3 blocks.
(Left: Red, Center: Red/Orange/Green, Right: Red)
The ways these 3 blocks flash are different for each pattern.

By pressing the [Pattern Test] key, the flashing of the selected pattern can be verified.

Alarm Pole Flash

Pattern	*Flash*
Pattern 1	(Red, Red, Red)→(・・・)→(Red, Red, Red)→(・・・)→(Red, Red, Red)
Pattern 2	(Red, Orange, Red)→(・・・)→(Red, Orange, Red)→(・・・)→(Red, Orange, Red)
Pattern 3	(Red, Green, Red)→(・・・)→(Red, Green, Red)→(・・・)→(Red, Green, Red)
Pattern 4	(・Red・)→(・・・)→(・Red・)→(・・・)→(・Red・)
Pattern 5	(・Orange・)→(・・・)→(・Orange・)→(・・・)→(・Orange・)
Pattern 6	(・Green・)→(・・・)→(・Green・)→(・・・)→(・Green・)
Pattern 7	(Red, Red・)→(・・・)→(・Red, Red) →(・・・)→(Red, Red・)
Pattern 8	(Red, Orange・)→(・・・)→(・Orange, Red)→(・・・)→(Red, Orange・)
Pattern 9	(Red, Green・)→(・・・)→(・Green, Red)→(・・・)→(Red, Green・)
Pattern 10	(Red・・)→(・・・)→(・Red・)→(・・・)→(・・Red)



Next, press the alarm level key to assign the selected flash pattern,

This section explains the setup of alarm suspension and upper / lower alarm limit.
On the alarm setup menu, ON/suspend of system alarm, ON/OFF and upper / lower alarm limit of each parameter can be set.

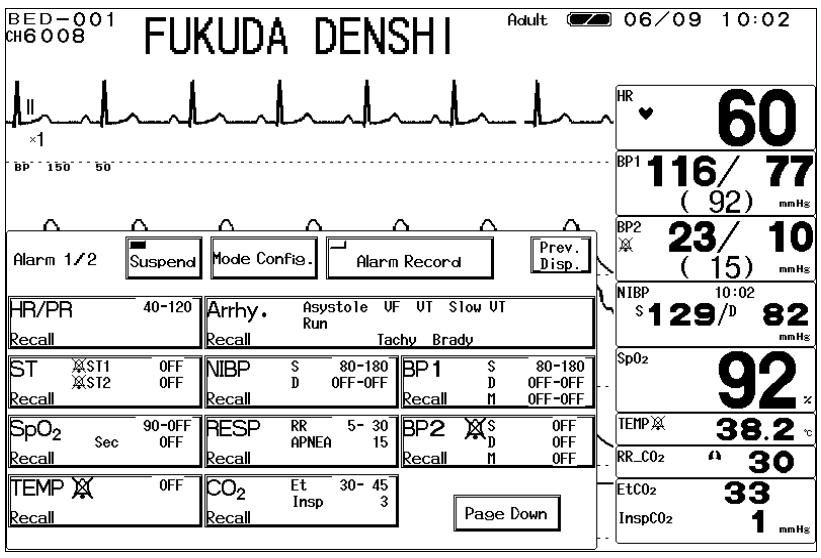
To Set the System Alarm

The system alarm can be set to ON or suspend, but it can not be turned OFF.

⚠WARNING	✍ When the system alarm is suspended, all the alarm will be suspended even if the parameter alarm is set to ON. Also, the alarm event will not be stored as recall. ✍ If the upper/lower alarm limit of the parameter is set to OFF, or arrhythmia alarm is set to OFF, alarm will not function even if the system alarm is set to ON. Pay attention when setting them OFF.

1. Press the [Menu] → [Alarm] keys.

The alarm setup menu will be displayed.



2. Press the [Suspend] key on the alarm setup menu.

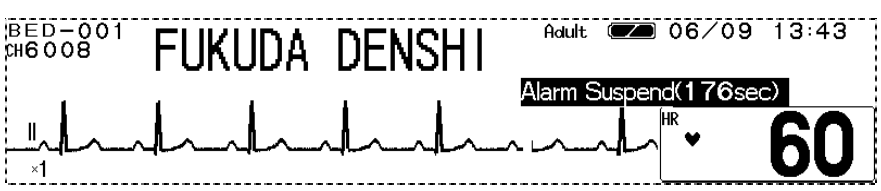
Pressing this key will sequentially switch the function to ON or suspend.

Alarm is suspended when the key LED is lighted.

Alarm is ON when the key LED is extinguished.

3. Check the message.

When the alarm is suspended, “Alarm Suspend (＊＊＊sec)” message will be displayed.
(＊＊＊sec.) indicates the remaining time.



To Turn ON the System Alarm

Turning the system alarm ON will activate the alarm setups for each parameter.

1. **Press the** [**Menu**] → [**Alarm**] **keys.**
2. **Set the alarm** [**ON**]**.**
   Press the [Suspend] key when the key LED is lighted. The key LED will extinguish.

The alarm is ON when the key LED is extinguished.

To Suspend the System Alarm

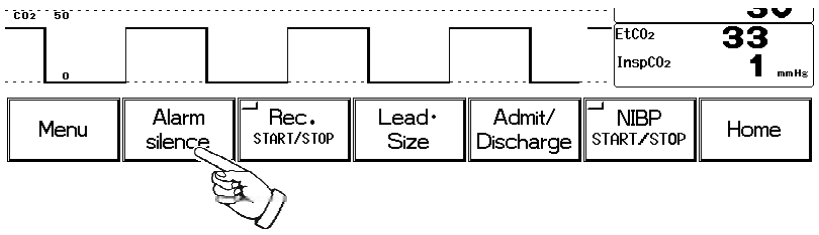
The alarm can be temporarily suspended. During the alarm suspension, "Alarm Suspended＊＊＊sec." message will be displayed. "＊＊＊sec." indicates the remaining suspended time. The alarm will turn ON when the suspended time completes.

1. **Press the** [**Menu**] → [**Alarm**] **keys.**
2. **Suspend the alarm.**
   Press the [Suspend] key when the key LED is extinguished. The key LED will light.

Alarm is suspended when the key LED is lighted.

To Silence the System Alarm

The alarm sound can be silenced for fixed amount of time. This setting will not affect the alarm message. If the alarm cause still remains at completion of silence time, the alarm sound will generate again. Also, if another alarm with the same or higher priority occurs during the alarm silence time, the alarm sound for the new alarm will generate.



●Precautions about Silencing the Alarm

✍Alarm silence function is effective for each parameter. If an alarm condition for the selected parameter is resolved for a moment but is generated again during the alarm silence time, the alarm will remain silenced. The recall and alarm recording will not function at this time.

✍If another alarm with the lower priority occurs during the alarm silence time, alarm sound will not generate. The recall and alarm recording will function.

✍If the [Alarm Silence] key is pressed for the alarm of another parameter which occurred during the alarm silence time, the alarm silence time for the first alarm will not be extended.

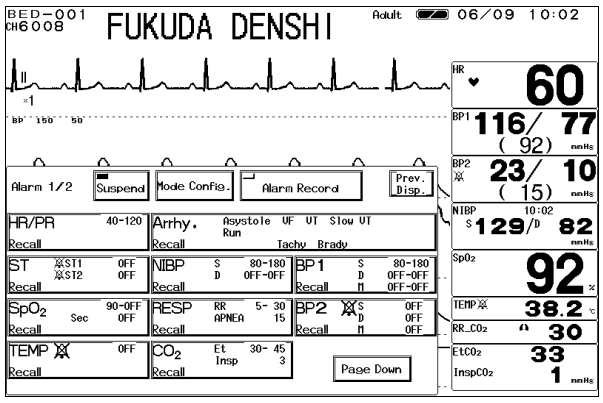
✍The alarm silence condition for all parameters will be ceased in the event of any of the following.
When the main power is turned ON.
When the system alarm status (ON / suspend) is changed.
When monitoring is suspended on the patient admit / discharge menu.
When the alarm mode is changed on the patient admit / discharge menu.
When the patient has discharged.

✍The alarm silence condition for each parameter will be ceased in the event of any of the following.
When the alarm silence time for the parameter is completed.
When automatic alarm is selected for the parameter.
When the alarm is turned OFF for the parameter.

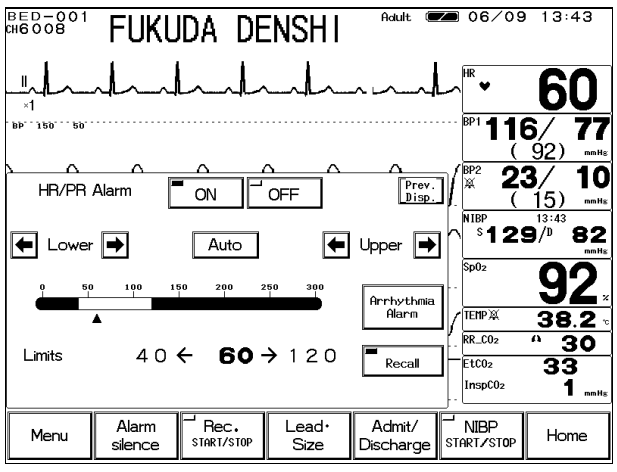
Alarm Setup for Each Parameter

The alarm for each parameter can be turned ON or OFF, and upper and lower alarm limit can be set.

1. **Press the [Menu] → [Alarm] keys.**
   The alarm setup menu will be displayed.



2. **Select the parameter to display the alarm setup menu.**



Display	*Description*
0 50 100 150 200 250 300 ▲	Displays the upper and lower alarm limit and the current measurement (▲). The limits can be adjusted by directly pressing the bar display or using the arrow keys.
Limits 40 ← 60 → 120	Displays lower limit←current value→upper limit.

Key	*Item*	*Description*
[ON] [OFF]	Individual Alarm	Selecting [ON] will generate the alarm. Selecting [OFF] will not generate the alarm.
[←] Lower [→]	Lower Alarm Limit	Sets the lower alarm limit. The lower limit will be turned OFF when a value below the range is selected.
[←] Upper [→]	Upper Alarm Limit	Sets the upper alarm limit. The upper limit will be turned OFF when a value above the range is selected.
[Auto]	Automatic Setup	Automatically sets the limits corresponding to the current value. If the limit is turned OFF, it will be remained OFF. The system alarm and parameter alarm will be in a ON condition.

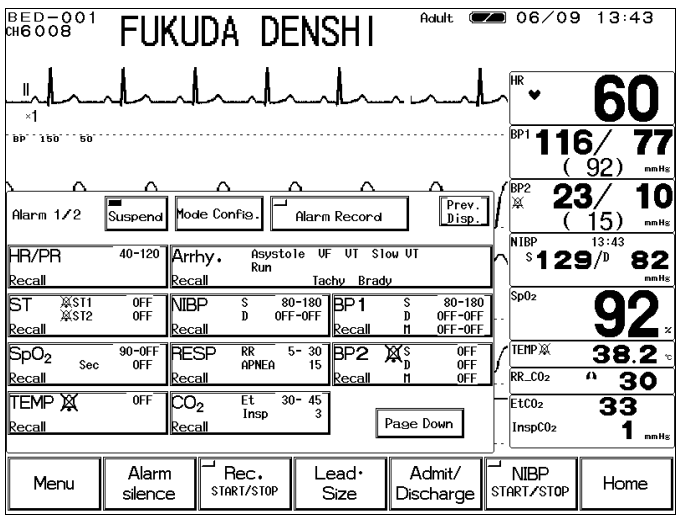
3. Select ON/OFF and set upper and lower alarm limit for the parameter alarm.

Numeric Data Key	*Item*	*Description*
HR/PR 40-120 Recall	HR / PR / BPR	ON, OFF 20－300bpm
ST ST1 OFF ST2 OFF Recall	ST	ON, OFF ST1 ±2.0mV ST2 ±2.0mV
BP1 S 80-180 D OFF-OFF Recall M OFF-OFF	BP1	ON, OFF 0－300mmHg
BP2 S OFF D OFF Recall M OFF	BP2	ON, OFF 0－300mmHg
SpO_2 90-OFF Sec OFF Recall	SpO_2	ON, OFF 50－100%
RESP RR 5- 30 APNEA 15 Recall	RR	ON, OFF 5－150bpm (Adult) 2－150bpm (Child, Neonate)
	APNEA (Upper Limit)	ON, OFF 5－20 sec.
TEMP OFF Recall	TEMP	ON, OFF 30－50
NIBP S 80-180 D OFF-OFF Recall	NIBP	ON, OFF 10－300mmHg
CO_2 Et 30- 45 Insp 3 Recall	$EtCO_2$	ON, OFF 1－100mmHg 0.1－13.3kPa 0.1－13.3%
	$InspCO_2$ (Upper Limit)	ON, OFF 1－4mmHg 0.1－0.4kPa 0.1－0.4%

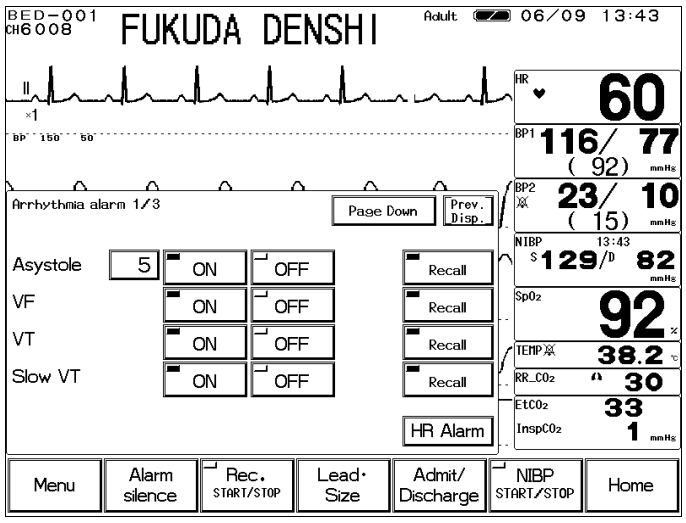
Arrhythmia Alarm Setup

The arrhythmia alarm can be turned ON or OFF, and arrhythmia detection level can be set.

1. **Press the [Menu] → [Alarm] keys.**
   The alarm setup menu will be displayed.

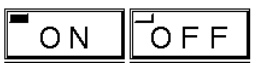


2. **Press the [Arrhy.] key to display the arrhythmia alarm setup menu.**



Page	*Item*
Page 1/3	Asystole, VF, VT, Slow_VT
Page 2/3	Run, Bigeminy, Trigeminy, Pause
Page 3/3	Couplet, Tachy, Brady, Frequent

●To Set ON/OFF of Arrhythmia Alarm



Selecting [ON] will generate the arrhythmia alarm.
Selecting [OFF] will not generate the arrhythmia alarm.
However, Asystole, VF, and VT alarm can not be turned OFF at the initial factory setting. Select [ON/OFF] for "Asystole, VF, VT" on Hospital Setup menu to turn OFF the alarm.

Reference Refer to "8. System Configuration Hospital Setup"

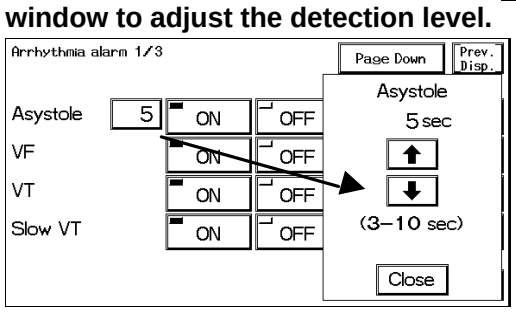
Page	*Item*	*Selection*
Page 1/3	Asystole	ON, (ON, OFF)
	VF	ON, (ON, OFF)
	VT	ON, (ON, OFF)
	Slow_VT	ON, OFF
Page 2/3	Run	ON, OFF
	Bigeminy	ON, OFF
	Trigeminy	ON, OFF
	Pause	ON, OFF
Page 3/3	Couplet	ON, OFF
	Tachy	ON, OFF
	Brady	ON, OFF
	Frequent	ON, OFF

NOTE	The "Arrhythmia alarm OFF" message will be displayed when the ASYSTOLE, VF, VT, SLOW_VT, and HR alarm is OFF.

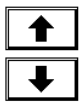
●To Set the Arrhythmia Detection Level

Select the level to detect each arrhythmia.

1. Pressing the detection level key (ex. [5] for Asystole) for each arrhythmia will display the window to adjust the detection level.



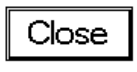
2. Set the detection level.



Use the arrow keys to set the detection threshold.

Item	*Range*
ASYSTOLE	3—10 sec.
RUN	2—8 beats
PAUSE	1.5—5 sec.
FREQUENT	1—50 beats/min.

3. Close the window to adjust the detection level.



Press the [Close] key.

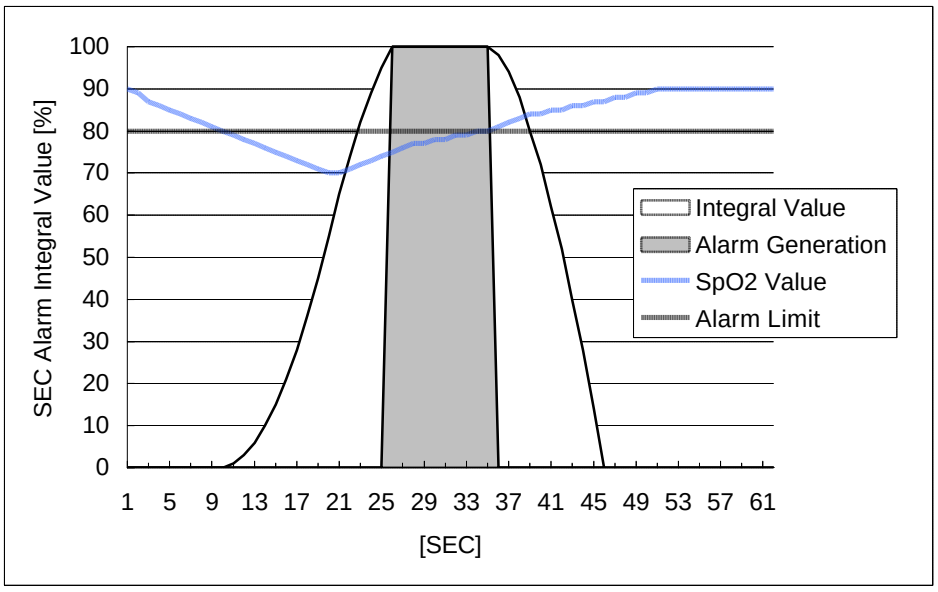
●Alarm Limit for TACHY, BRADY

The arrhythmia detection level for tachycardia (TACHY) and bradycardia (BRADY) alarm links with the upper and lower alarm limit for HR / PR.

The tachycardia (TACHY) alarm generates when the measurement exceeds the HR / PR upper alarm limit. When the upper alarm limit is OFF, alarm will not generate.
The bradycardia (BRADY) alarm generates when the measurement is below the HR / PR lower alarm limit. When the lower alarm limit is OFF, alarm will not generate.

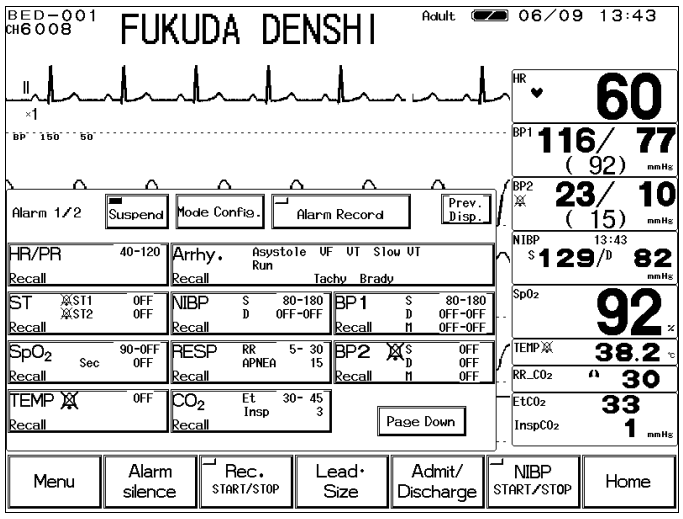
SpO_2 SEC Alarm Setup

When the SpO_2 value is unstable around the lower alarm limit, the frequently generated alarm may be bothersome. The SEC alarm function controls these frequent alarms.
This function generates the alarm only when the integral value (the accumulation of difference between the alarm limit and SpO_2 value at every second) reaches the preprogrammed SEC alarm threshold value.

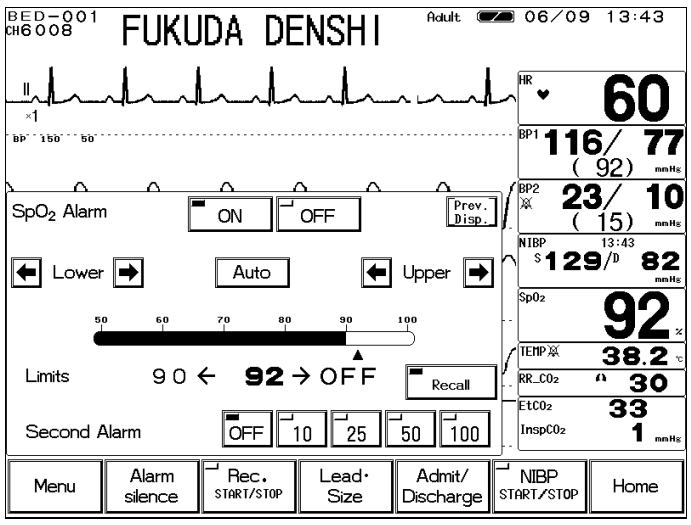


On this graph, the SEC alarm threshold value is set as 100.
The SpO_2 value begins to fall below the alarm limit at approximately 10 seconds. At the same time, the integral value begins to increase.
(Alarm limit) – (SpO_2 value) is accumulated each second.
At around 25 seconds, the integral value reaches 100 and the alarm is generated.
At approximately 36 seconds, the SpO_2 value returns to the level within the alarm limit, and at the same time, the integral value begins to decrease. {(Alarm limit) – (SpO_2 value)} ×2 is subtracted each second.
Also, there is a safety net when setting the SEC alarm function. This safety net is for the case when the SpO_2 value frequently falls below the alarm limit but does not last long enough to reach the SEC alarm threshold.
If the SpO_2 value falls below the limit 3 times or more during the last 60 seconds, an alarm will be generated even if the SEC alarm threshold is not reached.

1. **Press the [Menu] → [Alarm] keys.**
   The alarm setup menu will be displayed.



2. **Press the [SpO₂] key to display the alarm setup menu.**



3. **Select the SEC alarm value according to the alarm frequency.**

If [10] / [25] / [50] / [100] is selected, a circular SEC alarm indicator will be displayed inside the parameter key. As the integral value increases, the indicator will begin to fill, and when it is completely filled, an alarm will be generated.

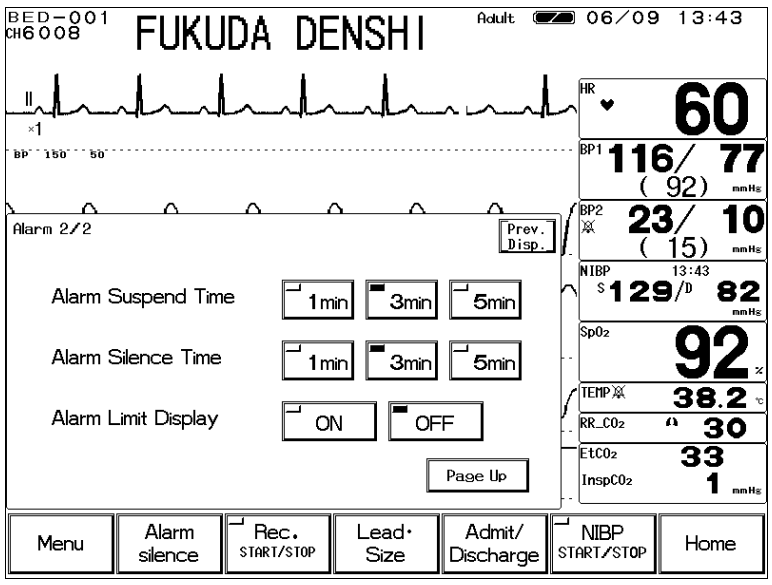
If [OFF] is selected, this SEC alarm indicator will not be displayed.

⚠CAUTION	✍ Whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation. ✍ If the SpO_2 alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0.

Alarm Suspend / Alarm Silence Time

The time for suspending the system alarm and suspending the alarm sound can be selected.

1. **Press the [Menu] → [Alarm] → [Page Down] keys.**
   The second page of the alarm setup menu will be displayed.



2. **Select the time for "Alarm Suspend Time.**

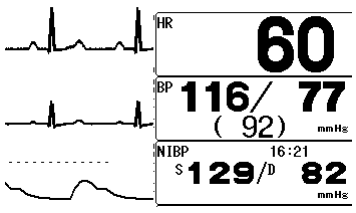
Select the appropriate time for alarm suspend time.

3. **Select the time for "Alarm Silence Time.**

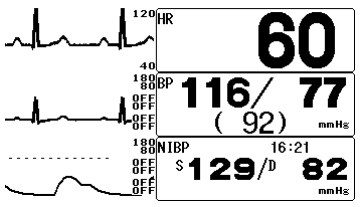
Select the appropriate time for alarm silence time.

ON / OFF of Alarm Limit Display

The alarm limit can be selected to display or not display on the home display according to the preference.

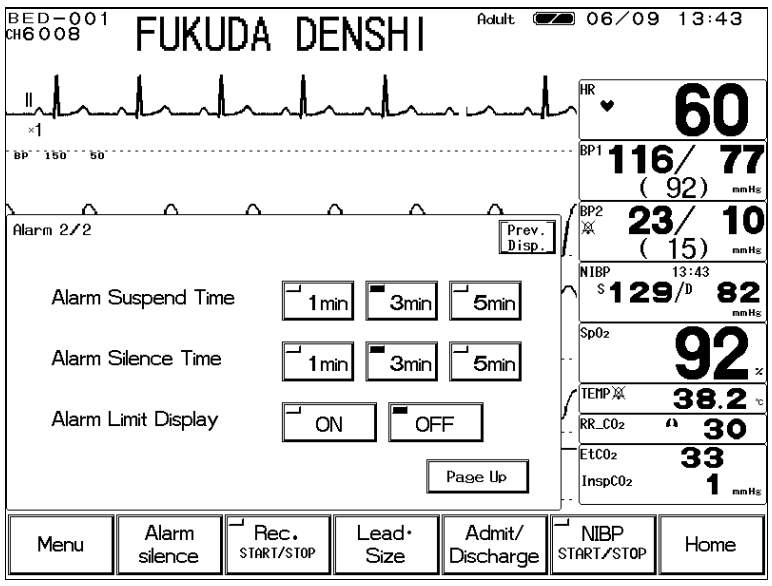


＜Display OFF＞



＜Display ON＞

1. **Press the [Menu] → [Alarm] → [Page Down] keys.**
   The second page of the alarm setup menu will be displayed.



2. **Select ON or OFF for alarm limit display.**

NOTE	✍ To display the alarm limit, short trend display should be set to OFF on the display configuration menu. ✍ The alarm limit for the parameter with the alarm turned OFF will not be displayed regardless of this setup.

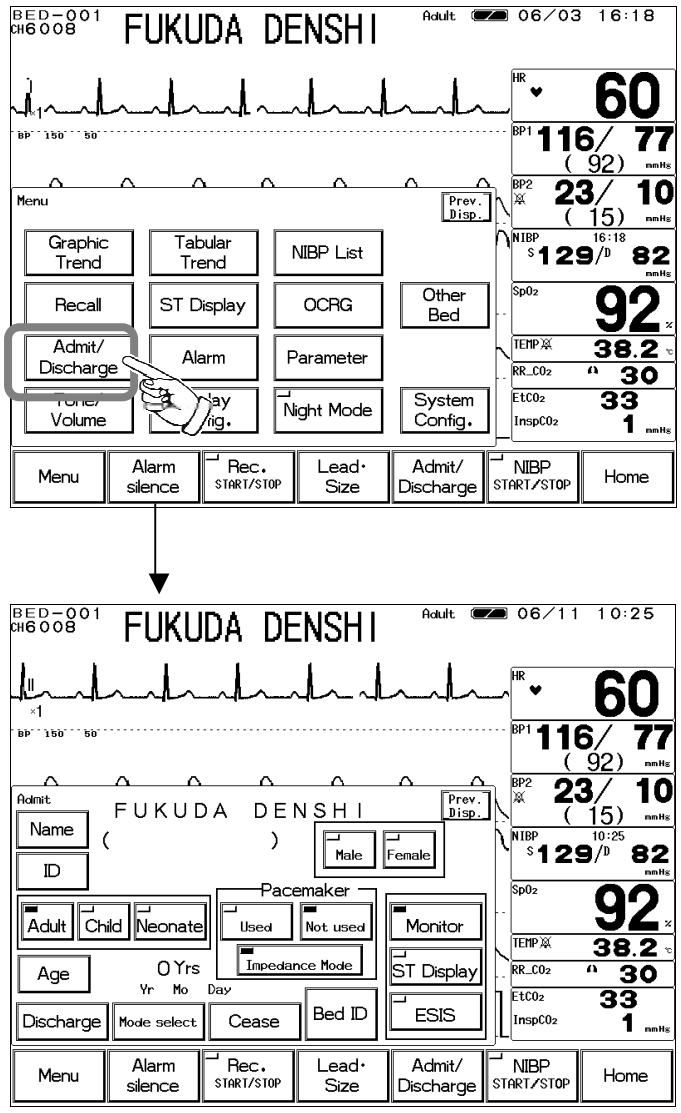
Chapter 5
Admit / Discharge of a Patient

This chapter describes the procedure to admit or discharge a patient.

— Admit / Discharge of a Patient — ····· 2
— Admitting a Patient — Entering Name, Sex, and Age ····· 3
Patient Name ····· 3
Patient ID ····· 4
Patient Type ····· 4
Patient Sex ····· 5
Pacemaker Use ····· 6
●Pacemaker Use Selection ····· 6
●Impedance Respiration Measurement ····· 6
Patient Age ····· 7
— Discharging a Patient — Erasing Name, Data, etc. ····· 8
Discharging Procedure ····· 8
— Monitoring Mode Selection — Alarm and Display Mode ····· 9
Mode Selection ····· 9
●Display Modes ····· 11
●Alarm Modes ····· 12
— Suspend Monitoring — Suspend and Resume Monitoring ····· 13
To Suspend Monitoring ····· 13
To Resume Monitoring ····· 14
— Room / Bed ID Setup — for LAN Communication ····· 15
Room / Bed ID Setup ····· 15

— Admit / Discharge of a Patient —

This menu allows setup of admitting, discharging, suspend monitoring of a patient, and selection of the display configuration mode and alarm mode according to the monitoring purpose.



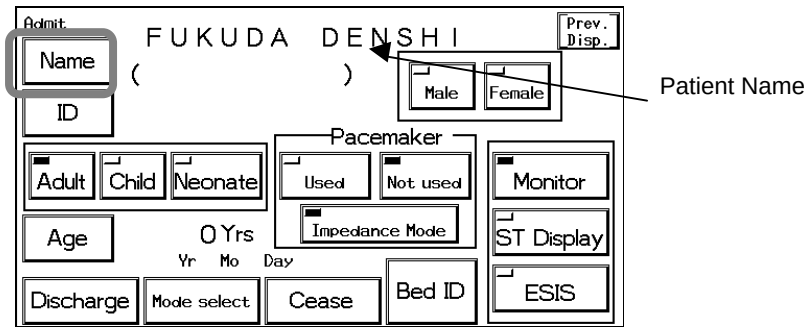
1. **Press the [Menu] → [Admit / Discharge] keys to display patient admit / discharge menu.**

⚠CAUTION	If you start monitoring a new patient without performing a discharge procedure for the previous patient, new data will be added to the previous data which will result in inaccuracy.

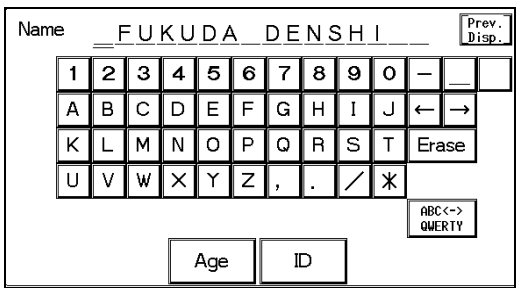
This menu allows entering of patient's name, ID, age, and selection of patient type (adult, child, neonate) and pacemaker use (used, not used) which affects the monitoring accuracy.

Patient Name

For entering the patient's name, up to 16 letters can be used.

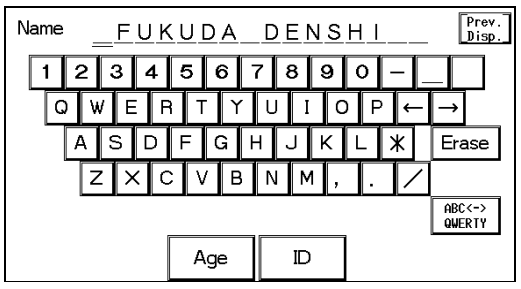


1. **Press the Name key.**
   Enter the name using the keyboard.



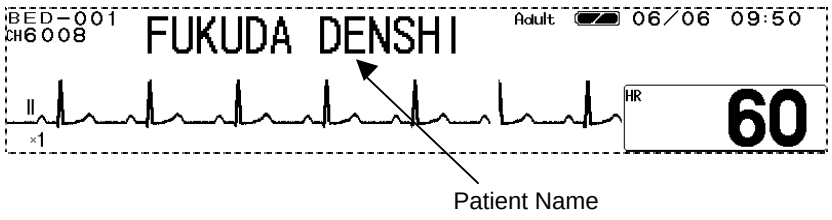
Enter the name using the alphanumeric keypad. The keypad can be selected from ABC or QWERTY arrangement.

ABC Arrangement



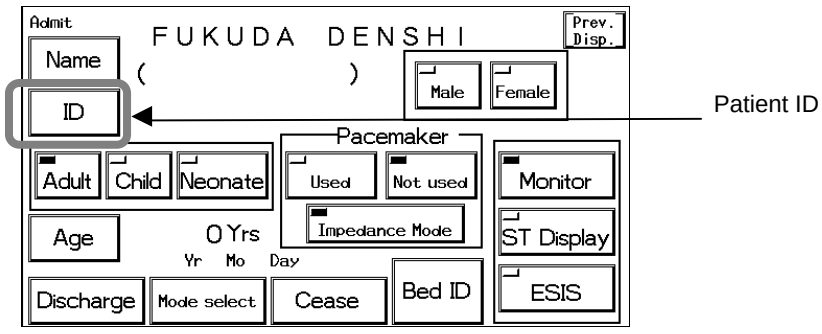
QWERTY Arrangement

2. **The entered patient's name will be displayed on the home display.**

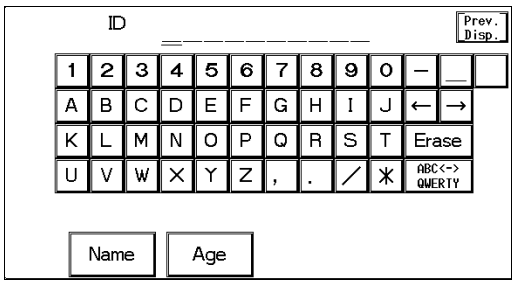


Patient ID

Up to 10 characters of alphabets, numbers, or symbols can be used for the patient ID.
Enter the ID according to the monitoring purpose. The entered ID will be output on the recording paper.



1. **Press the** **ID** **key.**



Enter the ID using the alphanumeric keypad.

Patient Type

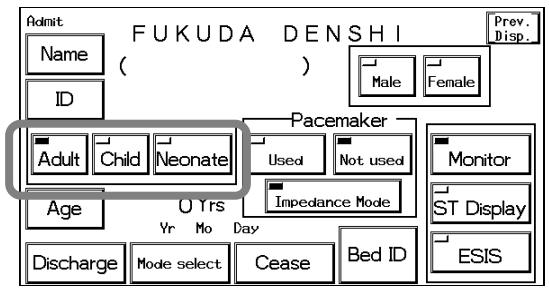
The selection of patient type affects the accuracy of NIBP measurement, HR measurement, and RR measurement. Also the delay time to generate the measurement data alarm will change according to the patient type.

	Adult	***Child***	***Neonate***
NIBP measurement range	10～280mmHg	10～180mmHg	10～120mmHg
HR	0bpm, 12～300bpm		0bpm, 30～300bpm
Filter Mode (Monitor)	0.5～40Hz		1.6～40Hz
Filter Mode (ESIS)	1.6～15Hz		1.6～15Hz
Filter Mode (ST Display)	0.05～40Hz		none
Impedance Respiration	1.5Hz		2.5Hz
Alarm delay time	5 sec.		0 sec.

The alarm delay time is the function to prevent frequent generation of the measurement data alarm by holding the alarm generation for the duration of each delay time.
The alarm delay time applies to the measurement data alarm for the following parameters; HR / PR, BP, RR, SpO_2, TEMP, $EtCO_2$ / $InspCO_2$, TACHY, BRADY.

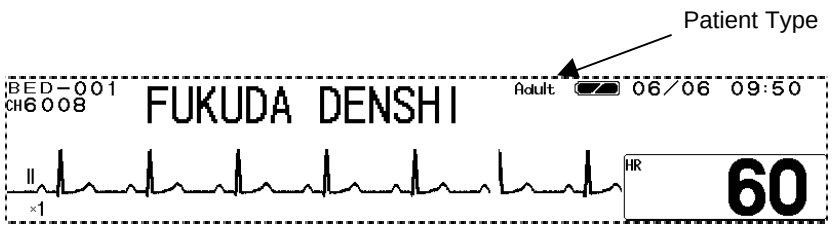
⚠WARNING	The monitor determines the detection algorithms for QRS and NIBP according to the selected patient type. Make sure the proper selection is made.

1. **Select Adult, Child, or Neonate.**



If "ST Display" is selected for the filter mode (Monitor / ST Display / ESIS), Neonate can not be selected for the patient type.
To select Neonate, set the filter mode to Monitor or ESIS mode.

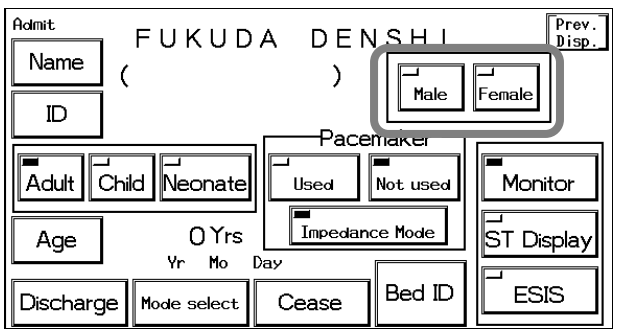
2. **The selected patient type will be displayed on the home display.**



Patient Sex

Select the patient's sex from male or female. The default is set as undetermined. The selected sex will be output on the recording paper.

1. **Select Male or Female.**



The selection of sex will not affect the measurement accuracy of the monitoring.

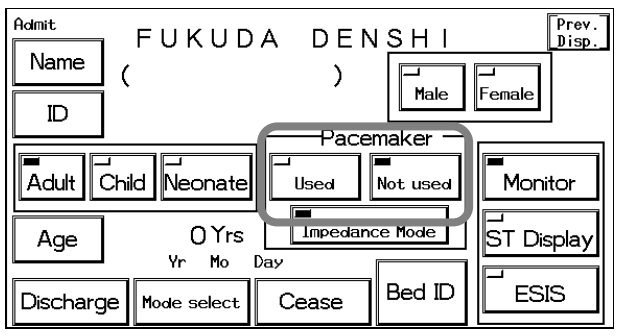
Pacemaker Use

●Pacemaker Use Selection

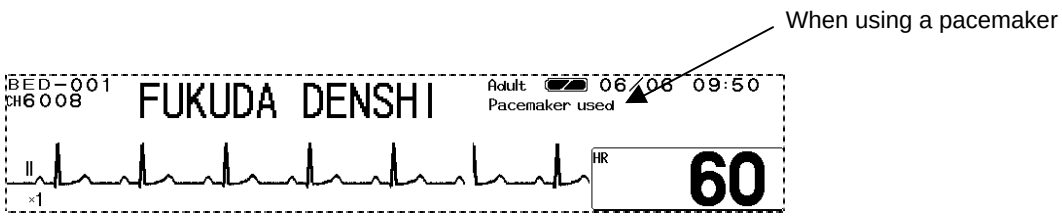
If the patient is wearing a pacemaker, the monitor will identify the pacemaker pulse and insert an artificial pulse onto the ECG waveform for easy identification. By detecting the pacemaker pulse, it prevents to erroneously detect QRS as pacemaker pulse when pacing waveform does not appear (pacing failure). The arrhythmia analysis analyzes pacing beat as P (pacemaker beat) or F (fusion beat) to prevent erroneous judgement of VPC.

⚠WARNING	The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.

1. Select Used or Not used for pacemaker use.



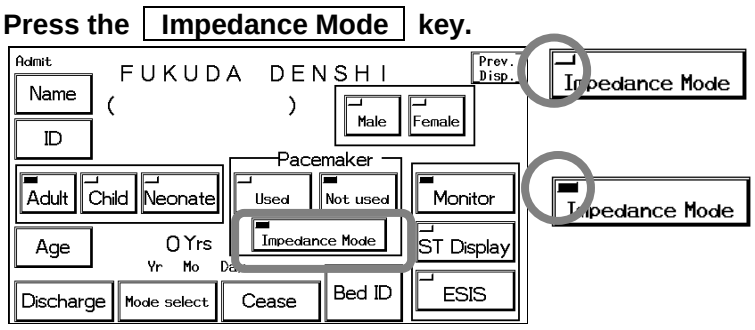
2. The pacemaker use will be displayed on the home display.



●Impedance Respiration Measurement

The respiration measurement using the impedance method conducts high-frequency and weak current between the ECG electrodes attached to the patient, and measures the potential difference between the electrodes caused by thoracic movement using the synchronous rectification system. For the patient using the adaptive (minute ventilation) pacemaker, the pacemaker measurement signal and the high-frequency current of this equipment interferes with each other which causes incorrect respiration measurement.
If the patient is using an adaptive (minute ventilation) pacemaker, set the impedance respiration measurement OFF.

1. Press the Impedance Mode key.

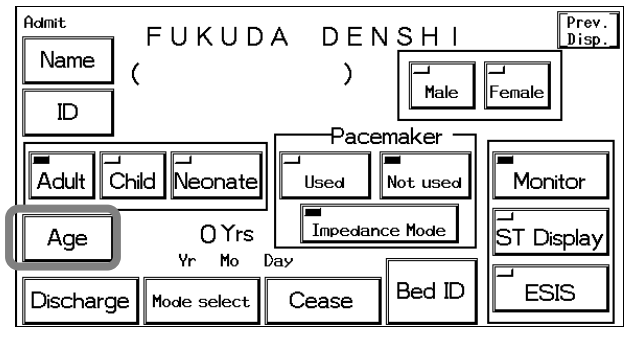


If the LED is extinguished, the impedance respiration measurement is stopped.

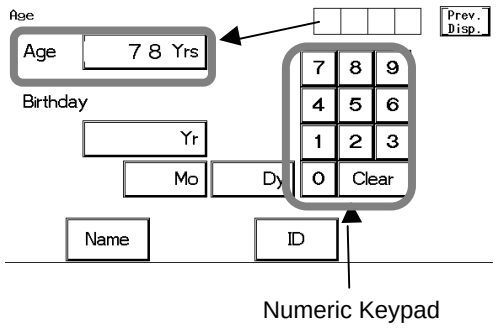
If the LED is lighted, the impedance respiration measurement can be performed.

Patient Age

There are two ways to set patient's age. One is to enter the birth date which will automatically calculate the age, and the other is to directly enter the age using the numeric keypad.
If Neonate is selected as patient type, the age in days will be displayed.

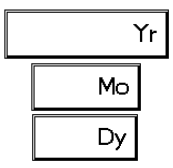


1. **Press the Age key, and enter patient's age.**



To directly enter the age, use the numeric keypad to enter the age and press the Yrs key.
The entered age will be displayed inside the key.

2. **Enter the patient's birth date using the numeric keypad. The age will be automatically calculated.**

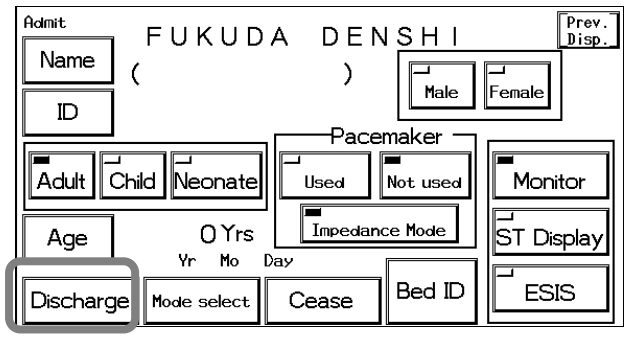


Enter the year, month, day using the numeric keypad, and press the Yr, Mo, Dy keys respectively.
The entered year, month, day will be each displayed inside the Yr, Mo, Dy keys.

— Discharging a Patient — Erasing Name, Data, etc.

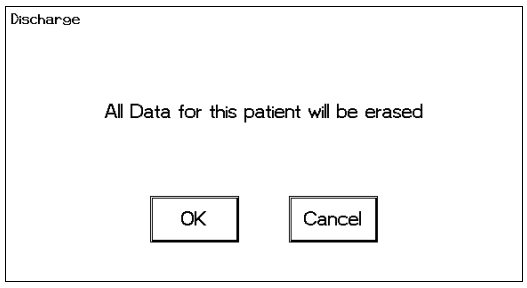
This menu allows to clear the patient name, ID, age, and past measurement data such as tabular trend, graphic trend, and recall data.

Discharging Procedure



1. Press the Discharge key.

The confirmation display will appear. If the Discharge key is pressed by mistake, press the Cancel key to return to the previous display.



2. Erase the patient data.

To initialize by erasing the patient data, patient information, press the OK key. The data will be initialized and returns to the home display.

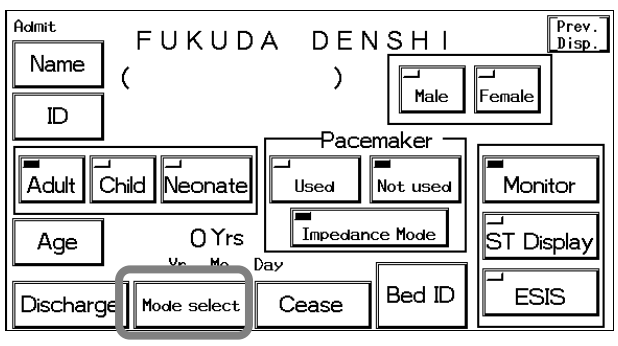
Data	*Description*
Patient Data	Erases the data of graphic trend, tabular trend, NIBP list, recall, ST Display, OCRG. The recall setup condition will remain.
Patient Information	Erases patient name, ID, sex, age. The patient type will not be initialized.
Measurement Condition	Pacemaker use will be set to unused, and respiration measurement condition will be set to ON.

— Monitoring Mode Selection — Alarm and Display Mode

This menu allows to select the alarm mode and display mode.
The alarm setting and display configuration can be each selected from 5 modes depending on the monitoring purpose. Select the appropriate mode when admitting a patient.

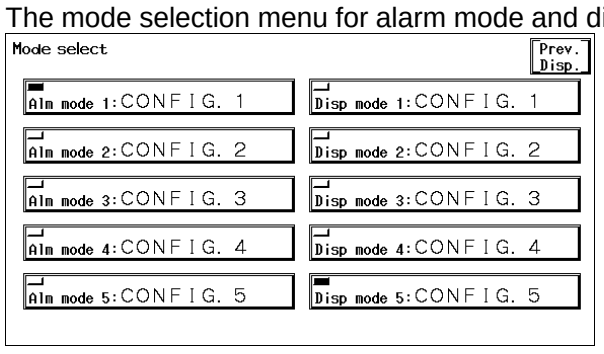
⚠CAUTION	The setup for the alarm mode and display mode remains stored even when the power is turned off or when discharging procedure is performed. Before monitoring, make sure the current monitoring mode is suitable for the patient's condition.

Mode Selection

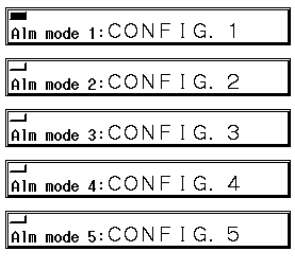


1. Press the Mode Select key.

The mode selection menu for alarm mode and display mode will be displayed.

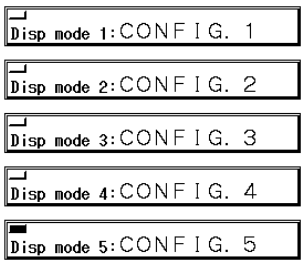


2. Select an alarm mode from the selection.



Press one key from the Alm Mode 1 ~ Alm Mode 5 keys to select an alarm setup mode which meets the monitoring purpose.
The setup for the alarm mode remains stored even when the power is turned off or when discharging procedure is performed. The previously selected alarm mode will be effective if the selection is not made.

3. Select a display mode from the selection.



Press one key from the Disp mode 1 ~ Disp mode 5 keys to select a display configuration mode which meets the monitoring purpose.
The setup for the display mode remains stored even when the power is turned off or when discharging procedure is performed. The previously selected display configuration mode will be effective if the selection is not made.

●Display Modes

Item		Default	Backup
Mode Selection		1	○
Mode 1	No. of Waveforms	3 Waveform	○
	No. of Numeric Data	4 Numeric Data	○
	Displayed Waveforms	ECG1, SpO_2, RESP	○
	Displayed Numeric Data	HR, NIBP, SpO_2, RR	○
	Enlarged Display	OFF	○
	Short Trend	OFF	○
	Comment	CONFIG. 1	○
Mode 2	No. of Waveforms	3 Waveforms	○
	No. of Numeric Data	4 Numeric Data	○
	Displayed Waveforms	ECG1, SpO_2, RESP	○
	Displayed Numeric Data	HR, NIBP, SpO_2, RR	○
	Enlarged Display	ON	○
	Short Trend	OFF	○
	Comment	CONFIG. 2	○
Mode 3	No. of Waveforms	4 Waveforms	○
	No. of Numeric Data	6 Numeric Data	○
	Displayed Waveforms	ECG1, BP1/2 (overlap), SpO_2, RESP	○
	Displayed Numeric Data	HR, BP1,BP2, NIBP, SpO_2, TEMP, RR	○
	Enlarged Display	OFF	○
	Short Trend	OFF	○
	Comment	CONFIG. 3	○
Mode 4	No. of Waveforms	4 Waveforms	○
	No. of Numeric Data	6 Numeric Data	○
	Displayed Waveforms	Cascade, BP1/2 (overlap), SpO_2, RESP	○
	Displayed Numeric Data	HR, BP1, BP2, NIBP, SpO_2, TEMP, RR	○
	Enlarged Display	OFF	○
	Short Trend	OFF	○
	Comment	CONFIG. 4	○
Mode 5	No. of Waveforms	6 Waveforms	○
	No. of Numeric Data	7 Numeric Data	○
	Displayed Waveforms	ECG1, BP1/2 (overlap),, SpO_2, CO_2	○
	Displayed Numeric Data	HR, BP1, BP2, NIBP, SpO_2, TEMP/ RR, CO_2	○
	Enlarged Display	OFF	○
	Short Trend	OFF	○
	Comment	CONFIG. 5	○

NOTE	The CO_2 monitoring function is not supported for the DS-7101L and DS-7101LT. If Mode 5 is selected, CO_2 parameter box will be displayed but parameter setup cannot be performed.

●Alarm Modes

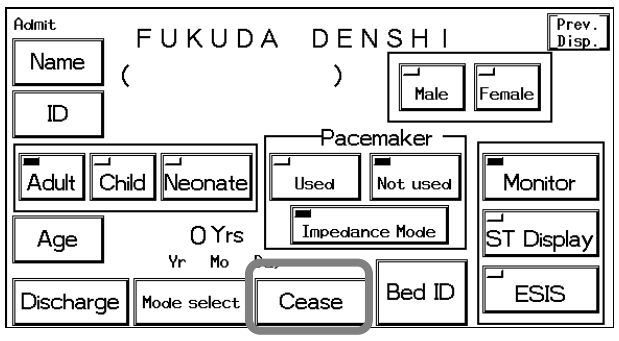
Item		*Default Setting*
Alarm Mode		1
Alarm Mode 1～5	HR	ON, 40－120
	ASYSTOLE	ON, 5 sec.
	VF	ON
	VT	ON
	SLOW_VT	ON
	RUN	ON, 3 beats
	COUPLET	OFF
	PAUSE	OFF, 2 sec.
	BIGEMINY	OFF
	TRIGEMINY	OFF
	FREQUENT	OFF, 10 beats
	TACHY	ON
	BRADY	ON
	ST	OFF
	BP1	ON SYS 80－180 DIA OFF－OFF MEAN OFF－OFF
	BP2	OFF SYS OFF－OFF DIA OFF－OFF MEAN OFF－OFF
	RR	ON 5－30
	APNEA	ON, 15 sec.
	SpO_2	ON, 90－OFF SEC Alarm OFF
	NIBP	ON SYS 80－180 DIA OFF－OFF MEAN OFF－OFF
	TEMP	OFF OFF－OFF
	$EtCO_2$	ON 30－45mmHg 4.0－6.0kPa 4.0－6.0%
	$InspCO_2$	ON 3mmHg 0.4kPa 0.4%

NOTE	The CO_2 monitoring function is not supported for the DS-7101L and DS-7101LT. Note that the $EtCO_2$, $InspCO_2$ alarm will not be generated.

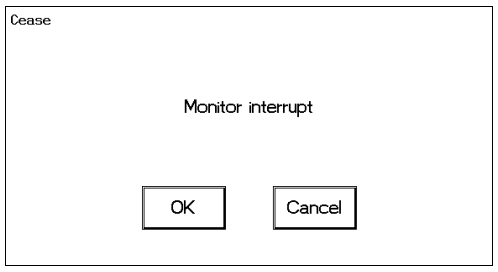
— Suspend Monitoring — Suspend and Resume Monitoring

This menu allows to suspend and resume monitoring when a patient temporarily leaves the bed. Turning the power OFF will erase the recall and ST measurement data, but with this suspend monitoring function, data measurement, alarm generation, automatic measurement, and automatic recording can be suspended without erasing any data and setup condition.

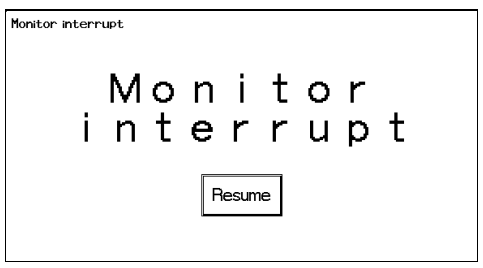
To Suspend Monitoring



1. **Press the [Cease] key.**
   The confirmation menu will be displayed. If the [Cease] key is pressed by mistake, press the [Cancel] key to return to the previous display.



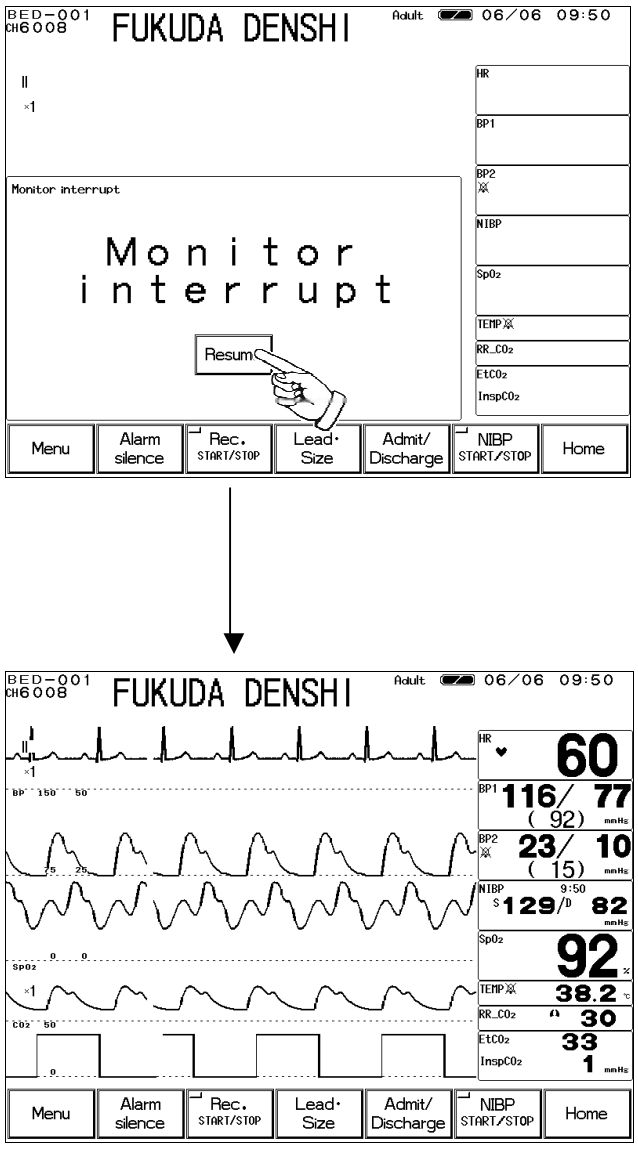
2. **Confirm the monitoring suspension.**
   Pressing the [OK] key will return to the home display with the [Resume] key displayed. The numeric data display and waveform display on the home display will be suspended and only the [Resume] key will be effective.



NOTE	The telemetry transmission will cease when monitoring is suspended. Note that the square wave will be displayed on the central monitor indicating the too far condition of the telemetry.

To Resume Monitoring

1. **Press the [Resume] key.**
   The monitor suspend display will be cleared and monitoring will resume.



⚠CAUTION	Resuming monitoring will also resume the alarm in suspension.

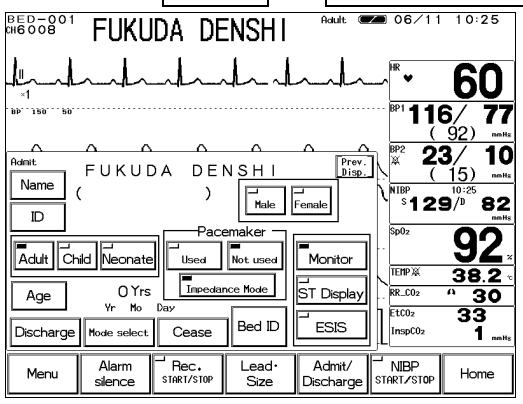
— Room / Bed ID Setup — for LAN Communication

This section describes the procedure to set the Room / Bed ID.
The DS-7100 system incorporates Ethernet LAN unit.
The set Room / Bed ID will be remain stored even when the power is turned off.

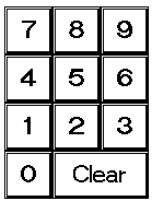
Room / Bed ID Setup

To connect to a wired network, it is necessary to set the Room / Bed ID.

1. Press the [Menu] → [Admit / Discharge] → [Bed ID] keys.

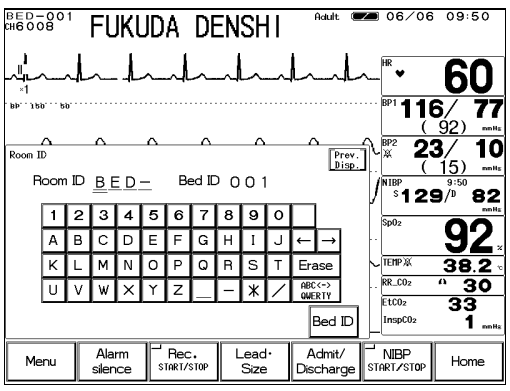


2. Enter the password.



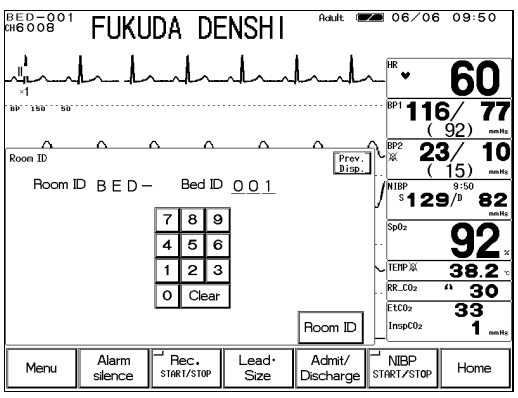
Use the numeric keypad to enter the password
The entered number will be displayed as "∗∗∗∗".

3. Set the Room ID.



Enter the Room ID using the alphanumeric keypad.
The keypad can be selected from ABC or QWERTY arrangement.
The entered ID will be displayed on the upper left of the screen.
Next, press the [Bed ID] key to display the Bed ID menu.

4. Set the Bed ID.



Enter the Bed ID using the numeric keypad.
The entered ID will be displayed on the upper left of the screen.
To connect to the wired network, set the ID in the range from 001 to 048.

⚠CAUTION	✍ The bed ID is factory set to “000”. If connected to the wired network with the bed ID unchanged, monitoring on the central monitor will not be possible. ✍ When connecting to a wired network, make sure that there are no other bedside monitors with the same ID. If there are more than one bedside monitor with the same bed ID, the duplicated bedside monitors can not be monitored on the central monitor. ✍ When connecting to a wired network, set the bed ID in the range from “001” to “048”. ✍ There are following restrictions when connecting the DS-7100 system to the DS-LANⅡnetwork. ✍ The DS-7100 system is not corresponded to the AU-5500N 8-channel recorder. The data for the DS-7100 system can not be recorded on the AU-5500N. ✍ When the measurement unit of BP is kPa, BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. These will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor can not be performed. ✍ When the temperature unit is ?F, the temperature data will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor can not be performed. ✍ Arrhythmia alarm of TACHY, BRADY, SLOW_VT, COUPLET, PAUSE will not be transmitted. ✍ For numeric data displayed as “×××”, maximum or minimum value of measurable range will be transmitted. ✍ The numeric data displayed as “———” will be treated as not measured data. ✍ For QRS classification, the “S” printed on the built-in recorder will be printed as “N” on the HR-500 Recorder. ✍ When DS-5800N/NX/NX^{MB} is used as a central monitor, the following function will not be displayed. ✍ Recall ✍ Graphic Trend, Tabular Trend ✍ ST Display