ECG, Respiration and SpO_2 Transmitter

LX-5630

Operation Manual

- **Before using the LX-5630 you must first thoroughly read this manual.**
- **Remember to keep this operation manual in an easily accessible place near the unit for future reference.**

FUKUDA DENSHI

Important Information

- **Only a physician or a person under the guidance of a physician can use this product.**
- **The information contained in this document is subject to change without notice due to improvement in the equipment.**

⚠CAUTION

Federal law restricts this device to sale by or on the order of a physician.

⚠CAUTION

Users are advised to periodically contact the FCC or specified frequency coordinator and determine if other or your transmitter frequencies that may cause interference.

⚠CAUTION

The manufacturers, installers and users of Wireless Medical Telemetry System equipment are cautioned that the operation of this equipment could result in harmful interference to other nearby medical devices.

Printed in Japan

TELEMETRY PRECAUTIONS

For proper management of the telemetry installation, consult your Fukuda Denshi representative concerning the following:

- Plan the installation of your telemetry system taking into account your entire medical facility needs and plant requirements.
- Be sure the antenna system installed meets the facility and plant requirements.

⚠ WARNING

This radio frequency device is susceptible to interference from outside sources. Interference may prevent the monitoring of patients connected to this devices. If a problems exists, contact your local service representative.

To assure safe and reliable operation, observe the following precautions:

- Be sure that no other devices are using the frequency assigned to this transmitter.
- This device is susceptible to interference from electrosurgical knives and other computerized equipment. If problems occur, contact your local Fukuda Denshi service representative.
- Any obstruction such as reinforced concrete or large metallic surfaces between the receiver and the transmitter can affect reception. If problems occur contact your local Fukuda Denshi service representative.
- When the low battery alarm is present, replace the battery.

⚠ CAUTION

The manufacturers, installers and users of WMTS equipment are cautioned that the operation of this equipment could result in harmful interference to other nearby medical devices.

Thank you for purchasing this instrument from Fukuda Denshi. Before use, read this operation manual thoroughly for correct handling and operation. If you are familiar with a similar type of product, it is recommended this operation manual be read and understood since the LX-5630 has unique operation and handling methods.

Safety Information and Messages

- Be sure to observe the warning and cautionary messages related to important safety information. These instructions are described under the following message headings. Understand the meaning of the different types of messages while reading this operation manual.

⚠**WARNING**	Erroneous operation by failure to follow this message may result in death or serious injury to the patient, operator, or create a fire hazard.
⚠**CAUTION**	Erroneous operation by failure to follow this message may result in injury to the patient or operator, or may cause damage to the LX-5630 and/or related instruments.

NOTE	A NOTE is not a warning instruction but offers information for correct use of the LX-5630 to avoid erroneous operation.

Safety Considerations in Using Medical Electrical Equipment

Contents described here are general safety considerations to be taken for proper operation of medical electrical equipment and for the safety of both the patient and operator. Safety considerations specific to the use of the LX-5630 are described on the next page.

⚠ WARNING

Strangulation Hazard!

- **Make sure all patient cables, leadwires, and tubing are positioned away from the patient's head to minimize the risk of accidental strangulation.**
- **Under no circumstances should any pouch be tied solely around a patient's neck.**

⚠ CAUTION

1. Do not use the equipment unless you are familiar with its operation.

2. Observe the following when installing or storing the equipment:

- **Select a place where the equipment may not be contaminated with splashing water.**
- **Consider the atmospheric pressure, temperature and humidity and provide adequate ventilation. Avoid direct sunlight. The equipment should not be installed or stored in a location where it may be adversely affected by air containing dust, saline or sulfur.**
- **Avoid inclination, vibration and shock, even during transport to ensure stable operating conditions.**
- **Do not install or store the equipment where chemicals are stored or gases are generated.**

3. Precautions before Operation

- **The equipment is not designed to be explosion-proof. Do not use the equipment in the presence of flammable gasses or anesthetics.**
- **Make sure the equipment is operating safely and normally at all times. Ensure that all cords and cables are correctly connected.**
- **Improper use of multiple instruments simultaneously may result in erroneous information or lead to a hazardous accident.**

4. Precautions during Operation

- **Do not operate the equipment beyond the time period required for diagnosis, monitoring or treatment.**
- **Observe the equipment and patient constantly for any abnormality.**
- **If the equipment or patient indicates any abnormality, stop the equipment from operating or take proper measures (e.g. disconnect transducers and electrodes) to ensure patient safety.**
- **Instruct the patient not to contact the equipment.**

⚠ CAUTION

5. Cares after Operation

- **Disconnect the cables by holding the connector plugs. Do not apply excessive force to cords by pulling.**
- **Keep the equipment clean in preparation for the next use.**

6. If the equipment is out of order, ensure patient safety by immediately turning the equipment off and disconnecting electrodes and/or transducers from the patient.
Contact your nearest Fukuda Denshi representative and label the device as "OUT OF ORDER".

7. Do not disassemble or attempt service on the equipment. Contact your nearest Fukuda Denshi representative for service.

8. Maintenance and Inspection

- **Be sure to perform periodic inspection of the equipment and accessories.**
- **Before operating the equipment which has not been used for a long period of time, make sure that the equipment operates normally and safely.**

9. When using an electrosurgical unit or defibrillator in conjunction with this equipment, take care of the following.

- **The high-frequency energy produced by electrosurgery equipment may result in burns to the patient or possible damage to the equipment. Be sure to observe the precautionary instructions described in the operation manual of the electrosurgical unit.**
- **Some types of equipment may be damaged by the energy discharged by a defibrillator. Ensure a thorough understanding of the precautionary instructions described in the operation manual of the equipment before using a defibrillator.**
- **Some types of equipment other than electrosurgical units and defibrillators may cause accidental hazards to the patient and operator when operated under adverse conditions. Read the operation manual attached to each individual unit and understand the precautionary instructions prior to use.**

⚠CAUTION

Some pacemaker pulses are difficult or not possible to detect. This is dependent on the amplitude and width of the pacemaker pulse in addition to the type of pacemaker and lead type used (unipolar, bipolar, etc.).

⚠CAUTION

QRS detection allows for detection of low amplitude ECG. But if excessive artifact is present on the ECG waveform, the noise may be detected as QRS in error.

⚠CAUTION

- **Make sure each receiving telemetry channel corresponds to that of the transmitter worn by the patient.**
- **Instruct the patient wearing a telemetry transmitter to remain within the range of the antenna system.**
- **To avoid interference from other transmitters in the adjacent area or hospital, make sure the proper channel identification and group codes are used.**
- **Refer system settings to your Fukuda Denshi service representative.**

⚠CAUTION

Do not use in high humidity or in areas of high oxygen concentration.

CONTENTS

1. General Description

The LX-5630 is a radio telemetry transmitter designed for monitoring the ECG, respiration, SpO_2 (arterial oxygen saturation) and pulse waveform. In the continuous mode, the transmitter will monitor ECG, respiration, SpO_2 and pulse waveform for 3 continuous days with two "AA" size alkaline battery. In the intermittent mode, the transmitter measures the SpO_2 every 30 seconds, and monitors ECG and respiration continuously for 5 days. Pulse waveform will not be measured in this mode.

The LX-5630 is provided with LCD display to show SpO_2 measurement, pulse waveform amplitude, SpO_2 alarm ON/OFF, battery status, ECG electrode status, SpO_2 probe status, and operation mode.

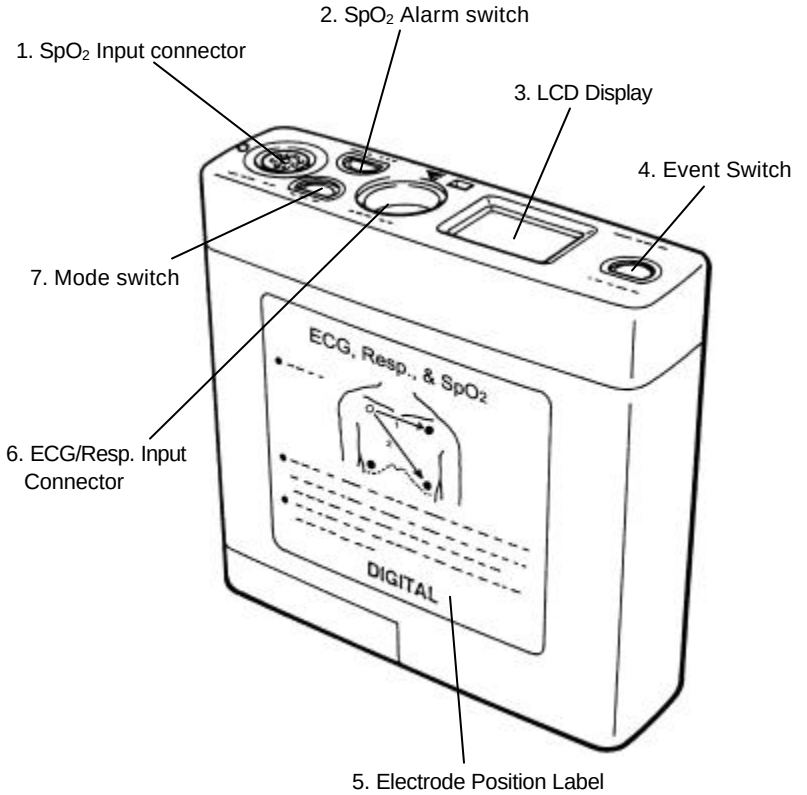
Before using this transmitter, read also the operation manual for the patient monitor at receiving side before using this transmitter.

⚠WARNING

Operation of this equipment requires the prior coordination with a frequency coordinator designated by the FCC for the Wireless Medical Telemetry Service.

EXTERNAL APPEARANCE

2. Controls and Indicators



1. SpO_2 input connector

The accompanied SpO_2 relay cable (CI-128A) is connected here. Different types of SpO_2 probe can be connected to this SpO_2 relay cable.

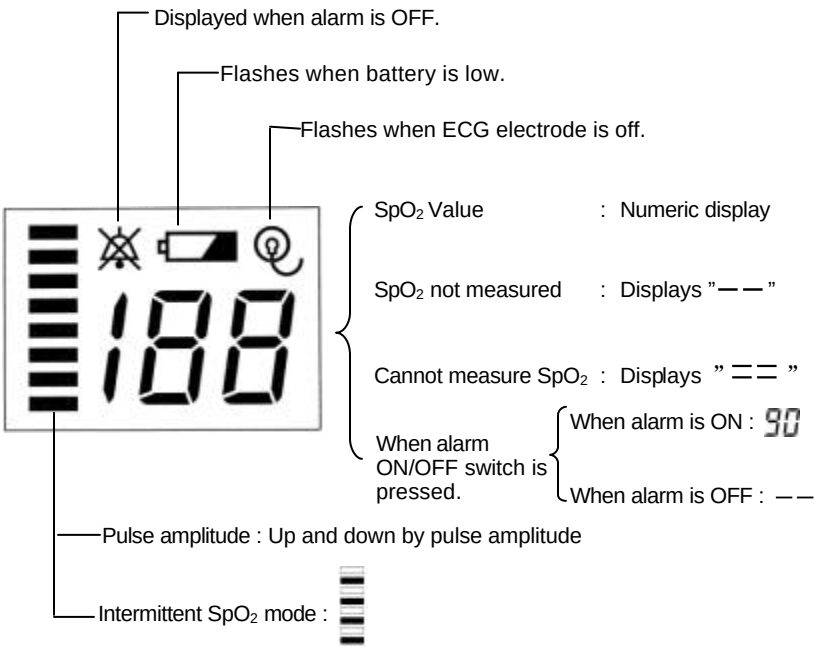
2. SpO_2 Alarm switch

This is the SpO_2 alarm function able/disable switch. When the SpO_2 alarm is disable, LCD display (3) will show .

When the SpO_2 measurement value drops to 90% or lower with the alarm ON condition, the alarm sound generates. When the power is turned ON, the alarm is in ON mode.

3. LCD Display

Displays the SpO_2 value, pulse amplitude, SpO_2 alarm ON/OFF, battery status, ECG electrode status, SpO_2 probe status, and operation mode.



4. Event Switch

The function assigned at the receiver side will activate. The function corresponded to the event switch is set at the receiver side.

5. Electrode Position Label

Indicates standard ECG electrode position and precautions for using the SpO_2 probe.

6. ECG/Resp Input Connector

The accompanied patient lead cable is connected here.

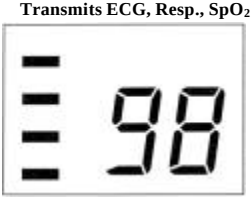
7. Mode Switch

This is the SpO_2 measurement mode switch to select continuous or intermittent mode. When the power is turned ON, this mode is in continuous mode.

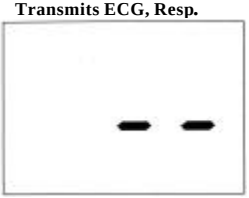
The SpO_2 measurement mode are shown on the LCD display as follows.

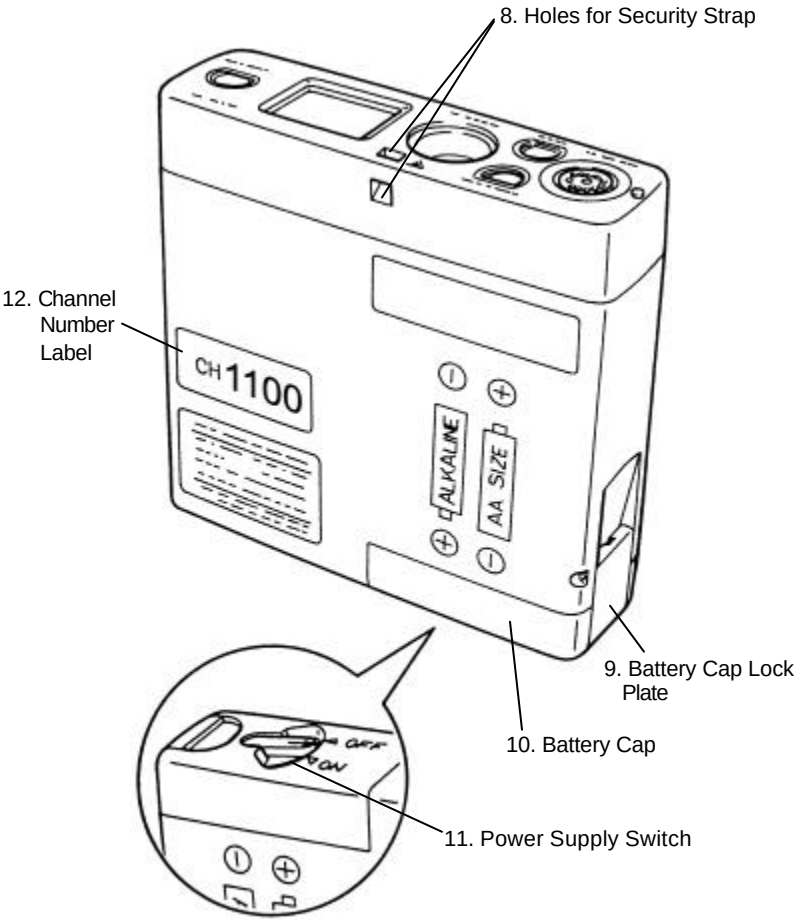
SpO 2 continuous mode
Transmits ECG, Resp., SpO_2

SpO 2 intermittent mode
Transmits ECG, Resp., SpO_2



SpO 2 probe off
Transmits ECG, Resp.




8. Holes for Security Strap
12. Channel Number Label
CH 1100
ALKALINE
AA SIZE
9. Battery Cap Lock Plate
10. Battery Cap
OFF
ON
11. Power Supply Switch

8. Holes for Security Strap

The accompanied security strap is attached here to prevent the transmitter from dropping. Adjust the length of the strap to the appropriate length for the patient.

9. Battery Cap Lock Plate

Locks the battery cap. To release the lock, open the lock plate outward while pressing the top of the battery cap.

10. Battery Cap

This is the battery compartment cap. To close the battery compartment, insert the protrusion part of the battery cap into the rectangular hole on the transmitter, then push in the batteries with the battery cap and lock the battery lock plate.

11. Power Supply Switch

This is the switch to turn ON or OFF the power supply. When the power is turned ON, the SpO_2 measurement mode is in continuous mode. When the remaining battery becomes low, the "  " mark flashes in the LCD display and the alarm beeps. As the remaining battery gets lower, nothing will be displayed on the LCD display.

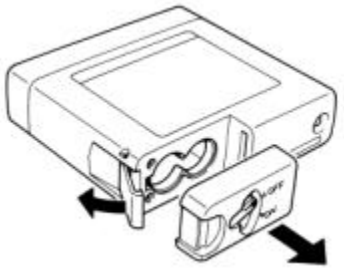
12. Channel Number Label

The transmitter channel number is printed on this label. At the receiver side, select the same channel number.

3. Preparation and Operation

[1] Loading a battery.

The battery cap can be removed by opening the lock plate outward while pressing the top of the battery cap.

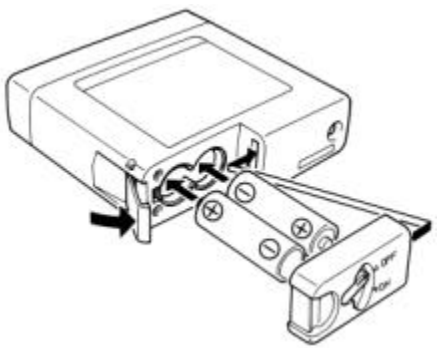


The LX-5630 uses two "AA" size alkaline cell (LR-6) for its power source.

When installing the battery, take note of the polarity. To close the battery compartment, insert the protrusion part of the battery cap into the rectangular hole on the transmitter, then push the batteries with the battery cap and lock the battery lock plate.

⚠CAUTION

If the transmitter is not in use for a long period of time, remove the battery and store in an appropriate place. The leakage from the battery may damage the equipment.



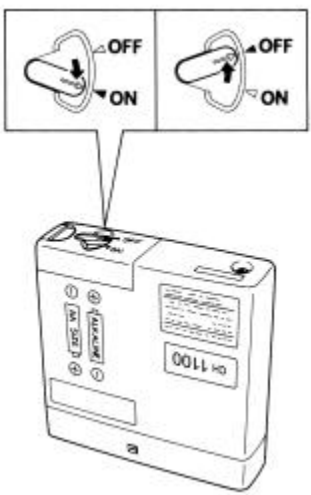
[2] Turn the power switch to "ON".

When the power is turned ON, the SpO_2 measurement mode is in continuous mode. To change the mode to intermittent mode, press the mode switch. In the intermittent mode, the SpO_2 will be measured at 30 seconds interval and no pulse waveform is sent, but ECG and respiration will be continuously measured. In the continuous SpO_2 measurement mode, the SpO_2 value and pulse waveform will be continuously measured.

⚠ CAUTION

In the intermittent mode, the SpO_2 is measured at 30 seconds interval. Even when the SpO_2 value suddenly changes during this interval, the transmitter will only show the last SpO_2 measurement value. For the patient with the possibility of sudden change, select the continuous mode.

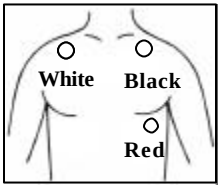
In the intermittent mode, the battery life is about 5 days and about 3 days in continuous mode.



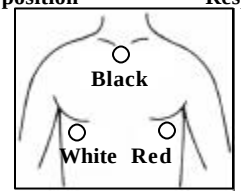
[3] Attach the electrodes.

For single lead ECG and respiration monitoring, use the CM-85B for AHA color code.

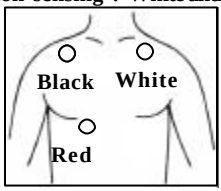
AHA color code electrode position **Respiration sensing : White and Red**



LEAD II



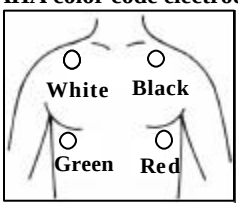
LEAD CC5



LEAD MCL1

For two lead ECG and respiration monitoring, use the CM-85C for AHA color code.

AHA color code electrode position



LEAD I and LEAD II

CH 1 (**+ : Black**, **- : White**) **LEAD I**

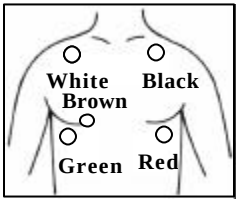
CH 2 (**+ : Red**, **- : White**) **LEAD II**

Reference : Green

Respiration sensing : White and Red

For dual channel ECG and respiration monitoring, use the CM-85D for AHA color code patient cable (five electrodes).

AHA color code electrode position



LEAD II and LEAD MCL 1

CH 1 (**+ : Red**, **- : White**) **LEAD II**

CH 2 (**+ : Brown**, **- : Black**) **LEAD MCL1**

Reference : Green

Respiration sensing : White and Red

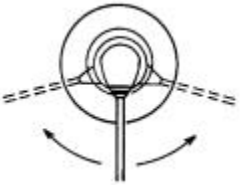
⚠ CAUTION

Some pacemaker pulses are difficult or not possible to detect. This is dependent on the amplitude and width of the pacemaker pulse in addition to the type of pacemaker and lead type used (unipolar, bipolar, etc.).

⚠ CAUTION

The time constant of ECG input is shorter than general hard wired patient monitor. The ST level measurement may be different compared to the general hard wired patient monitors.

[4] Connect the lead wire to the electrode.



Connect the tip of lead wire to the center of the electrode and gently swing it right and left.
Refer the electrodes positions and color code in previous page.

[5] Connect the lead wire to the transmitter.

Connect the patient cable firmly to the ECG/Resp. input connector of the transmitter.
When disconnecting the patient cable, do not disconnect the lead wire set by pulling on the wires.

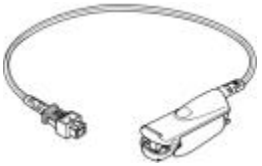
To send only the ECG and Resp., remove the SpO_2 relay cable (CI-128A) from the transmitter.
In this case, the transmitter will operate for 6 continuous days.

⚠CAUTION

Confirm the direction of the keyed plug to match the transmitter's guide key on the connector. Improper connection will cause damage to the transmitter, patient cable, and will not provide proper monitoring.

[6] Attach the SpO_2 probe.

There are several types of SpO_2 probe depending on the monitoring purpose. Select an appropriate type according to the intended use. The lightweight type such as SD-5C or TG-26(UD-5C) is suitable for the LX-5630.



SR-5C
for adult, reusable

TG-25(SP-5C)
for adult, reusable

TG-26(UD-5C)
for universal use

SD-5C(25) for adult, semi-disposable
SD-5C(20) for pediatric, semi-disposable

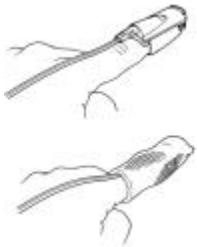
CE-5C for earlap

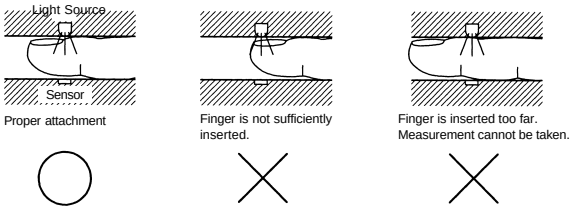
NOTE **The accuracy of this instrument, like that of all other dual-wavelength oximeters, can be influenced by the presence of abnormal hemogrobins such as carboxyhemoglobin (HbCO) and methemoglbin. The tables below show the errors which may occur due to these hemoglobins. The instrument may be also affected by cardiogreen or intravascular dyes.**

SpO_2	HbCO			METHEMOGLOBIN		
	1%	5%	10%	1%	5%	10%
50%	-0.1%	-0.7%	-1.5%	0.2%	1.3%	3.2%
70%	-0.1%	-0.7%	-1.5%	-0.6%	-2.3%	-3.2%
90%	-0.2%	-0.8%	-1.6%	-1.5%	-6.0%	-9.6%
100%	-0.2%	-0.8%	-1.7%	-1.8%	-7.5%	-12.2%
Note	The value will be displayed lower than the actual value.			The value may be displayed higher than the actual value when SpO_2 value is around 50%.		

■ SR-5C (Finger Clip Probe) Attachment

The SR-5C is suitable for middle/long-term measurement, and should be clipped to a fingertip. It should be positioned so that the LED (light source) is at the base of the fingernail, as shown in the figure below. Use the finger mesh cover (FC-M) to secure the probe.





Proper attachment

Finger is not sufficiently inserted.

Finger is inserted too far. Measurement cannot be taken.

⚠ CAUTION

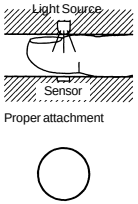
Precautions for Use of SR-5C

- **Cover the probe with a black cover if it is exposed to direct sunlight. Some measurement error may occur if the probe is exposed to direct sunlight during measurements.**
- **The SR-5C is designed for use on adult finger. Do not use on other parts.**
- **When removing the probe, do not pull on the cord.**
- **If continuously measuring over a long period of time, change the measuring finger every 2 hours to prevent low-temperature burn. Especially for continuous use on patient with peripheral circulatory disturbance, change the measuring finger more frequently.**
- **Do not use a tape to fix the probe. It may cause edema or congestion.**
- **The probe should be positioned so that the light source is at the base of the fingernail. Take care not to insert the finger too deep to prevent injury.**
- **It may not be possible to take measurements in case of an excessively high hematocrit value. In such case, reattach the probe to a thinner finger.**
- **Remove nail polish before taking measurements to enable stable measurements.**
- **It may not be possible to take measurements in case of poor blood circulation or poor blood stream. In such case, remove the probe, rub or warm the finger to improve blood circulation, then reattach the probe.**
- **Before attaching a probe to a patient, clean the probe using a cloth moistened with sterilizing alcohol.**
- **The connector terminals of the probe should be protected against water or chemicals.**
- **It may not be possible to take measurements in place with vibrations or while walking. In such case, use the UD-5C or SD-5C for more stable measurements.**
- **Inaccurate measurements can be caused by the placement of SpO_2 probe on an extremity with a blood pressure cuff, arterial catheter, or intravascular line.**

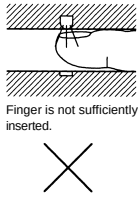
■ TG-25 (SP-5C) (Finger Clip Probe) Attachment

The TG-25 (SP-5C) is suitable for short-term measurement, and should be clipped to a fingertip. It should be positioned so that the LED (light source) is at the base of the fingernail.

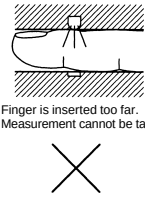
TG-25 (SP-5C)



Proper attachment



Finger is not sufficiently inserted.



Finger is inserted too far. Measurement cannot be taken.

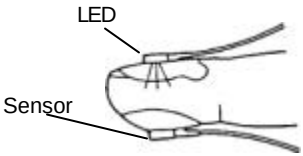
⚠ CAUTION

Precautions for Use of TG-25 (SP-5C)

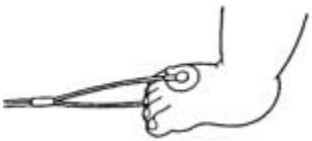
- **Cover the probe with a black cover if it is exposed to direct sunlight. Some measurement error may occur if the probe is exposed to direct sunlight during measurements.**
- **The TG-25 (SP-5C) is designed for use on adult finger. Do not use on other parts.**
- **When removing the probe, do not pull by holding the cable.**
- **The TG-25 (SP-5C) is designed for short-term measurement. If measurements are taken continuously over a long period of time, change the measuring finger every 2 hours to prevent low-temperature burn. Especially for continuous use on patient with peripheral circulatory disturbance, change the measuring finger more frequently.**
- **Do not use a tape to fix the probe. It may cause edema or congestion.**
- **The probe should be positioned so that the light source is at the base of the fingernail. Take care not to insert a finger too deep to prevent injury.**
- **It may not be possible to take measurements in case of an excessively high hematocrit value. In such case, reattach the probe to a thinner finger.**
- **Remove nail polish before taking measurements to enable stable measurements.**
- **Before attaching the probe to a patient, clean the probe using a cloth moistened with sterilizing alcohol.**
- **The connector terminals of the probe should be protected against water or chemicals.**
- **It may not be possible to take measurements in place with vibrations or while walking. In such case, use the TG-26 (UD-5C) or SD-5C for more stable measurements.**
- **Inaccurate measurements can be caused by the placement of SpO_2 probe on an extremity with a blood pressure cuff, arterial catheter, or intravascular line.**

■ **TG-26 (UD-5C) Attachment**

The TG-26 (UD-5C) is suitable for long-term measurement and can be attached to a finger of an adult, or to a foot, palm, wrist or ankle of a neonate. Before attaching the probe to a patient, clean the skin using a cloth moistened with sterilizing alcohol.



TG-26 (UD-5C)



TG-26 (UD-5C)

⚠CAUTION

Precautions for Use of TG-26 (UD-5C)

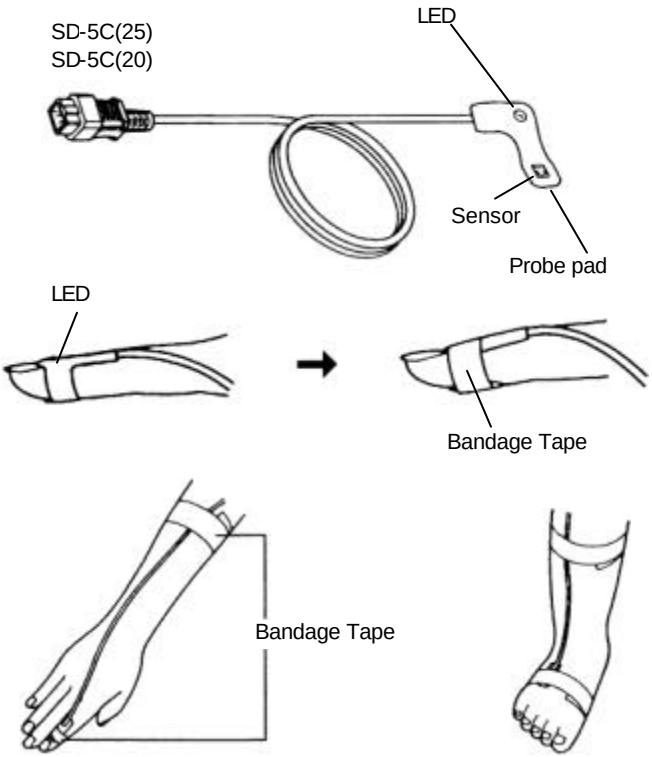
- **Cover the probe with a black cover if it is exposed to direct sunlight. Some measurement error may occur if the probe is exposed to direct sunlight during measurements.**
- **Make sure that the two pads are aligned.**
- **If the use of double-sided adhesive tape causes skin irritation, stop using it. In such case, try using a bandage tape.**
- **Attach the pad with the LED to the base of the fingernail and the sensor pad to the opposite side of the finger.**
- **If measurements are taken over a long period of time, change the measuring site several times a day to prevent rash, redness or a low-temperature burn. Be especially careful for the continuous use on premature infant, neonate, or a patient with peripheral circulatory disturbance by changing the measuring site frequently.**
- **When fixating the probe by bandage tape, do not tighten it too hard as this may cause edema or congestion.**
- **If the use of adhesive tape causes skin irritation, it should be discontinued.**
- **Since pediatric patients skin can be extremely sensitive, be careful when removing the tape.**
- **Inaccurate measurements can be caused by the placement of SpO_2 probe on an extremity with a blood pressure cuff, arterial catheter, or intravascular line.**

■ **SD-5C (20) & SD-5C (25) Attachment**

The SD-5C (20) and SD-5C (25) are disposable probes to prevent infection. These can be attached to a finger of an adult, or to a foot, palm, wrist or ankle of a neonate by using a bandage tape. The probe should be used for only one patient, and should be replaced after using for approximately one week.

For use on finger, position the LED (light source) on the base of the fingernail, and fixate using a bandage tape.

Before attaching the probe, clean the skin using a cloth moistened with sterilizing alcohol.



⚠CAUTION

Precautions for Use of SD-5C(20), SD-5C(25)

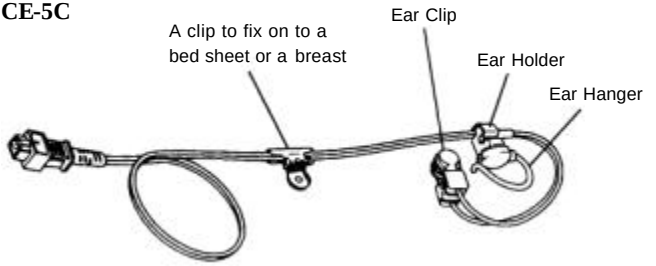
- **If measurements are taken over a long period of time, change the measuring site several times a day to prevent rash or low-temperature burn.**
- **When fixating the probe by bandage tape, do not tighten it too hard as this may cause edema or congestion.**
- **Since the skin of a neonate is extremely sensitive, be careful when removing the adhesive tape.**
- **Check that the LED (light source) and sensor are properly aligned. The sensor must be on the opposite side of the LED.**
- **When removing the probe from the patient or removing the bandage tape from the probe, hold the probe pad and not the cable.**
- **Cover the probe with a black cover if it is exposed to direct sunlight. Some measurement error may occur if the probe is exposed to direct sunlight during measurements.**
- **Do not apply excessive force on the LED and sensor, otherwise damage to the probe may result.**
- **Inaccurate measurements can be caused by the placement of SpO_2 probe on an extremity with a blood pressure cuff, arterial catheter, or intravascular line.**

■ CE-5C (Earlap Probe) Attachment

The CE-5C is suitable for long-term measurement and is used by attaching to an ear.

Before attaching the probe to a patient, clean the skin using a cloth moistened with sterilizing alcohol.

CE-5C



(1) Attach the ear holder to the probe cable.

Insert the tube (at 16.5cm from the probe end) to the ear holder.

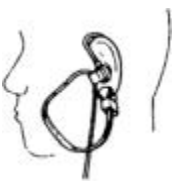
Push in the hook part to the notch.

(2) Place the ear hanger to the ear.

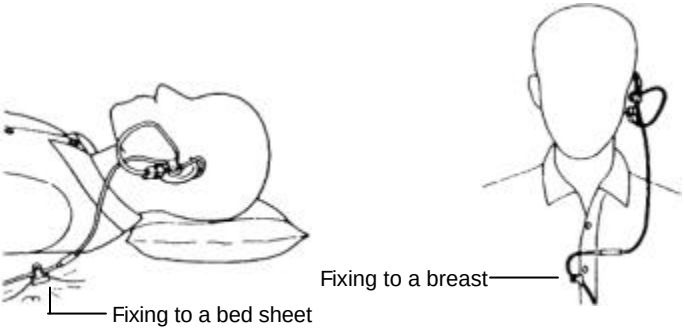
- It is possible to slide the ear hanger up and down.
- The ear hanger can be used on both small and large ear.
- It can be also turned.

(3) Attach the ear clip to the ear.

Before clipping, massage or warm the earlap for good circulation.



Use the ear clip to fix on to the bed sheet or breast as follows.



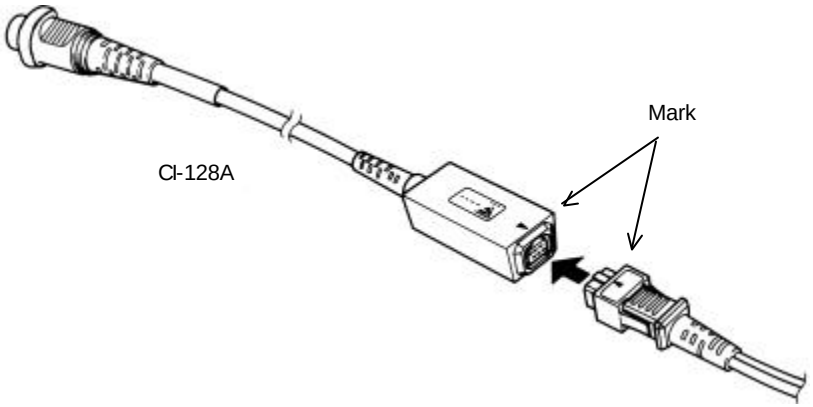
⚠CAUTION

Precautions for Use of CE-5C

- **The CE-5C is designed for use on earlap of an adult. Do not use on neonate or infant.**
- **If measurements are taken over a long period of time, change the measuring site several times a day to prevent rash or low-temperature burn.**
- **Do not use a tape to fix ate the probe. It may cause edema or congestion.**
- **Depending on the pulse condition, it may not be possible to take correct measurements. In such case, use other types of probe and change the measurement site.**
- **To prevent edema or congestion, massage or warm the measuring site several times a day to improve blood circulation.**
- **When removing the probe, do not pull on the cable.**

[7] Connect the SpO_2 relay cable (CI-128A) and SpO_2 probe to the transmitter.

To connect the SpO_2 relay cable (CI-128A) and SpO_2 probe connector, align the marks on the socket box and the SpO_2 connector.



⚠CAUTION

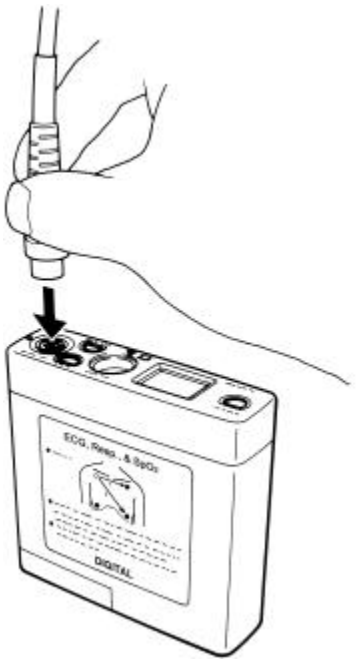
Risk of Burn Injury by the Use of Probe

- **Do not use probes/cables other than those specified by Fukuda Denshi. Use of unspecified probes/cables may cause the probe to overheat, resulting in burn injury to the patient.**
- **If any question on usable probes/cables for this transmitter, contact your local service representative.**

⚠CAUTION

- **The pulse waveform sent from this transmitter is delayed from the ECG waveform. If the pulse waveform is used as a synchronized signal, pay attention to this delay.**
- **Do not use the pulse waveform as a synchronized signal for other equipments.**

To connect the SpO_2 relay cable (CI-128A), align the marks on the cable and the transmitter. Firmly hold the connector part and gently push it in.
When disconnecting the SpO_2 relay cable, do not pull on the wire part. Always hold the connector part.



4. Group Code Setup

The LX-5630 transmits a digitized code which includes the transmitting channel ID and group code to prevent interference from other radio apparatus or a neighboring hospital's transmitter.
There are 64 group codes. Zero ("0") is set as initial setting.
At the receiver side, it is required to set the same group code with the transmitter. (Zero ("0") is set as initial setting at the receiver side.)
The receiver is continuously checking the incoming channel number and group code with the number and code programmed to the receiver.
If changing the transmitter's group code, please contact your local Fukuda Denshi service representative.

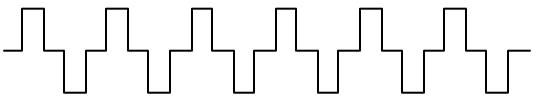
NOTE: The system function to prevent interference will not work if the receiver does not incorporate this function.

5. Receiver Channel Setup

Select the receiver channel at the patient monitor corresponding to the telemetry transmitter. The channel number will be shown on the display. Also, if the group code is set on the transmitter, it should be also set on the receiver. (For details of channel setup and group code setup, refer to the operation manual for the patient monitor on the receiver side.)
If the set channel number does not correspond to the actually received channel number, the monitor will display a cautionary waveform as shown below. This function will prevent interference with other transmitters or external sources.

NOTE: This function will work only if the receiver incorporates the interference detection function.

Example of the DS-5800N telemetry patient's display when interference is present.



This cautionary waveform will also be displayed when a mismatch on group code or channel number occurs.

⚠CAUTION

This radio frequency device is susceptible to interference from outside sources. Depending on receiving signal condition, the waveform may include noise, false pacer spike, etc. To prevent these interferences, it is recommended to install and use the telemetry antenna system.

6. Cleaning and Disinfection

Clean the transmitter, patient cable, SpO_2 relay cables, and SpO_2 probes with gauze or sanitary cotton dampened with alcohol or inert soap. Pay attention not to get cleaning liquid into the patient lead connector or battery compartment.

Do not use cleaner containing organic solution, thinners, toluene, or benzene.

Do not autoclave or heat the equipment and patient cable above 60 °C.

When the room is disinfected by spraying, take proper measures so the chemical solution does not get into the connector or enter the equipment.

7. Maintenance and Inspection

Items in this section include routine daily and periodic checks of the equipment to ensure it is operating properly.
It is recommended that to maintain the safety and reliability of functions and performance of the equipment, the daily and periodic checks given in this section be followed.

⚠CAUTION

- **Do not open the housing or attempt service. Refer service to Fukuda Denshi.**
- **Do not allow excessive moisture or cleaning agents into the connectors or inside the equipment.**

■Daily Check

Perform daily checks in accordance with the recommended daily check list.

No.

Date **Checker** **Installation Place**

Unit LX-5630 **S/No.** **Purchase Date**

Items	Details of the Check	Criteria	Judgement
Appearance	Visually check for any damage, cracks, chink, chips and peeled nameplate on the housing.	No abnormality should be found.	☐OK ☐NG
Battery Compartment	Visually check the connecting spring inside the device and battery cap.	Spring should not be transformed, deformed or rusted.	☐OK ☐NG
Power	Turn ON/OFF power to verify proper switch operation.	With battery installed, the LCD will display.	☐OK ☐NG
ECG Connector	Visually check for connector of main unit and patient cable.	No scratch ,chips, dust should be found.	☐OK ☐NG
Patient Cable	Visually check the wire coating of patient cable.	No cracks, kinks, or damage should be found.	☐OK ☐NG
SpO_2 Relay Cable	Visually check the cable sheath and connectors.	No cracks, kinks, or damage should be found.	☐OK ☐NG
SpO_2 Sensor	Visually check for cable sheath sensor and connectors.	No cracks, kinks, dust, damage should be found.	☐OK ☐NG
Wireless Channel	Visually verify the transmit channel ID, and group code. Follow instructions of the wireless channel manager for the receiver.	Must correspond with wireless channel check list.	☐OK ☐NG
Operational function	Turn ON the power and make sure the operation is normal.	Waveform is received without any problem.	☐OK ☐NG
Display function	Turn ON the power and verify the SpO_2 data, bargraph, etc. is properly displayed.	All data should be properly displayed.	☐OK ☐NG
Periodic Check	Check the date of previously performed periodic check.	Should be within one month.	☐OK ☐NG

8. Specifications

Parameters	: 1 or 2 channel ECG, respiration, SpO_2, Pulse waveform
ECG input impedance	: 50 MO or above
ECG max. input range	: +/- 5 mV
ECG freq. response	: 40 Hz (refer also to the receiver filter)
ECG time constant	: 0.8 seconds
Resp. measurement	: Impedance pneumography
Resp. sensitivity	: 1 cm/O when patient monitor sensitivity is "1"
Resp. meas. current	: 84kHz, 100 μA or less
SpO_2 meas. range	: 0 ~ 100%
SpO_2 meas. method	: Two light wavelength, pulse waveform
SpO_2 accuracy	: 70 ~ 100% : +/-2% 0 ~ 69% : not specified
SpO_2 meas. time	: Approx. 5 sec.
SpO_2 built-in alarm	: Lower limit fixed to 90%
LCD display	: SpO_2 value, pulse amplitude, electrode off, low battery, SpO_2 alarm OFF, SpO_2 alarm status, SpO_2 alarm lower limit, SpO_2 meas. status, operation mode.
Alarm sound	: SpO_2 alarm, low battery alarm
Defibrillator protection	: By protection circuit in the ECG patient cable
Status information	: Electrode off, low battery, event switch, pacemaker detection, channel ID, 64 group codes, SpO_2 probe off
Transmission freq.	: 608 to 614 MHz
RF output power	: 1.0 mW +/-2 dB
Channel spacing	: 12.5 kHz
Occupied band width	: 8.5 kHz
Modulation mode	: Digital, Frequency shift keying
Power source	: Two 1.5 V AA size alkaline battery
Battery polarity protection	: Mechanical reverse polarity protection
Battery life	: 3 days continuous, 5 days intermittent SpO_2 operation, 6 days for ECG & Resp. only
Water proof	: Water-resistant

Weight	: Approx. 190 g (including battery)
Dimensions	: 94 (W) x 90 (H) x 26.5 (D) mm
Operating temperature	: 10 to 40 °C
Operating humidity	: 30 to 85 % RH (without dew condensation)
Storage temperature	: -10 to 60 °C
Storage humidity	: 10 to 95 % RH

⚠CAUTION

Specifications are subject to change without prior notice.

9. Accessories

■ Standard Accessories

No.	Name	Model	Quantity	Remarks
1	SpO_2 Relay Cable	CI-128A	1	
2	Pouch	AB-101	2	
3	Security Strap	OB-25	1 kit	
4	Battery	LR-6	2	
5	Patient Cable	CM-85C	1	
6	Instruction Manual		1	

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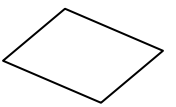
4 	5 	6 

■ Optional Accessories

No.	Name	Model	Note
7	Patient cable	CM-85B	For single ECG lead and respiration.
8	Patient cable	CM-85C	For two ECG lead I, II and respiration.
9	Patient cable	CM-85D	For dual ECG for any two channel differential ECG and respiration, five -electrode type.
10	SpO_2 probe for finger	SR-5C	For adult, reusable
11	SpO_2 probe for finger	TG-25 (SP-5C)	For adult, reusable
12	SpO_2 probe for universal	TG-26 (UD-5C)	Universal
13	SpO_2 probe for finger	SD-5C(25)	For adult, semi-disposable
14	SpO_2 probe for finger	SD-5C(20)	For pediatric, semi-disposable
15	SpO_2 probe for earlap	CE-5C	

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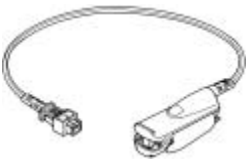
10 	**11** 	**12** 
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FUKUDA DENSHI CO.,LTD.

Head office : 39-4, Hongo 3-chome, Bunkyo-ku, Tokyo, Japan

Phone : -81-3-3815-2121

Fax : -81-3-3814-1222

4L3381 200306