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**Introduction**

The YD-F-285TR transport infant incubator is the ideal life support equipment for infants requiring closely monitored and controlled environment on the road. Coupled with microprocessor and a compact physical design, the YD-F-285TR allows medical crews to move the incubator in and out of the ambulance or emergency vehicle with great ease and convenience. Each unit shipped is endorsed by the ISO9000 certified production line at YON DON’s factory and customers can rest assured of the highest standard on the YD-F-285TR incubators.

*Sample illustration of YD-F-285TR*
*Actual product may appear different.*
Features and Specifications

Control System
1. Digital microprocessor based control system
2. 3-Level over-heating protection mechanism
3. Motor failure detection
4. Skin sensor failure detection
5. Power failure detection
6. Reminder audio alerts every 15 minutes if actual air/skin temperature does not reach within 1 degree range of the set temperature
7. Advanced programmable heating parameters for different ambient conditions
8. Touch keys for easy control settings
9. Water-proof control panel film to protect against spills or splashes
10. Large LED displays for easy readings on incubator status

Closed Environment Compartment
1. Durable and transparent acrylic provides great visibility to infant
2. Convenient access ports reduce air temperature fluctuations
3. Double-wall minimizes temperature fluctuations (optional feature)
4. Soft mattress provides comfort to the infant
5. Advanced air circulation system to provides best exchange and distribution of heat and air/oxygen
6. Spacious compartment provides room for oxygen hood (hood is optional)
7. Convenience ports available to allow secure pathways for skin probes, oxygen tubes, and etc
8. Front door allows transporting infant in/out of the incubator with great ease
9. Tilt-enabled compartment provides maximum access to interior of the compartment

Mobile Stand
1. Durable swivel casters with lock provide great maneuverability
2. Strong stainless based stand with adjustable heights
3. Round hand rails provides great ease of handling when mobilizing
4. Oxygen cylinder holder available

Indicators
1. SKIN TEMP. LED
   Displays infant skin temperature when skin sensor is properly attached to the infant and SKIN TEMPERATURE control mode is in operation. Display range is from 20.0°C to 44.0°C.
2. AIR TEMP. LED
   Displays incubator air temperature. Display range is from 20.0°C to 44.0°C.
3. **SKIN CONTROL LED**
   Indicates current operating mode is SKIN CONTROL. Incubator will adjust temperature and heat output according to the infant’s skin temperature.

4. **AIR CONTROL LED**
   Indicates current operating mode is AIR CONTROL. Incubator will adjust temperature and heat output according to internal air temperature.

5. **HIGHT TEMP. LED**
   Indicates the current temperature is higher than selected temperature.

6. **LOW TEMP. LED**
   Indicates the current temperature is lower than selected temperature.

7. **SENS FAIL. LED**
   Indicates a failure in detecting a functional skin sensor.

8. **SET TEMPERATURE LED**
   Indicates the current temperature setting for the incubator.

9. **HEATER OUTPUT LED**
   Indicate the current amount of heat transferred into the incubator via heated air. See figure for illustration.

   ![Heat Output Diagram]

10. **MOT FAIL. LED**
    Indicates the incubator is detecting a non-functional motor.

11. **OVER 37.3 LED**
    Indicates the incubator is detecting temperature higher than 37.3 °C and heat output is reduced to zero output.

12. **HIGH-H TEMP LED**
    Indicates the incubator is detecting high temperature (38 °C) and the highest level of fail-safe mechanism is activated to cut off power supply to the heater. This prevents risk of over heating the internal air in case of a malfunctioning system.
**Controls**

1. Power Switch
   - Turns on/off power

2. Upper Arrow Button
   - Increment digits when setting the control temperature
   - Increment digits for internal control parameter adjustments

3. Lower Arrow Button
   - Decrement digits when setting the control temperature
   - Decrement digits for internal control parameter adjustments

4. Set Button
   - Saves current setting changes when pressed
   Note: If Set button is not pressed, changes made are saved.

5. Mute Button
   - Silences current audio alert

6. Air/Skin Button
   - Switches operating mode between Air or Skin control

**Power System**

1. Transport Incubator Power Cable
   - Incubator power cable can plug into wall outlet power source
   - Alternatively incubator power cable can plug into inverter (inverter receives power from battery)

2. Inverter Power Cable
   - Connects to battery

3. Charging Unit Power Cable
   - Charger power cable can plug into wall outlet power source to charge battery and supply power to incubator simultaneously
   - See Charging Unit details for instructions

4. High-Capacity Rechargeable Battery
   - Provides at least 2.5 hours of power supply to transport incubator when fully charged
   - Battery life can vary depends usage
   - Output 12V, 57AH with input (charging) 220V
   - Battery is maintenance-free
   - 4 Fuses for the POWER PACK
   - The POWER PACK also serves as an UPS (Uninterruptible Power Supply) when it is plugged to the socket outlet and is connected to the incubator

YD-F-285TR Transport Incubator
5. Charging Unit
   - Charges battery when unit is plugged in to a wall outlet power source
   - Supplies direct power from wall outlet power source to incubator
   - When disconnected from wall outlet, supplies power to incubator from battery

**WARNING:** When the voltage from electrical outlet is unstable or below specified voltage, the charger may not function correctly. Particularly if the power source does not deliver the specified voltage, the charger may not be able to supply electricity to incubator while charging the battery. When unstable power is in use, incubator control system may frequently activate audio alarm indicating power failure or temperature alarm. Operator should plug both incubator and charging unit to separate electrical outlets at the same time so that battery can still be charged and incubator can also function despite lower voltage from wall outlet. Incubator has higher tolerance to unstable wall outlet power sources.

6. Power Inverter Unit
   - Converts DC power to AC power for incubator use
Operational Instructions

Power Supply

1. Standard Indoor Operation
   Please connect the power cables as illustrated in the diagram below. Note that this is the standard way of operating the incubator whenever an electrical outlet is available. However, if a power outlet is not available, the incubator will run on the battery until the battery is drained. Therefore, it is recommended that the charger’s power cable is always connected to an electrical outlet to keep the battery charged at all times so that the transport incubator is always ready for emergency situations.

2. Mobile
   Simply disconnect the charger’s power cable to the electrical outlet and check the battery meter to see if there is enough power in the battery.

3. By Pass
   In cases when a stable voltage is not available or charger malfunctions, operator may choose by-pass mode. Charger will charge the battery as long as it is connected to an electrical outlet even if the voltage is a little off the specified volt.
**Operating Mode**

After the power supply has been connected, turn on the Power Switch.

1. **Air Control**
   - This is the default mode as soon as power is turned on. Press button and hold for 3 seconds to switch between Air or Skin control mode.
   - Press button to silence the audio alarm. Upon powering up the incubator, low temperature alarm usually sounds due to low initial air temperature.
   - Refer to Temperature Adjustment for changing control temperature.
   - If the skin probe is attached, the SKIN CONTROL will still display skin temperature even if AIR CONTROL mode is the current operating mode.

2. **Skin Control**
   - A functional skin probe must be attached to the socket properly before the skin control mode can be selected. If a working skin probe cannot be detected, the incubator’s risk prevention mechanism will switch to air control mode.
   - Press button and hold for 3 seconds to switch between Air or Skin control mode.
   - Refer to Temperature Adjustment for changing control temperature.

**Temperature Adjustment**

The following steps illustrate the procedures to change control temperature

1. Press button and hold for 3 seconds to enter setting mode.

2. Press upward arrow (↑) to increment or downward arrow (↓) to decrement the control temperature.

3. Observe the current setting on the SET TEMPERATURE display.

4. When the desired temperature is selected, press set button again to save the setting and exit setting mode.

**Temperature Alarm Setting**

The incubator’s factory default settings are 1.0. See the following chart for illustration. Assume the control temperature is set at 35.5 °C.

<table>
<thead>
<tr>
<th>Actual Temperature Reading</th>
<th>Temperature Alarm Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 36.5 °C</td>
<td>High Temperature Alarm sounds</td>
</tr>
<tr>
<td>35.5 ─ 36.5 °C</td>
<td>Silent (Temperature within control range)</td>
</tr>
<tr>
<td>= 35.5 °C</td>
<td></td>
</tr>
<tr>
<td>34.5–35.5 °C</td>
<td>Low Temperature Alarm sounds</td>
</tr>
<tr>
<td>&lt; 34.5 °C</td>
<td></td>
</tr>
</tbody>
</table>
1. To change High Temperature Alarm range, hold UPWARD ARROW button and SET button for 3 seconds. Then release the two buttons to enter the setting mode. Adjust the range from 0.1 ~ 3.0 and press SET button when done. Note that 0.0 range means the High Temperature Alarm is disabled.

2. Low Temperature Alarm range adjustment can be performed in similar way. Hold DOWN ARROW button and SET button for 3 seconds. Then release the two buttons to enter the setting mode. Adjust the range from 0.1 ~ 3.0 and press SET button when done. Note that 0.0 range means the Low Temperature Alarm is disabled.

**Using Transparent Compartment**

1. Transport Compartment

2. Front Door

3. Convenient Ports
4. Access Ports

5. Irish Port

**Attaching Skin Probe**

1. Insert the skin probe into the socket. See the illustration below.

2. Keep the skin probe sensor head to the infant. Make sure the flat metal side of the sensor head is in complete contact with the infant. See illustrations below.
Using Transport Stand

1. Lifting Transport Stand
   When lifting the whole transport system (incubator with stand), be sure to hold the lower handrail of the transport stand. See illustration below.

2. Adjust Transport Stand Height
   - Full Height -> Mid Height -> Low Height
3. Moving Transport Stand
   • Make sure the two side handles of the incubator are securely fastened to the stand with straps. See illustration below.
   • Hold the upper handrail of the stand to move. Make sure all casters are unlocked before mobilizing.

4. Using Oxygen Cylinder Holder
   See the illustration below.

   Secure the bottom first.

   Lock cylinder top.
**Power Pack Safety**

1. Operating Procedures
   - When not in use, turn off incubator’s power switch to prevent over discharge of battery power.
   - Use the right charging/discharging settings to ensure the battery’s quality and capacity.
   - The battery is maintenance-free; it strictly **forbids** adding water into the battery and using any metal such as steel wire brush to connect or clean the terminals.
   - Do not put anything on the top of the power pack. Keep metallic object out from battery terminals to prevent short-circuiting, which may lead to battery acid leakage, battery heating up, or fire.
   - Keep the power pack dry and away from water or seawater.
   - Avoid exposure of battery to direct sunlight.
   - The power pack is heavy and must be firmly secured to the transport stand in order to prevent injuries or damages caused by falling battery. Any impact to the battery can affect the power pack’s overall performance.
   - If the battery is damaged physically or by short-circuit, acid may leak from the container. Damaged battery must be properly disposed to avoid health risks from the leakage of poisonous acid.
   - Placing battery upside down could cause sulfuric acid to leak out.
   - The battery loses efficiency gradually due to slow and irreversible chemical reactions and self-discharging over time. If the battery is stored and not used for more than a year, its capacity will reduce significantly and may not be usable for transport incubator. Regular charging and discharging may prolong the life of the battery.
   - Replacement of the battery is required when the battery capacity is below 50%. We recommend that the battery to be replaced once every year to ensure that adequate battery capacity for the purpose of the transport incubator is always available.
   - If you encounter unusual behavior from the transport incubator or the power pack system, immediately terminate the operation of the equipment to ensure the safety of all personnel and equipment.

2. Dangers
   - Do not store the battery inside any equipment. The battery must be placed in a place with good ventilation. Improper storage of battery may increase the risks of battery explosion and severe injuries to nearby people.
   - Battery must be kept away from any source of heat or flame to prevent battery ignition or even explosion. All power cables connected to the battery must be well insulated in order to prevent short-circuiting. If short-circuiting occurs, smoke or even a fire may result from the battery.

3. Warnings
• Do not burn the battery or throw it into a fire. Doing so may cause the battery to explode and toxic gas may be released.

• There is sulfuric acid inside of the battery. Please use water for cleaning if skin or clothes have been in contact with the acid. If acid gets into your eyes, use ample clean fresh water to flush your eyes and seek medical attention immediately.
Additional Operational Notes

Pre-Operation Procedures

1). Warning

(1) Before inserting into the electrical outlet, make sure the power switch is in off position.

(2) Before heading out for emergency, make sure a) the internal temperature has risen up to the pre-set temperature. b) The power pack is recharged fully.

(3) Power cord of Incubator also can be plugged into other electrical outlets without through the power pack. Caution: a) Only correctly electrical outlets should be used. b) Before putting infant into the incubator, turn on the machine and make sure the temperature inside the incubator has risen up to the pre-set temperature.

(4) Please make sure a three-hole electrical outlet is used. If it is not a three-hole outlet, the plug of the machine will no be able to fit in. If recklessly change the three-hole plug into a two-hole one, it may lead to the damage of the machine of electrical leakage.

(5) There are four tags on the power cord indicating correct connection. Please do not damage the tags and ensure correct connection. Caution: Please match the voltage of the electrical outlet with the voltage indicated on the tag. If the voltage is mismatched, the machine will be damaged

(6) Caution when placing the incubator:
[a] Do not place it under the direct sunlight for a long time.
[b] Do not place it near the heater or the outlet of the air conditioner.
[c] A place with the temperature around 25°C to 28°C, degree of humidity 65% and good circulation of air is ideal for the machine.
[d] The normal operating temperature of the incubator is 32°C to 34°C with the degree of humidity 55% to 65% RH.
Maintenance

A. Attention-Before cleaning the machine
(1) Before washing the machine, make sure the circuit is not connected.
(2) To wash the machine, simply use water and wipe it with a cotton cloth. To sterilize the machine, a germicide lamp can be used (Please refer to our company’s product : model YD-P-311). If using the sterile solution for cleaning, please use 2/1000 portion of the BENZALDONIUM CHLORIDE SOLUTION or BENZETHONIUM CHLORIDE SOLUTION to dilute the sterile solution. Do not clean the machine with undiluted sterile solution or sterile solution that is not fully diluted (ie. Solution that is not well mixed). After using the sterile solution, use water and a cotton cloth to clean out the residual sterile solution.
(3) Do not use alcohol based sterile solution for cleaning.
(4) If a germicide lamp is used for sterilization, place the lamp inside the incubator and use a dark color cloth to cover the incubator during sterilization. The ideal sterile period when using the germicide lamp is 5 minutes. Do not look into the germicide lamp when it is operated.
(5) After the incubator is used, a foul smell may develop which can be decreased by putting active-carbon into the incubator. (About 100g, and warped with cloth) can be put inside the incubator and used as deodorant.
(6) The micro-organism filter can not be cleaned by washing. Please replace the filter every three months as a rule, while admitting that the useful life of the filter depends on the air contamination level and usage frequency. See the illustration below.

B. Cleaning the exterior
(1) Please use a dry or damp cotton cloth to wipe the acrylic hood, control unit and cabinet. Caution: When cleaning the exterior, do not use a cloth that is too wet in order to prevent any leakage of water into the control unit (Especially when wiping the control panel) that will lead to the damage of the machine.
C. Cleaning interior units
(1) Cleaning the mattress : take out the sponge pad and wipe it with a damp cotton cloth.
(2) Cleaning the acrylic bed : wipe it with a damp cotton cloth.
D. Replacement of micro-filter
(1) Remove the micro-filter carefully to prevent dust on it from scattering. Wipe thoroughly clean the surface and mounting portions of the filter cover with soft cloth. And then fix a new one in position and screw the filter cover back on.
E. Skin Temperature probe
(1) Clean it lightly with soft dry cloth.
(2) To disinfect the sensor element of the skin temperature probe, clean it with soft cloth soaked with detergent disinfectant solution.
(3) Be sure to store the skin temperature probe in its case when not in use.
(4) Caution: Alcohol must not be used to clean the skin temperature probe to avoid the hardening of the material.

**Caution:**
(1) The incubator must be clean and has its maintenance regularly.
(2) For proper operation of the machine, please do not put anything which could block the air circulation near the air vents.
(3) For changing the consumable units (or damaged units), please use the standard units from our company to ensure the proper operation of the machine. Our company is not responsible for any damage that is caused by using improper units.
Trouble-shooting

Please check the following point before requesting repair service when find troubled.

A. Power Unit
   a) Power switch dose not light:
      1. Power switch in “OFF” position?
      2. Power disconnected from the electrical plug?
      3. The incubator circuit breaker?
      4. The fuse circuit breaker?
      5. The battery is out of power? or the hospital circuit breaker not interrupting circuit?
   b) Power failure alarm persists when charging unit is connected to an electrical outlet.
      1. Charger unit requires stricter voltage and it is possible that the electrical outlet is not supplying required voltage. For example, if the charger unit requires 230Volts and the electrical outlet only supplies 220Volts, then the charger may not be able to function correctly. When this happens, make sure that your electrical outlet supplies the specified power, or alternatively you can choose to connect both the incubator’s power cable and the charger unit’s power cable to electrical outlets at the same time. This will ensure battery is being charged and incubator functions within parameter.

B. Incubator Temperature:
   a) The temperature dose not rise:
      1. The temperature setting proper?
      2. The power voltage is low?
   b) The temperature rises too high:
      1. The temperature setting proper?
      2. The skin temperature probe attached to infant?
      3. The diaper gauze clogged the air vent?
      4. The air-circulating fan stopped?
   c) Digital skin temperature indicator dose not function Properly:
      1. The temperature probe inserted firmly into skin temperature connection?
      2. The skin probe have attached to infant abdomen securely with tape?
      3. The skin probe into lukewarm water (30℃ -40℃) for check the indicator displays skin temperature accurately, and find what shall be changed.
   d) Inaccuracy of the temperature control may be caused by:
      1. Incorrect placement of the acrylic mattress board. Please make sure it is placed flat.
      2. Incomplete closure of the acrylic hood. Check to see if anything is interfering the closure.
      3. Fail to close the acrylic front door or the hand ports. Please ensure closure of both.
      4. The blockage of the air vents. Please remove the blockage.
      5. Pre-set temperature is too high or too low. Please adjust the pre-set temperature.

YD-F-285TR Transport Incubator
6. Problems in the control unit. Please contact our company or the dealer for check-up or repair.

e) Inaccuracy of temperature indication may be caused by:
   1) Under the operation of the internal temperature control model:
      1. Blockage of the air vents. Please remove the blockage.
      2. The surface of the sensor is not clean. Please wipe the sensor.
      3. The damage of the sensor or the control unit. Please contact our company or the dealer for check-up or repair.
   2) Under the operation of the skin temperature control:
      1. The skin probe is not well attached or attached properly to the control unit. Please follow the instructions to re-attach the skin probe on the infant’s skin.
      2. The surface of the skin probe is not clean. Please wipe the skin probe.
      3. The damage of the skin probe or the control unit. Please contact our company or the dealer for check-up or repair.

C. Oxygen concentration does not rise:
   1. Oxygen flow rate in flow meter?
   2. Oxygen has been accurately supplied?
   3. The power unit positioned correctly?
   4. The filter cover has fixed?
   5. The micro-filter could filter element?

D. Others
   a) Fail to cancel the warning signal may be caused by:
      1. The power supply is not connected. Please follow the instructions to connect the power supply.
      2. Fail to have electricity supply from the outlet or the voltage is incorrect. Please check the voltage of the outlet.
      3. The fuse is not inserted or the fuse is failed. Please follow the instructions to insert or change the fuse.
      4. Problems in the mute control key. Press the mute control key again.
      5. Internal temperature is too high (the warning signal will light on). Please refer to Problem Solving: B. d). Inaccuracy in temperature control.
      6. The damage of the fan or the control unit. Please contact our company or the dealer for check-up or repair. Stop to use.

   b) The warning signal fails to sound may be caused by:
      1. Applying the mute control key. Have to wait till another emergency condition for the warning signal to sound again (except under special condition).
      2. The damage of the mute control key or the control unit. Please contact our company or the dealer for check-up or repair.
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Warranty Service. If the system has been working until recently, please contact your agent (the company that sold the system to you) first. We will be more than glad to help should you require further assistance after contacting your local agent.

Thank You
YON DON ENTERPRISE CO., LTD.

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YD-F-285TR Transport Incubator
Appendix

1. Assembly diagrams, starting from next page for a total of 4 pages.
   • First page: The exterior of Transport Incubator.
     Note: The control panel box (Item No. TR-7/Parts No. TR2850) is old model. The correct one; please refer to the second page. The I.V pole (Item No. TR-9/Parts No. TR7761) is optional accessory.
   • Second page: Control Panel Box.
   • Third page: I.C. Hood.
     Note: The Item Nos. TR-1-28, 34 & TR-14-34~36 (Parts No. 2320, 2321 & 2315, 2316 & 2313) are optional, and available if Double Wall of IC Hood is purchased.
   • Fourth page: Transport Stand.