# OPERATING INSTRUCTIONS


**SMART SUPPORT SURFACE™ (SSS) Using Real Time Pressure Monitoring (RTPM) Sensor Technology**

# MODEL K-Z

## HYBRID ROTATION & TRUE LOW AIR LOSS SYSTEM

## OPERATING INSTRUCTIONS MANUAL FOR ALL K-Z MODELS

**US & INTERNATIONAL PATENTS PENDING**

GATEWAY TO THE FUTURE

KAP MEDICAL™

An FDA Registered Company, Products are FDA listed.

**1395 Pico Street**
**Corona, CA 92881**
**951 340 4360**
**FAX 340 4361**

**Email: kapmedical@kapmedical.com**
**www.kapmedical.com**

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## DANGER:

**♦EXPLOSION HAZARD♦**

**DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS**

## Caution:

- Do not use in the presence of smoking materials or open flame. Air flowing through air mattress will support combustion.
- Risk of electrical shock, do not remove control unit cover.
- Refer servicing to qualified service personnel.
- Equipment should only be connected to a properly grounded three pronged wall outlet, using 10~14 foot (305~427 cm) hospital grade power cord provided with the product.

## Warning:

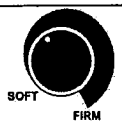
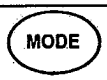
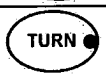
- Never drop or insert any object into any opening of the control unit.

## MANUFACTURER'S LIABILITY

KAP MEDICAL'S original warranty on K-Z HYBRID ROTATION & TRUE LOW AIR LOSS SYSTEM will remain in effect during the warranty period, provided any changes, readjustments, or repairs have been carried out by a factory authorized service center or a technician of KAP MEDICAL, or whenever the control unit and mattress system has been used according to the following operating instructions.

KAP MEDICAL'S liability under the warranty is the repair or replacement provided and, in no event, shall KAP MEDICAL'S liability exceed the purchase price paid by the customer for the product. Under no circumstances shall KAP MEDICAL be liable for any loss, direct, indirect, incidental, or special damages arising out of or in connection with the use of this product.

## EXPLANATION OF SYMBOLS USED ON THIS DEVICE

| SYMBOL | EXPLANATION |
|---|---|
|  POWER | Turns unit On / Off. |
|   | Turn clockwise or counter clockwise to adjust patient comfort pressures levels. |
|   | Turn clockwise or counter clockwise to set desired Times or Angles. |
|   MODE | Selects appropriate patient therapy mode. |
|   Max Flow | Inflates mattress rapidly (15 minute timer). |
| Upright | Boosts 15~25 % more air pressures in the mattress during fowler position to avoid patient bottoming out. |
|  LOCK | Locks out all control unit functions to prevent patient settings tampering. |
|  | Puts current function in Pause mode. |
| O Power Fail<br>Low Pressure | Power failure or if the hose is disconnected an audio /visual alarm will sound. |
|   | To achieve auto patient pressure profile. |
|   | Selects appropriate patient rotation cycle. |
|  ALARM SILENCE | Mutes audio alarm. |

| | |
|---|---|
|  | **Indicates the point of attachment of the equipment to earth (Grounding Point).** |
|  | **Attention: Instructs end user / care giver / operator to refer to the manual.** |
|  | **Indicates that the degree of protection against electrical shock is TYPE BF.** |
|  | **Not for use in presence of flammable anesthetics.** |
|  | **Risk of electrical shock, do not remove back cover.** |

## K-Z HYBRID ROTATION WITH TRUE LOW AIR LOSS SYSTEM

### SMART SUPPORT SURFACE™ (SSS) Using Real Time Pressure Monitoring (RTPM) Sensor Technology

**K-Z SYSTEM (Figure-1 on page 16):**
The K-Z System is a HYBRID ROTATION WITH TRUE LOW AIR LOSS control unit with a mattress. The unit is used to inflate a mattress replacement system. The control unit is designed to provide continuous ROTATION WITH TRUE LOW AIR LOSS pressure at required patient comfort levels. The ABS/PVC blended enclosure houses a high capacity output air blower, a quick disconnect coupling connector, 14 foot detachable hospital grade power cord, display panel, and a CPR label.

The mattress replacement system (B) is comprised of a durable Cordura base (C) with a safety 2" convoluted foam or air base, 5" or 8" (inflated) detachable air cushions (T), and covered with a vapor permeable, water proof, low friction and low shear nylon quilted top sheet (E) with zipper or straps to fasten the top sheet to the mattress base. The complete mattress system has 6~10 straps (F) in several areas so it can be easily fastened to any size hospital bed.

## K-Z HYBRID ROTATION WITH TRUE LOW AIR LOSS SYSTEM FEATURES

### CONTROL UNIT (A) {Figure - 2 Page 17}:

- High capacity air output, 45 CFM (1275 LPM), and quiet operating control unit. Max flow mode (W) inflates mattress in 30~60 seconds depending on the size of the mattress. Has 15 minute Max Flow timer.
- State of the art micro-controller technology unit for accurate patient comfort pressure values and TURN times.
- Highly visible and bright back lit 4x20 character LCD (D) digital display panel (G) displaying current mode (H), Turn times, count down timer (I), and desired patient comfort pressure level (Z).
- Ergonomically designed and easy to operate attractive patient comfort control (K) and mode and turn parameters setting (L) knobs, to set mode parameters and comfort levels. The knobs retract into the display panel cavity to avoid tampering and also to protect the knobs from damaging.

- 0~31 mmHg pressure levels of patient comfort control with bar graph (Z) display.
- Front panel (G) has power switch (PS), and desired comfort pressure level.
- Therapy (Static) mode LED.
- Turn (Rotation) mode (LED) (N).
- Integrated handle/hanger (P) for easy carrying and hanging of the control unit from the footboard of the bed.
- Lock Switch (LO) to lock out all control functions.
- 10~14' (305~427 cm) long detachable 16~18 AWG hospital grade power cord (Q).
- Durable and attractive quick connection and disconnection (CPR deflation) Magnetic connector (R) with three ½" flow ports with RTPM (real time pressure monitoring) technology sensor ports.
- Control unit has short circuit / over voltage protection with single/dual fuse (S) shown in the picture.
- Patient Set-Up (SU) is used to enter patient weight and height for auto patient comfort pressure profile.
- II (Pause) (PZ) to pause rotation or therapy.
- Power Fail (PF) LED flashes to indicate power outage.
- Alarm Silence mode (AS) to mute audio chime.
- Molded ABS enclosure.

**SUPPORT SURFACE (MATTRESS) (B) {Figure - 1 Page 16} WITH US & INTERNATIONAL PATENTS PENDING Z AIR CUSHIONS:**

- Self contained mattress replacement system / mattress overlay system (B) with easily detachable components for cleaning.
- Detachable urethane coated, 70 Denier nylon taffeta, flame retardant / water repellent, mildew resistant, low friction and low shear, 5" or 8" high (inflated) detachable lateral tubular air Z cushions (T) (20~21), removable air cushions.
- Two safety side air bolsters to contain patient inside the mattress during rotation mode.
- Two bottom rotation boost bladders to achieve additional rotation angle.
- Detachable zippered or strapped highly breathable urethane coated, 70 Denier nylon, flame retardant / water repellent, highly vapor permeable, anti-microbial, low friction and low shear quilted reusable top sheet (E).
- 2" safety air pad or convoluted safety foam pad enclosed in the base (C) to support the patient in the event of loss of air pressure in the mattress.
- The mattress has hose assembly (V) with easy to use quick connect and disconnect magnetic connector (R).

## TECHNICAL SPECIFICATIONS

### ELECTRICAL SPECIFICATIONS

| | U.S. / INTL. |
|---|---|
| **Input Voltage AC:** | 90 / 240 V |
| **Input Frequency:** | 60 / 50 Hz |
| **Inrush Current:** | 2A |
| **Maximum Power Consumption:** | 150 ± 20 W |
| **Circuit Protection:** | Single/Dual fused, 250V, 5A fast blow fuse(s). |
| **Mode Of Operation:** | Continuous |

### PERFORMANCE SPECIFICATIONS

Weight Capacity:

Standard Mattress: 360 Lb. (160 Kg.) maximum.
Bariatric Mattress: 1000 Lb. (455 Kg.) maximum.

| | U.S. / INTL. |
|---|---|
| Pressure Zones: | 2 |
| Max Flow: | 1275 LPM (45 CFM) |
| Max Flow Timer: | 15 minutes |
| Min Pressure: | 4~12 mmHg |
| Max Pressure: | 28~38 mmHg |
| Support Surface Inflation Time: | 20 to 60 seconds. |

Patient Comfort Pressures / Rotation Parameters

| | |
|---|---|
| Soft Pressure: | 6 ± 4 mmHg |
| Firm Pressure: | 32 ± 6 mmHg |
| Turn Times: | 5 Minutes ~ 4 Hours. |
| Rotation Angle: | 0~40 degrees |

Patient Contact:

Control unit and the mattress have **Latex** free components.

MECHANICAL SPECIFICATIONS

Control Unit (A)

| | |
|---|---|
| Dimensions, LxWxH: | 12" x 5 3/4" x 10 .5" (29.54cm x 14 x 27cm) |
| Weight: | 9 lbs. (4 Kg.) |
| Power Cord: | 14' Long Hospital Grade |
| Connection: | ½" flow magnetic quick connector |
| Packaging: | 1piece/box |

**Air Filter:** Charcoal Air Filter with Fire Retardant.

⚠ **PLEASE CLEAN FILTER EVERY 5 MONTHS OR WHENEVER DIRTY. Remove 2 thumb screws and separate filter foam from filter cover. Wash filter foam using soap and water, dry and replace filter back with the filter cover on the unit and fasten screws.**

Support Surface (B)

Air cushions are R.F. welded, liquid proof and washable.
Base is liquid proof and washable.
Top Sheet is low friction, low shear force producing, breathable, liquid proof and highly vapor permeable.

| Description | Inflated Dim. LxWxH | Weight |
|---|---|---|
| Mattress: | 80"x36"x10" (203x89x25.5cm) | 23 lbs. 10.5 Kg. |
| Packaging: | 1 Piece per Box | |

ENVIRONMENTAL SPECIFICATIONS

**Operating Conditions:**

| | |
|---|---|
| Ambient Temperature: | 40° ~ 104° F<br>10° ~ 40° C |
| Relative Humidity: | 30% ~ 75% Non-Condensing |
| Atmospheric Pressure: | 700 hPa to 1060 hPa |

**Storage And Shipping Conditions:**

| | |
|---|---|
| Ambient Temperature: | -40° ~ 158° F<br>-40° ~ 70° C |
| Relative Humidity: | 10% ~ 100% |
| Atmospheric Pressure: | 500 hPa to 1060 hPa |

**Protection Against Harmful Ingress Of Liquids:**

Ordinary Protection (IPXO)

**Mattress Sanitation:**

Complete support surface is made out of superior quality materials and is modular in construction, all components such as manifold, hose assembly, air cushions, top sheet, and foam base are interchangeable and can be easily cleaned or detached for laundry.

## SAFETY AGENCY APPROVALS

ETL Listed:


To standard for safety of Medical Electrical Equipment

Conforms To: UL STD 2601-1 with respect to Electrical Shock, Fire and Mechanical Hazards

Certified To: CAN/CSA STD C22.2 No. 601.1

CE Mark: CE

## FDA REGISTRATION

FDA registered company as a manufacturer and as a contract manufacturer.

KAP MEDICAL'S quality system meets the requirements of FDA 21 CFR, PART 820-Good Manufacturing practices for medical devices and ISO 9001.

Products are FDA listed.

## SAFETY INSTRUCTIONS

- To avoid damaging your K-Z control unit (A), before operating be sure the AC power (X) available at your location matches the power requirements printed on the boiler plate label (Y) on the back of the control unit.

- To avoid electric shock, always plug in the power cord of the control unit into a properly grounded power source (X).

- Do not insert items into any openings of the control unit (A). Doing so may cause fire or electrical shock by shorting internal components.

- Do not spill liquids or food on or into the control unit (A). In the event of any spillage, immediately turn off the control unit and disconnect it form the power source (X). Return the control unit for servicing to a factory authorized service center.

- Care should be taken such that the inlet air vent of the control unit (A) is not blocked, and kept away from any heat sources or radiators during the operation of the unit.

- Care should be taken such that the power cord (Q) of the control unit is not pinched, or has any objects placed on it, and also ensure it is not located where it can be stepped on or tripped over.

- Do not attempt to service the control unit except as explained in this operating instructions manual, contact factory for servicing instructions. Always follow operating and service instructions closely.

♦ **WARNING:** Before opening the control unit (A) enclosure, make sure the control unit is turned off and unplugged from its power source (X). The control unit enclosure should only be opened by a factory authorized qualified technical service personnel. ♦

## SYSTEM SET-UP

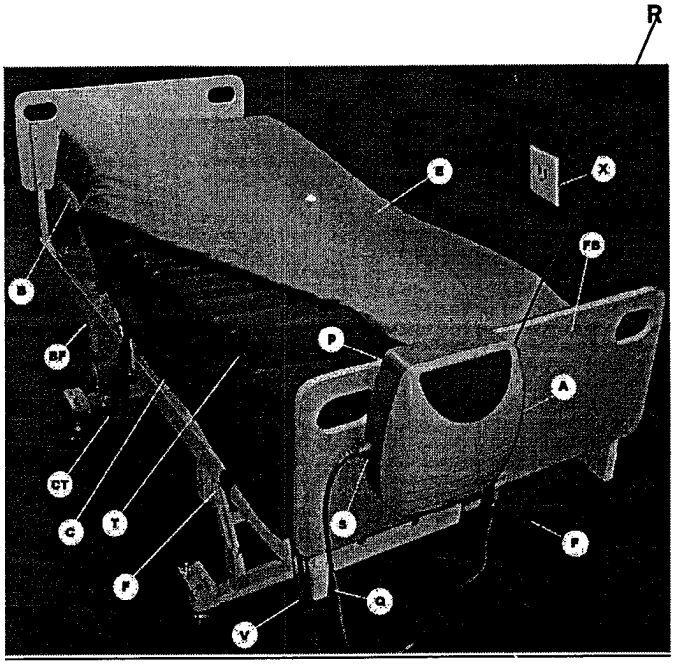



Figure –1

**PLEASE NOTE: K-Z HYBRID ROTAION WITH LOW AIR LOSS System must be installed on bed frames that are equipped with side rails. Please raise side rails on the bed and lock them in position after the patient is on the mattress. NEVER LEAVE PATIENT UNATTENDED ON MATTRESS SYSTEM WITH BED SIDE RAILS IN THE DOWN POSITION.**

## CONTROL UNIT SET-UP

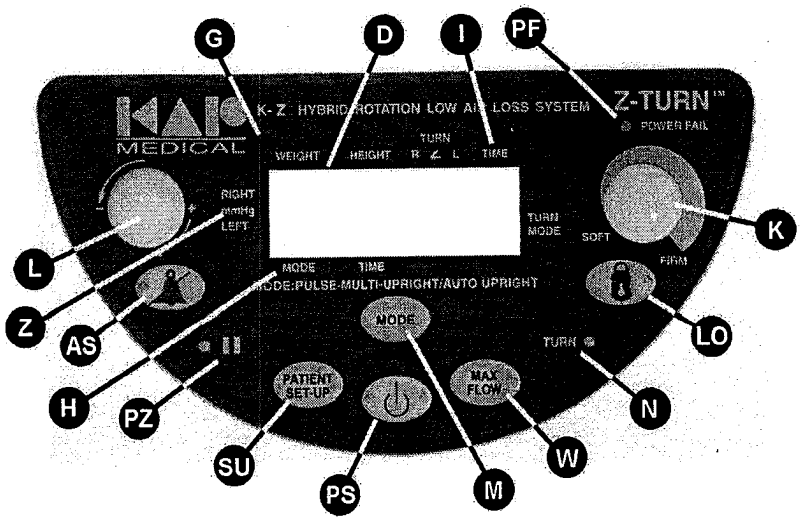



**Figure-2**

**Refer To The Figure-1 On Page 16**

1. Before using the K-Z ROTATION WITH LOW AIR LOSS MATTRESS REPLACEMENT SYSTEM please remove any non K-Z mattress replacement system or overlay system from the bed.

2. **K-Z Mattress Replacement system**: When using the K-Z Mattress replacement system care should be taken such that the mattress is placed directly on the bed frame.

3. Unroll the K-Z Replacement Mattress and place it on the bed frame (BF). Note: Make sure that

the hose end of the mattress is towards the foot of the bed.

4. There are six/ten nylon black straps with buckles (F), one/two straps at the head of the mattress, one/two on the foot of the mattress, and two/three on the each side of the mattress. Loop each strap around the bed frame and fasten it securely to the bed frame using the buckle.

5. Open the hooks (P) on the back of the control unit (A) and suspend the control unit from the footboard (FB) of the bed (BF). If the bed you are using does not have a footboard, place the control unit (A) on its base (not on its back where the filter is located) on a flat surface underneath the bed near the foot of the bed frame (BF). **Note:** Care should be taken such that the air inlet vent on the control unit is not covered, and the control unit is not placed on the floor in such a manner that it is a hazard for flow of traffic.

6. Uncoil the power cord (Q) and plug the cord into the appropriate AC power source (X), which is properly grounded. Plug the other end of the power cord into the control unit and press it in place. **Note:** Care should be taken such that the power cord of the control unit is not pinched, or has any objects placed on it, and also ensure it is not located where it can be stepped on or tripped over.

7. Connect the mating connector (R) on the mattress hose assembly (V) into the insert on the control unit magnetic connector and lock it

in place. Also make sure the CPR tag (CT) {if present} insert connector is securely connected into the mattress manifold body connector on the side of the mattress. **Note:** Make sure the magnetic connector has a good connection. Also, care should be taken such that the mattress hose is freely suspended without being pinched or kinked.

4. Make sure the left and the right side safety air bolsters are fully inflated and are hard. Also make sure the bottom safety air pad is inflated and hard.

## OPERATING INSTRUCTIONS

**Refer To The Figure 1 & 2 On Page 16 & 17**

1. Make sure the CPR Tag (CT) {if present} insert connector is securely connected into the mattress manifold body connector on the side of the mattress.

**INITIAL POWER UP**

1. During initial power up (when power cord ( Q ) is plugged into the power source X), the control unit ( A ) will display "KAP MEDICAL, Z-TURN, TURNING OR ROTATION LOW AIR LOSS SYSTEM" for a brief moment and then displays "LIFETIME OPERATION, HOURS AND MINUTES" and go through a system initialization routine for few seconds. Once the routine is complete the display (D) will display "KAP MEDICAL STAND BY" on the digital display.

2. If the unit is in stand by mode the amber LED will be on, the display will read "KAP MEDICAL STAND BY". Press the power key (PS)  the green LED turns on, and then press MAX FLOW mode (W) the blower will turn on at maximum flow.

3. If the power comes on after a power outage, the control unit will go through its system initialization routine for few seconds and then resumes the set functions.

**MAX FLOW (W)**

1. Press 

MAX FLOW (W) key, the green LED will turn on. This mode is used to rapidly inflate the mattress. During this mode a series of beeps will sound every 3 minutes as a reminder that MAX FLOW mode has been activated. MAX FLOW mode will deactivate after 15 minutes. The digital display will display 2 bars on the display with actual mattress pressure displayed in mmHg. The LED will turn off and the unit will default to previous memory setting. During this mode the entire mattress will be pressurized to 35 ±6 mmHg. **Note: The audible beep can be muted by activating the alarm silence key.**

2. The mattress (B) will inflate to its normal size in 30 ≈ 60 seconds. (Inflation time depends on the size of the mattress).

4. During MAX FLOW mode the display will read "MAX FLOW" and the count down time (I)

"15.00" on the top and the comfort control level (Z) bar graph will be displayed to full scale with 35 mmHg.

## PATIENT SET-UP (SU)

1. This key is used to set Patient auto pressure profile setup. When PATIENT SET-UP key 

is pressed the display will show patient weight, using left knob (L) set patient's weight in Lbs or Kg (Press Max Flow key to toggle between Lbs and Kg). Press mode to accept patient weight values. The display will now show height, using the knob set patient's height in inches or centimeters (Press Max Flow key to toggle between inches and centimeters). Press mode to accept patient height values.

2. Once the patient parameters are entered the micro-controller will automatically set the patient pressure profile and display the patient height and weight, and the auto pressure values in mmHg on the digital display.

3. However the patient comfort pressures can be overridden by simply adjusting the Soft/Firm knob (K).

## THERAPY (STATIC)

1. To set Therapy mode press 

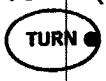
(M) key to "THERAPY" position on the

display just above MODE. This can also be achieved by turning off the "TURN" key, then the unit will go into "THERAPY" mode.

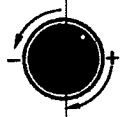
2. In THERPAY mode all the air cushions in the mattress will be maintained at a constant pressure.

**TURN (ROTATION) (N)**

1. To set (TURN) {N} mode, press the TURN




(N) key, display will bring up the turn time menu. Using the left knob (L)




set the Left turn time in minute or hours or press "PAUSE (II) to turn off Left turn. Press "MAX FLOW" key to go to Right turn, using knob (L) set Right turn time or press "PAUSE" (II) key to turn off Right turn. Press "MAX FLOW" key again to go to Dwell, using knob (L) set Dwell time or press "PAUSE" (II) to turn off Dwell. Each of the above TURN modes can also be turned off by just turning the left knob (L) counter clock-wise till "OFF" is displayed next to each of the turn modes.

When finished setting the turn times press "TURN" key again, the display will bring up the turn angle menu. Using the left knob (L) set Left turn angle in degrees. Press "MAX FLOW" key to go to Right turn angle,

using left knob (L) set Right angle in degrees.

2. In the LEFT TURN (ROTAITON) mode the right air cushions in the mattress will be maintain at a constant high pressure, and the left air cushions will be maintained at a constant low pressure, and visa versa for the RIGHT TURN mode. And continue back and forth by stopping in the DWELL (Flat) position in between each Left and Right cycle. During Right, Dwell, Left or No turn mode the digital display will show the current turn mode (LEFT OR RIGHT OR BOTH OR OFF), the count down turn time, the current turn angle (LEFT OR RIGHT) with bar graph, Left or Right zone pressures in mmHg with bar graph, and the current mode ROTATION, THERAPY, PULSE, MULTI, OR UPRIGHT.

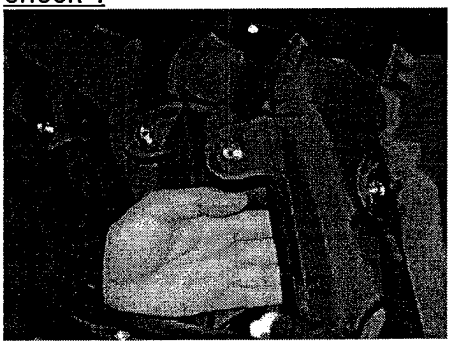
**PATIENT COMFORT CONTROL LEVEL (K)**

1. The K-Z system is designed for patients weighting between 50 ≈ 1000 lbs. (22 Kg. ≈ 455 Kg.). By turning the comfort control knob (K) 

towards the SOFT position reduces the pressure setting, and by turning the knob towards the FIRM position increases the pressure. The patient comfort pressure ranges from SOFT 6 ± 4 mmHg to FIRM 32 ± 6 mmHg. The mattress inflation and deflection pressures are monitored by the micro-controller in real

time using RTPM (Real Time Pressure Monitoring) sensor technology. Depending on the desired patient comfort level the controller will increases or decrease the speed of the air blower to provide the appropriate air flow into the mattress to maintain the desired pressure in the mattress.

2. Once the mattress is inflated to its normal size with the patient lying on it, set the COMFORT CONTROL KEY to the desired patient comfort level. Wait 5 minutes for the mattress pressure to stabilize, verify the appropriate pressure required to support the patient by performing a simple "four finger check".



Make sure that the patient is lying flat on his or her back in the middle of the mattress. Place four fingers between the air cushions directly underneath the sacral region of the patient's body. There should be a minimum of 3 to 4 finger width clearance between the bottom of the patient and the safety foam base, (on an overlay there is no safety foam base). Repeat this procedure until the

desired patient comfort pressure is achieved.

**II (PAUSE) (PZ)**

When  PAUSE mode is chosen, the micro-controller will pause the current mode in operation, (For example: If system is in Right Turn mode it will stay in Right Turn mode until the Pause key is turned off, if in Therapy mode it will stay in Therapy mode).

**LOCK OUT (LO)**

Control unit functions (including power switch) can be completely locked out from being tampered with, by simply pressing and holding the  lock key until the light comes on (approximately 3~5 seconds).

To deactivate simply press and hold the lock key until the  light turns off).

**ALARM SILEANCE (AS)**

1. During "MAX FLOW" mode the unit will beep twice every 3 minutes to indicate the caregiver that the unit is in "MAX FLOW" mode, and also in the event of the control unit sensing an abnormal condition, such as low pressure or power outage an audio visual signal will be activated to alert the care giver. If desired the care giver can mute the audible signal by

activating the Alarm Silence mode (AS) to keep the patient from being disturbed.

2. An audio-visual alarm is sounded in the event of power failure or when the hose is disconnected from the unit. Audio alarm can be muted by pressing  alarm silence key.

## FAILURE MODES

### POWER FAIL (PF)

In the event of power outage the microprocessor will activate an audiovisual signal to alert the caregiver by flashing the amber "POWER FAIL" LED and turning on the buzzer. Once the power is restored to the control unit the audiovisual signal will cease and unit resumes operating its set mode.

### LOW PRESSURE (LP)

In the event of hose disconnection the Micro-controller will activate an audiovisual signal to alert the caregiver by flashing the "LOW PRESSURE" on the digital display and turning on the buzzer. Once the low pressure problem is fixed the audiovisual signal will cease and the unit resumes operating its set mode.

### MODE (M)

**A.** PULSE:

Press pulse mode and set desired pulse time

using knob (L). For every set time the pressures in all zones of the mattress will be lowered to 50% of the comfort level set, for few seconds and back to set pressures. Will repeat for every set pulse time.

B. MULTI:

If 10 min. multi mode is selected the unit will perform 10 min. each of Therapy and Pulse, functions, and repeat the cycle over and over.

C. UPRIGHT / AUTO UPRIGHT:

1. This mode is selected during the patient is in fowler position (when the bed frame is articulated to fowler position). In upright mode the unit will maintain 20% more pressure than the set pressure (up to max to 31± 4 mmHg) in the Torso section of the mattress in order to keep the patient supported without the patient being bottomed out.

2. Auto fowler mode is available. When the head section of the bed frame is articulated the unit will automatically go into fowler mode without the caregiver's or the patient's assistance and maintain pressures in the mattress as explained in section C1 above.

**RECOMMENDED PRESSURE SETTINGS**

a. For rapid inflation of the mattress press (W) "MAX FLOW" key until green LED turns on.

b. For extra firm support during Patient ingress / egress, or Patient wound care, or Patient turning, or Patient cleaning it is recommended to set the mattress pressure to MAX by pressing (W) "MAX FLOW" key.

c. During patient Fowler positioning, or in case of a patient who's weight to height ratio is above average, it is recommended to set the comfort control to 10% more than the set pressure level.

## CPR FUNCTION

**Refer To The Diagram On Page 16**

1. To deflate the mattress for a CPR procedure, press the quick release buttons on both the coupling bodies (R), and simultaneously pull the hose (V) from the control unit flange connector.

2. The red CPR tag is present on the patients bottom right hand side of the mattress. Disconnect the red CPR tab (CT) connectors on the mattress which will deflate the side air bolsters and the bottom safety air pad.

3. In case of CPR emergency, for quick deflation of the mattress unzip the top sheet from the foot to the head by pulling the zipper located by the patient right foot, near the exit location of the hose assembly, or on some mattresses by unfastening the top sheet straps from the side of the mattress. Disconnect a few air cushions, which are directly below the patient's chest

from the mattress by pressing the quick release button on the connector with one hand and pulling the air cushion connector with the other.

## CLEANING PROCEDURE

**WARNING**

**CONTROL UNIT:**

- Before attempting to clean the USA or the International control unit, turn off unit and disconnect the control unit power cord from the power source. ♦

- **DO NOT HEAT, STEAM AUTOCLAVE, OR IMMERSE THE CONTROL UNIT IN LIQUIDS** ♦

1. Wear eye goggles and rubber gloves before starting the cleaning procedure.

2. The following germicidal detergents / disinfectants are recommended by the EPA as hospital disinfectants.

    a. Johnson Wax, Virex 128, EPA Registration Number 47371-130-4822.

    b. Quaternary Detergent-Disinfectant by Airkem Professional Products, Division of Ecolab, Inc., Ecolab Center, St. Paul, Minnesota. EPA registration number: EPA # 42964-5.

    c. Hi-Tor Germicidal Detergent by Huntington Laboratories, Inc. Huntington, Indiana. EPA registration number: EPA # 303-91.

**Note: A fresh spray bottle of disinfectant / detergent solution should be prepared every day to clean the control unit.**

3. By following the preparation instructions provided with the germicidal detergent /disinfectant solution, prepare the required amount of disinfectant solution or mild detergent solution.

4. Pour required amount of the germicidal solution into a spray bottle.

5. Using a brush or a cloth wipe off dust. If necessary, spray the exterior of the top and the bottom enclosures, power cord and the cord plug with the prepared disinfectant / detergent solution. Using a damp cloth wipe down the sprayed surface cleanly. **Note: Do not spray excess amount of solution on the control unit.**

3. Once the control unit is clean, wipe the unit, the power cord, cord receptacle, and the cord plug dry with a clean dry cloth.

6. Place the control unit to dry in a cool, dry area for an hour before operating the unit again. If the control unit is not used immediately place the control unit in a plastic bag and store it in a storage area.
7. After the cleaning operations are completed remove and dispose the rubber gloves appropriately. Wash your hands thoroughly with antibacterial soap.

MATTRESS

9 Wear eye goggles and rubber gloves before starting the cleaning procedure.

10. Follow steps 2 through 4 above to prepare disinfectant solution.

11. Using damp cloth wipe down the air cushions and the mattress base. Once the air cushions and the base is clean, wipe them down with a clean dry cloth.

12. Air cushions should be washed periodically; top sheet will require more frequent washing. Set wash cycle to heavy load with warm water. Once the water is full add manufacturer- suggested quantity of laundry detergent and/ or standard hospital disinfectants. If the air cushions or the top sheet becomes soiled with human waste, or blood, clean immediately by wiping down. Use hospital recommended laundry detergent and/ or disinfectant per manufacturer's instructions. **Note: Use non-chlorine bleach detergent.**

13. Once the washing cycle is complete, make sure excess water from inside the air cushions is completely removed. Set the dryer to lowest heat settings, and operate the dryer until the air cushions or the top sheets are completely dry.

14. Leave the mattress to dry in a cool, dry area for an hour before using. If the mattress is

not used immediately, roll the mattress and insert it into a plastic bag and store it in a storage area.

15. After the cleaning operations are completed remove and dispose the rubber gloves appropriately. Wash your hands thoroughly with antibacterial soap.

## CARE AND STORAGE

1. When control unit is not in use, turn off the unit, disconnect the power cord from the power source and wrap the cord around the control unit. Wrap the control unit and the power cord in a plastic bag and cable tie it so that dust cannot enter the bag.

2. Store the control unit in a storage area designated to medical electronic product storage.

## TROUBLESHOOTING GUIDE

**THE FOLLOWING INFORMATION IS FOR FACTORY AUTHORIZED SERVICE FACILITIES AND FACTORY QUALIFIED SERVICE PERSONNELL ONLY.**

KAP MEDICAL can provide technical support to factory qualified technical personnel. Contact KAP MEDICAL service department for more information.

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| A. Mattress Not Inflating properly | 1. Mattress hose disconnected | 1. Connect hose connectors and lock them in place |
| | 2. Air hose kinked or split | 2. Unkink hose or replace split hose |
| | 3. Major leak in the air cushions or overlay pad | 3. Replace leaking air cushions or overlay pad |
| | 4. Kinked or split manifold | 4. Unkink manifold or replace split manifold |
| | 5. Control unit not working | 5. Send control unit back to factory for repair |
| | 6. Blower malfunction | 6. Send control unit back to factory for repair |
| B. No Power | 1. Control Unit OFF | 1. Check power |

| | | |
|---|---|---|
| | 2. Power cord disconnected<br>3. No power in the power source<br>4. Power outage<br>5. Blown fuse | source and turn unit on.<br>2. Connect cord to the power source<br>3. Check power source has power and turn it "ON"<br>4. Wait till the power source has power<br>5. Send unit back to factory for repair |

## PREVENTIVE MAINTENANCE

It is important to periodically test the K-Z unit to verify the proper functionality. If the unit air pressure reading is out of specification, it can result in poor or reduced patient support.

⚠ **PLEASE CLEAN FILTER EVERY 5 MONTHS OR WHENEVER DIRTY. Remove 2 filter screws and separate filter foam. Wash filter foam using soap and water, dry and replace filter back on the unit and fasten screws.**

**NOTE: All preventive maintenance service, performance and electrical tests, or repairs should be performed only by factory authorized and qualified technical personnel.**

**Preventive Maintenance Schedule**

The following tests should be performed every 6 to 9 months and all test data should be recorded, a device history record on each control unit should be maintained.

1. Electrical Tests
   The following or similar Hi-pot Tester and Electrical Safety Analyzer should be used to perform electrical tests.

   a. ROD-L Hi-pot Tester (120 / 240 Models)
   b. Bio-Tek Analyzer, (220 / 240V AC Models)

   To perform the leakage current test on the control unit please follow the manufacturers or factory authorized test instructions for setting-up and performing the electrical tests.

   **Caution: Risk of electrical shock, proper precautionary measures should be taken while performing electrical tests.**

   A. Hi-pot Test
      If no alarm sounds, or no red "fail" light appears, the test is complete in

about 60 seconds. The control unit passes Hi-pot test.

B. Leakage Current Test

Connect ground cable to the control unit main ground test point found on the back of the unit. Switch function switch to leakage current position and test the following power configurations.

| Polarity Switch | Ground Switch |
|---|---|
| 1. Normal Polarity | Normal Ground |
| 2. Reverse Polarity | Normal Ground |
| 3. Reverse Polarity | Open Ground |
| 4. Normal Polarity | Open Ground |

120 V Models
PASS $\leq$ 100 µA
FAIL > 100 µA

220 / 240 Models
PASS $\leq$ 500 µA
FAIL > 500 µA

C. Ground Impedance Test

Connect ground cable to the control unit main ground test point found on the back of the unit. Switch the polarity switch to "OFF" and function switch to ground wire resistance position.

120V and 220 / 240V Models

PASS ≤ .1 Ω

FAIL > .1 Ω

2. Performance Tests

The following Flow and Pressure gauges should be used to perform functional tests.

a. Flow gauge, 0 ~ 50 CFM
b. Pressure gauge, 0 ~ 100 mmHg
c. Quick disconnect hose assembly

To perform the functional tests on the control unit please follow the factory authorized test instructions for setting-up and performing the functional tests.

A. Flow Test

Connect the dual hose connector to the control unit and the flow gauge. Turn on the unit and set the comfort control knob to max weight position, record flow reading.

PASS ≥ 35 CFM

B. Pressure Test

Connect the dual hose connector to the control unit and the pressure gauges. Turn on the unit and set the comfort control to Soft (1) and record reading, set to Firm (9) position and record reading. Set

comfort control to Max Flow position and record reading.

ALL Models

Minimum Comfort Position
PASS = 4~12 mmHg
Maximum Comfort Position
PASS = 26 ~36 mmHg

Max Flow Position
PASS = 28~38 mmHg

C. Rotation Pressure Test

Connect the hose connector to the control unit and the pressure gauges. Turn on the unit and set the comfort control knob to max Firm position, and in turn mode with 40 degree angle and record right and left rotation air pressure values in both zones.

120 and 220 / 240 V AC Models

Right Turn

Left: PASS = 26~36 mmHg
Right: PASS = 0~8 mmHg

Left Turn

Right: PASS = 26~36 mmHg
Left: PASS = 0~8 mmHg

## ACCESSORIES

| | |
|---|---|
| K-ZMS: | K-Z Mattress System |
| K-ZMS39, K-ZMS42, K-ZMS48, K-ZMS54, K-ZMS60: | K-Z Bariatric System |
| K-Z: | K-Z Control Unit |
| K-ZM: | K-Z Mattress |
| K-ZM39, K-ZM42, K-ZM48, K-ZM54, K-ZM60: | K-Z Bariatric mattress |
| K-140Z (SAC): | Foot Support Air Cushion |
| K-144: | Standard size quilted Breathable Top Sheet. |
| K-144TS39, K-144TS42, K-144TS48, K-144TS54, K-144TS60: | Bariatric size quilted breathable top sheet. |

- **Note:** To place an order or if you have any questions regarding the K-Z ALTERNATING PRESSURE & TRUE LOW AIR LOSS Mattress Replacement System and its warranties, please call KAP MEDICAL customer service at 951 340 4360, Email: sales@kapmedical.com.

## WARRANTY

KAP MEDICAL warrants the K-Z control unit and the mattress for a period of ONE (1) year from the original date of purchase.

KAP MEDICAL standard warranty is extended to the original buyer purchasing the equipment directly from KAP MEDICAL or through its authorized dealers. All warranty periods, where applicable, commence on the date of purchase from KAP MEDICAL or its authorized dealers.

KAP MEDICAL'S sole obligation and liability under this warranty is limited to (at KAP MEDICAL'S option) the repair or replacement by KAP MEDICAL'S authorized personnel of any parts or assemblies, which upon test and examination by KAP MEDICAL, prove to be defective. This equipment may be returned prepaid to KAP MEDICAL after notification has been given and approval obtained for the return. Please call your KAP MEDICAL sales representative or customer service at (951) 340 4360 to arrange for warranty services.

KAP MEDICAL'S liability under the warranty is the repair or replacement provided and, in no event, shall KAP MEDICAL'S liability exceed the purchase price paid by the customer of the product. Under no circumstances shall KAP MEDICAL be liable for any loss, direct, indirect, incidental, or special damages arising out of or in connection with the use of this product.

The control unit warranty does not cover normal maintenance such as cleaning, periodic electrical tests, performance tests, and updating of equipment or parts thereof. This warranty shall be void and not apply if the control unit, including any of it's parts, is modified without KAP MEDICAL'S written authorization, is attempted to be repaired by personnel not authorized by KAP MEDICAL, is not maintained in accordance with the prescribed preventive maintenance schedule, is used with accessories or parts not authorized by KAP MEDICAL, or is damaged due to misuse, mishandling, abuse, negligence, accident, fire, or inadequate packaging by owner for shipment of the control unit for service, upgrade, repair, retrofit, or product return. All reasonable freight charges for valid factory approved warranty returns will be reimbursed. KAP MEDICAL makes no guarantee of clinical results.

♦ **THE WARRANTY STATED ABOVE (INCLUDING ITS LIMITATIONS) IS THE ONLY WARRANTY MADE BY KAP MEDICAL AND IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. KAP MEDICAL SHALL NOT BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND.**

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KAP MEDICAL™

**1395 Pico Street**
**Corona, CA 92881**
**951 340 4360**
**FAX 340 4361**

**Customer Service: 1-866-KAP-MED 1 (866 527 6331)**
**Technical Support & Service: 1-951-340-4366**

**Email: sales@kapmedical.com**
**www.kapmedical.com**

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