



Western Surgical®

MEDIVENT EXCEL VENTILATOR

USER MANUAL



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MEDIVENT EXCEL VENTILATOR USER MANUAL



**Read this manual thoroughly before
using the ventilator on patients.**

**The equipment may be modified
or
upgraded without prior notice.**

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* Due to constant upgradation design, price and features are subject to change any time without prior notice.



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PRECAUTIONS

- MEDIVENT EXCEL must be handled and operated by qualified and trained personnel.
- The Operation Manual must be thoroughly read before using the ventilator on patients.
- Inadequate use of the ventilator, without full knowledge of the characteristics and function, may endanger the patient, the operator and the unit itself.
- Always connect the ventilator to an adequate voltage AC power supply and ensure that it is stable and within the working range of 180 to 260 V A.C
- Never neglect to connect external Earth conductor on the plug.
- Always check for the proper Earth connection in the wall socket by an electrician. Mere presence of 3-pin socket does not necessarily mean proper Earth connection.
- Please check for the correct order of phase and neutral terminals in the socket. These should be in the right and left side respectively.
- If UPS is used for external battery backup, UPS must always be connected to stable and regulated Mains AC to avoid discharge of and damage to battery even if the ventilator is not in use.
- Never attempt to repair/service the ventilator by unauthorized persons. Always contact the MEDISYS service center for any kind of problem.

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INTRODUCTION

MEDIVENT EXCEL is a simple to use electronic lung ventilator that **requires no compressed gas source for its driving**. Its operation is micro-controller based and settings are very **operator friendly**. It is designed for long-term ventilation in wards. The design is equally suitable for ventilation during **anaesthesia** employing usual **Circle Absorber system or Bain's co-axial circuits**.

The unit provides for **CMV, ASSIST + CMV and SIMV** modes of ventilation. Oxygen enrichment is provided through a separate port. The unit has comprehensive alarms and safety features. It also provides for **Apnea backup ventilation**. The **light emitting displays** are bright and easily visible on the panel.

FEATURES

- Micro-controller based
- No external driving pressure source
- CMV, ASSIST + CMV, SIMV modes
- Variable I/E ratio
- Inspiratory Hold for better distribution of gas
- Adjustable safety valve
- Apnea backup ventilation
- Port for oxygen enrichment
- Bright display of parameters
- Low power consumption
- Comprehensive alarms
- No pre-mature cut-off during inspiratory phase
- Anaesthesia ventilation with circle absorber / Bain's Circuit

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SPECIFICATIONS

Classification	Flow Generator type
Driving source	220 V AC / battery pack
Modes	CMV, CMV + Assist, SIMV
Tidal Volume	50 to 1200 ml
Frequency	6 to 40 bpm (1 to 40 bpm in SIMV)
Inspiratory time	0.4 to 3 seconds
Inspiratory hold	0 to 2 seconds
I / E ratio	1: 1 to 1: 5
Apnea backup	every 4 seconds in case of Apnea
Alarms	patient disconnection, high/low pressure
Safety valve	adjustable: 10 to 60 cmH ₂ O
Power	60 W (approx)
Dimensions	410 X 230 X 280 mm

STANDARD SUPPLY

The MEDIVENT EXCEL comprises the following standard supply.

1. Ventilator
2. Single limb breathing circuit with sensing line
3. Expiratory valve
4. Anaesthesia adapter for sensing
5. O₂ enrichment assembly and jets of 40% and 50%
6. Dummy lung and reservoir bag

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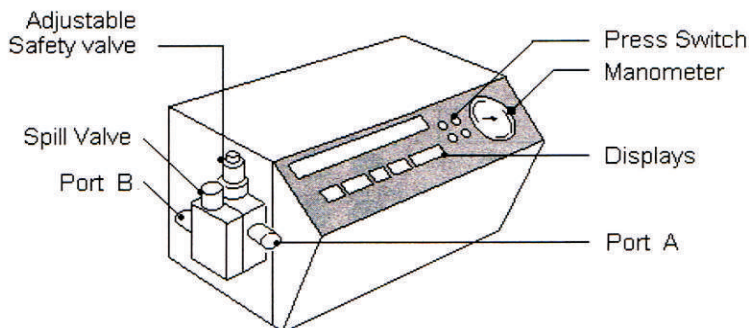
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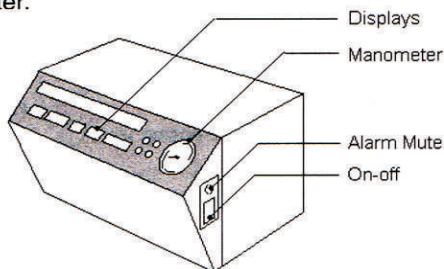
GENERAL DESCRIPTION

The front panel of the unit is inclined suitably for easy visibility to the operator. The displays and the control press switches are logically grouped. The four displays (frequency, tidal volume, inspiratory time and inspiratory hold) are for operator setting.



The Total Frequency shall indicate the breathing frequency due to CMV and patient triggering at any instant. If the patient fails to trigger, the displays of Frequency and Total Frequency becomes identical. The last display indicates the I:E ratio due to set parameters. The manometer on the right indicates the airway pressure during the inspiratory phase.

Four **control press switches** are provided for operator setting. The **Select switch** is for selecting the parameter to be changed. The **Mode switch** is for selecting the mode of ventilation and the **Increment or Decrement** switch is for changing the values of the selected parameter. **Blinking** of the display indicates the selection of the required parameter.



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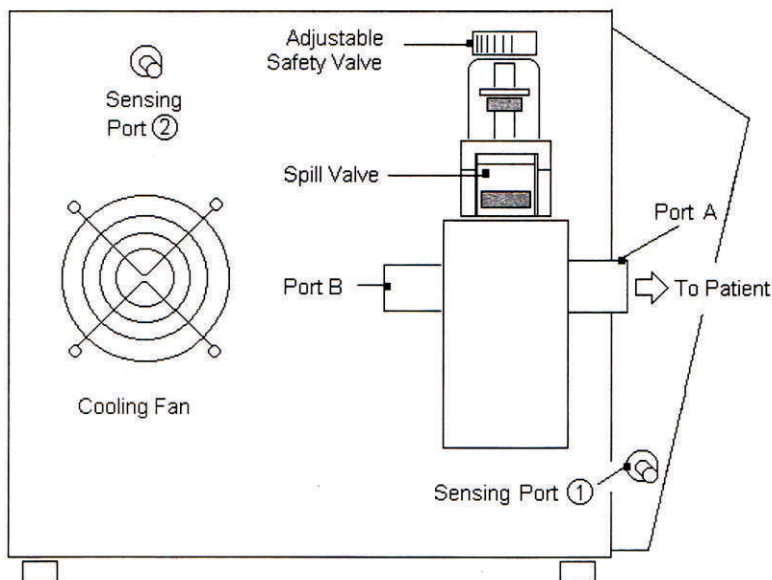
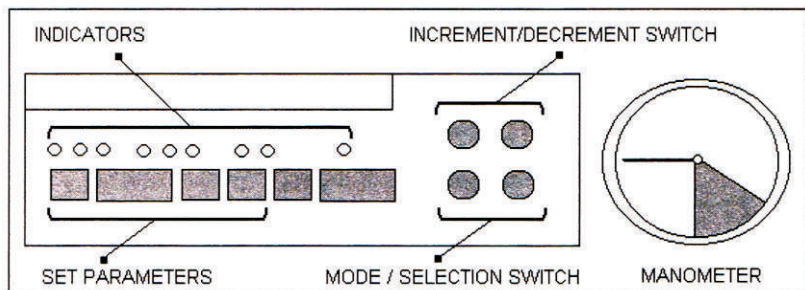
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The indicating lights for **mode selection, breath type, alarms and out of range selection** are placed in group on the top of the displays. The **Alarm Mute** and **Power ON-OFF** are placed on the right side panel of the unit.

The patient outlet, safety valve and enrichment assembly are placed on the left side panel. The safety valve is adjustable between 10 cmH₂O to 60 cmH₂O.



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FRONT and LEFT SIDE PANEL CONTROLS



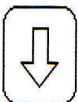
MODE

This press switch selects the Modes of ventilation CMV, AV + CMV and SIMV.

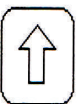


SELECTION

This press switch selects the parameters for changing its values.



This press switch is used for decrement in values of the selected parameter.



This press switch is used for increment of values of selected parameters.



This press switch is for temporarily silence the sound of the alarm for 25 seconds (approx) However the visual alarm indication is not affected.



The power switch to switch on or switch off the ventilator.

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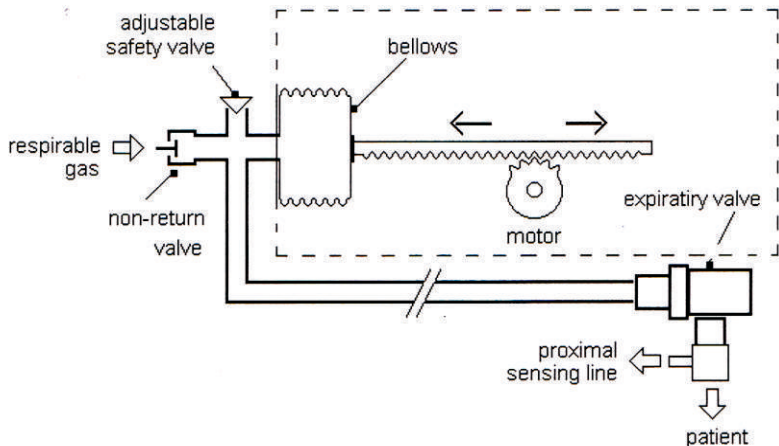
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INTERNAL SETUP AND MECHANISM

The system comprises of a bellows connected to a Stepper Motor through a gear and rack assembly. The bellows can expand and collapse with the rotation of the motor shaft. The rotation of the motor shaft is controlled electronically with the help of Microprocessor.



SIMPLIFIED SCHEMATIC DIAGRAM

The respirable gas enters through the non-return valve into the bellows as it expands and passes to the patient when the bellows is squeezed. The gas from the bellows cannot escape to atmosphere because of the non-return valve. The displacement of the bellows depends on the set tidal volume.

The respirable gas may be atmospheric air or air enriched with oxygen. Oxygen is fed into the system through a Jet-Venturi and reservoir bag assembly. The flow of oxygen is maintained such that the reservoir bag does not collapse completely. Insufficient delivery of oxygen shall cause dilution in the desired oxygen concentration.

At expiratory phase, the bellows expand causing the expiratory valve to open and patient expires through expiratory port.

The stepper motor can give torque up to 40 kg cm and is capable of generating inspiratory pressure more than 60cmH₂O.

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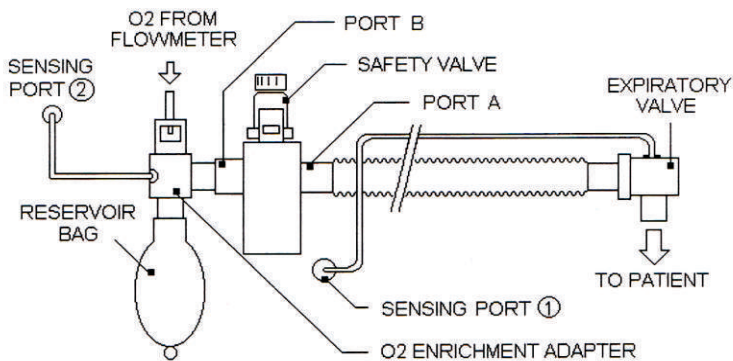
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OPERATION

WARD VENTILATION

Components required are

1. Single limb Breathing Circuit with sensing line
 2. Expiratory Valve
 3. O₂ enrichment adapter
 4. Dummy Lung
 5. Reservoir Bag
- Connect the Breathing Circuit, Expiratory Valve, and the sensing line as shown in the diagram above.
 - Set the Safety valve at 60 cmH₂O or as required
 - Connect the power cord to Mains AC and switch on the ventilator.
 - The ventilator will start with initial default setting.
 - Now connect the Dummy Lung at patient outlet



SETUP FOR VENTILATION IN WARDS

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INITIAL DEFAULT SETTING :

Mode : CMV
Frequency : 15
Tidal vol : 400 ml
Inspiratory time : 1 second
Inspiratory hold : 0.3 seconds
I : E ratio : 1: 2

The operator now can change the following parameters, if needed: Frequency, Tidal Volume, Inspiratory Time and Inspiratory Hold.

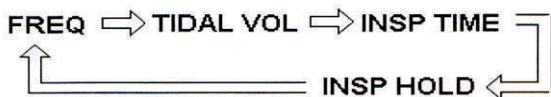
TO CHANGE FREQUENCY

1. Press SELECT till Frequency starts blinking
2. Press or till desired value is achieved
3. The blinking stops after some time and the frequency is set

TO CHANGE TIDAL VOLUME

1. Press SELECT till Tidal Volume starts blinking
2. Follow the same procedure as above

To change INSPIRATORY TIME and INSPIRATORY HOLD follow the similar procedure as mentioned above.



NOTE 1: The ventilator can deliver maximum 700 cc per second. Thus if Tidal Volume is set more than 700 cc, the inspiratory Time will automatically be increased accordingly. Similarly, as another example, the Tidal Volume of 350 cc can be delivered in 0.5 seconds. If the Inspiratory Time is set at 0.5 second and the Tidal Volume is increased beyond 350 cc, the time will also automatically increase.

NOTE 2: Any attempt to set parameters beyond the range shall not be accepted by the system. This will be indicated by blinking of red LED on the right hand side of the panel.

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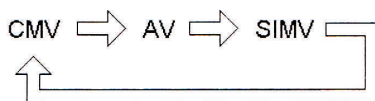
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TO CHANGE MODES

Press MODE once and the CMV mode will shift to AV.

Press MODE again and the AV mode will shift to SIMV.

Press MODE again and the SIMV mode will shift to CMV and so on.



The selection of Modes is indicated by illumination of respective LED on the left hand side of the panel.

CMV - The set parameters are tidal volume, frequency, inspiratory time and inspiratory hold. The resulting I : E ratio is displayed on the panel. Every control breath is indicated by the glowing of respective indicator.

AV - The set parameters are same as CMV. The sensitivity is factory preset at 1cmH₂O below ambient pressure and is **not PEEP compensated**. If PEEP is generated the patient must create 1 cmH₂O pressure drop below the ambient to trigger the ventilator. If the breaths are patient triggered, the resulting frequency is displayed as Total Frequency.

SIMV - The set parameters are same as CMV with the exception that the frequency shall be the SIMV frequency. The patient is free to breathe from atmosphere between the mandatory breaths. If the patient effort is registered within the synchronization window, the mandatory breath is synchronized.

APNEA BACKUP VENTILATION - If the mandatory/controlled breaths are more than 10 seconds apart and the patient does not trigger the ventilator within this 10 second, the apnea condition is registered by the system. The ventilator then provides Apnea Backup ventilation every 4 seconds in SIMV. As soon as the patient starts breathing, SIMV settings are restored.

OXYGEN ENRICHMENT

Connect the Oxygen Enrichment adaptor and a reservoir bag as shown in the diagram above. Connect the required fixed percent jet (40% or 50%) and supply oxygen to it through a flow meter.

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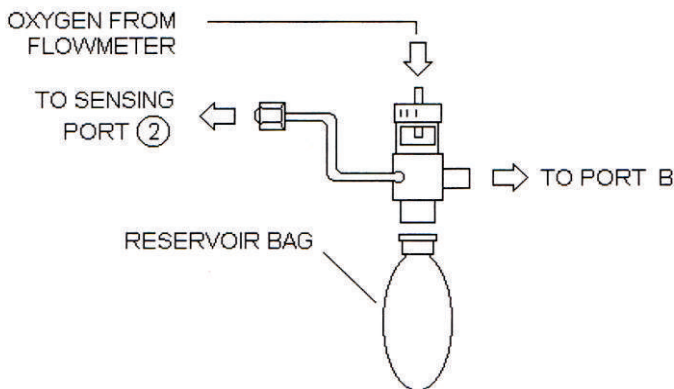


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O₂ ENRICHMENT ADAPTER

Increase and **adjust the flow such that the reservoir bag does not collapse completely** after every inspiration. If flow of oxygen is insufficient, atmospheric air will be drawn into the system thereby lowering the FiO₂ marked on the Fixed Percent Jet. Normally 40% and 50% oxygen jets are provided with the unit as standard supply.

Note :

- Avoid using excess oxygen flow as it causes wastage of oxygen.
- Excessive oxygen flow through the jet may also generate PEEP.
- Never obstruct the air entry path of O₂ enrichment adapter
- Do not connect the enrichment adapter if 21% FiO₂ is required
- Never obstruct the port B as it will cause loss of respirable gas into the system.

Warning : *Never connect the O₂ enrichment connector if oxygen flow is not provided. There may be insufficient entry of respirable gas from atmosphere resulting in loss of ventilation.*

ANAESTHESIA VENTILATION

The ventilation during anaesthesia may be performed using Circle absorber or Bain's co-axial circuit.

Components required are (1) Corrugated hose (2) Anaesthesia adapter with sensing line, (3) Reservoir Bag and (4) Dummy Lung.

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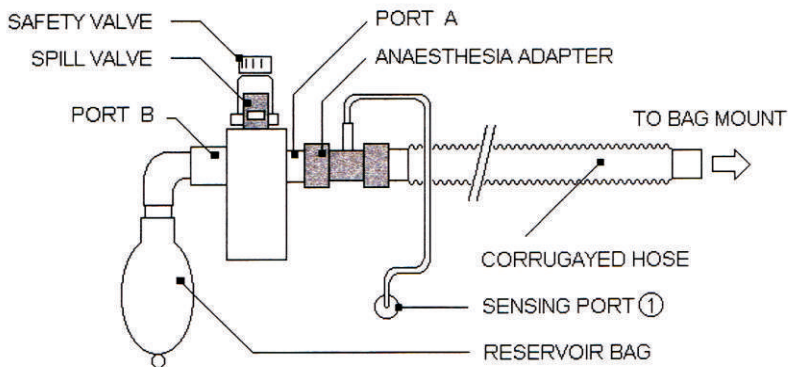


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SETUP FOR ANAESTHESIA VENTILATION

- Connect the corrugated hose, anaesthesia adapter, the reservoir bag and sensing line as shown in the diagram below.
- Set the Safety valve at 60 cmH₂O or as required.
- Connect the power cord to Mains AC and switch on the ventilator.
- Set the mode to CMV and set the other parameters like tidal volume, frequency etc as required
- Now connect the other end of corrugated hose to bag mount of the usual anaesthesia circuit.

Note : Close all Heidbrink / APL valves, as an automatic expiratory valve is included in the ventilator.

ALARMS

The alarms available in the unit are

1. High pressure (HP) alarm - set at 50 cmH₂O
2. Low pressure (LP) alarm - set at 5 cmH₂O

The Low Pressure alarm also acts as alarm for **Patient Disconnection / Low Tidal Volume / Non-Functioning** of the unit. The alarms are factory pre-set and as such require no setting by the operator.

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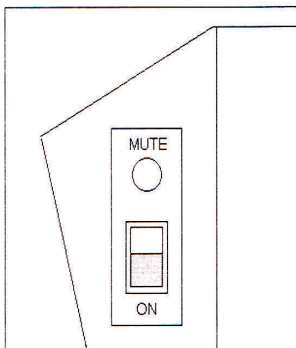
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ALARM MUTE

The sound of any alarm can be muted for 30 seconds (approx) by pressing once the MUTE SWITCH on the right side of the unit. The alarm will again sound after 30 seconds if the fault is not corrected.



INDICATORS

1. CMV - if the selected mode is Control Mechanical Ventilation
2. AV - if the mode selection is for Assisted Ventilation
3. SIMV - if the selected mode is Synchronized Intermittent Mandatory Ventilation
4. CONT - blinks in case of mandatory/control breaths
5. TRG - blinks in case of breaths due to patient triggering
6. APN - blinks in case of Apnea Back-up ventilation
7. HP - blinks in case of inspiratory pressure more than 50cmH₂O
8. LIP - blinks in case of low inspiratory pressure due to patient disconnection etc.
9. SETTING BEYOND RANGE - blinks if the settings attempted are not permitted by the unit.

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USING UPS FOR POWER BACKUP

Connect the power cord of UPS (**NOT A STANDARD SUPPLY**) to Mains AC and ventilator power cord to UPS output socket.

Switch on the Mains AC and then switch on the UPS

Now switch on the ventilator

CAUTION !

When the AC Mains supply fails, the ventilator runs on charged battery of the UPS till the battery is exhausted. So, **other means of AC supply (say generator) must be provided at the earliest before the ventilator stops.**

Please note that AC Mains supply should be stable and in the normal range of 200 to 260 Volts. **If not, suitable Stabilizer/CVT must be provided before connecting the UPS.**

In case the UPS output cuts off due to low battery, the UPS must not be switched on again unless AC supply is restored. Otherwise, the battery and the UPS may get damaged.

Always keep the UPS connected to the Mains AC with UPS switched off even if the ventilator is not in use. This will help proper charging and ensure the expected life of the battery of the UPS.

Never try to run the ventilator on a defective UPS.

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Date of Installation	Installed By
Model No.	Serial No.
Warranty Period	
Name of Doctor & Address :	

Customer Sign. With Stamps

**Marketed By: Western Surgical
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No Claim Warranty :

1) Any Defect Throughtout Power Supply

2) Any Physical Damage

3) Under Warranty Standby Unit Not Provide

4) Under Warranty When Company Send Parts or Machine we Imidiat send to Buyer.

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OUR OTHER PRODUCTS RANGE



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