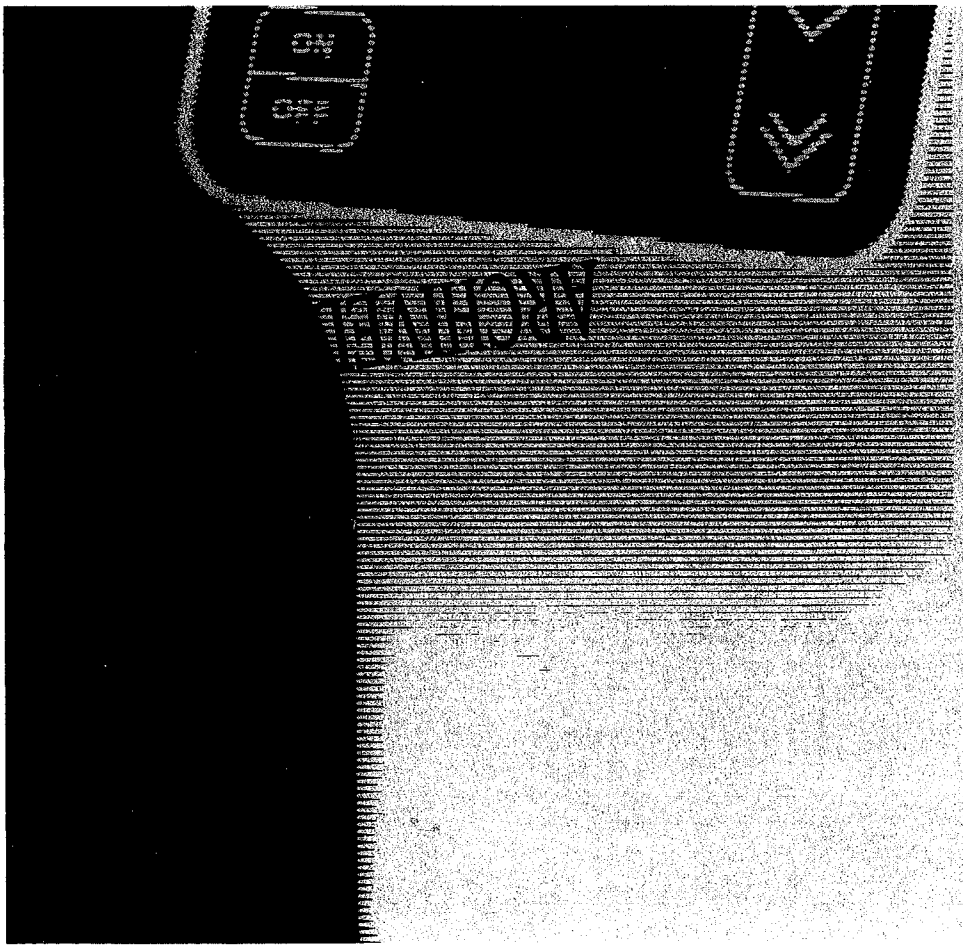
IVAC

Directions For Use



MODEL

591

IVAC®
STAR•FLOW®
VOLUMETRIC
PUMP

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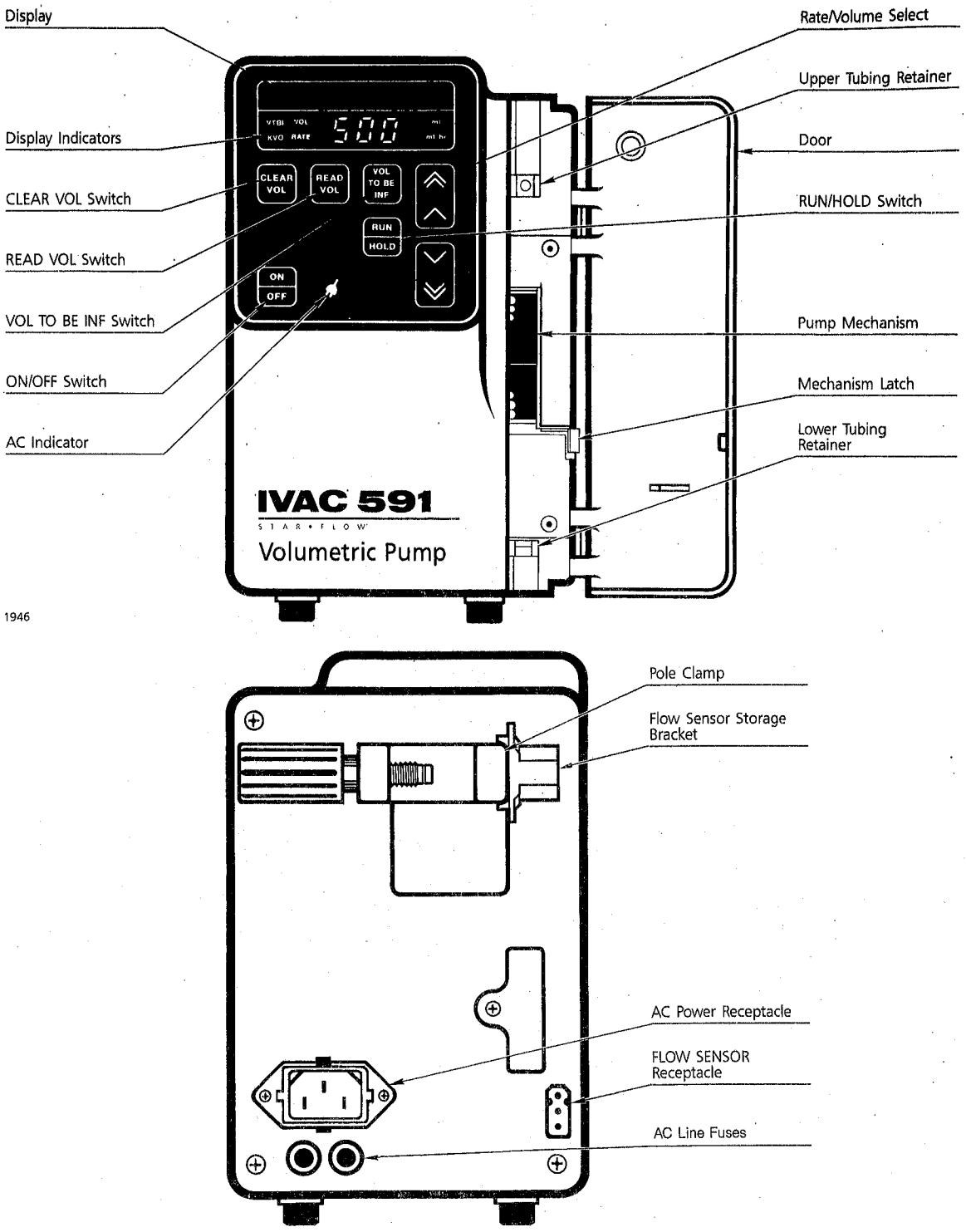


Figure 1. IVAC Volumetric Pump - Model 591

FEATURES

The IVAC® Volumetric Pump Model 591 automatically regulates the infusion rate of intravenous solutions. The microprocessor based pump uses a linear peristaltic, volume displacement mechanism to regulate fluid flow at the desired rate. The pump's many features include:

- Easy setup and operation.
- Quick start mode.
- Automatic control of infusion rate.
- Volumetric rate entry.
- Wide range of infusion rates: 1 to 999 ml/hr in 1 ml/hr increments.
- Diagnostic alarm messages to simplify operation and troubleshooting.
- Volume infused display.
- Volume-to-be-infused capability with automatic switchover to the "keep vein open" (KVO) rate.
- Easy viewing of rate, volume to be infused and volume infused settings.
- Automatic flow shutoff and activation of audible and visible alarms when fluid container is emptied, tubing is occluded, battery is discharged, selected rate cannot be maintained, or door is opened during infusion.
- Lightweight and portable with self-contained rechargeable battery.
- Audible and visible low battery indication about one hour before battery alarm.
- Drop detection while on hold or in start-up with door closed.

SPECIFICATIONS

RATE RANGE	1 to 999 ml/hr in 1 ml/hr increments.
VOLUME INFUSED RANGE	0 to 9999 ml in 1 ml increments.
VOLUME-TO-BE-INFUSED RANGE	0 to 9999 ml in 1 ml increments.
KVO	5 ml/hr or current infusion rate if less than 5 ml/hr.
POWER REQUIREMENTS	220-240 V ~ ;50/60 Hz; 0.07 amp; 3-wire grounded system.
BATTERY LIFE	When fully charged, a new battery will power the pump for a minimum of 6 hours at 125 ml/hr infusion rate. The battery automatically recharges whenever the unit is connected to AC power. A fully discharged battery can be recharged to 70% of its capacity in about 6 hours.
GROUND LEAKAGE CURRENT	At 220 Vrms line, maximum 10 µA rms ungrounded. Conforms with the electrical safety requirements of Class 1, Type ♥ instruments, as defined by the 1988 version of IEC 601-1, Safety of Medical Electrical Equipment, General Requirement.
ALARMS	Alarm conditions cause the pump to display specific alarm messages, sound an audible alarm, and except for the low battery and KVO alerts, cease operation. Alarm and display messages include: FLO, door, hold, bat., batt., SEt Out, and Err.(See the ALARMS AND DISPLAY MESSAGES section of this manual for message descriptions.)
ADMINISTRATION SET	IVAC "59" Series primary and secondary administration sets ONLY.
DIMENSIONS	Height 19.3 cm (7.6 in.), Width 13.0 cm (5.1 in.), Depth 18.3 cm (7.2 in.).
WEIGHT	Approximately 2.7 kg (6 lb).
CASE	Impact resistant plastic.

SPECIFICATIONS

MAXIMUM BOLUS VOLUME (ml) *	At 1 ml/hr: 0.7 ml At 100 ml/hr: 0.6 ml	**MAXIMUM OCCLUSION PRESSURE**	Approximately 1.4 bar = 20-30 PSI
MAXIMUM TIME TO ALARM *	At 1 ml/hr: 70.0 minutes At 100 ml/hr: 0.6 minutes	**SYSTEM ACCURACY**	± 5%

* Testing performed per IEC 601-2 using IVAC 59 series IV sets.

OPERATING CONTROLS

ON/OFF SWITCH
Turns instrument on or off.

RUN/HOLD SWITCH
Starts and stops infusion, silences the audible alarm, and enables the rate to be changed while the pump is running.

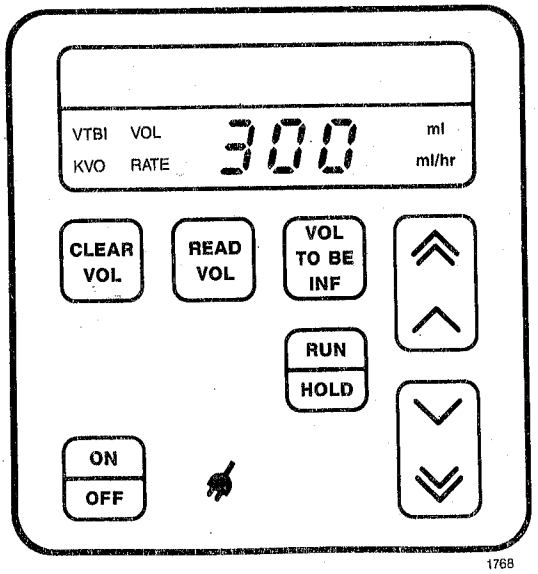
RATE/VOLUME SELECT SWITCHES
Sets desired infusion rate and volume to be infused. Rate and volume to be infused values can be increased or decreased slowly ^ v or quickly ^^ vv depending upon which section of switch is pressed.

READ VOL SWITCH
Displays volume infused as long as switch is pressed.

CLEAR VOL SWITCH
Clears the volume infused to 0000 when held for two seconds, and clears the volume to be infused to 0000 (OFF) when pressed simultaneously with the VOL TO BE INF switch. This switch is inactive when the pump is running.

VOL TO BE INF SWITCH
Sets the volume-to-be-infused value when used with the Rate/Volume select switch(es). This switch also clears the volume to be infused to OFF when pressed simultaneously with the CLEAR VOL switch for two seconds. If the pump is running when the switch is pressed, the volume to be infused will be displayed, but cannot be changed.

DISPLAY INDICATORS RATE, ml/hr, VOL, ml, VTBI, KVO)	Indicate type of information currently being displayed, and whether the pump is running in KVO mode.
AC INDICATOR	Indicates pump is connected to AC power and the battery is being charged.
RUN INDICATOR	Three horizontal bars flash sequentially in the left-most digit of display when pump mechanism is operating.
DROP INDICATOR	Horizontal bars of run indicator convert to "0" when a drop is detected in the drip chamber.



PATIENT PRECAUTIONS

To avoid possible injury to patient, observe the following precautions:

- Use only IVAC "59" Series primary and secondary administration sets. The use of any other set will cause improper pump operation. IVAC sets are supplied sterile for one time use only. Do not resterilize.
- Positive Pressure System Infiltrations: This pump is a positive pressure delivery system capable of developing positive fluid pressures to overcome widely varying resistances to flow encountered in practice, including resistances imposed by small gauge catheters, filters, and intra-arterial infusions. It is neither designed nor intended to detect infiltrations and will not alarm under infiltration conditions.
- This pump is designed to stop fluid flow under alarm conditions other than the low battery and KVO alerts. Periodic patient monitoring must be performed to ensure the infusion is proceeding as expected.
- Unrestricted flow may occur if the set is removed from the instrument prior to fully closing the set regulating clamp, or if the set is improperly installed in the instrument.
- Before operating the pump verify that the administration set tubing is free from kinks and positioned correctly in the instrument.
- Radio Frequency Interference: Operating the pump near equipment which radiates high energy radio frequencies (e.g., electrosurgical/cauterizing equipment), may cause false alarm conditions. If this happens, reposition pump away from source of interference; or, turn off pump, close clamp, remove tubing from pump mechanism, and manually regulate flow with set regulating clamp.
- Should an instrument be dropped or severely jarred, the instrument should be inspected by a qualified technician to ensure its proper function.
- Artifacts: It is normal for intravenous infusion devices to produce nonhazardous currents when infusing electrolytes. These currents vary at a rate proportional to the infusion device flow rate. When the ECG system is not functioning under optimal conditions, these currents may appear as artifacts, simulating actual ECG readings. To determine if ECG abnormalities are caused by patient condition or the ECG equipment, place the infusion device on hold. If the ECG readings become normal, the ECG equipment requires attention. Proper setup and maintenance of the ECG equipment should eliminate these artifacts. Reference the appropriate ECG monitoring system documentation for instructions on setup and maintenance.

USER PRECAUTIONS

To ensure proper performance of the pump and to avoid possible injury to the operator, observe the following precautions:

- AC Power Connections: The power cord must be connected to a properly grounded 3-wire receptacle (e.g., one marked "Hospital Use" or "Hospital Grade"). Where the integrity of the protective earth grounding system is in doubt, operate unit on battery power.
- Temperature: For optimum instrument life, the pump should be operated in temperatures ranging from 10°C (50°F) to 40°C (104°F).
- Anesthetics: A possible explosion hazard exists if the pump is used in the presence of flammable anesthetics. Place the pump away from such hazardous sources.
- Electrical Disturbances: Local electrical disturbances may cause the fuses to open. Replacing the fuses should restore normal operation. If not, determine the cause before attempting to restart. Use only T 63 mA replacement fuses.
- Instrument Housing: Do not open or remove the instrument housing. There are no user serviceable parts inside. The housing should only be removed by qualified repair personnel using proper grounding techniques. When the housing is removed, an electrical shock hazard exists which can result in serious injury to persons and instrument component damage.

INITIAL SETUP

1. After unpacking the Model 591 pump, charge the battery for at least 6 hours to ensure the battery is charged to about 70% of its capacity. To do so, attach the power cord to the pump and plug it into an AC outlet. The pump can be operated on AC power at any time during this period.
2. Attach the pump securely to a standard IV pole or IVAC instrument stand.
3. Insert the plug end of the IVAC Flow Sensor - Model 192 into FLOW SENSOR receptacle on the back of the pump. Store the flow sensor on the storage bracket on the back of the pump.
4. Operate the pump on AC power whenever possible to provide sufficient battery operation when needed.

Press the ON/OFF switch to turn on the pump. Verify that all display LED segments momentarily light, and that the pump "beeps". This confirms that the pump is functioning correctly. When this sequence is complete the volume to be infused (VTBI) will be displayed and the VTBI and ml indicators will light, if the VTBI feature is turned on. Press the RUN/HOLD switch to advance the display to infusion rate. The ml/hr indicator will light. If the VTBI feature is turned off, only the rate will display.

The pump continuously performs self-tests and displays an error code if it detects an internal malfunction. Refer to the ALARMS AND DISPLAY MESSAGES section of this manual for message descriptions. If the pump fails to perform in the manner described in these operating instructions, do not use the pump. Contact qualified service personnel.

PREPARING THE IV

The Model 591 pump will operate properly only with IVAC "59" Series administration sets.

1. Prepare the solution container and IVAC "59" Series primary administration set in accordance with applicable set directions for use. Close set regulating clamp. Suspend solution container.
2. Fill the drip chamber to the fill line or about half-full. This allows sufficient air space between the drop forming orifice and the surface of the fluid to facilitate proper drop detection.(See Figure 2.) Ensure drip chamber is in vertical position, otherwise a FLO alarm may result.
3. Prime the set by slowly opening the set regulating clamp. Invert and tap the 'Y' injection site(s) to expel all air. Close the set regulating clamp.
4. Perform venipuncture, if required. Attach set to venipuncture device.
5. Verify IV is patent before proceeding. Adjust set regulating clamp to KVO rate, if appropriate, until instrument setup is complete.

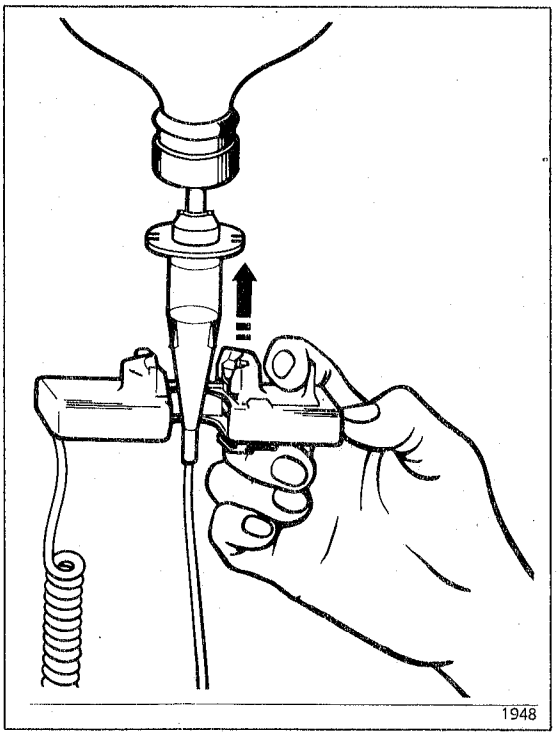
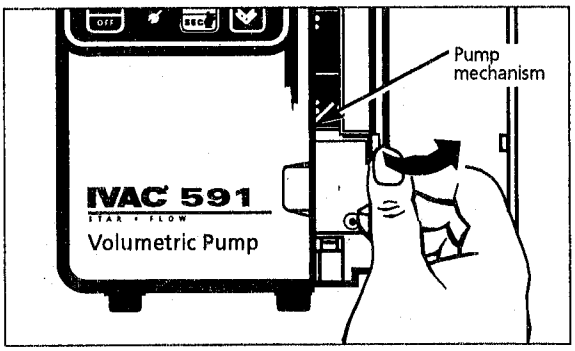


Figure 2. Flow Sensor Placement

LOADING THE SET

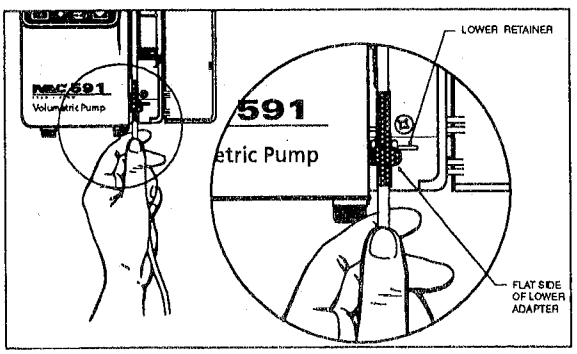
1. Verify that the plug end of the IVAC Flow Sensor — Model 192 is inserted into the FLOW SENSOR receptacle on the back of the pump. Clip the flow sensor over the flanges of the spike. (See Figures 2.)
2. Press ridges to open the instrument door. Open the pumping mechanism by pushing the orange latch to the right. (See Figure 3.)

Figure 3.



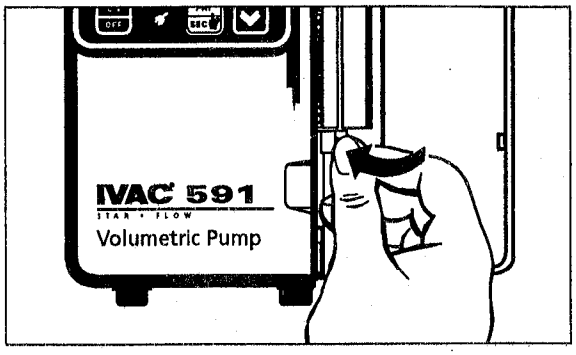
3. Visually inspect mechanism to make sure it is intact and clean. If it appears damaged or dirty, do not use the pump. Contact qualified service personnel to replace or clean the mechanism.
4. To Load the set, insert the upper tubing adapter into the upper tubing retainer. POSITION THE LOWER ADAPTER INTO THE LOWER RETAINER, ENSURING THAT THE FLAT SIDE OF THE ADAPTER FACES TOWARD YOU. (See Figure 4.)

Figure 4.



5. Close the mechanism by pushing the orange latch to the left. Verify the tubing is fully within the mechanism. DO NOT USE THE DOOR TO CLOSE THE ORANGE LATCH. (See Figure 5.)

Figure 5.



6. Close the door, taking care not to pinch the tubing with door edges.
7. Fully open the set regulating clamp. Verify that no fluid flows and no drops are falling in the set drip chamber.

STARTING THE PUMP

NOTE: If the volume to be infused and rate settings are known to be correct, the pump can be "quick started". Press the ON/OFF switch to turn on the pump, then press and hold the RUN/HOLD switch until the pump mechanism is operating.

1. Press the ON/OFF switch to turn on the instrument. The volume to be infused will be displayed, and the VTBI and ml indicators will light, if the volume-to-be-infused feature is turned on.
2. Press the Rate/Volume Select switches ^ v to set or change the volume to be infused; then press RUN/HOLD to display the current rate. Or, if no changes are to be made to the volume to be infused, press RUN/HOLD to display current rate. The VTBI indicator will turn off once the rate is displayed and the ml/hr indicator will light.

   NOTE: If the VTBI feature is turned off, the rate will display automatically when the pump is turned on.
3. Press ^ v to set the desired infusion rate (1-999 ml/hr).
4. To read the volume infused, press and hold the READ VOL switch.
5. To clear the volume infused, press and hold the CLEAR VOL switch until the display reads 0000 (four zeros). This indicates that the previous volume infused has been cleared from the pump's memory.
6. A volume to be infused can also be set now if not set during step 2 of this section. Press and hold the VOL TO BE INF switch. The display will show OFF if it was not previously set. While pressing the VOL TO BE INF switch, press ^ v to set the desired value, then release the VOL TO BE INF switch.

   NOTE: Once the pump has counted down to zero from the preset volume-to-be-infused value, it automatically switches to a 5 ml/hr KVO rate, (or current rate, whichever is less), lights the KVO indicator, and produces two audible beeps every 5 seconds.
7. To turn off the volume to be infused feature, press and hold the VOL TO BE INF switch while pressing v to decrease the value until the display reads OFF. Or, simultaneously press the VOL TO BE INF and CLEAR VOL switches for about 2 seconds until the display reads OFF. With the volume to be infused set to OFF the pump will not enter a KVO mode.
8. Press the RUN/HOLD switch to start the pump. The run indicator will appear when the pump mechanism begins to operate.

MAKING CHANGES DURING OPERATION

1. To change the infusion rate while the pump is running, press and hold the RUN/HOLD switch, change the rate by pressing ^ v, then release the RUN/HOLD switch to continue the infusion at the new rate.

   NOTE: The following changes can only be made while the pump is in the hold mode (i.e., when the infusion is stopped). To place the pump on hold, press the RUN/HOLD switch. The display will alternate between "hold" and the current rate. If the pump is left for more than 2 minutes without a switch being pressed during the start-up or hold mode, an alarm will sound and the display will flash "hold." Press the RUN/HOLD switch to clear the alarm. Should a hold alarm occur before fluid delivery begins and the pump is operating on battery power, the pump will automatically shut off after 3 minutes in alarm.
2. To clear the volume infused, place the pump on hold and press the CLEAR VOL switch until the display reads 0000. Once cleared, press the RUN/HOLD switch again to continue infusion.
3. To change the volume to be infused, place the pump on hold, press and hold the VOL TO BE INF switch, set the new volume to be infused by pressing ^ v, then release the VOL TO BE INF switch. Press the RUN/HOLD switch to continue the infusion.
4. To change the set, place the pump on hold, and ***close the set regulating clamp.*** Remove the flow sensor, open the door, open the mechanism latch by pushing the latch to the right. Carefully remove the tubing adapters from the tubing retainers. Change the set. In-

sert the tubing adapters into the tubing retainers, verify that the instrument tubing segment is fully within the mechanism, close the mechanism latch by pushing the latch to the left, close the door, position the flow sensor onto the drip chamber, and open the set regulating clamp. Press the RUN/HOLD switch to continue the infusion.

5. To turn off the pump press the ON/OFF switch. The infusion rate, volume to be infused and volume infused will be retained in the pump's memory.
WARNING: Fully close the set regulating clamp whenever the pump is turned off, and prior to removing the set from the instrument to prevent possible free flow or overinfusion.

SECONDARY INFUSIONS THROUGH UPPER 'Y' INJECTION SITE

Medication may be added through the upper 'Y' injection site of the primary administration set. (See Figure 6.) Do not attempt to infuse both fluids simultaneously by this method.

WARNING: For proper operation use only "59" Series 20 drops/ml secondary administration sets.

1. Prepare and suspend the secondary solution container and secondary administration set in accordance with the set directions for use.
2. Ensure that the pump is on hold. Close the primary set regulating clamp above upper 'Y' injection site. Failure to do so may cause backflow into the primary line and mixing of solutions.
3. Properly position flow sensor on secondary set drip chamber (see Figure 6). Open secondary set regulating clamp.
4. Set prescribed infusion rate and, if appropriate, volume to be infused. Press RUN/HOLD switch to start infusion. When secondary container empties, pump will alarm FLO. If the volume-to-be-infused feature is used, and the secondary container is not empty when the volume to be infused is reached, the pump will infuse at the KVO rate and light the KVO indicator.
5. Following the completion of the secondary infusion, press RUN/HOLD to place the pump on hold. Return flow sensor to primary set drip chamber. Set prescribed infusion rate (and volume to be infused, if appropriate) for primary solution, then close secondary set regulating clamp. Open the primary set regulating clamp and press RUN/HOLD switch to start infusion.

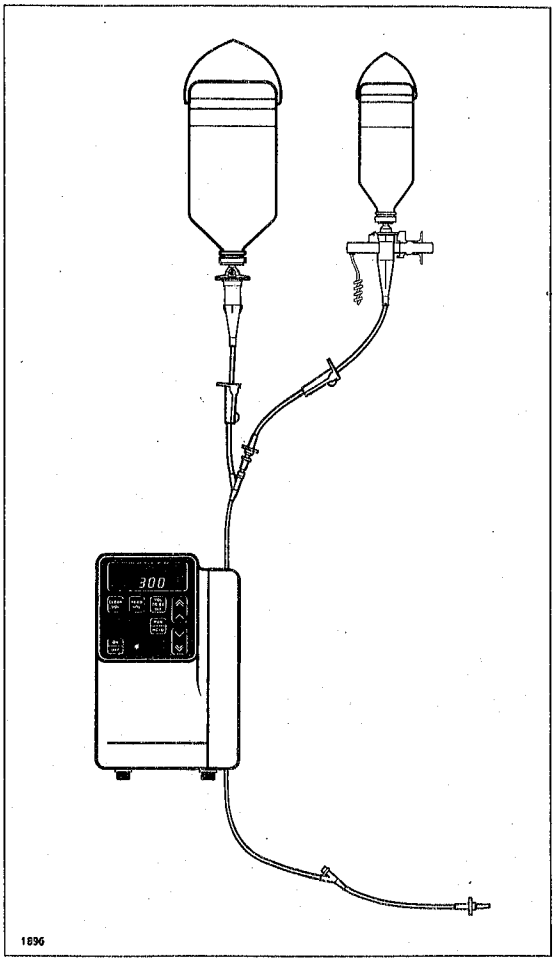


Figure 6. Setup For Secondary Infusions Through Upper 'Y' Injection Site.

BATTERY OPERATION

The Model 591 pump operates on internal battery (DC) power anytime the pump is disconnected from AC power, provided that the battery is properly charged. If the pump is operating on battery power, the rate display will flash on and off to indicate battery operation.

To recharge the battery to 70% of its full capacity, connect the pump to an AC outlet for about 6 hours. The AC indicator will light whenever the pump is connected to AC power and the battery is being charged. Longer recharging will increase the charge (there is no danger of overcharging).

NOTE: The battery should not be left in a discharged state for long periods, as this may cause permanent damage to the battery.

AMBULATING

The pump can be used when a patient is ambulating or being transported. Disconnect the pump from the AC outlet to operate on battery power. Verify pump and power cord are securely fastened to an IV pole or portable stand. Avoid excessive swinging of the solution container, since fluid in the drip chamber may splash up and cause the pump to alarm.

If the pump sounds an alarm, note the alarm message and press the RUN/HOLD switch to place the pump on hold. Use the following guide to eliminate the cause of the alarm. After correcting the condition, press the RUN/HOLD switch again to restart the infusion.

Information Display/Probable Cause	Corrective Action
Flashing Message With Audible Alarm	
	Check the probable causes and correct.
No drops or not enough drops detected. Solution container empty, closed clamp, occluded tubing, clogged filter. Flow sensor disconnected while operating.	
	Shake drip chamber to clear sidewalls. If alarm persists, replace set.
Abnormal drops detected. Fogging or droplets on sidewalls of drip chamber.	
Drip chamber overfilled or splashing of fluid caused by excessive movement of drip chamber (as in transport of patient). Flow sensor not plugged in, or optical path obstructed.	Check plug and position of flow sensor and fluid level in drip chamber. Correct as required.
	Ensure IV tubing is completely installed and occluded by the mechanism.
Flow detected in excess of set rate or when pump is on hold, or during start-up.	
	Cycle power off, then on. If problem persists, do not use pump. Contact qualified service personnel.
(followed by a letter or number)	
Possible instrument malfunction.	
	Check set for proper installation. Close door and restart pump.
Door opened during infusion or upon entering run mode.	

Information Display/Probable Cause	Corrective Action
hold Two minutes have elapsed since pump was placed on hold or into start-up mode, or a switch may be stuck. If the pump is in start-up mode and on battery power, it will automatically power-off if left in this alarm for 3 minutes.	Press RUN/HOLD switch once to silence alarm, and again to restart pump. If a switch is stuck, contact qualified service personnel.
batt Battery has insufficient charge to operate pump.	Plug power cord into AC outlet. Pump will be operable immediately.
SEt Out IV set removed or improperly installed in pump.	Check set for proper installation.
Momentary display that disappears shortly after power is turned on	Plug the power cord into AC outlet. Pump will be operable after several seconds.
Pump has automatically shut off due to low battery charge.	
Alternating Message bat (Alternating with rate display, pump continues to run) Low battery; battery has about 1 hour or less of usable charge remaining.	Plug power cord into AC outlet.
hold (Alternating with rate display) Pump has been placed on hold. This is not an alarm condition.	Press RUN/HOLD switch once to restart infusion.
NOTE: Alarms may not sound if pump is operating on AC power with a fully discharged battery, and AC power loss occurs. Fluid flow will stop.	

When storing the pump, it is recommended that the pump be connected to AC power to ensure full battery charge the next time it is used. Do not store pump with battery in a discharged state, as this may result in permanent battery damage.

DO NOT STEAM AUTOCLAVE OR IMMERSE THIS PUMP. The pump may be EtO gas sterilized, providing the maximum temperature does not exceed 58°C, (136.4°F), and the relative humidity does not exceed 60%. Aerate the pump for 24 hours in free air, or for 8 hours in an aerator. The above procedure is intended as a guideline only. It is the user's responsibilty to properly verify that sterilization is successful by using proper controls and biological indicators designed for that purpose.

It is a good practice to routinely clean the exterior surface of the pump, the door, and the mechanism, especially if spillage has occurred. Use a cloth dampened with warm water, or a mild, non abrasive detergent (such as commercially available dish cleaning liquid) mixed with water. Care should be taken in the choice of cleaning agents and disinfectants used on this instrument. DO NOT USE ALCOHOL, AMMONIA OR AMMONIUM CHLORIDEBASED AGENTS because they will damage the plastic parts and could cause failure of certain critical parts on the instrument. Unplug the power cord from the AC wall outlet before cleaning. Do not immerse the pump or allow fluids to enter the instrument housing. The cam follower assembly may be removed from the pump and immersed in warm, soapy water for cleaning.

The flow sensor should also be cleaned routinely, especially if spillage has occurred. The flow sensor can be cleaned by running warm water over it while actuating the slider. Dry thoroughly. The flow sensor may be EtO gas sterilized without causing damage to the optics lens. Do not use solvents or cleaning agents as they could damage the plastic parts of the flow sensor. Refer to the Housekeeping, Central Service, or Infection Control Department in your facility for further information.

To ensure the pump remains in good operating condition, both regular and periodic inspections are required.

Regular inspections consist of performing the procedures described in the START-UP/OPERATIONAL CHECK and STORAGE, STERILIZING, AND CLEANING sections of this manual before each usage of the instrument. Regular inspections are not covered under any contract or agreement offered by IVAC Corporation and must be performed by the user.

Periodic inspections consist of the following inspection procedures. These inspections must be performed at regular intervals as indicated.

Inspection Procedure	Frequency
Inspect case and power cord for damage	6 months
Inspect cam and follower assemblies for damage, excessive wear, or foreign matter	6 months
Perform instrument self-tests	6 months
Perform functional tests	6 months

The periodic inspections previously listed must be performed in accordance with IVAC requirements and guidelines. (Customers within the United States should note that these inspections are also intended to complement the intent of JCAHO requirements.)

Detailed instructions for performing periodic inspections and maintenance can be found in the instrument service manual and service bulletins that supplement the service manual.

See SERVICE INFORMATION for instructions on how to obtain a service contract or service manual.

WARNING: Failure to perform the required regular and periodic inspections may result in a failure of the instrument to perform or alarm as specified.

If the pump fails to respond as described in this manual and the cause cannot be determined, do not use the pump. Refer to qualified service personnel.

Within the United States, application and service information may be obtained by writing to the IVAC Service Department at:

IVAC Corporation
10300 Campus Point Drive
San Diego, California 92121-1579
Attn: Instrument Service

Within the United States, IVAC Corporate Customer Service provides a toll free telephone line for your convenience. For information or assistance call (800) 482-4822.

Outside the United States, application, service information and service manuals may be obtained by contacting your local IVAC Service Department or distribution center.

Please include with the request for service information a description of the difficulty experienced (include all pertinent information such as flow rate, administration set and lot number, IV solution used, and the message displayed at the time of difficulty).

If it is necessary to return the instrument for service, carefully package the instrument with the flow sensor (preferably in the original packaging), and return it to the appropriate service center or distribution center. IVAC cannot assume any responsibility for loss of or damage to returned instruments while in transit.

IVAC Corporation (hereinafter referred to as "IVAC") warrants that: (A.) each new IVAC instrument (controller, pump or peripheral instrument) is free from defects in material and workmanship under normal use and service for a period of one year from the date of delivery by IVAC to the first purchaser and (B.) each new accessory (e. g., drop sensor, air in line detector, instrument adapter) is free from defects in material and workmanship under normal use and service for a period of one year from the date of delivery by IVAC to the first purchaser. If any product requires service during the applicable warranty period, the purchaser should communicate directly with your local office/distributor. If returned to IVAC at your local office, repair or replacement will be carried out at IVAC's expense, subject to the terms of this warranty. The product requiring service should be returned promptly, properly packaged and postage prepaid. Loss or damage in return shipment to the repair facility shall be at purchaser's risk.

In no event shall IVAC be liable for any incidental, indirect or consequential damages in connection with the purchase or use of any IVAC product. This warranty shall not apply to, and IVAC shall not be responsible for, any loss arising in connection with the purchase or use of any IVAC product which has been repaired by anyone other than an authorized IVAC service representative or altered in any way so as, in IVAC's judgement, to affect its stability or reliability, or which has been subject to misuse or negligence or accident, or which has had the serial or lot number altered, effaced or removed, or which has been used otherwise than in accordance with the instructions furnished by IVAC. This warranty is in lieu of all other warranties, express or implied, and of all other obligations of liabilities on IVAC's part, and IVAC neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with the sale of IVAC products.

IVAC disclaims all other warranties, express or implied, including any warranty of merchantability or of fitness for a particular purpose or application.

WARNING: The mechanism should be cleaned regularly to maintain proper operation. Spilled fluid left to dry in the pumping mechanism and latch will cause stiff or sluggish operation and may lead to a free flow condition. Visually inspect mechanism and check flow rate if condition is suspected. FLO.3 alarm may also alert you to the situation. **Do Not Use** under this condition. Remove unit for cleaning as described below.

To ensure proper operation of the pump, the mechanism requires cleaning after fluid spills and during periodic inspections.

Removing the Mechanism-Open the orange mechanism latch. Remove the two retaining screws. Apply forward pressure to the back of the two mechanism case ribs until the back right corner of the mechanism is dislodged. Pull the mechanism out.

Cleaning the Mechanism-Soak the mechanism for 10 minutes in warm mild detergent solution.

Rinse the mechanism well under running water.

The mechanism **must** be allowed to dry thoroughly. Compressed air or heat drying below 100°F (38°C) may be used.

When dry, verify that the latch and all the fingers of the mechanism move freely. If they do not move freely, repeat the soak, rinse, and dry process.

Lubricating the Mechanism-Lubricate the mechanism with DOW CORNING Lubricant #33 or GENERAL ELECTRIC Versilube® Silicone lubricating grease. Apply lubricant to both sides of the mechanism latch and where the pressure pad swivels.

Reassembling the Pump-With the orange mechanism latch open, gently insert the mechanism back into the pump. With the mechanism still partially pulled out, put the front edge in place. Rotate the mechanism until the back edge seats. Reinsert the retaining screws. Apply gentle downward pressure to the mechanism while tightening both screws.

Placement Check-Hold the RUN/HOLD switch down while turning the instrument on (use the ON/OFF switch); hold both switches down for two seconds. Use the up arrow switch to select test 8 (t=08). Press the RUN/HOLD switch twice. If there is excessive noise, loosen both retaining screws and adjust the mechanism up or down until the mechanism is quietest. Tighten both retaining screws. Press the ON/OFF switch to turn the pump off.

Refer to the Housekeeping, Central Service, Infection Control, or Biomedical Engineering Department in your facility for further information.