

Operating Guidelines for the Medrad Continuum Infusion System

Purpose: In order to minimize extravasations and maintain imaging quality the following guidelines and instructions shall be used.

Guidelines:

1. System must be outside of magnet room to remove pump from mounting bracket. Pump is only MRI compatible as a system.
2. Do not use any other IV pole. The system is not intended for long-term use outside the MR environment.
3. The IV pole limited to three pumps.
4. Pump charger is not MRI compatible and must never enter magnet room. Do not operate the pump while in the charger.
5. Store the pump in the charger when not in use. The battery should always be fully charged.
6. Battery charge will last approximately four hours at the maximum flow rate of 500 ml/hr. It takes six hours to charge a fully depleted battery.
7. LED Display - Green blinking light indicates infusion delivery. Red light indicates an alarm state.

OPERATION

1. Insert the primary IV line into the keyway aligning the flow direction with orange arrows.
2. Always place the most critical medication in the primary pump.
3. If two medications must be delivered immediately upon connection to the pump, it is recommended that the therapies be to two separate injection sites using two primary lines.
4. To connect a secondary line, follow the steps for one IV line and, after priming the secondary line, connect it to the Y-connection on the primary line. Follow the same instructions for the third line and connect it on the Y-connector on the secondary line.
5. Do not connect the patient until the setup and priming of all lines are complete.
6. Press syringe icon and prime the pump before connecting to the patient. Prime volume is configurable from 20 to 60 ml. Primary line priming volume is 10ml. Secondary and third line priming volume is 5ml.
7. Confirm that air is removed before connecting the patient.

PROGRAMMING

1. To quickly access the **Select Program** screen, press **Stop/No** immediately after turning pump on. Select **Continuous** or **Dose** program.

2. **Continuous - Press Start/OK**, select Rate, **press Start/OK**. Select Volume, press **Start/OK**. To change rate titration during infusion, enter new rate, press **Start/OK**.
3. **Dose –**
 - a. Enter patient weight in Kg, press Start/OK.
 - b. Enter concentration, press Start/OK.
 - c. Enter dose, press **Start/OK**.
 - d. Enter volume, press **Start/OK**.
 - e. To change rate titration during infusion, enter new rate, press **Start/OK**
4. **Bolus Program**
 - a. Available in **Continuous or Dose** program.
 - b. Press Orange syringe icon during infusion.
 - c. Enter bolus volume, press **Start/OK** within 10 seconds to initiate bolus.
 - d. Press **Stop/No** to stop bolus injection. Bolus is delivered at the flow rate programmed in the **Adjust Settings Menu**. Maximum bolus flow rate is 500 ml/hr.
5. **Lock Mode - To Lock** keypad, press and hold the Information icon until the graph is black and a beep is heard. To **unlock** keypad, press and hold the Information icon until the graph is **clear** and a **beep** is heard.
6. **KVO**
 - a. Automatically starts after a protocol is complete.
 - b. Four beeps indicate four minutes of KVO. Four more beeps indicates four more minutes of KVO. KVO flow rate can be set from 1 to 5 ml/hr with an initial default of 5ml/hr.

ADJUST SETTINGS

1. Change Current Pump Settings:
 - a. Press Info icon two times
 - b. Scroll to Adjust Settings
 - c. Scroll and select MORE, press Start/OK
 - d. Enter 901, press Start/OK.
2. Adjustable parameters:
 - a. Restart Pump
 - b. Pressure Default
 - c. Select Program
 - d. KVO Rate
 - e. Air Bubble Size
 - f. Store Last Program
 - g. Time Option
 - h. Delay before Start
 - i. Maximum Bolus Volume

- j. Maximum Flow Rate
- k. Maximum Bolus Flow Rate
- l. Language
- m. Set Time and Date
- n. History

SHOW SETTINGS

View Current Pump Settings - Press Info icon two times, select Show Settings, press Start/OK to view: Battery Level, Time and Date, Tube Temperature, Buzzer Level, Pressure Level Pressure Default, Selected Program, Priming Volume, KVO, Air Bubble Size, Store Lat Program, Time Option, Delay Before Start, Maximum Bolus Volume, Maximum Flow Rate, Bolus Flow Rate, Language, Serial Number, Production Date, Operation Time, Software Version, Volumetric Calibration, Pressure Delta, Pressure Cap and Exit.

ALARM CONDITIONS AND TROUBLESHOOTING

1. **Routine inspections and maintenance** will ensure continued performance and reduce equipment malfunction. MEDRAD recommends complete calibration and a performance check annually.
2. **Troubleshooting:**
 - a. When the pump detects a problem, the infusion **stops**, audible **alarm** is Activated, LED indicator is **red**, message appears on **screen**
 - b. Press **STOP/NO** to mute alarm for two minutes.
 - c. Refer to the **Operation Manual** for a complete listing of alarms, possible causes, and required action.

CLEAN-UP

1. Turn the pump off and remove battery before cleaning.
2. Clean the unit using a lint-free cloth dampened with warm water and a mild Detergent before every patient.
3. Always unplug the charger from AC power before cleaning.
4. Do not immerse any part of the system or allow liquid to enter the enclosure.
5. For all body fluid spills, follow the hospital decontamination procedures.