

## The Device

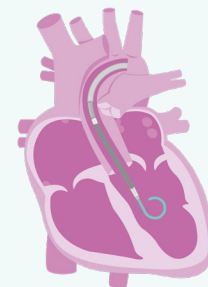
The Impella® is inserted into a vessel either surgically or percutaneously (see table for device types).

**Left Ventricle Support:** Pump inlet sits in the left ventricle and outlet rests above the aortic valve

**Right Ventricle Support:** Pump inlet sits in the right ventricle and outlet rests above the pulmonary valve

	LVAD			
	Impella 2.5 <sup>2</sup>	Impella CP <sup>1</sup>	Impella 5.0 <sup>2</sup>	Impella 5.5 <sup>1,3</sup>
Average Peak Flow	2.5 L/min	4.3 L/min	5.0 L/min	6.2 L/min

<sup>1</sup>with Smart Assist® <sup>2</sup>device to be replaced with newer technology <sup>3</sup>minimal vessel diameter 7mm



## Pump Settings (on Display Screen)

**Speed:** The main setting that can be changed to alter CO. P levels go from 0–9.

**Flow (L/min):** calculated CO through the pump. If number is yellow pump is not in good position. If white it is appropriately placed.

**Purge Flow (ml/hour):** The rate the Dextrose fluid is going to lubricate the motor.

**Purge Pressure (mmHg):** The amount of pressure needed to push the purge fluid through the pump.

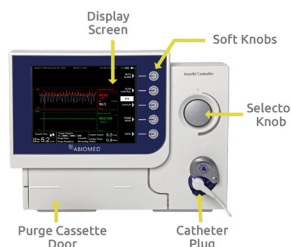
## System Components

### Heart Pump

The motor spins continuously, with blood entering through the inlet, and being ejected via the outlet.

The 2.5, CP, and 5.0 all have a pigtail at the end of the catheter – the 5.5 has a blunt tip

Pumps with Smart Assist® also have an optical placement sensor that will display data on the Impella® Controller.



### Controller

**Soft Knobs:** Open, display, and close menu options

**Selector Knob:** Button rotates to navigate through menus, press to make a selection

**Purge Cassette Door:** Spring-loaded door housing the purge cassette

**Catheter Plug:** Connects Impella® catheter to the controller

Pump settings on display screen

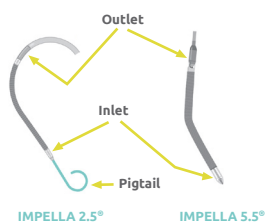
### Purge System

The purge cassette delivers purge fluid, which acts as a rinsing fluid, to the microaxial pump to keep blood from entering the motor.

**Purge Fluid:** Purge fluid is typically made up of D5W (dextrose in water), with 25 IU/mL of heparin.\*



\*Some centers have had success without heparin



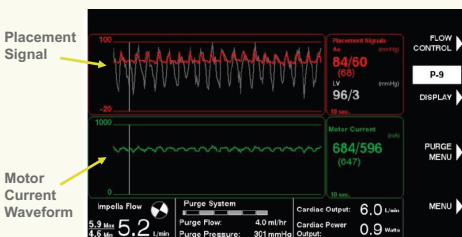
## Power Sources

- Battery life = 1 Hour
- Plug into AC outlet at all times

Red: Critical Yellow: Serious White: Advisory notifications  
Note: More information and instructions will display on screen

## Wave Forms

Type	Color	Measurement Description	Range
AO Placement Signal	Red	Monitors Ao Pressure – Used to determine location of the pump's sensor in relation to aortic valve	0–160 mmHg
LV Placement Signal—only displays with Smart Assist® and P level >4	White	Monitors LV Pressure – Used with Ao placement signal to determine pump's location in the LV Waveform peak should couple with Ao waveform to indicate optimal placement	0–160 mmHg Negative values may indicate malposition
Motor Current	Green	Measurement of the pump's energy usage during systole and diastole.	0–1000 mA, Goal 200 mA difference b/t numbers



## Anticoagulation

- Total Heparin delivered to patient = Impella® purge Heparin + systemic IV Heparin
- Purge fluid Heparin concentration D5W 25 U/ml (50 U/ml may be used)
- Goal: ACT 160–200 depending on clinical situation



## Potential Emergencies

### Hemolysis

Possible thrombosis or malposition of device

**Watch For:** Urine color changes and increase in LDH, Plasma free Hgb

**Treatment:** Check placement of catheter and reposition. Possibly lower P level.

### Suction

Inadequate ventricular filling from hypovolemia or device malposition

**Watch For:** Decrease in flow or change in hemodynamics. There may also be a low flow alarm.

**Treatment:** Decrease P level and assess volume status. Evaluate catheter position.

### No Flow / Low Flow

The catheter may have moved and be malpositioned or a thrombus is obstructing flow.

**Watch For:** Decreased CO, low flow alarms, and flat motor current waveforms.

**Treatment:** Decrease the P level below baseline. Troubleshoot device with X-ray and ECHO. May need repositioning or replacement of the pump.

### CPR

If there is a cardiac arrest and CPR is needed decrease the P level to 2 and start CPR. When ROSC returns check positioning of catheter.

If only defibrillation or cardioversion is required do not adjust P level.

