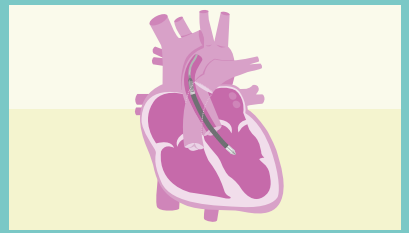
Impella® Left
CP & 5.5 with SmartAssist®
Algorithms & Care Guide



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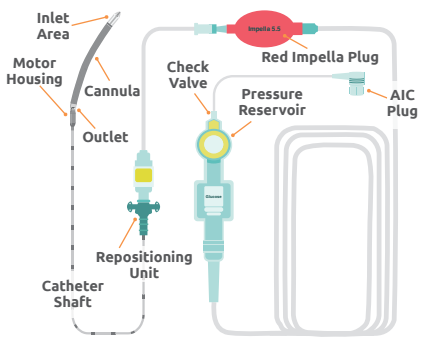
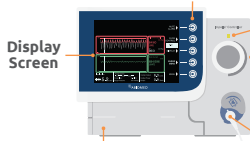
Device Components

Impella® Left 5.5 Pump



Automated Impella Controller (AIC)

Soft Buttons *Display and close menu options. Functions change depending on screen.*



Display Screen

Power Indicator

Selector Knob *Rotates to navigate menus, press to select.*

Purge Cassette Door *Spring loaded door housing the purge cassette.*

Catheter Plug *Connects Impella Catheter to the controller. Displays pump settings on screen.*

Device Settings

CP Flow Rates

P-Level	Mean Flow Rate (L/min)
P-0	0.0
P-1	0.0 – 0.9
P-2	1.1 – 2.1
P-3	1.6 – 2.3
P-4	2.0 – 2.5
P-5	2.3 – 2.7
P-6	2.5 – 2.9
P-7	2.9 – 3.3
P-8	3.1 – 3.4
P-9	3.3 – 3.7

5.5 Flow Rates

P-Level	Mean Flow Rate (L/min)
P-0	0.0
P-1	0.0
P-2	0 – 1.9
P-3	1.1 – 2.7
P-4	1.9 – 3.3
P-5	2.8 – 3.7
P-6	3.4 – 4.1
P-7	3.9 – 4.5
P-8	4.3 – 4.9
P-9	5.0 – 5.5

Select the lowest P-level recommended (P-2 or higher) that will enable you to achieve the flow rate necessary for patient support.

Purge Management

Purge Fluid: Consists of D5W with 25 to 50IU/mL of heparin or D5W with 25 to 50 mEq/1L of sodium bicarbonate.

Purge Flow (2–30mL/hr): Regulated by the device, it represents the rate at which purge fluid is infused into the motor and delivered to the patient.

Purge Pressure (300–1100mmHg): Regulated by the device, the amount of pressure needed to push purge fluid through the pump motor.

Changing the Purge Fluid & Cassette:

- Change per institutional guidelines.

DE-AIR PURGE | PURGE CASSETTE & FLUID BAG | PURGE FLUID BAG

- Follow step-by-step instructions in the Purge Menu.

TROUBLE SHOOTING

Air Detected

AIC monitors for air in system. If detected, AIC signals an alert to disconnect luer and starts automatically de-airing the purge system.

Purge Pressure (<300 mmHg)

Inspect purge system for leaks. If none, increase purge fluid dextrose concentration. If it continues, replace purge cassette.

Purge Pressure (>1100mmHg)

Inspect purge system and catheter for kinks. If none, decrease purge fluid dextrose concentration to 5%. If it continues, replace purge cassette. If the problem persists, contact AbioMed rep and consider TPA administration.

Unresponsive Patient

Adequate Perfusion

Support hemodynamics
Assess for other causes: stroke, hypoglycemia, sedation, hypoxemia

Inadequate Perfusion

Support hemodynamics
Follow ACLS/PALS protocol
Reduce P-level during CPR

Assess Pump Function

Impella functioning

Assess for other causes, but not limited to:
sepsis, stroke, and bleeding

AIC ON, IMPELLA STOPPED

- Evaluate active alarms
- Assess patient volume status
- Confirm all connections secure
- Review the AIC screen for device placement and consider STAT echo
- Consider acute device thrombosis
- Refer to device failure algorithm

Impella NOT functioning

CONTROLLER FAILURE

- Confirm all connections secure
- Refer to device failure algorithm
- Switch to backup controller

Suction

"Suction" Alarm

Reduce P-level by 1 or 2

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Assess Volume Status
Order Echo to confirm position and RV function

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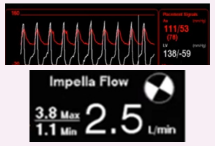
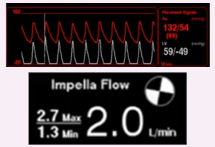
Suction can result in:
Hemolysis OR Low Flow



Diastolic Suction

- Normal systolic pressure
- Negative diastolic pressure (recovers by end of diastole)
- Low diastolic flow

**Usually volume-related*



Continuous Suction

- Low systolic pressure
- Negative diastolic pressure
- Low systolic and diastolic flows
- Uncoupled Ao and LV waveforms

**Usually position-related*

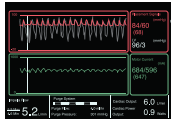
Pump Placement & Assessment

Device Dimensions	Impella CP	Impella 5.5
Drive Catheter Diameter	9 Fr	9 Fr
Overall Largest Pump Diameter	14 Fr	21 Fr
Cannula Length	11.6 cm	9.6 cm
Cannula Length+Motor	13.5 cm	11.4 cm
Left Ventricle Length	8.5 cm	6.0 cm
Aorta Length	7 cm	6.4 cm

Confirming Placement with Echocardiogram:

- Confirm position with transthoracic echo in the parasternal long axis window
- Correct position: catheter angled anteriorly toward the LV apex and away from the heart wall.
- Inlet position below the aortic valve:
  CP = 3.5 cm **5.5 =** 5 cm

AIC Placement Screen Waveforms



- **Aortic (red):** Fiber-optic sensor location relative to the aortic valve.
- **Ventricular (white):** Calculated waveform useful in managing the Impella.
- **Motor current (green):** Measures the energy intake of the motor relative to the aortic valve. Pulsatile currents, indicative of the cardiac cycle, confirm correct placement.

Device Failure

"Impella Stopped" Alarm

STABLE Patient

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Restart at previous P-level

YES RESTART / NO RESTART

YES RESTART → Echo: Assess position, RV Failure
Discuss pump replacement

YES RESTART → Restart at P-2

NO RESTART → Wait 1 Minute, Restart Again

NO RESTART → Replace Pump

UNSTABLE Patient

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Support Hemodynamics
Follow ACLS/PALS protocol
Reduce P-level during CPR

Signs of Impending Pump Failure:

- Persistent high or low purge pressure despite corrective measures
- Increasing or elevated motor current
- Decreased flow rates

Other Troubleshooting:

1. Confirm device is powered "on"
2. Ensure device is plugged into **RED** outlet
3. Check electrical outlet

Device Malposition

STABLE Patient

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Assess Placement Signal

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Aortic Pressure

Motor Current Waveform:
FLATTENED

Alarm: "Impella Position in Aorta"

UNSTABLE Patient

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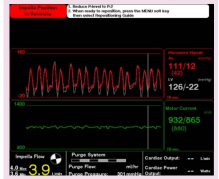
Support Hemodynamics
Follow ACLS/PALS protocol
Reduce P-level during CPR

Ventricular Pressure

Motor Current Waveform:
DECREASED PULSATILITY



Alarm: "Impella Position in Ventricle"

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Reduce to P-2
Obtain ECHO to assess postion
Reposition per protocol*

**If catheter is completely out of the ventricle, do not attempt to reposition without guidance.*

Hemolysis

Lab values and clinical exam consistent with Hemolysis.

Cause	Controller Indicator/Alarms	Action
Inlet prox. to intra-ventricular structure	**"Suction"**, decreased flows	- Echo & Reposition - See "Suction"
Pump Malposition	Position alarms with decreased flows, **"Impella Flow Reduced"** **"Placement Signal Low"** **"Suction"**, decreased flows	- Reduce P-level - Echo & Reposition - See "Suction" &/or "Device Malposition" - Placement Signal Low
Higher than needed P-level	No controller indicators **"Impella Flow Reduced"*** **"Suction"**, decreased flows	- Reduce P-level - See "Suction"
Inadequate Preload	Position alarms **"Impella Flow Reduced"** **"Suction"**, decreased flows	- Reduce P-level - Assess vol. status - Echo - See "Suction" &/or "Device Malposition"

* *"Impella Flow Reduced" alarm is specific to Impella CPSA (in AUTO mode only)*

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