SynCardia
temporary Total Artificial Heart

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Typical Fill Volumes and Cardiac Output

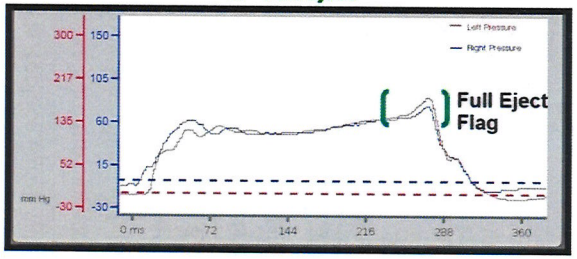
70cc TAH-t
Fill Volume (FV): **50-60 mL**
Cardiac Output (CO): 6-9 L/min

50cc TAH-t	
Fill Volume (FV): **30-40 mL**	**NOTE:** The C2 Driver will NOT provide a High Fill Volume alarm when connected to a 50cc TAH-t. Watch Fill Volumes and Flow Waveform!
Cardiac Output (CO): 4-6 L/min	

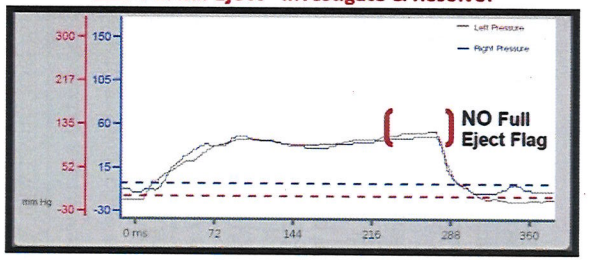
Systole – Driveline (Air) Pressure Waveform (Use for assessment of Full Ejection)

- Measurement of driveline air pressure
- Look for the secondary rise in pressure
  - "Full Eject Flag" = Full Eject
- Ventricular ejection primarily affected by:
  - Drive Pressure
  - Afterload

✓ **Full Eject**



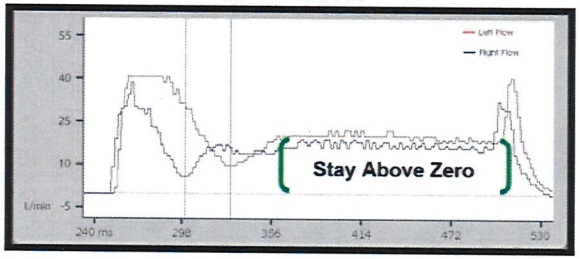
⚠ **Partial Eject - Investigate & Resolve!**



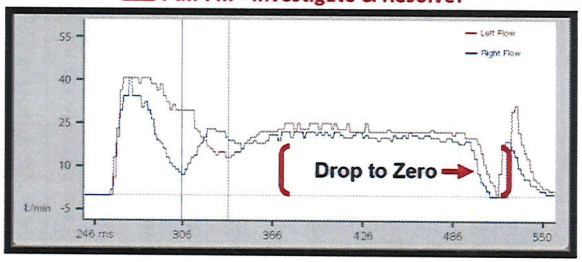
Diastole – Driveline Air Flow Waveform (Use for Assessment of Partial Fill)

- Measurement of airflow to the Driver as an estimate of blood flow into the ventricle
- Look for airflow throughout the diastolic cycle
  - Airflow observed = Diaphragm moving/filling
- Ventricular filling primarily affected by
  - Patient volume status and filling pressures
  - Beat Rate
  - Vacuum

✓ **Partial Fill**



⚠ **Full Fill - Investigate & Resolve!**



Additional Visual Checks

✓ On/Off Key is **removed** from Driver when connected to patient

✓ Average Cardiac Output Waveform has **consistent CO**

✓ Driver is in ICU Mode or Ambulatory Mode outside of the O.R.

⚠ Sudden Trending Decrease in CO Waveform – **Investigate & Resolve**

Typical Driver Settings on Companion 2 Driver

Beat Rate:	125 ± 15 bpm	**% Systole:**	50 ± 5 %
Left Drive Pressure:	180 – 210 mmHg	**Right Drive Pressure:**	80 – 100 mmHg
Left Vacuum Pressure:	0 to -13 mmHg	**Right Vacuum Pressure:**	0 to -10 mmHg

Alarm	Corrective Action
System Malfunction	Replace Driver with a backup Driver & **Notify SynCardia.**
Low Cardiac Output	Assess patient; make sure the Driveline is connected and has no kinks. Verify Driver settings are achieving full eject/partial fill conditions from Driver displayed waveforms. Assess patient conditions that may contribute to a low Cardiac Output. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia.**
Compressor Malfunction **Dual Compressor Malfunction**	Replace Driver with a backup Driver & **Notify SynCardia.** While not on a patient, turn the Driver off and on again. If alarm persists, return the Driver to SynCardia.
Emergency Battery Error	Replace Driver with a backup Driver & **Notify SynCardia**. While not on a patient, charge the Driver that displayed the alarm for up to 11 hours. Turn the Driver off and on again. If alarm persists, return the Driver to SynCardia.
Emergency Battery In Use	Verify Driver is connected to a power source (wall outlet) and External Power indicators are displayed. Replace External Batteries with fully charged Batteries. If condition persists, replace Driver with a backup Driver & **Notify SynCardia**.
Cardiac Output Imbalance	Assess patient; make sure the Driveline is connected and has no kinks. Verify Driver settings are achieving full eject/partial fill conditions from Driver displayed waveforms. Assess patient conditions that may contribute to a low Cardiac Output on one side. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Low Pressure	Assess patient; make sure the Driveline is connected and has no kinks. Verify Driver settings are achieving full eject/partial fill conditions from Driver displayed waveforms. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Emergency Battery Low	Verify Driver is connected to a power source (wall outlet) and External Power indicators are displayed. Replace External Batteries with fully charged Batteries. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Ventricle Over Pressure	Verify the Over Pressure alarm setting is 20 mmHg higher than the active Driver pressure settings. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Pressure Incorrect	Verify Driver Right Pressure Incorrect alarm settings are appropriate. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
External Battery Error	Verify Driver is connected to a power source (wall outlet) and External Power indicators are displayed. Replace External Batteries with charged Batteries and verify Batteries indicate a charge on fuel gauge. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Low External Battery	Verify Driver is connected to a power source (wall outlet) and External Power indicators are displayed. Replace External Batteries with charged Batteries and verify Batteries indicate a charge on fuel gauge. If alarm persists, replace Driver with a backup Driver & **Notify SynCardia**.
Fill Volume High	**NOTE:** this alarm only applies to use with 70cc TAH-t (this alarm is not present with 50cc TAH-t). Verify Driver settings are achieving full eject/partial fill conditions from Driver displayed waveforms. Assess patient conditions (volume status/activity) that may contribute to a Left Fill Volume High alarm. If alarm persists, certified clinical staff may adjust Driver beat rate or vacuum.
Filter Maintenance	Using the finger access grooves on the sides of the Driver, replace or clean each filter (2 filters per Driver) then dismiss the filter maintenance alarm within the Setup menu.