



Bedside Quick Guide

ARROW®
NEVER SETTLE™

Table of Contents



Preparing the VPS G4™ Device	3	
VPS G4 Base Unit and Interface Setup		
Pre-Sterile Setup	4	
ECG Setup		
Remote Control		
ECG Calibration		
Sterile Setup	5-6	
Site and Catheter Setup		
ARROW® VPS® Stylet Setup		
Doppler Testing		
Procedure	7	
Catheter Insertion Procedure		
ARROW VPS Symbols		
Capturing Data with a Blue Bullseye.....	8	
Post-Procedure		9-11
ARROW VPS Stylet Removal		
ECG Electrode Removal		
Starting a New Procedure		
Important Notes When Confirming Tip Placement Via Chest X-ray		
Reviewing a Procedure		
Shutting Down the System		
Troubleshooting		12-14
Flipping Orange/Yellow Symbols		
Flipping Green/Blue Symbols		
Lost/Weak Doppler Signal: Yellow Triangle		
Lost/Distorted ECG Signal		
Transient Blue Bullseye		
VPS Stylet Sticking in Catheter		
Catheter Completely Inserted: No Blue Bullseye		

Preparing VPS G4™ Device



TIP: Fully charge the VPS G4 Base Unit and the VPS G4 Interface for eight hours prior to first time use. The VPS G4 Base Unit should always be powered on before the VPS G4 Interface.

VPS G4 Base Unit and Interface Setup

1. Connect power cable to the VPS G4 Base Unit
2. Connect the VPS G4 Interface to the VPS G4 Base Unit via USB cable
(If using WiFi, see the VPS G4 Operator's Manual for connection instructions)
3. Press and Hold the VPS Base Unit power button for approximately 1 second
 - a. Battery Charging LED is **orange** when charging, **blue** when fully charged
 - b. Console Power LED is **green** when on
 - c. Power On LED is **blue** when plugged into AC
4. Press and Hold the VPS G4 Interface power button for approximately 3 seconds
5. Launch VPS Application
6. Select NEW PROCEDURE
7. Enter patient information, Patient ID is required
Press CONTINUE to save information
8. Attach the VPS Stylet Extension Cable to the front of the VPS G4 Base Unit
Align the **red** dots on the connectors



Pre-Sterile Setup

ECG Setup

1. Connect ECG cable to the front of the base unit if not already connected
2. Connect ECG leads to electrodes
3. Place electrodes on patient body as indicated, white on right shoulder
4. Place **red** and **black** electrodes on upper left leg



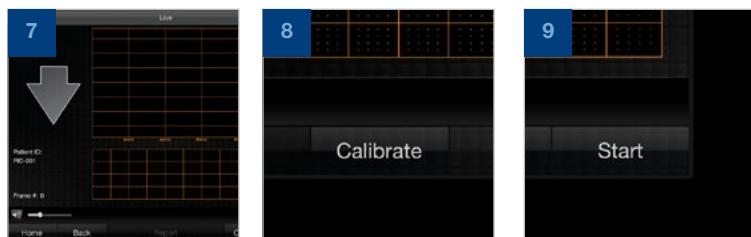
Remote Control

5. Turn on remote control
- Hold down the POWER/SCREEN CAPTURE button
6. Place remote in easily accessible area



ECG Calibration

7. Go to LIVE screen
8. Press CALIBRATE button
9. Calibration stops automatically if successful and START button is enabled
10. If the system does not calibrate the first time, an error message will appear, alerting you to the failure and the START button will turn **orange**. Press CALIBRATE button again to re-try.
11. If the system cannot calibrate, you can continue with the procedure, but only the **gray** arrow will appear on the screen. The Doppler and ECG graphs will still be available, and can help you navigate. However, an alternate method of tip confirmation is required, such as fluoroscopy or chest X-ray.

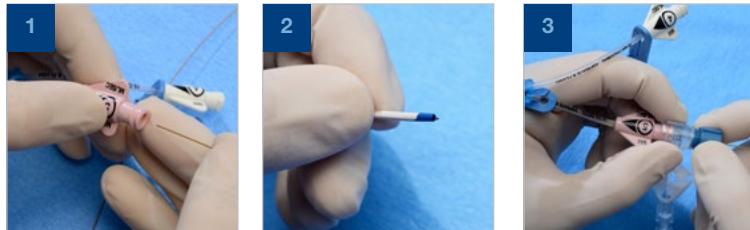


Sterile Setup

Site and Catheter Setup

WARNING: Do not trim the ARROW® VPS® Stylet

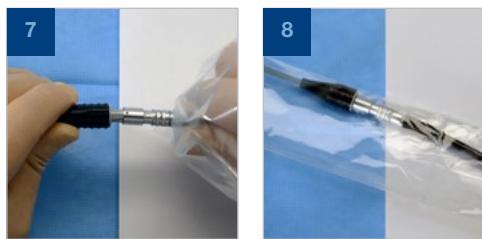
Follow your hospital protocol for site and catheter setup, venous access, catheter measurement and trimming. There are no changes required to your hospital's standard protocol. Follow the Instructions for Use in the kit containing the ARROW VPS Stylet.



ARROW VPS Stylet Setup

If using a pre-loaded ARROW Catheter with the VPS Stylet, skip to step 4

1. **Carefully insert** the VPS Stylet tip into the catheter's largest lumen port and advance slowly
2. **Stop when the VPS Stylet tip** protrudes 1 mm outside of catheter
3. **Secure the VPS Stylet** by tightening the Touhy Borst
4. **Extend catheter** to verify that the VPS Stylet tip still extends by 1 mm
5. **Mark the VPS Stylet** (sterile marker provided) where it meets the **blue** Touhy Borst
6. **Slide the sterile plastic sleeve** over the VPS Stylet cable
7. **Grasp the VPS Stylet Extension cable** with the sterile bag and carefully connect it to the VPS Stylet — aligning the **red** dot of the extension cable connector to the black fin on the VPS Stylet cable
8. **Slide the plastic sleeve** fully over the extension cable and **secure** to prevent it from slipping

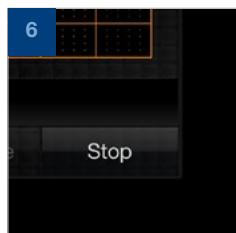
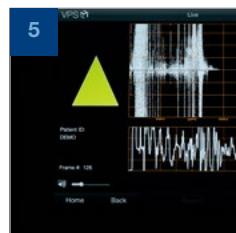
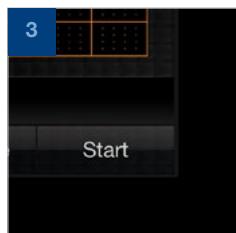


Sterile Setup • Continued

Doppler Testing

Use the remote control to operate the VPS G4 Interface from the sterile field.

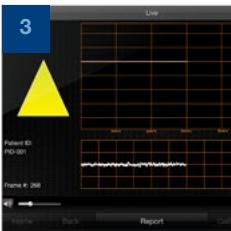
1. Place your hand inside the sterile bag, grasp the remote control, pull the bag over the device and seal
2. Press the UNMUTE button on the remote control
3. Press the START button
4. Flush the VPS Stylet lumen with saline
5. Listen for a strong “whoosh” sound as fluid passes over the VPS Stylet.
If no sound is heard when flushing, it may be an indication that the VPS Stylet is not working properly. See the *Troubleshooting section of the VPS G4 Operator’s Manual* for further instructions.
6. Press the STOP button
7. Tightly clamp the side port of the Touhy Borst to maintain saline column



Procedure

Catheter Insertion Procedure

1. Insert the ARROW® VPS® Stylet assembly into introducer
2. Press the START button on the remote control
3. Wait for approximately 7 seconds, until a colored symbol is displayed, before advancing the catheter/VPS Stylet assembly
4. Advance 1-2 cm/second



ARROW VPS Symbols



Green Arrow Keep Going

The catheter/VPS Stylet assembly is moving with the flow of the blood towards the heart.



Orange Circle Do Not Enter

The catheter/VPS Stylet assembly is moving against the flow of the blood. The catheter/VPS Stylet assembly could be advancing up the jugular, in the azygous vein, in an artery, laterally across the chest, or beyond the target (in the Right Atrium). Gently retract the catheter/VPS Stylet assembly until the **Green Arrow** or **Blue Bullseye** symbol appears.



Yellow Triangle Redirect Catheter

The catheter tip is possibly against a vessel wall or retracted inside the catheter. Pull the catheter/VPS Stylet assembly back. Check the VPS Stylet marking to verify the tip has not retracted back inside the catheter. Adjust the VPS Stylet if necessary. Turning the catheter/VPS Stylet assembly can also realign it inside the vessel to allow a stronger signal to be obtained.

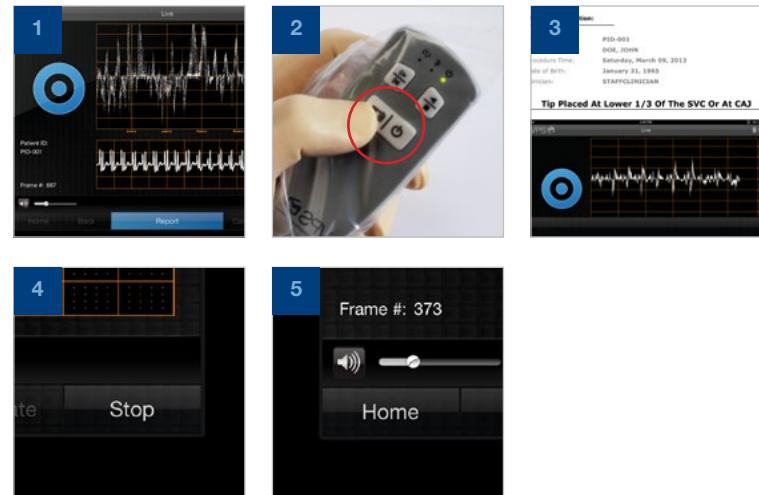


Blue Bullseye Correct Placement

You have reached the the lower 1/3 of the SVC-CAJ. Position the tip in the upper edge of **Blue Bullseye** zone. The REPORT button will turn **blue** when a steady **Blue Bullseye** is achieved. Push the **blue** REPORT button to capture the screen shot. **Complete the procedure per hospital protocol.**

Capturing Data with a Blue Bullseye

1. When a **Blue Bullseye** is achieved, maintain the catheter/VPS Stylet assembly position until the REPORT button turns **blue** (10 seconds/8 consecutive heartbeats)
2. **Press** the CAPTURE button on the remote control to save a copy of the screenshot as a PDF file available for download or printing
3. If a steady **Blue Bullseye** is achieved, the following statement will appear on the PDF report: 'Tip Placed At Lower 1/3 Of The SVC Or At CAJ'
4. **Press** the STOP button
5. **Press** the HOME button (*bottom left*) to return to the home screen to begin or review a case
6. If a **Blue Bullseye** cannot be achieved, end the case on a **Green Arrow** and an alternative method of tip confirmation is required. A screen capture can still be taken of the **Green Arrow** screen for the patient record.



Post-Procedure



TIP: You can leave the VPS G4™ Base Unit switched on between patients, but it should be turned off at the end of each day.

ARROW® VPS® Stylet Removal

1. **Secure** the catheter
2. **Flush** the catheter lumen with the VPS Stylet
3. **Unscrew** the Touhy Borst and **slowly remove** the VPS Stylet and Touhy Borst from the catheter as one unit
4. **If you encounter resistance: Stop**
5. **Flush** catheter or strengthen the lumen per hospital protocol
6. **Remove** both the catheter and the VPS Stylet, if the VPS Stylet can't be removed alone
7. **Disconnect** and dispose of the VPS Stylet per institutional protocols, procedures and policies. Clean all device components and store properly.
(See the VPS G4 Operator's Manual for complete cleaning instructions)

ECG Electrode Removal

1. **Remove** ECG electrodes from patient and discard per hospital protocol
2. The ECG cable can remain connected to the VPS G4 Base unit
(See the VPS G4 Operator's Manual for details)

Starting a New Procedure

1. **Press** HOME button to return to the VPS G4 Interface home screen
2. **Click** NEW PROCEDURE and enter the Patient ID information
3. **Proceed** as before

Post-Procedure • Continued

Important Notes When Confirming Tip Placement Via Chest X-ray

Remove any patient items that may interfere with visualization including jewelry, bra, and ECG patches/wires.

It is important to keep the arm with the PICC at the same angle from the patient's midline as performed during PICC insertion.

For this patient, the angle was 90°/___ for the left/right arm. (Inserter to circle correct insertion angle and arm)

Provide support for the arm during the X-ray procedure.

Keep X-ray beam 90° perpendicular to the film. **Verify angle.**

Keep the distance between the beam and the film at 48 inches. **Measure this to ensure that it is correct.**

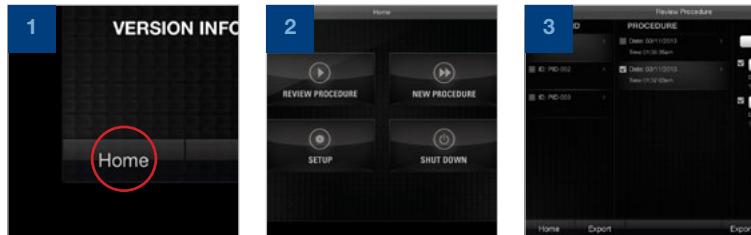
Shoot X-ray at end-expiration during normal breathing. **Do not ask the patient to take a deep breath as this will move the PICC line and will not provide a proper assessment of the catheter tip.**

Post-Procedure • Continued

TIP: If using Wi-Fi, ensure full battery charge is maintained.

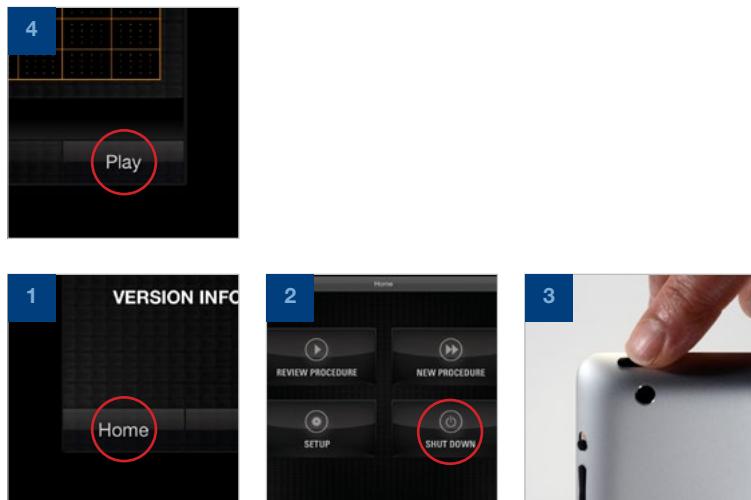
Reviewing a Procedure

1. From any screen, **press** the HOME button to return to the VPS G4™ Home Screen
2. **Click** REVIEW PROCEDURE
3. Select the patient and choose the correct date and time
4. **Press** PLAY



Shutting Down the System

1. **Press** the HOME button to return to the VPS G4™ Home Screen
2. **Press** the SHUT DOWN button to shut down the VPS G4 Base Unit and close the VPS® Application
3. **Turn off** the VPS G4 Interface by holding down the SLEEP/WAKE button
4. Use the slide button to power off



Troubleshooting

TIP: Do not force the catheter/VPS® Stylet assembly forward through, or end the case on a **Yellow** or **Orange** symbol. Always end on a **Green Arrow** symbol if you cannot achieve a **Blue Bullseye**. The tip of the VPS Stylet may be against a vessel wall, or may have retracted inside the catheter. Try each of the steps below, in turn, to resolve the issue.

Flipping Orange/Yellow Symbols

1. **Flush** the catheter/VPS Stylet assembly and lock side port to ensure proper saline column
2. **Pull the catheter/VPS Stylet assembly back** until stable **Green Arrow** or **Blue Bullseye** symbol is obtained

Flipping Green/Blue Symbols and/or Doppler Sound Dampening

1. **Slowly advance** the catheter/VPS Stylet assembly 1/2 cm at a time
2. If the Doppler changes to retrograde flow and the **Orange** symbol appears, slowly retract to obtain a **Blue Bullseye**
3. **Wait** for a steady **Blue Bullseye** (approximately 10 seconds or 8 consecutive heartbeats)
4. If possible, have the patient hold their breath
5. If necessary, accept unstable **Blue Bullseye** position based upon waveform data and confirm with alternate method (e.g. CXR)
6. **Always end on Green Arrow** if you cannot achieve a **Blue Bullseye**

Lost/Weak Doppler Signal: Yellow Triangle

1. **Ensure the VPS Stylet tip extends** 1 mm from the tip of the catheter and that the Touhy Borst is tightly secured. Adjust if necessary
2. **Rotate** the catheter/VPS Stylet assembly to realign it inside the vessel
3. **Slowly pull catheter/VPS Stylet assembly back** until **Yellow Triangle** disappears. **Slowly re-advance**
4. **Flush** and lock side port
5. **Press STOP button, then press START button again**

Lost/Distorted ECG Signal

1. **Flush** the lumen containing the VPS Stylet and lock side port to ensure proper saline column
2. **Check** ECG electrodes to ensure they are in the correct place and there is proper skin contact
3. **Check** ECG cable to ensure proper connection

Troubleshooting · Continued



TIP: Intravascular ECG waveform distortion is normal in the upper vasculature. Expect a **Blue Bullseye** on normal sinus heart rhythm patients.

Remember that the 2.33 cm landing zone is an average. Some landing zones can be very small. The VPS® Stylet should only be used with catheters having an inner lumen diameter of $\geq 0.021"$.

Transient Blue Bullseye

1. **Advance** the catheter/VPS Stylet assembly in $\frac{1}{2}$ cm increments pausing for 5-10 seconds
2. If the Doppler changes to retrograde flow, and the **Orange** symbol appears, slowly retract to obtain a **Blue Bullseye**

VPS Stylet Sticking in Catheter

1. **STOP.** Do not pull hard when resistance is met
2. **Flush** the catheter/VPS Stylet assembly, strengthen catheter lumens (per hospital protocol), and gently attempt to remove the VPS Stylet and Touhy Borst together from catheter
3. **STOP** if resistance is felt
4. When retracting the VPS Stylet, make sure the entire catheter and the VPS Stylet cable are lying flat and as straight as possible
5. Follow hospital protocol for the VPS Stylet removal (e.g. reposition patient, head down or up, arm repositioned, flush and attempt removal)
6. Have patient cough and take a deep breath if possible, then flush and attempt removal

Troubleshooting · Continued

Catheter Completely Inserted: No Blue Bullseye

SCENARIO 1

Catheter may be cut too short to reach the landing zone, or catheter has looped (confirmed via chest X-ray).

- May have to replace the catheter/VPS® Stylet assembly, depending upon actual location in SVC (per hospital policy and procedure)
- Pull the catheter/VPS Stylet assembly back 2-5 cm, reinsert and observe ECG waveform/amplitude and Doppler signal changes

SCENARIO 2

Catheter is appropriate length, ECG amplitude has increased, and Doppler signal is good with **Green Arrow** only — no **Blue Bullseye** achieved.

- Leave the tip at **Green Arrow** at calculated length, or use the VPS Waveforms for indication of tip position. Follow hospital procedure for tip confirmation (CXR or fluoroscopy)

SCENARIO 3

Looped catheter

- ECG amplitude is not changing or is distorted, Doppler signal is weak, tip is possibly in upper vasculature. Pull back and redirect. If no **Blue Bullseye** is obtained, follow hospital procedure for tip confirmation (CXR or fluoroscopy)

SCENARIO 4

Catheter was cut several cm too long. A “speedy” insertion may result in placement too far past the landing zone. You may also see an inverted/biphasic P-wave.

- Slowly pull back the catheter/VPS Stylet assembly, pausing every 1 cm for 5-10 seconds to evaluate Doppler readings

ARROW®
NEVER SETTLE™

Teleflex, Arrow, Never Settle, the Blue Bullseye symbol, Vascular Positioning System, VPS and VPS G4
are trademarks or registered trademarks of Teleflex Incorporated or its affiliates.
© 2013 Teleflex Incorporated. All rights reserved. 2013-1803

Teleflex

TELEFLEX MEDICAL PO Box 12600 Research Triangle Park, NC 27709
Toll Free: 866.246.6990 Phone: 919.544.8000 Int: 919.433.8088
TELEFLEX.COM