

The Nickel™

Serious Tool, Compact Design



Nickel™ Doppler Function

- The Nickel™ sends three target frequencies into the ultrasound system at 10, 5 and 2.5 MHz.
- *Isn't Doppler only sensitive to returns that are very close in frequency to the transmitted Doppler frequency?*
 1. For CW (Continuous Wave) this is the case, i.e., only signals within roughly 10kHz of the CW Doppler frequency, dependent on the displayed velocity range, will be detected.
 2. For PW (Pulsed Wave) this is **not** the case. To get the range resolution provided by PW Doppler, the input must be sensitive to a broader range of frequencies.
 - A. The higher the range resolution, i.e. the smaller the sample volume (SV) size, the broader the range of input frequencies that the system **MUST** be sensitive to.
 - B. Thus, to have the highest likelihood of detecting the “Nickel” return signals, the smallest sample volume size must be selected.
- Additionally the Doppler PRF (related to the maximum velocity range) is also important.
 1. As the Doppler PRF is decreased the design of the ultrasound system also provides a reduction of their front-end bandwidth (increasing the signal-to-noise level), thus selecting the higher PRF is important to detecting the Nickel return signal.
 2. The PRF can be set to high, however, since the Nickel may only detect, transmit and generate a return signal roughly a 5kHz rate.
- Thus, to display the Nickel™ return signals in PW Doppler you should
 - Set the SV to the smallest size possible (~1mm)
 - Set the PRF in the range of ~5 to 7kHz
 - Make sure the SV depth is set to a depth that overlaps the range of depths that the Nickel outputs the closest frequency to the Doppler frequency.