

Requirements for thermal anemometry system for hot-wire/film sensor applications:

1. Total number of anemometry channels required is 5 channels. Four channels shall be type CTA (constant temperature anemometer) and one channel shall be type CCA (constant current anemometer). System shall be capable of expanding to add four channels or more.
2. Anemometer shall be able to provide enough power to supply all channels simultaneous for either hot-wire or hot-film sensors operations.
3. Probe protection circuit shall be required for each channel.
4. System shall be completely manual with no microprocessor controls or computer interface controls.
5. Each channel shall be capable of operating at different bridge ratios to include a 1:1 ratio.
6. Each CTA channel shall have compensation circuitry to be able to provide high frequency bandwidths of at least 450kHz while using long cable lengths (20 meters) between sensors and anemometer channels. Measurements will be acquired in hypersonic tunnels that require high frequency bandwidths.
7. Anemometer channels shall provide low output noise ($< 400 \text{ pV/Hz}^{0.5}$). Measurements will be acquired in 'quiet' supersonic/hypersonic tunnels where the signal levels are very small.
8. Unit shall have signal-conditioning units that provide for gain adjustments and DC offsets.
9. Square or pulse wave injection shall be required for all CTA channels to estimate frequency response of system. Similarly, current injection into the sensor shall be required for the CCA channel to estimate time constant sensor.