

Flight Instruments and Failure Modes Cheat Sheet

First identify the data source, then the display, then the power source. Exact installations vary.

PITOT-STATIC

- Airspeed uses pitot (total) minus static pressure. Altimeter and VSI use static pressure only.
- Pitot opening blocked, drain open -> airspeed trends toward zero.
- Pitot opening and drain blocked -> trapped pressure; IAS rises in climb and falls in descent.
- Static blocked -> altimeter freezes, VSI trends to zero, IAS under-reads in climb and over-reads in descent.
- Alternate static commonly uses cabin pressure and introduces POH-listed errors.

GYRO / ATTITUDE SOURCES

- Conventional training panel often has vacuum attitude and heading indicators plus an electric turn coordinator - verify the airplane.
- G1000: AHRS supplies attitude/heading, magnetometer supplies magnetic-field input, ADC supplies air data, displays present the data.
- Display failure is not sensor failure; reversionary mode can move valid data, but cannot repair failed AHRS/ADC data.

MAGNETIC COMPASS

- UNOS in Northern Hemisphere turns: undershoot north, overshoot south.
- ANDS on east/west headings: acceleration indicates north, deceleration indicates south.
- Magnetic variation is true-to-magnetic; deviation is aircraft compass error.

FAILURE CROSS-CHECK

- Suspect a system only after comparing independent sources, outside references, power indications, and flags/red Xs.
- A red X means invalid/unavailable data - do not use the hidden value.
- Do not repeatedly reset a circuit breaker. Follow the POH/checklist.

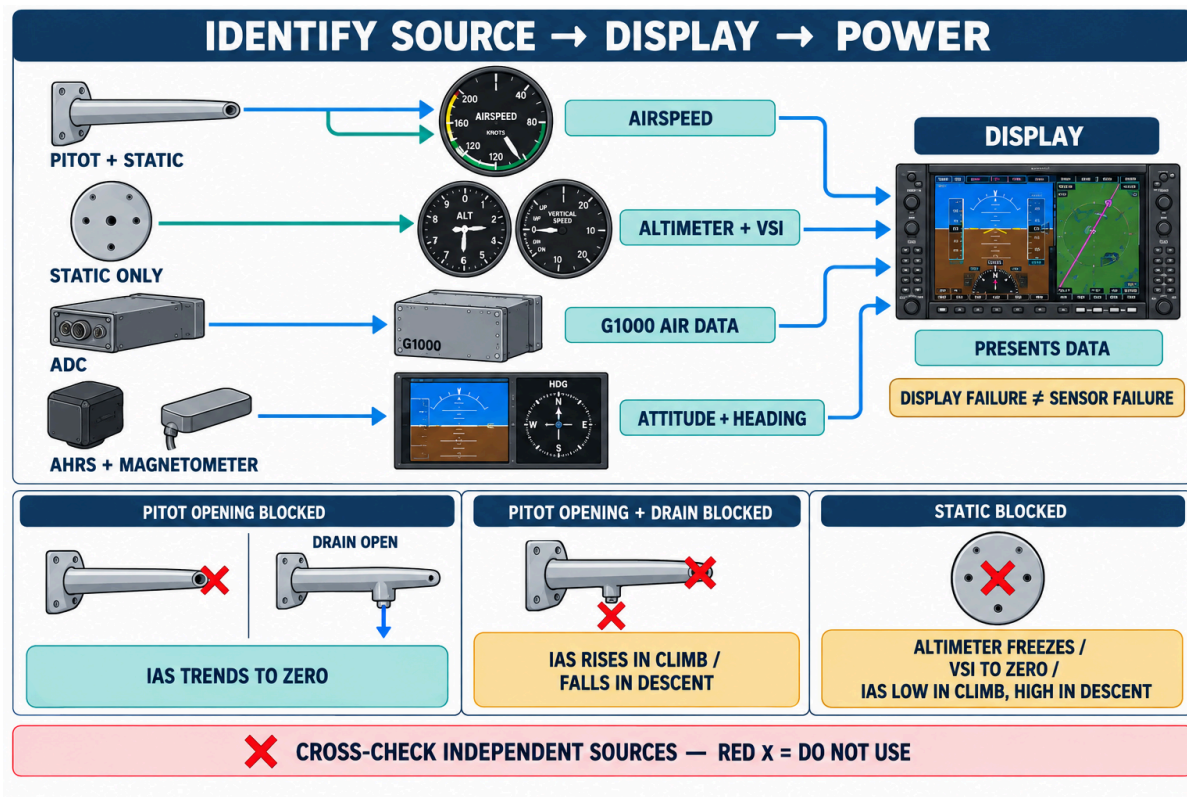
CHECKRIDE SCENARIOS

- Attitude and heading fail together on a conventional vacuum panel while turn coordinator works -> suspect vacuum system.
- G1000 airspeed, altitude, VSI red-X together while attitude remains -> suspect ADC/air-data source.
- PFD black with healthy MFD and sensors -> use reversionary mode/standby instruments per checklist.

TRAP

- Do not memorize 'AH vacuum, T electric' as universal. The aircraft equipment list and supplements control.

VISUAL SUMMARY



Source map and signature failure patterns for pitot-static and integrated flight displays.

Primary references: Aircraft POH/AFM and avionics supplements; FAA PHAK Flight Instruments.