

Input Filter (Resistance) Error

TI Precision Labs – Current Sense Amplifiers

Quiz

How to Read CSA Datasheets – quiz

1. Select all of the following that are true about CSAs
 - a. Differential input resistances can be in the range of a few k Ω .
 - b. Input bias stages require differential input bias currents to partially power the CSA.
 - c. Input bias stages require common-mode input bias currents to partially power the CSA.
 - d. The internal resistors (RBIAS, RINT, and RFB) can all vary by $\pm 20\%$ due to temperature variation.

How to Read CSA Datasheets – quiz

2. Select all of the following that are true about CSAs with input filters:
- a. Input filters will cause the gain from shunt voltage to device output to be increased.
 - b. Input filters will cause the gain error variation to increase.
 - c. The offset error due to the input filter will be dominated by the tolerance of the input resistors chosen.
 - d. If the input filter capacitor chosen is too large, then the device could become unstable.
 - e. The new circuit gain will be dependent upon the common-mode input bias current.

How to Read CSA Datasheets – quiz

3. A system designer needs a CSA with an input filter with 100- Ω input resistors (RF). Which device will yield the lowest input filter error?
 - a. The INA190A3 or the INA185A3?

How to Read CSA Datasheets - quiz

4. A system designer is using an input filter for the INA185A4 and decides to calibrate the circuit's offset and gain error. She notices that error increased unexpectedly when the common-mode voltage level changed from 20-V to 10-V and the temperature was stable. What happened?

Answers

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How to Read CSA Datasheets – quiz

3. A system designer needs a CSA with an input filter with 100- Ω input resistors (RF). Which device will yield the lowest input filter error?
 - a. The INA190A3 or the INA185A3?

Answer: The INA190A3 will yield a lower error due to input filter because it is a high-input impedance CSA with lower input bias currents.

How to Read CSA Datasheets - quiz

4. A system designer is using an input filter for the INA185A4 and decides to calibrate the circuit's offset and gain error. She notices that error increased unexpectedly when the common-mode voltage level changed from 20-V to 10-V and the temperature was stable. What happened?

Answer: The error increased because the common-mode voltage (V_{CM}) was not stable. Once the V_{CM} changes, the $I_{B_{CM}}$ will also change and this affects the input offset voltage due to input filters for CSAs.