

SINGLE SUPPLY 4-20mA CURRENT LOOP RECEIVER

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Many industrial current-loop data acquisition systems operate on a 24V or 28V single supply. You can make a single-supply current loop receiver with the RCV420 by using its 10V reference as a pseudo ground. The RCV420 will convert a 4-20mA loop current into a 0 to 5V output voltage with no external components required. The current loop can be sourcing or sinking and can be referenced to either the power-supply V+ or ground.

The complete circuit for a single-supply current loop receiver is shown in Figure 1. In this application, a 4-20mA current source referenced to power-supply ground drives the receiver. The V- terminal and the Ref Com terminal of the RCV420 are both tied to power supply ground. The 10V reference output (Ref Out) becomes a pseudo ground where the current loop receiver common pin (Rcv Com) is tied. The current loop receiver output is now referenced to the 10V pseudo ground.

In normal operation, the 4-20mA current loop signal would produce a 0-5V output with the RCV420 offset pin (Ref In) connected to the +10V reference. The 10V reference provides a -1.25V offset so 4mA input current will produce 0V out. In this application, the Ref In pin is connected to power supply ground which acts as a -10V reference—producing a +1.25V offset. Now with the inputs connected for an

inverted output signal, the RCV420 output will be 0 to -5V referenced to the pseudo ground. Since the pseudo ground is at 10V, the actual output will be 10V to 5V—a signal which can drive most floating ground meters.

For a current loop receiver with a 4-20mA current sink referenced to the power-supply V+, use the connection shown in Figure 2.

The circuit can operate on a single supply ranging from +15V to +36V (+44V absolute max). The pseudo ground (Ref Out) can source or sink up to 5mA.

For an isolated single-supply 4-20mA current loop receiver, you can connect the circuit to an isolation amplifier as shown in Figure 3. In this circuit the ISO122 is operated single-supply using the 10.0V pseudo ground. Note that the output side of the isolation amplifier still requires dual supplies.

Output from the ISO122 will be 0 to -5V. You could interchange the input connections to the ISO122 to get a 0 to 5V output, but power-supply rejection would degrade performance.

The ISO122 is a low-cost iso amp in a standard plastic DIP. For a hermetic isolation amplifier, use the ISO120. Hook-up details are shown in Application Bulletin AB-009.

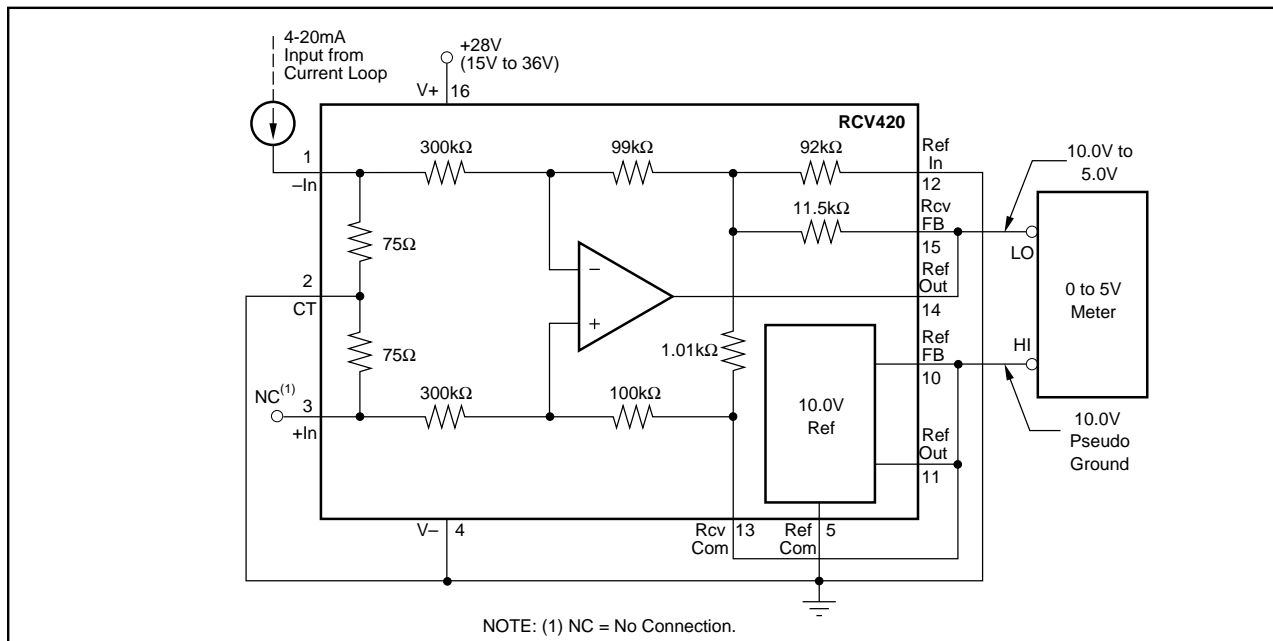


FIGURE 1.

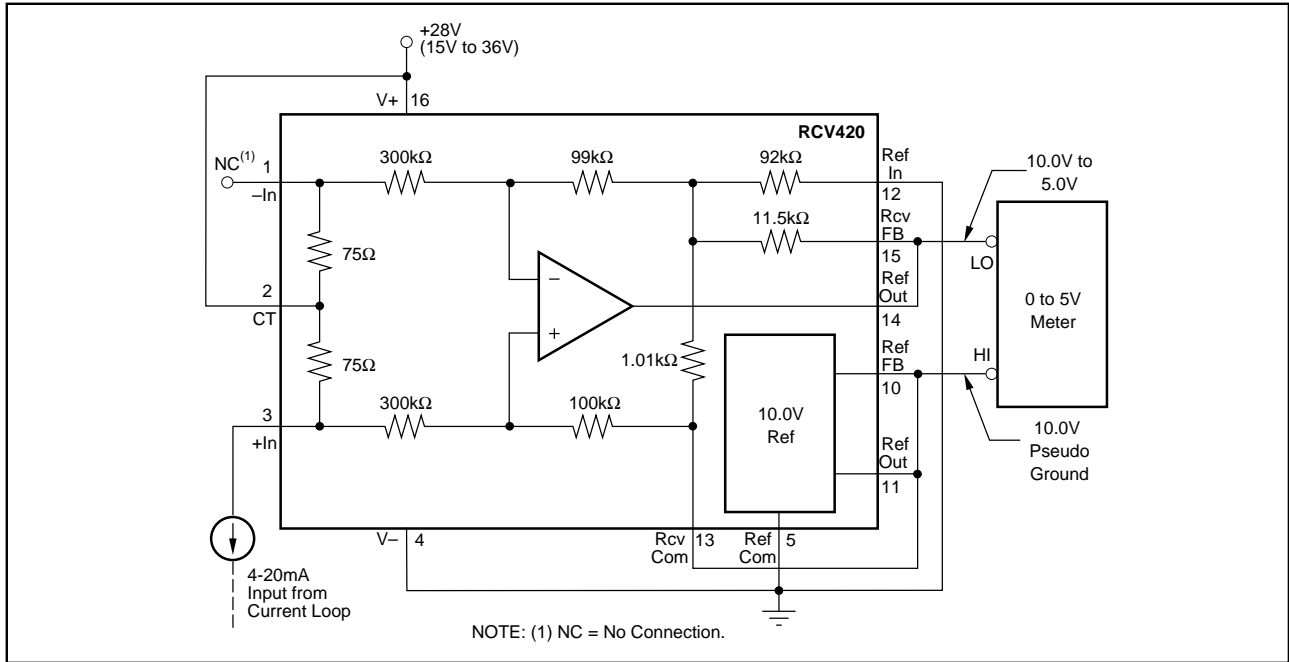


FIGURE 2.

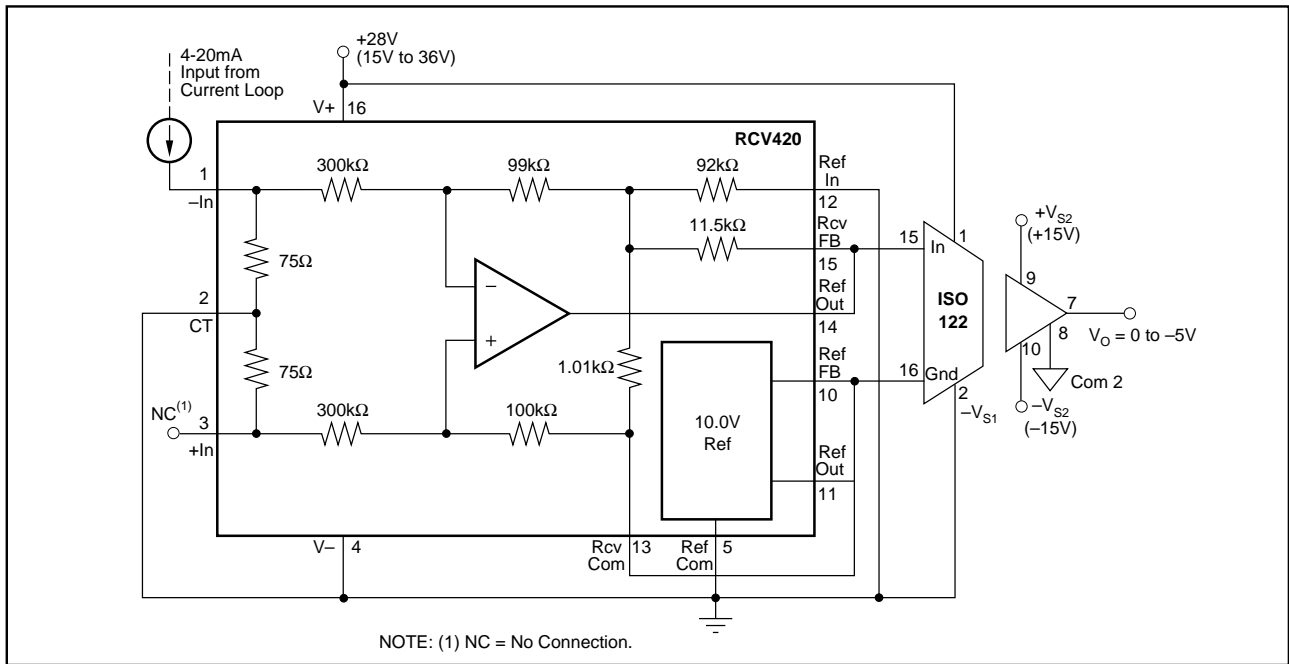


FIGURE 3.

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