INTELLIGENT CONTROLS INC
SACO ME 04072 USA

FAQ Note

No 4-20mA Analog Output

Problem: The instrument display reads correctly but there is no analog output signal.

Explanation: INCON indicates that an instrument is configured to produce an analog output signal, proportional to the displayed value, by a hyphen and a number immediately following the four-digit product model number. The number will be a "-0", "-1", "-2", or "-4" to indicate what type of signal the instrument will output. If one of these numbers is not present in the model number, the instrument is not configured to output an analog signal.

The 4-20mA analog output ("-4") requires an external 15-24 volt DC power supply. There is a maximum allowable load resistance of 750 ohms, through which the analog signal can be driven. If this load resistance is exceeded, the output signal will not function properly.

The instrument's analog output circuitry is protected from surges and unwanted voltages by the use of Transorb surge arrestors and small series resistors.

Troubleshooting:

1. Verify that the instrument is equipped with an analog output (as indicated above). Verify that the output signal is a 4-20mA type.

2. Verify that there is 15 to 24 volts powering the current loop externally and that the polarity is correct. This voltage should be measured at the analog output terminals on the instrument (between terminals 1 & 2, terminal #1 should be positive.) If this voltage is present, proceed to the next step. If not, check the power supply and wiring, there may be an open circuit or the power supply may be dead.

3. Create a short current loop: Remove all connections to the field load (RTU, Controller, PLC, etc…) Connect a milli-ammeter in SERIES with the analog output terminals and the power supply only.

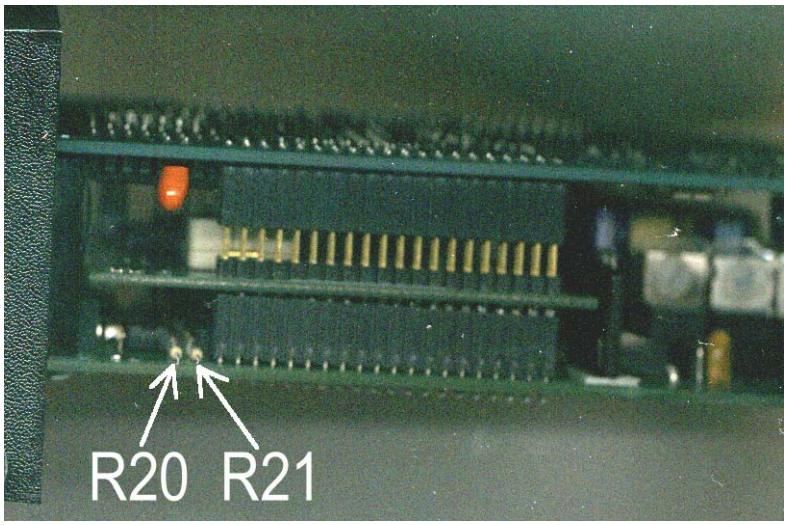
4. Using the analog output calibration mode (see the instrument's manual), force the analog output signal to its full scale HI output. Measure the output current at the instrument directly on terminals 1 & 2. If there is no output signal at all, proceed to the next step. If current can be measured but it is not the expected 20 milliamp full scale current, skip to step #10. If no current is measured proceed to the next step.

5. Turn off power and remove the instrument from its case (squeeze the lock tabs on top and bottom of the front panel, pull firmly to slide the instrument out of the plastic case).

6. Check the gold PCB contact fingers inside the case. Look inside the case, at the bottom row of gold contacts. The analog output contacts are the two at the far right. Each contact has three slender fingers. If any of the fingers is bent up or seriously deformed, the instrument's PCB will not receive power through the case.

7. If a bent contact is found on an output terminal, remove the bent contact and replace it.

8. Check the resistance of the protection resistors R20 and R21 (see photo below). These resistors should measure less than 130 ohms. If either resistor measures greater than 130 ohms, replace the resistor with a new 120 ohm, 5%, 1/8 watt resistor.



9. Reassemble the instrument. Repeat steps #3 & #4. If there is an output proceed to the next step. If the problem persists skip to step #11

10. Perform the analog output calibration procedure found in the instrument's manual. If the output cannot be properly calibrated there is an electronic failure, probably on the bottom PCB. Proceed to the next step. If the output can be properly calibrated skip to step #12.

11. There is probably an electronic component failure. Call the INCON Technical Support line (800-984-6266) for an RMA to return the instrument for repair.

12. Now that the output of the instrument is proven to be good, connect the output to the field load (RTU, Controller, PLC, etc…). If the output signal fails to work properly, the field load resistance is too high. There is trouble with the field load – not with the INCON instrument. Troubleshoot the field load.