Industrial Shields®

KNOW-HOW · CHECKLIST

4-20 mA input: find a wrong reading in 6 steps

Most wrong 4-20 mA readings come from the loop wiring or from an input type that does not match the signal, not from the sensor. Check in this order.

Check	What to do	Good result
1. Transmitter type	Read the label: 2-wire, 3-wire or 4-wire	You know where the loop gets its power
2. Loop power	With the loop closed, measure the voltage at the transmitter terminals	Within the range on the transmitter label
3. Loop current	Open the loop and measure in series in mA	Between 4 and 20 mA, consistent with the process
4. Input type	Check that the input accepts current, or has the right resistor	Current mode, or 500 Ω precision resistor on a 0-10 V input (2 to 10 V)
5. Common reference	Check that the loop supply 0 V reaches the analog 0 V of the PLC	One common 0 V, unless the input is isolated
6. Scaling	Compare the program value at 4 mA and at 20 mA	4 mA reads 0 % and 20 mA reads 100 %

What the readings tell you

- **0 mA or close to 0:** open loop, broken wire or no loop power.
- **Below 3.6 mA or above 21 mA:** many transmitters signal a fault this way (NAMUR NE 43).
- **Correct mA, wrong value in the PLC:** input type, channel or scaling.
- **Stuck at the maximum:** current signal on a voltage input without resistor.
- **Value that jumps:** noise: shielded twisted pair away from drives, and average samples.

If the input has never worked

- Check the polarity: + of the loop to + of the transmitter.
- A 2-wire transmitter needs a supply in series in the loop. Do not assume the PLC input powers it.
- Check that the program reads the right channel and input mode. This depends on your PLC range.

Details for your PLC range: industrialshields.com/slides/slide/4-20-ma-input-reading-wrong-check-it-step-by-step-936