

PLC Scaling Quick Reference

Raw analog counts → engineering units for practical PLC troubleshooting.

Core Linear Scaling

Engineering Value = $EU_Low + ((Raw - Raw_Low) \div (Raw_High - Raw_Low)) \times (EU_High - EU_Low)$

Always use the actual raw-count range configured by the PLC/I/O system.

Worked Example

Suppose an analog input uses 4–20 mA and the configured raw range is 3277–16384 counts for 0–100 PSI.

At 9830 counts: $0 + ((9830 - 3277) \div (16384 - 3277)) \times 100 \approx 50.0$ PSI.

Troubleshooting Checklist

1. Measure the field signal first: mA or V.
2. Confirm the I/O channel configuration and input type.
3. Read the raw value before examining the scaled value.
4. Verify the raw minimum and maximum used by the logic.
5. Verify engineering-unit LRV and URV.
6. Check whether the PLC program applies additional offsets, clamps, filtering, or square-root extraction.
7. Compare the PLC value with an independent field measurement.

Common Mistakes

- Using the wrong raw-count range.
- Reversing raw or engineering-unit limits.
- Scaling a 4–20 mA signal as if it were 0–20 mA.
- Applying square-root extraction twice on DP flow applications.
- Ignoring under-range/over-range behavior and channel configuration.