

Fluc Instrumentation – User Manual (EN Version)

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1. Overview

Fluc Instrumentation is an application designed for instrument technicians and maintenance engineers. It brings together conversion and simulation tools for analog signals (4–20 mA, 0–20 mA, voltages), temperature sensor conversions (PT100/PT1000, thermocouples), electrical utilities (Ohm's law, three-phase calculations), and calibration/export functions for reports.

Purpose: simplify on-site operations — quick conversion, calibrator simulation, traceable recording with project context.

2. Installation & Getting Started

- Install the app from the App Store.
- On first launch, open the Project tab and fill in: Client, Project, Site, Reference. These fields will automatically be attached to each record and included in CSV exports.
- Check the language in the About tab if needed (FR/EN available).

3. Navigation and Tabs (quick view)

- Signal: convert signal ↔ % ↔ process value.

- Simulator: inverse calculation (% → mA, process value → mA) and calculation from signal.
- Calibration: 5-point recording, error calculation, conformity check.
- Pressure / Level / Flow: presets for common ranges.
- PT100 / PT1000: resistance ↔ temperature.
- Thermocouples: mV ↔ °C (K, J, T, N, R, S).
- Three-phase: kW/kVA ↔ A, single-phase/three-phase Y/Δ, cos φ.
- Ohm's Law: U, I, R, P.
- Export: filters, preview, CSV export and sharing.
- History: view, delete, preview records.
- Project: manage Client/Project/Site/Reference.
- About: info and support.

4. Step-by-Step Use Case (common example)

Goal: convert 13.6 mA to % and bar with a 0–10 bar process range (4–20 mA mode).

Steps:

1. Open the Signal tab.
2. Select 4–20 mA.
3. Set Process min = 0, Process max = 10, Unit = bar.
4. Enter Measurement = 13.6 mA.
5. The app automatically calculates:
 - Percentage = $((13.6 - 4) / 16) \times 100 = 60 \%$
 - Process value = $0 + 0.6 \times (10 - 0) = 6.0 \text{ bar}$
1. (Optional) Add a note before saving.
2. Tap Save — the measurement is added to the history with the note and project context.

5. Simulator

Available modes:

- From %: enter a percentage (e.g., 75%) → calculates the signal (e.g., mA for 4–20 mA).
- From process value: enter the value (e.g., 7.5 bar) → calculates % then signal.
- From signal: enter mA/V → calculates % and process value.

Inverse formula:

$\text{Signal} = \text{Signal\_min} + (\text{Percentage} / 100) \times (\text{Signal\_max} - \text{Signal\_min})$

Example: 4–20 mA, 75% → mA = 4 + 0.75 × 16 = 16 mA

6. Notes and Project Metadata

- A Notes field is available above the Save button in recording views (Signal, Simulator, PT100, Thermocouples, Calibration, Process).
- Client / Project / Site / Reference fields are managed in the Project tab and automatically propagated to records.
- Notes and metadata appear in the history and are included in CSV exports.

7. History

- Displays the list of records (date, signal, measurement, %, process value, unit, notes, client, project, site, reference).
- Actions: tap to view details, swipe to delete.
- Data is sorted by descending date.

8. CSV Export

- Open the Export tab.
- Filter by period (All / Today / This week / This month) and/or by signal type.
- Tap Export CSV → a temporary file is created and can be shared.

CSV header:

Date,Signal Type,Measurement,Percentage,Process
Value,Unit,Client,Project,Site,Reference,Notes

Example line:

"16 August 2026 09:12:00","4–20
mA",13.6000,60.00,6.0000,"bar","ClientX","ProjectA","Site1","REF-123","Initial
calibration"

9. 5-Point Calibration

- Enter the values of the 5 points (0%, 25%, 50%, 75%, 100%) or the corresponding measurements (mA/V).
- The app calculates absolute and relative error and indicates conformity according to tolerance.
- Each recorded point is added to the history and can be exported.

10. PT100 / PT1000, Thermocouples, Three-phase

- PT100/PT1000: resistance ↔ temperature conversion (coefficient $\alpha = 0.00385$). Bidirectional mode.
- Thermocouples: types K/J/T/N/R/S — mV ↔ °C conversion with cold-junction compensation.

- Three-phase: $kW \leftrightarrow A$, $kVA \leftrightarrow A$, for single-phase/three-phase (Y/Δ) with $\sqrt{3}$; include $\cos \phi$ for real power calculations.

11. Field Tips

- Fill in the Project tab before a session to automate measurement context.
- Use the Simulator to obtain the mA to apply with a loop calibrator.
- Add a detailed note (tag number, position, condition) to simplify reporting.
- Export regularly for external backup.

12. Troubleshooting & Quick FAQ

Q: The app crashes at startup after modifying the SwiftData model.

A: Cause: store migration. Solution: uninstall the app from the simulator/device to recreate the store (old data will be lost). In development, a migration strategy is recommended.

Q: Project fields are missing on older records.

A: Records created before the fields were added will remain empty for those columns.

Q: Can I edit a measurement after saving?

A: Currently the app allows viewing and deletion; editing may be added if desired.

13. Annexes

Useful formulas:

- General percentage:

Percentage = $((\text{Measurement} - \text{Signal\_min}) / (\text{Signal\_max} - \text{Signal\_min})) \times 100$

- Process value:

Value = $\text{Process\_min} + (\text{Percentage} / 100) \times (\text{Process\_max} - \text{Process\_min})$

- Signal from %:

Signal = $\text{Signal\_min} + (\text{Percentage} / 100) \times (\text{Signal\_max} - \text{Signal\_min})$

CSV header:

Date,Signal Type,Measurement,Percentage,Process
Value,Unit,Client,Project,Site,Reference,Notes

Support

- Support email: contact@fluconsulting.com
- For any bug, attach a CSV export and a screenshot with the version shown in the About tab.

End of EN manual

