

# METEO Module

L&R Engineering – Rev. 2b 04-2026 – R. Oliva

## 1. Introduction

The METEO module from L&R Engineering is a peripheral board that operates as a meteorological data acquisition unit (Wind, Atmospheric Pressure and Temperature) in a format compatible with DIN rail enclosures (model DINR416). It is based on a PSoC1 microcontroller (*Programmable System-on-Chip*) [Ref1] which internally features configurable analog and digital modules, providing great flexibility to adapt to changing requirements and designs, while also resulting in a very robust unit, proven in some cases through more than a decade of field operation [Ref2].

The firmware enables very accurate frequency readings within the typical ranges of anemometric sensors, with hardware that allows signal conditioning for typical models such as NRG or Thies. It additionally features three analog inputs with 12-bit ADC for wind direction, temperature, and barometric pressure measurement. Data output is transmitted every 1 second as a serial frame (generally converted to RS485, @38400 baud, for example via the RS485-v2 module [Ref3]) with header, termination and checksum for validation by the receiving CPU (Figure 1). The boards, assembled DIN modules or the complete assembly, with or without a weatherproof metal enclosure, can be purchased through L&R Engineering.



Figure 1 View of the METEO module with associated RS-485 interface

A block diagram of the METEO board and its wiring schematic can be seen in Figure 2. The sensor configuration and type will depend on the application, but the system is flexible and adaptable to different configurations.

**DINR416-METEO1 - BLOCK DIAG**  
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**CONEXIONADO (A1)**

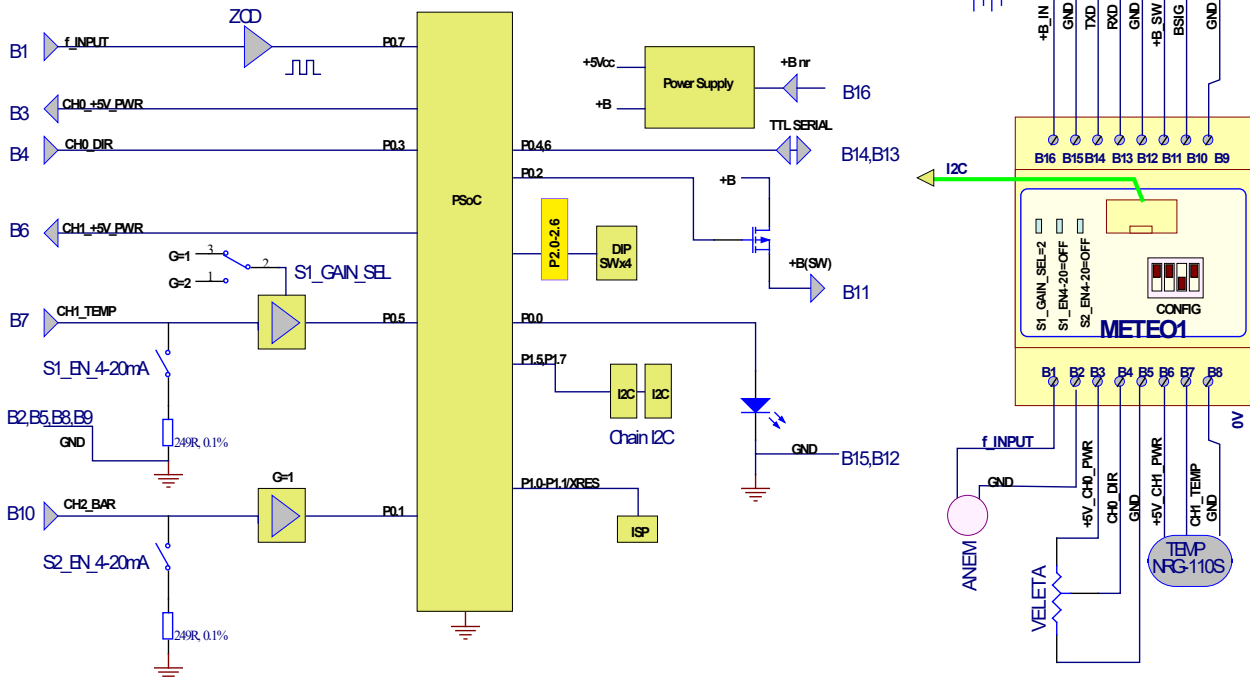


Figure 2 Block Diagram of the METEO module and typical Sensor wiring

The METEO module allows connection via RS485 at distances of up to 100 m using an external converter, or short-range connection via I2C/Slave to a CPU operating as Master, for multi-level reading implementation.

## 2. METEO Unit Calibration

Calibration of METEO units (Figure 3, calibration for INTI 04-2023) can be performed on request at the Laboratory using methodology and instrumentation with certified traceability.

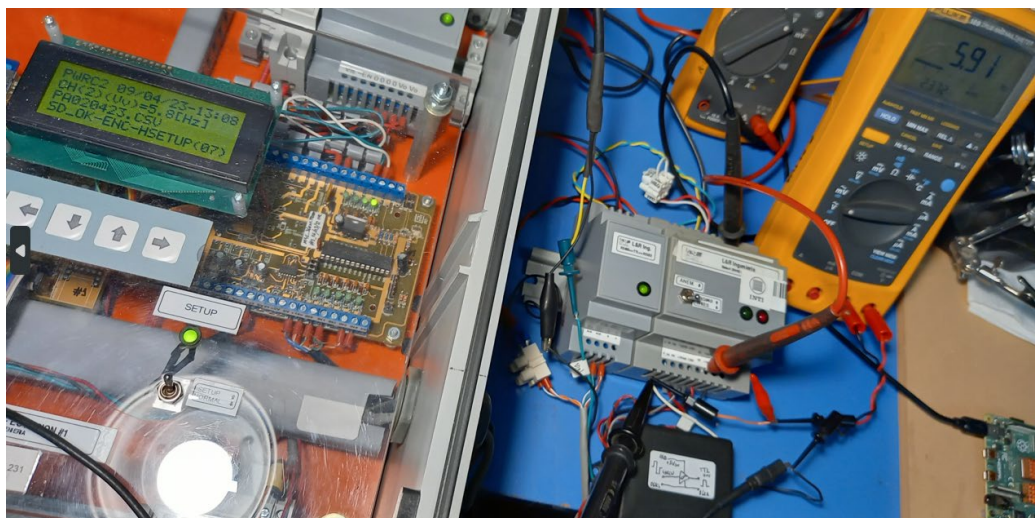


Figure 3 Calibration of METEO module and PWRC2 system at INTI (04-2023)

Calibration depends on each channel and the quantity to be verified. Figure 4 shows the low-level calibration scheme for wind speed/frequency and for the analog wind direction vane. The signal waveform depends on the case: if METEO is configured for the Thies Anemometer, the input is digital TTL with pulses from 0 to 1200 Hz. If configured for NRG Max#40, the input is sinusoidal with variable amplitude, from 0 to 100 Hz. High-level calibration refers to the calibration constants for each instrument – provided by the manufacturer or an independent laboratory – which are stored in the main data logger.

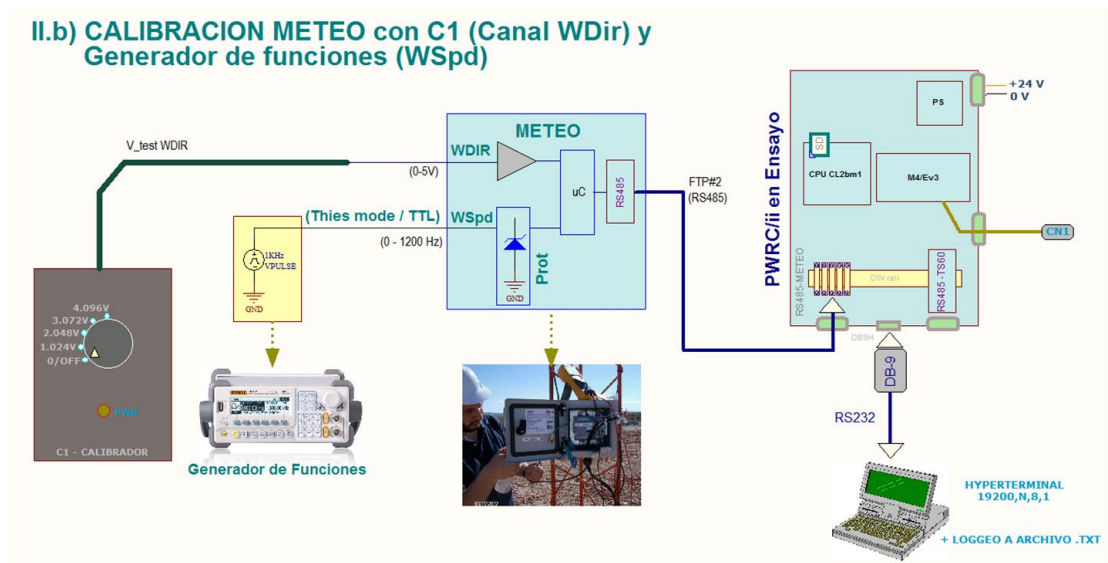


Figure 4 – Simplified model – low-level calibration with METEO – wind direction and speed inputs

### 3. METEO Main Board, Wiring and Mounting

The METEO main board is shown in Figure 5 (left), and a mounting in a weatherproof metal enclosure is shown in Figure 5 (right). The schematic and further board details can be found in [Ref4].

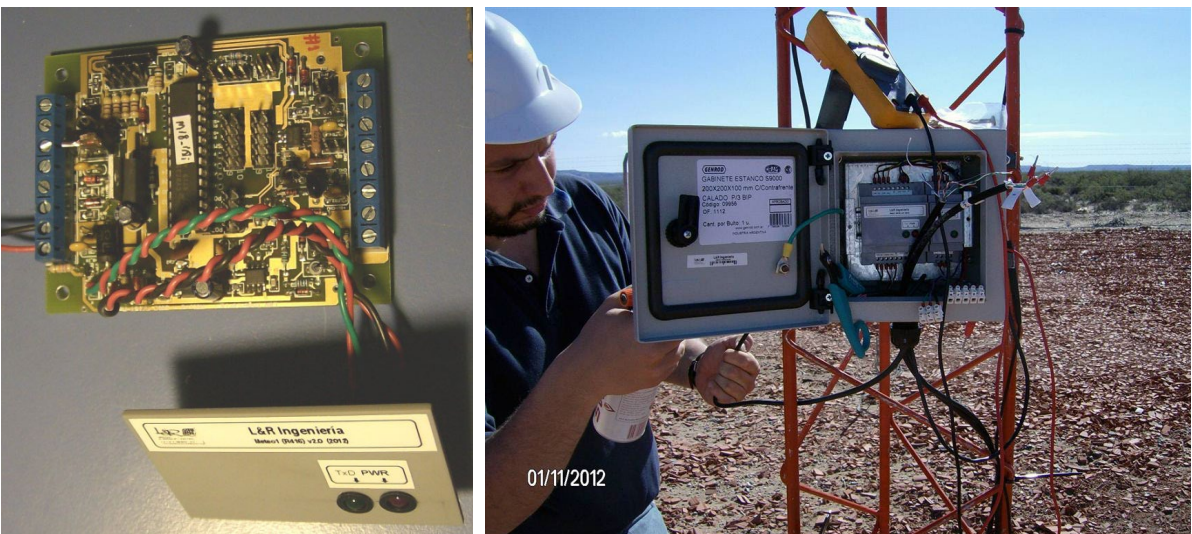


Figure 5 METEO module main board and installation at INTI Cutral-Có Test Site

For outdoor installations at distances > 50 m from the main data logger, the most convenient wiring is shown in Figure 6, connecting the METEO outputs to an RS485 converter.

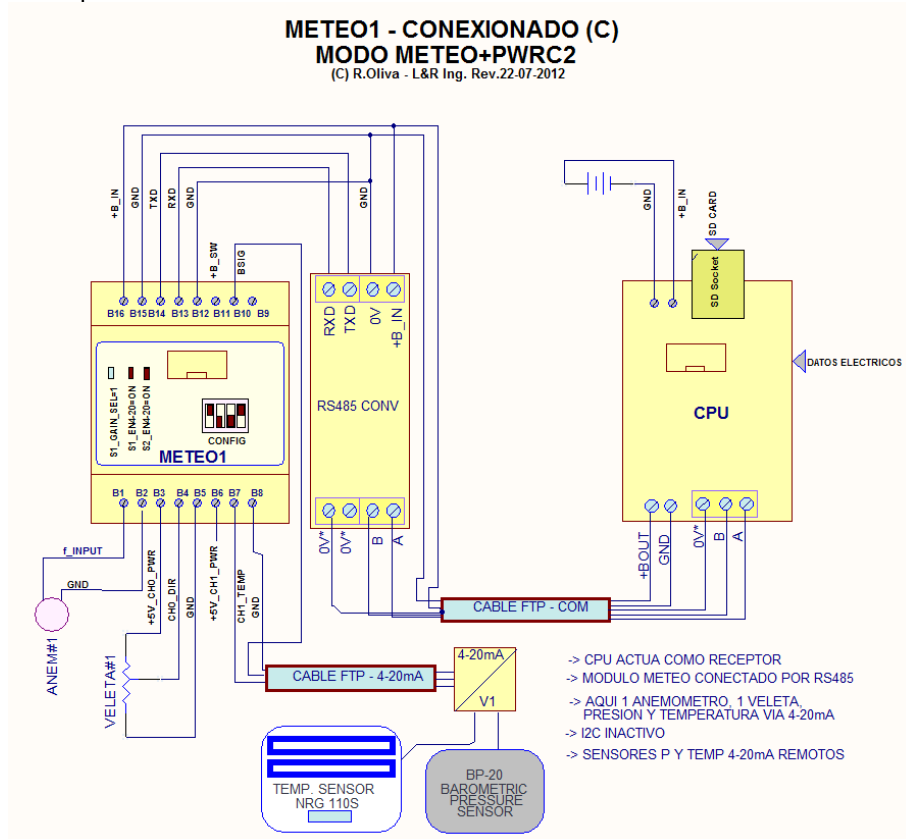


Figure 6 Sensor wiring on METEO, for distances > 50 m using RS-485

## 5. References

[Ref1] PSoC-1 CY29466 Microcontroller <https://www.infineon.com/cms/en/product/microcontroller/legacy-microcontroller/legacy-8-bit-16-bit-microcontroller/psoc-1/cy8c29x66/>

[Ref2] JEPT 05-2025 (Open Access) "Test Site for Small Wind Turbines – Technical and Logistical Issues of a Decade-Long Project" <https://www.lidsen.com/journals/jept/jept-07-02-009>

[Ref3] RS485-v2 Module by L&R Engineering <https://www.lyringenieria.com.ar/language/en/productos/rs485-brd-rs-485-rs-232-ttl-board-module-v2/>

[Ref4] METEO Module by L&R Eng. <https://github.com/LyRIng/METEO>

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**NOTES:**