

# EC PRO



## The specialised controller for fan-assisted heat exchangers with EC motors

ECpro is a configurable controller for fan-assisted heat exchangers with EC motors. It integrates control, diagnostics, safety functions, BMS communication and multi-brand management into a single platform, reducing the need to develop dedicated application firmware.



# Not an adapted PLC. A controller designed for the fan section.

ECpro is designed for HVAC&R applications where EC fans are a core part of the unit.

The typical heat-exchanger control logic is built in as configurable parameters: the OEM does not start from an empty controller, but from a platform already tailored to the application.



## 01

### Application specialisation

The typical functions of a fan-assisted heat exchanger are already integrated: Low Capacity, Floating SP, Fail Safe, Auto Clean, multi-circuit management and seasonal logic.

The OEM configures the machine behaviour, reducing dedicated application development.

#### SPECIALISED

#### EC logic already integrated

Low Capacity, Floating SP, Digital Scroll, 3-level Fail Safe, Auto Clean — ready to configure.

## 02

### Parameterisation

16 preset configurations provide a ready-made base that can be adapted to the machine.

Setpoints, PID, emergency strategies, limits, ramps and operating banks are set by parameters, with configurations that can be replicated across multiple units.

#### CONFIGURABLE

#### 5 multi-brand EC protocols

ebm-papst, Ziehl-Abegg, Hidria, Nicotra, Dunli. Other brands can be assessed on request.

## 03

### Scalability when needed

ECpro operates as a stand-alone main controller.

MFan, MDGT, MNET, KLNK, KMEM and any custom modules are added only when the application requires topologies, I/O, connectivity or more advanced functions.

#### SCALABLE

#### Independent COM ports

Each line has dedicated resources: BMS, EC motors, display and expansions do not share the same traffic.

# From analogue control to advanced fan-section management.

ECpro can be configured according to the level of control required by the machine: 0–10 V control signal, Modbus management of EC fans, or point-to-point architecture with MFan. The platform remains the same; only the level of integration changes.

The OEM chooses according to the application requirements — and can move to a different integration level later without replacing the controller.

## 01 0–10 V control

Analogue simplicity, with dedicated control logic.

ECpro can control EC fans or fan groups through 3 independent analogue outputs, configurable as 0–10 V, 10–0 V, 1–10 V or 10–1 V.

This is the simplest configuration when a traditional analogue control signal has to be maintained, without giving up structured control of the fan section.

0–10 V / 10–0 V

1–10 V / 10–1 V

3 independent outputs

3 groups / circuits

Direct / Reverse

## 02 EC Modbus management

Access to motor data, without developing each protocol from scratch.

When the application requires diagnostics, motor data and advanced EC fan functions, ECpro directly manages Modbus communication with the supported motors. The motor line is separate from the BMS line: the supervisor can read RPM, power, temperature, operating hours and faults over a dedicated communication line.

Modbus RTU

Dedicated motor COM

Dedicated BMS COM

Optional isolated lines

Guided addressing

Integrated protocols

## 03 Point-to-point architecture with MFan

When fan management has to become more robust, scalable and maintainable.

For applications with many EC fans, or where service continuity is critical, ECpro can be expanded with MFan.

Motor management moves from a daisy-chain network to a point-to-point topology, with independent connections to each individual fan. MFan simplifies service, diagnostics and motor replacement, reducing the typical issues of shared networks.

Independent node

Faster service

Localised fault

Simplified replacement

No manual addressing

ECpro lets you choose the integration level best suited to the machine: analogue when only a control signal is required, Modbus when data and diagnostics are required, MFan when the architecture needs to become more robust, scalable and maintainable.

## One platform for multiple circuits, seasons and operating conditions.

ECpro's control structure is designed for real machines: those that change behaviour between summer and winter, cooling and heating, nominal operation and low load. Operating conditions are handled through parameters, without multiplying devices or external logic.

Independent circuits, seasonal operating banks, dynamic setpoints and fan groups with differentiated logic — all by parameters.

4 setpoints + 4 PID

### One setpoint per section, without interference

Each setpoint has its own separately configurable PI loop. Useful for multi-circuit machines: up to 4 sections with different target speeds, on a single controller.

2 operating banks

### Summer/winter, cooling/heating

Switching via digital input or Modbus register. Each bank has independent setpoints, hysteresis and ramps.

Floating SP

### The operating point shifts with the outdoor temperature

The setpoint shifts automatically according to an external variable (e.g. ambient temperature). It optimises seasonal efficiency without additional BMS logic.

3 x 0–10 V outputs

### Three independent groups

Each output can be associated with a different setpoint and configured in direct or reverse mode, to control fan groups or different functions on the same machine.

2 comparators

### Configurable thresholds and windows

Analogue signal monitoring with configurable thresholds (window mode). They activate relay outputs for alarms or special functions without external logic.

2 speed steps

### Dedicated speeds for special functions

Forced speeds for spray, heat pump, PI bypass and defrost. Activated via digital input or internal condition, with configurable activation delay.

#### MAIN CONFIGURABLE PARAMETERS

Setpoints 1–4

Hysteresis per setpoint

Minimum RPM speed

Maximum RPM speed

Acceleration ramp

PI gain (Kp)

PI integral time

Floating SP offset

Floating min/max limits

Emergency timeout

Emergency speed

Alarm thresholds

Comparator thresholds

Spray thresholds

Night mode schedule

Speed steps 1–2

Relay activation delay

Direct/Reverse mode

0–10 V / 1–10 V output range

## NATIVE APPLICATION FUNCTIONS

# Functions born in the field, already integrated in the platform.

Every ECpro application function is based on needs encountered on real machines: low-load instability, safety and emergency management, coil cleaning and supervisor integration.

The aim is to provide configurable logic that the OEM would otherwise have to develop, test and maintain independently.

## EFFICIENCY AND CONTROL



### Low Capacity

At low load, ECpro enables only the fans required, reducing oscillations and part-load consumption.



### Floating SP

Dynamic setpoint based on outdoor temperature, to adapt control to seasonal conditions.



### Digital Scroll

Dedicated logic for Emerson Copeland Digital Scroll compressors, integrated to stabilise refrigerant pressure.



### Multiple fan banks

Up to 4 independent circuits with digital control, 3 with analogue control.



### Multiple coils

Coordinates multiple coils on the same fan system, balancing setpoints without external logic.

## SAFETY AND EMERGENCY



### Fail-safe

Configurable emergency strategies for loss of BMS or fan communication, with separate timeouts and behaviour defined according to the architecture.



### Safeguard

Checks the rated range of transducers and probes and signals values above or below that range.



### Thermal Stop

Immediate stop via priority digital input, for safety enable signals and machine interlocks.



### Impeller release

Reverse rotation to free the impeller in the presence of ice or snow, where supported by the EC protocol.



### Winter Mode

Configurable temperature threshold and fan speed for managing winter conditions.



### Night Mode

Automatic maximum speed limit during night-time periods, for applications with noise constraints.

## DIAGNOSTICS AND MAINTENANCE



### Cable Break

With a 1-10 V command, distinguishes a broken cable from a zero command and activates emergency speed.



### Bridge Polling

Two upstream lines: a command line to the BMS and a separate monitoring line, for redundancy.



### Auto Clean

Coil cleaning cycles activated by schedule or by the BMS, also with reverse ventilation where provided.



### 5 access levels

5 access levels, from viewing only to full configuration.

# Integrated multi-brand EC protocols. Addressing included.

ECpro communicates with the leading EC fan manufacturers using integrated Modbus protocols. Changing fan supplier does not necessarily mean redesigning the application logic of the machine. ECpro manages the protocol differences of the supported brands and helps maintain a common platform.

ebm-papst

Ziehl-Abegg

Nicotra

Hidria

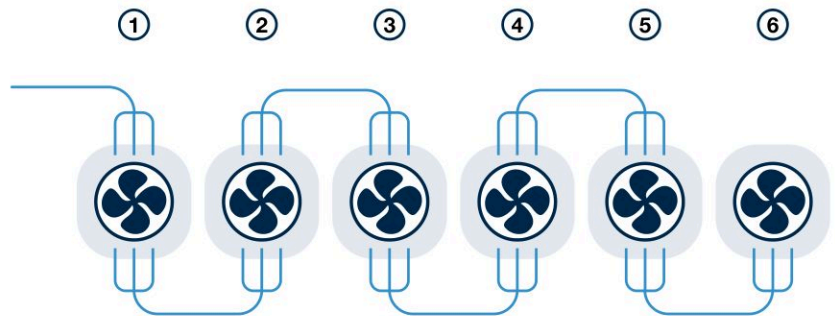
Dunli

+ on request

## ADDRESSING: TWO OPERATING MODES

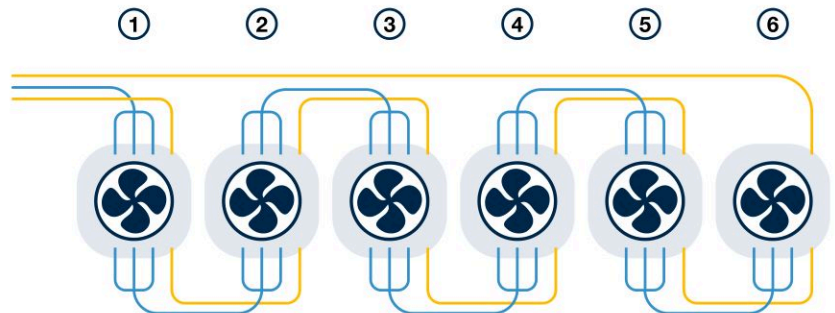
### Progressive addressing

Fans are powered in sequence and the controller assigns Modbus addresses during the start-up procedure. A simple mode, with no special wiring, available with supported brands.



### Automatic addressing with dedicated wiring

Where provided by the manufacturer, an automatic procedure via dedicated wiring can speed up commissioning on systems with many fans.



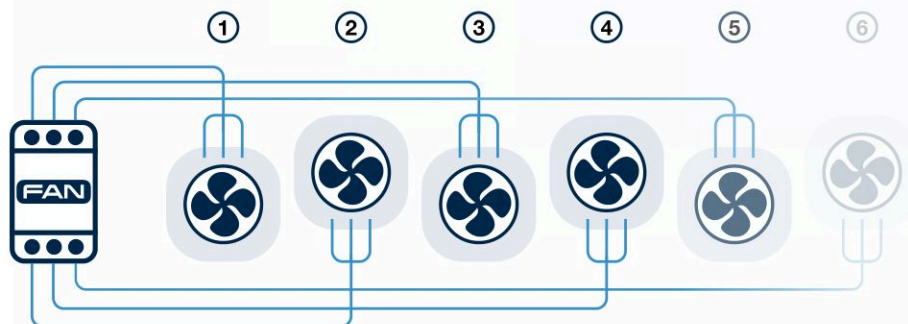
## MFAN

ECpro works well on its own. With MFan, it becomes a system.

The MFan module, part of the Selpro ecosystem, brings EC management into a point-to-point architecture: each fan has its own independent connection, eliminating the typical issues of a daisy-chain network.

It adds automatic detection and automatic remapping during replacement. With **MFan**, ECpro **manages** each **fan** through a **point-to-point connection, without addressing**. In systems with **many fans**, **data** and **diagnostics** for each node help identify faults.

- **No manual addressing** required
- **No motor configuration** required
- **No protocol knowledge** required from the installer



## OEM ADVANTAGE

### One controller, any supported EC fan.

Changing fan manufacturer does not require rewriting drivers or revalidating the entire machine. ECpro internally manages the native protocol of each manufacturer — including different firmware versions within the same brand.

Traditional approach → ECpro

**Multiple PLC drivers** → **Single ECpro driver**

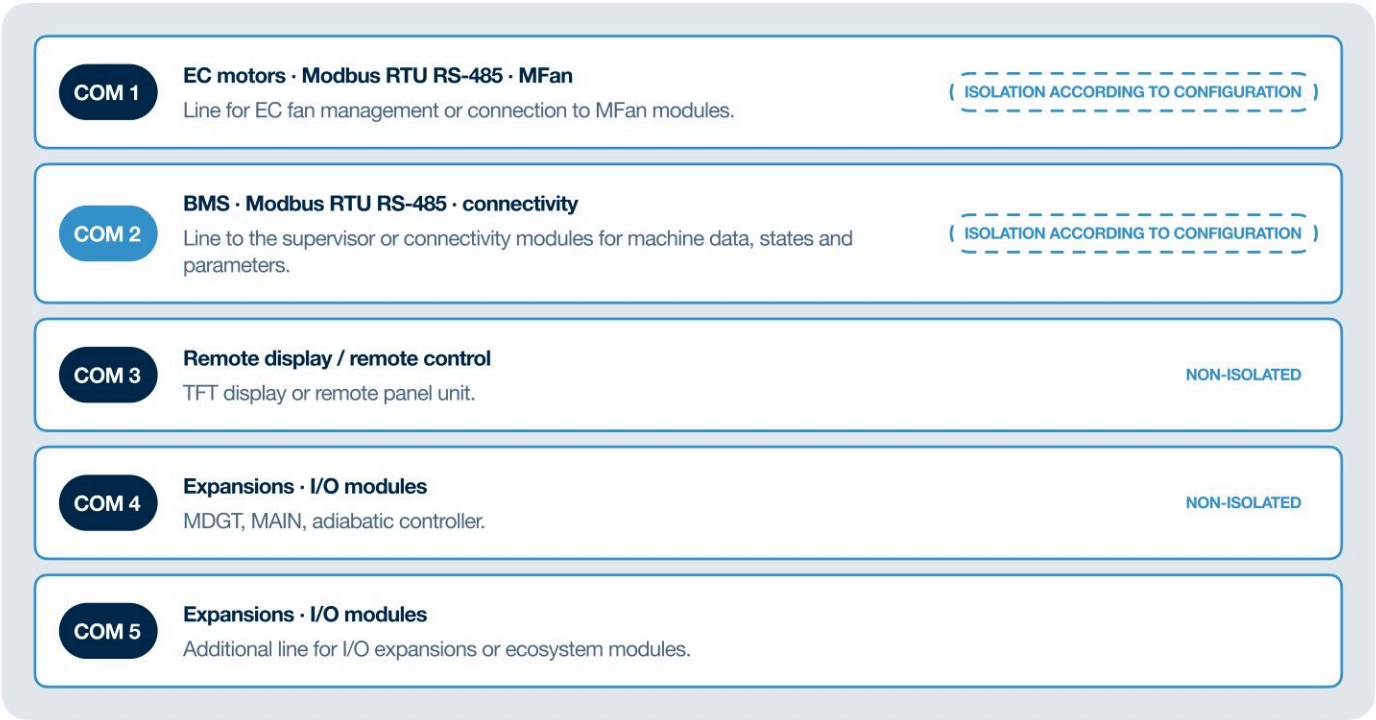
**Validation by brand** → **One-time validation**

**Manual addressing** → **Brand-specific guided procedures**

**Motor replacement** → **Simplified recognition procedure**

# Separate communications: each function has dedicated resources.

ECpro separates the main communication flows over physically distinct lines, each with its own resources. The supervisor does not directly poll the fans: ECpro collects, organises and makes the data available on a dedicated line, with predictable response times.



## MODBUS REGISTERS EXPOSED TO THE BMS – COM 2

|                 |                                                                      |             |                            |
|-----------------|----------------------------------------------------------------------|-------------|----------------------------|
| Setpoint        | R/W by bank                                                          | Speed       | RPM per motor and group    |
| Power           | W per motor and total                                                | Temperature | °C per individual motor    |
| Operating hours | Counter per motor                                                    | Alarms      | Status and code per EC fan |
| System status   | Operating mode, I/O, events · complete map in the integration manual |             |                            |

The available data depend on the EC manufacturer's protocol.

## Configurable I/O to build the machine logic.

ECpro adapts to every system. Each analogue input, digital input and output can be assigned to a specific application function: the manufacturer defines how the controller interprets signals, enable inputs, states and alarms.

### 6 Analogue inputs

Suction temperature, condensing pressure, outdoor temperature, 0–10 V signal, NTC/PTC/PT1000 probes: every variable relevant to control can be read, converted and used in the logic.

0-5 V 0-10 V 0-20 mA 4-20 mA NTC 10K PTC PT1000

Refrigerant gas conversions included

Configurable inputs

### 3 Analogue 0–10 V outputs

3 independent 0–10 V outputs for fan groups, circuits, auxiliary functions or modulating commands where required by the application.

0-10 V / 10-0 V

1–10 V cable-break compatibility

3 independent circuits

0–10 V valve control

### 6 On/Off digital inputs

Remote start/stop, damper enable, winter mode, Heat pump, Auto Clean, Thermal Stop or spray: each input can activate a mode or a protection.

Heat pump

Remote start/stop

Direct/reverse mode

Fixed speed with spray

Night speed limit

Winter mode

Reduced fan capacity

Operating bank switch

Auto Clean

Thermal Stop

### 4 NO/NC digital relay outputs

4 relays for error, warning, spray active, fans running, comparators and machine states, with programmable activation delay.

Error

Error + Stop

Error + Stop + Zero Speed

Warning

Spray active

Safe slave status

Threshold comparator 1

Threshold comparator 2

EC fans running

Auto Clean active

#### EC MOTOR COMMAND SETTINGS

Cut-off / minimum speed limit

Max RPM speed limit

Heat pump speed

Speed with spray

Configurable RPM steps

Programmable night speed limit

Emergency command management

EC acceleration ramp

Anti-ice / Maintenance

# Configuration, cloning and local access.

ECpro provides 16 preset configurations, which can be customised through parameters according to the application.

TFT display, USB-C, configuration memory and local Wi-Fi access allow the configuration to be modified, protected, replicated and updated throughout the different work phases: production, testing and maintenance.

## Hybrid TFT display

Optional TFT with touch and keys, on-board or remote panel-mounted

Application preset selection, parameter editing, machine status display and event viewing directly from the controller or from a remote panel display.

Touchscreen and physical keys make the interface practical also in technical environments; access levels protect critical parameters for user, OEM and service.



## K MEM

### Cloning in production

Configuration · cloning · log download

Saves the complete ECpro configuration and replicates it to other units via USB-C, without a laptop and without manual parameter transcription. Useful in production, testing and unit replacement. It also allows event logs to be downloaded for diagnostics and maintenance.



## K LNK

### KLNK Wi-Fi dongle

In the "KLNK" USB-C port: local Wi-Fi and the Selpro browser app, with no installation.

#### Phone app:

configure parameters, view live data, alarms and event history, test the fans and run guided motor addressing.

#### Commissioning and servicing:

for technicians at the machine. Remove after use; it does not stay fitted in the panel.



## Expand when needed, not before.

ECpro works as a stand-alone main controller.

Selpro ecosystem modules are not prerequisites: they extend the platform when the application requires point-to-point topologies, additional I/O, advanced adiabatic functions, IP connectivity or local access.

### Point-to-point Modbus

#### M<sup>FAN</sup>

Enables digital EC motor management, without the complexity of Modbus

The M<sup>FAN</sup> module brings EC management into a point-to-point architecture: each fan has its own independent connection, eliminating the typical issues of a daisy-chain network. It adds automatic detection and automatic remapping during replacement.

The ECpro + M<sup>FAN</sup> combination is the solution for those seeking **maximum robustness, diagnostics and scalability**.



ECpro + M<sup>FAN</sup>

**Managed addressing** → faster commissioning

**Simplified motor configuration** → fewer field interventions

**Protocol managed by ECpro** → less complexity for the installer

**Motor replacement** → simplified recognition procedure

### Advanced adiabatic systems

#### M<sup>OGT</sup>

Enables management of advanced adiabatic systems

Enables management of advanced adiabatic systems by adding dedicated resources for valves, pumps, spray, enable signals and wet/dry sequences.

It coordinates EC fan control with adiabatic cooling functions, according to the application configuration.

ECpro + M<sup>OGT</sup>

**Modulating valves** → proportional control where provided

**Pump management** → dedicated commands and configurable sequences

**Wet/dry sequences** → integration with ECpro

**Fast outputs** → fast command actuation

|                        |                                  |                                                                                                                                                                                            |
|------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FCR</b>             | <b>Digital I/O expansion</b>     | Expansion with 12 digital inputs and 12 digital outputs, 3 analogue 0–10 V inputs and Modbus RS-485. Manages configurable logic, stepped control and simple multiple On/Off spray outputs. |
| <b>MAIN</b>            | <b>Analogue signal expansion</b> | Converts 0–10 V signals into Modbus commands. 4 analogue inputs + 4 On/Off logic signals. Enables advanced analogue management and retrofit applications.                                  |
| <b>M<sup>NET</sup></b> | <b>IP connection expansion</b>   | Enables ECpro IP connectivity to BMS and supervisory systems via Modbus TCP/IP and BACnet/IP.                                                                                              |

#### CUSTOM

TAILOR-MADE MODULES

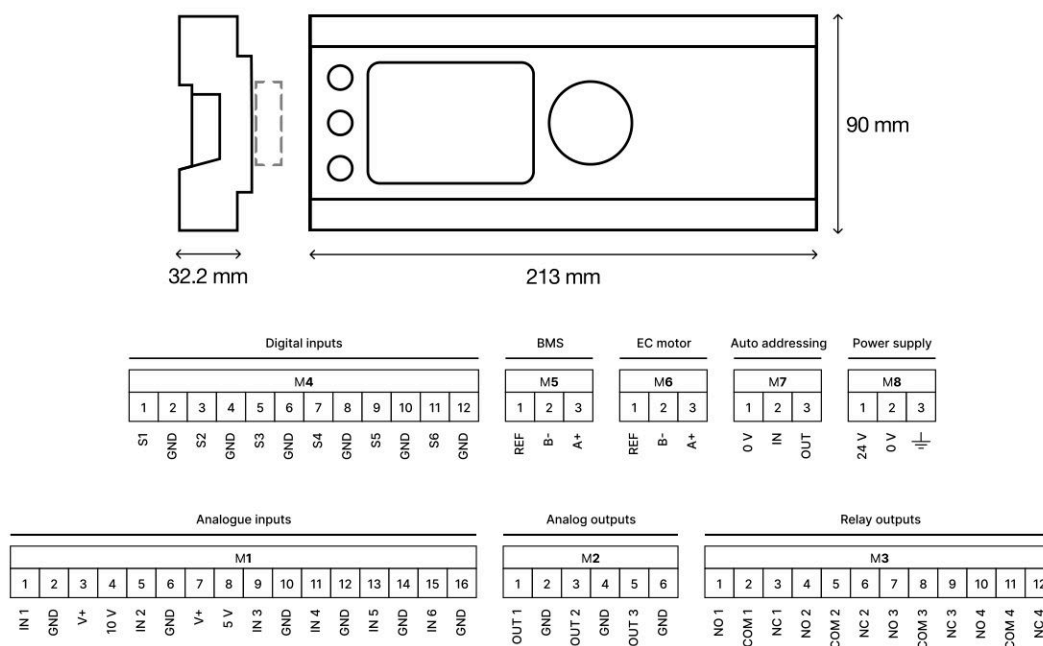
### Can't find the module you need?

Selpro products are developed together with customers, listening to the real needs of systems. Many special functions integrated into ECpro originate from real needs emerging from OEM projects. If your application requires a module with specific features — special inputs, additional protocols, dedicated logic — we can assess the development of a custom expansion together. The ecosystem is designed to grow.

**OEM developments on request** - proprietary protocols, specific I/O, custom logic. Possibility to assess customisations or new expansions based on the customer project.

# ECpro — Hardware specifications.

DIN-rail module, 24 Vac/dc supply, plug-in terminals with 3.5 mm pitch (supply terminal 5 mm) — fits any standard machine panel.



|                               |                                                                                                        |
|-------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Power supply</b>           | 24 Vac/dc $\pm 10\%$ · 50/60 Hz                                                                        |
| <b>Analogue inputs</b>        | 6 × configurable: 0–5 V · 0–10 V · 0–20 mA · 4–20 mA · NTC 10K · PTC · PT1000                          |
| <b>Digital inputs</b>         | 6 × On/Off (voltage-free contact) — configurable as active-open or active-closed                       |
| <b>Analogue outputs</b>       | 3 × independent 0–10 V · maximum current 20 mA                                                         |
| <b>Relay outputs</b>          | 4 × changeover contacts, 250 V AC / 3 A, NO/NC, programmable delay                                     |
| <b>Housing</b>                | Self-extinguishing PC/ABS, UL 94 V-0 · grey · DIN rail                                                 |
| <b>Display</b>                | 4-line × 20-character with 4 keys · optional touch TFT, on-board or remote                             |
| <b>COM 1</b>                  | RS-485 Modbus RTU · optional isolation · EC fan control                                                |
| <b>COM 2</b>                  | RS-485 Modbus RTU · optional isolation · BMS slave · connectivity                                      |
| <b>COM 3</b>                  | RS-485 Modbus RTU · remote display / remote control                                                    |
| <b>COM 4</b>                  | RS-485 Modbus RTU · On/Off expansions and I/O modules                                                  |
| <b>COM 5</b>                  | RS-485 Modbus RTU · On/Off expansions and I/O modules                                                  |
| <b>Operating temperature</b>  | -20...+70 °C                                                                                           |
| <b>Protection rating</b>      | IP20                                                                                                   |
| <b>Dimensions (W × H × D)</b> | 213 × 90 × 32.2 mm                                                                                     |
| <b>Input protections</b>      | 30 Vdc low-energy overvoltage protection                                                               |
| <b>Output protections</b>     | 30 Vdc low-energy overvoltage protection; current limitation in case of overload and/or short circuit. |
| <b>Certifications</b>         | CE · UKCA                                                                                              |

# Let's start with your application and define the right configuration.

Every application has its own constraints: type of heat exchanger, EC brand, supervisory architecture, safety logic, service requirements. Selpro offers an initial technical discussion to identify the most suitable configuration — not a one-off supply, but a product-focused collaboration.

## 01 Application analysis

Type of heat exchanger, EC brand, number of fans, current protocol, BMS architecture, regulatory and service constraints.

## 02 Configuration proposal

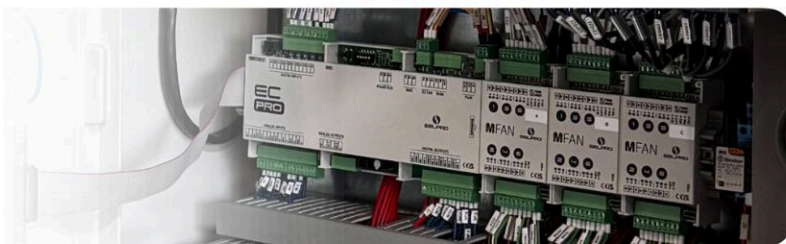
Most suitable ECpro configuration and any ecosystem modules (MFan, MDGT, MAIN) + wiring and parameterisation guidelines.

## 03 Parameterised sample

ECpro parameterised for your specific application · ready for laboratory or field testing.

## 04 Support and validation

Support during commissioning, validation and training. Collaboration on firmware, expansions and product roadmap.



**Selpro SRL**

Via Padre Giovanni Piamarta, 5/11  
25021 Bagnolo Mella (BS) - Italy

↗ [selpro.it](https://selpro.it)

↗ [info@selpro.it](mailto:info@selpro.it)

↗ +39 030 6821611