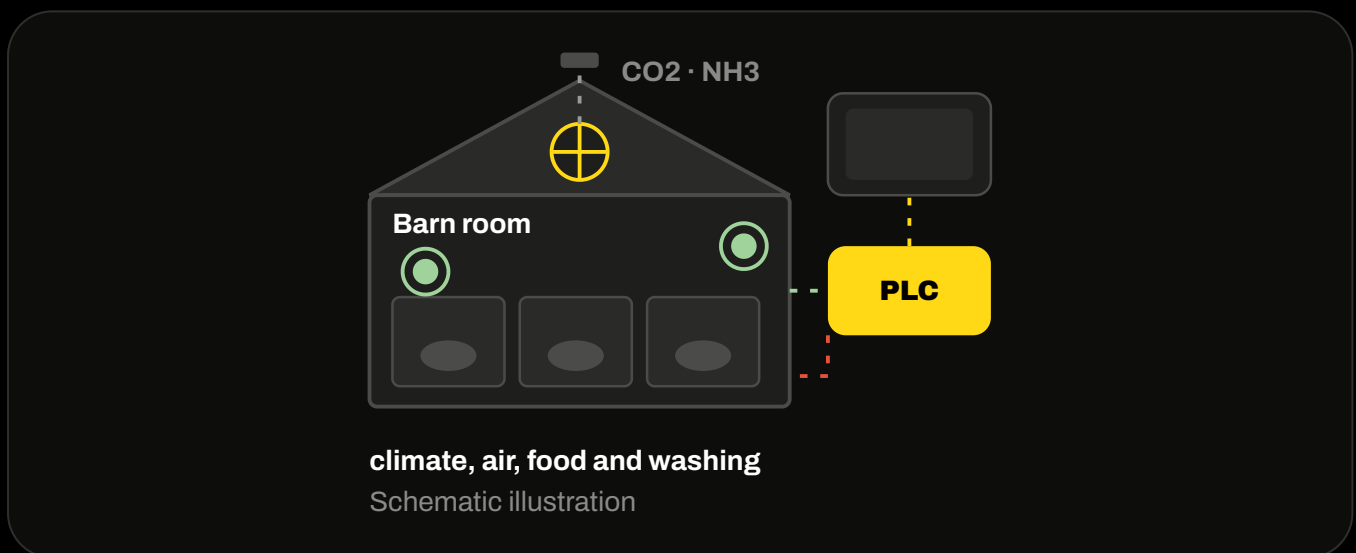


PIG FARM · M-DUINO 19R+

Climate, air, food and washing. **One PLC per barn room.**

Set values, exact rations and clean pens, from one controller.

[Read the interactive case study online ›](#)



2

climate sensors,
temperature and humidity,
compared with set values

4

jobs on one PLC: climate,
air, food and water, pen
washing

8

relay outputs on the M-
Duino 19R+ for one room
and one pen

1

Panel PC to set all the
programs, values and
schedules

THE CHALLENGE

Animal welfare depends on the air, the food and a clean pen.

The goal is environmental control for animal welfare, and data that moves along the process chain. The system controls the climate of the room, weighs the food and the water for each pen, keeps the air free of harmful gases and washes each pen on a schedule. A Panel PC collects the information, stores it on a server and analyses it.

01

A climate on set values

A temperature sensor and a humidity sensor read the room. From the set values, the PLC switches on the air conditioner and the dehumidifier.

02

CO2 and ammonia out

Both gases are harmful for the animals and for the people. Extractors with filters keep the air clean inside and do not send the gases outside.

03

Exact food and water

The food is weighed before it drops into the pen, and a water meter lets the exact amount pass. The program adds up every pen: the inventory is always ready.

04

Washing without stress

Two high-pressure pipes in the drain wash the pen on a schedule. First the door opens, so the animal goes to the common area and does not suffer.



One panel for every program

A Panel PC shows the menu of programs. From there, people set all the parameters and the schedules. The case connects the panel to Wi-Fi, to store the data on a server and analyse it.

HOW IT WORKS

Three loops: climate and air, food and water, washing.

Loop 1 · Climate and air

Set values for the room, and air without harmful gases.

A temperature sensor and a humidity sensor read the room. Depending on the pre-selected values, the PLC switches on the air conditioner and the dehumidifier. Extractors with filters take CO2 and ammonia out of the room and keep them from going outside. Pick a scenario and move the set values. To run a full day of climate control in a closed room, with fresh air for CO2 and drying, open the [greenhouse climate simulator](#) and its mushroom room (it runs on ESP32 PLCs; the logic is the same).

Loop 2 · Food and water

Weigh each ration. Count each litre.

A solenoid valve opens a gate and the food falls into a scale. When the scale reaches the ration, the valve closes. A second door drops the food for the animal. For water, a water meter lets the exact amount pass. The program adds the quantities of each pen and keeps the rest of the total: the inventory is done. Pick a pen, set a ration and press Dose.

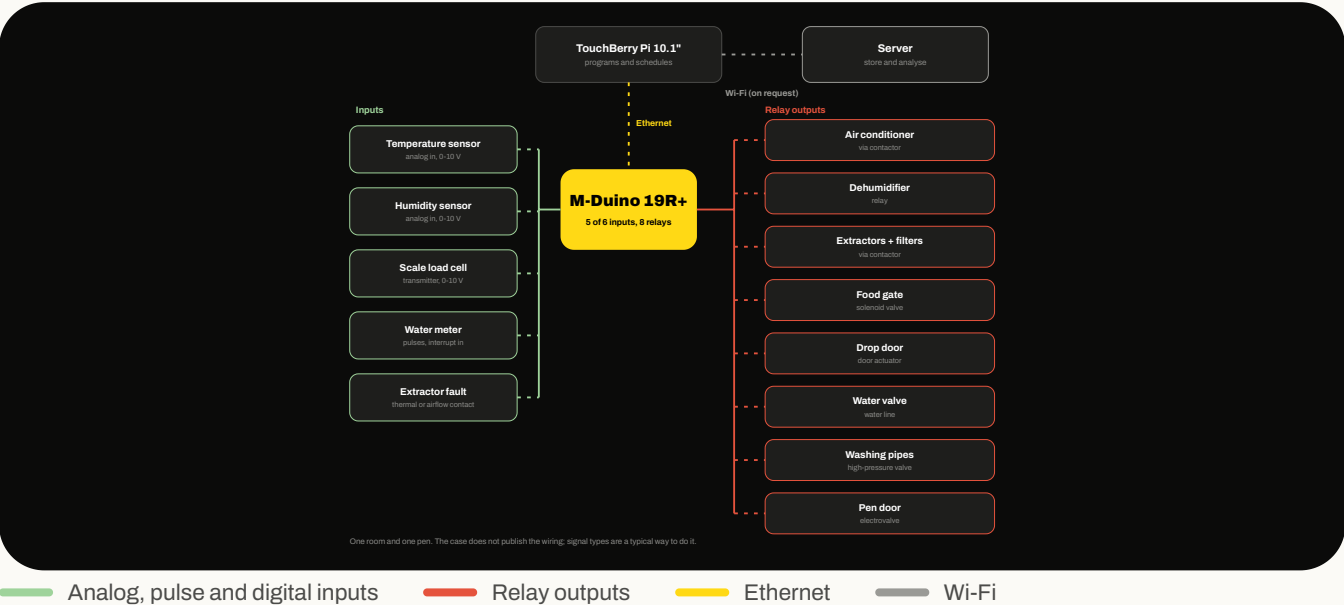
Loop 3 · Washing

Wash the pen only when the door is open.

On a schedule, two high-pressure pipes in the drain wash the pen. They work only while the pen door is open, through an electrovalve, so the animal goes out to the common area and does not suffer. Start the washing, then try it with an animal that stays inside.

How do you automate a pig farm with a PLC?

An M-Duino 19R+ reads two climate sensors, the load cell of the scale, the water meter and a fault contact of the extractors. Its eight relays switch the air conditioner, the dehumidifier, the extractors, the food gate and door, the water valve, the washing pipes and the pen door. A typical way to do it: the PLC talks to the Panel PC over Ethernet, and the Panel PC reaches the server over the farm Wi-Fi, as in the case. This count is for one room with one pen; more pens need more outputs.



Signals and data for one room and one pen (example)

Signal	Between	Type	Purpose
Room temperature	Temperature sensor → M-Duino 19R+	Analog in, 0-10 V	Compared with the set value: air conditioner on or off
Room humidity	Humidity sensor → M-Duino 19R+	Analog in, 0-10 V	Compared with the limit: dehumidifier on or off
Food weight	Load cell of the scale → transmitter → M-Duino 19R+	Analog in, 0-10 V	Ration for each pen. The case does not publish the load cell interface
Water volume	Water meter → M-Duino 19R+	Digital in with interrupt, pulses	Exact litres for each pen, and the water total
Extractor fault / airflow	Thermal relay contact or airflow switch → M-Duino 19R+	Digital in, 24 Vdc	Alarm on the panel if the ventilation fails
Air conditioner	M-Duino 19R+ → contactor → air conditioner	Relay out	Cooling above the set value
Dehumidifier	M-Duino 19R+ → dehumidifier	Relay out	Drying above the humidity limit
Extractors with filters	M-Duino 19R+ → contactor → extractors	Relay out	CO2 and ammonia out of the room, through filters
Food gate	M-Duino 19R+ → solenoid valve	Relay out	Fills the scale up to the ration
Drop door	M-Duino 19R+ → door actuator	Relay out	Drops the weighed food to the pen
Water valve	M-Duino 19R+ → valve on the water line	Relay out	Closes when the meter reaches the set litres
Washing pipes	M-Duino 19R+ → high-pressure valve	Relay out	Washes the pen through the drain, only with the door open
Pen door	M-Duino 19R+ → electrovalve	Relay out	Opens the pen so the animal goes to the common area
Programs and data	M-Duino 19R+ ↔ TouchBerry Pi 10.1"	Ethernet	Set values, rations, schedules, inventory
Storage and analysis	TouchBerry Pi 10.1" → server	Wi-Fi	Store the data and analyse it

One PLC per room. One panel for the programs.



M-DUINO ETHERNET PLC ARDUINO 19R

An industrial PLC built around an original Arduino Mega 2560, with 6 inputs and 11 outputs, 8 of them relays, Ethernet and RS-485, for DIN rail. In the barn it reads the climate sensors, the scale and the water meter, and switches all the loads of one room.

Inputs	6: 4 analog/digital (0-10 V, 10-bit), 2 digital optoisolated with interrupt (5 to 24 Vdc)
Outputs	11: 8 relays, 3 analog/digital/PWM (0-10 V)
Relays	Up to 4 A at 230 Vac or 2 A at 24 Vdc, resistive load
Comms	Ethernet (W5500), RS-485, RS-232, TTL serial, I2C, SPI
Power and mounting	12 to 24 Vdc, DIN rail TS35, IP20, inside a cabinet

The original case names the M-Duino 19R and shows its picture. It is this product, reference IS.MDuino.19R+. For one room it uses 5 of the 6 inputs and the 8 relays. For more pens or rooms, add a second M-Duino on the same Ethernet network or choose a model of the family with more outputs (see the [family datasheet](#)).

[See the M-Duino 19R+ ›](#)



TouchBerry Pi Panel PC 10.1" CORE

The control point of the farm: a Raspberry Pi 4 behind a 10.1" capacitive touchscreen, on Ethernet to the PLC. It shows the menu of programs, where people set the parameters and the schedules, and it stores the data.

Screen	10.1" IPS, 1280 x 800, capacitive, 900 nits
Comms	Gigabit Ethernet, 4 x USB, one serial port (RS-485, RS-232 or TTL); Wi-Fi and Bluetooth on request
Power	12 to 24 Vdc, UPS for safe shutdown
Environment	0 to 45 °C, 10 to 90 % RH without condensation, IP20 front

The original case links to the TouchBerry Pi 10.1". Today it is the TouchBerry Pi Panel PC 10.1" CORE. The case text also names a TinkerTouch panel, which is no longer sold. The case connects the panel to Wi-Fi. Wi-Fi and Bluetooth are not included by default: talk to us before you order (see the [family datasheet](#)). For a panel inside the barn, with dust and splashes, the [FLEX version](#) offers an IP65 front.

[See the TouchBerry Pi 10.1" ›](#)

Set values, not guesswork

The air conditioner and the dehumidifier follow the values that people set on the panel. The PLC keeps them all day and all night, and it logs what it did.

Water only in an empty pen

The washing pipes work only with the pen door open, so the animal is in the common area. The rule lives in the PLC program, not in the memory of a person.

One panel for every program

People set the parameters and the schedules on the TouchBerry Pi panel. The panel stores the data and sends it to the server for analysis.

AUTOMATING A LIVESTOCK BARN?

Tell us about your barn. An engineer will answer.

Tell us how many rooms and pens you have, the climate loads, how you feed and give water, and how you wash. We will propose the inputs and outputs, the controller and the panel.

READ IT ONLINE

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