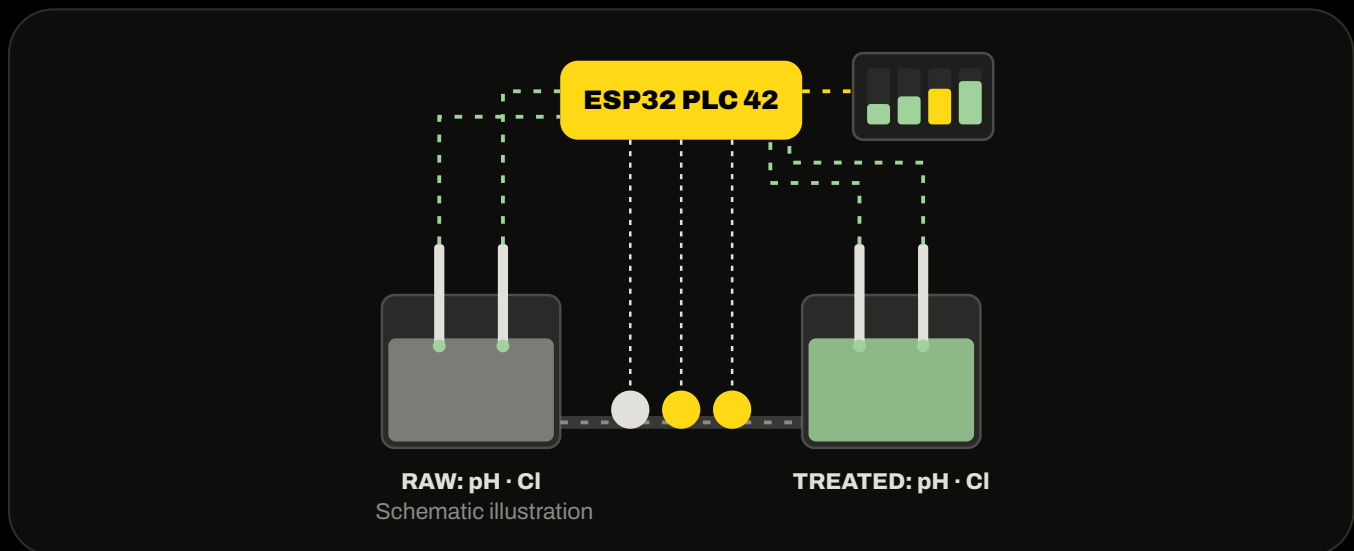


WATER TREATMENT · ESP32 PLC 42

Keep pH and chlorine in range with one ESP32 PLC 42.

pH and chlorine dosing, MQTT to a Panel PC, remote settings.

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


4

analog sensors: pH and chlorine in each tank

3

ON/OFF outputs: water pump and two dosing valves

1

ESP32 PLC 42 runs the control loop

MQTT

values to the Panel PC over Ethernet

THE CHALLENGE

Dose the right amount, with nobody standing next to the tank.

pH and chlorine change all the time. If you dose too little, the water is out of specification. If you dose too much, you waste chemicals. Your control system has to read the water, correct it, prove the result and show all of it to people who are not on site.

01

Two values, one dose

Analog sensors read pH and chlorine at a fixed interval. When a value leaves its range, the system must dose at once. Not when someone checks.

02

An unattended station

The customer wanted an autonomous station. Nobody stands next to the tanks, so the status and the settings must be available from another location.

03

Built to copy

The same design had to be easy to replicate in another area nearby. Same hardware, same program, a new site.



Proof at the outlet

Two more sensors in the treated water tank measure pH and chlorine again. You do not assume the dose was right. You measure it.

HOW IT WORKS

Two loops: dose the water, then prove it.

Loop 1 · Dosing

Out of range? The PLC doses until the value is back.

Analog sensors in the untreated water tank read pH and chlorine at a fixed interval. The ESP32 PLC 42 compares each value with its range. When a value is out of range, the PLC opens the solenoid valve of that chemical and regulates the speed of the dosing pump. When the value is back in range, it closes the valve. You set the ranges on the Panel PC.

- pH and chlorine sensors on analog inputs (4-20 mA or 0-10 V)
- One ON/OFF output per dosing solenoid valve
- Dosing pump speed regulated by the PLC (signal not published)

Loop 2 · Proof and supervision

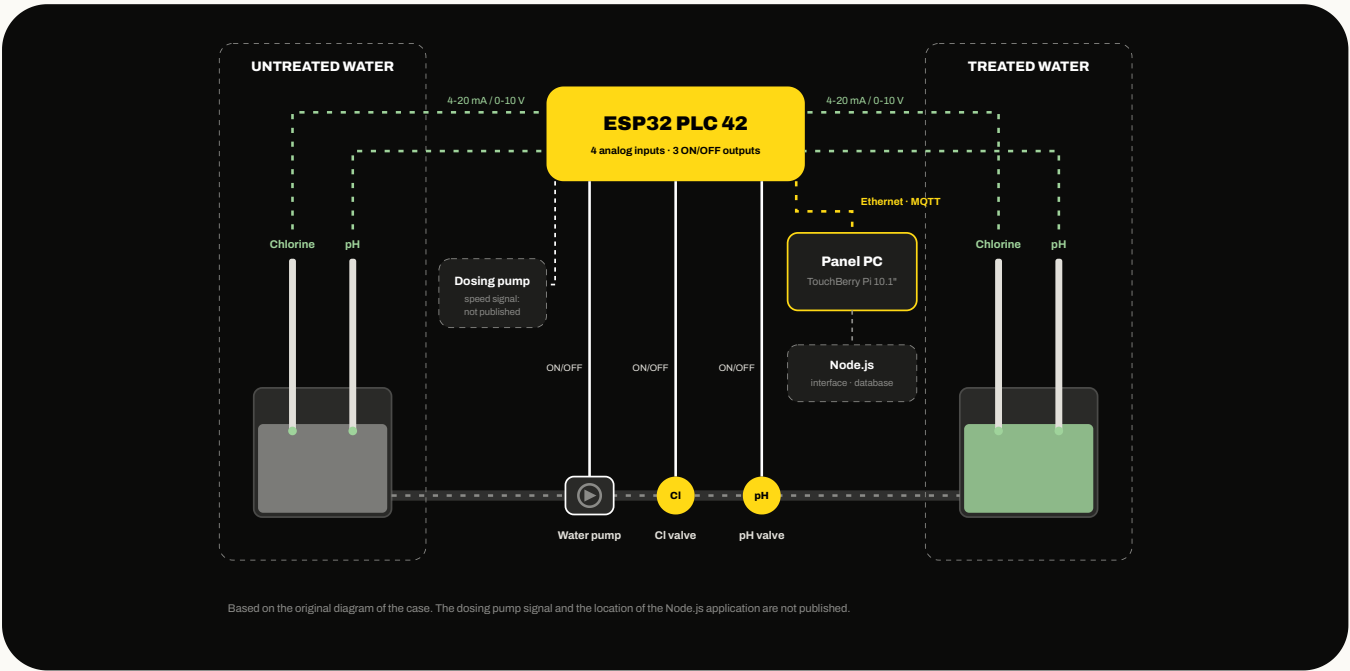
The treated tank confirms. The Panel PC shows it.

Two more sensors in the treated water tank measure pH and chlorine again. The ESP32 PLC 42 sends all values over MQTT on the Ethernet cable to the TouchBerry Pi 10.1" Panel PC. The operators see the plant there, and the database keeps every value. From the Panel PC they change the preset values, and the PLC doses to them.

- Two sensors in the treated water tank confirm the result
- MQTT over Ethernet between the PLC and the Panel PC
- Status and settings available from another location

How does one ESP32 PLC 42 run a water treatment station?

Four analog sensors go to the ESP32 PLC 42: pH and chlorine before and after the treatment. Three ON/OFF outputs drive the water pump and the two dosing solenoid valves. An Ethernet cable carries MQTT messages to the Panel PC. This diagram follows the original diagram of the case.



— Sensor signals, 4-20 mA or 0-10 V — Digital ON/OFF outputs — Ethernet · MQTT — Water flow

Signals and data

Signal	Between	Type	Purpose
pH, raw water	pH sensor → ESP32 PLC 42	Analog 4-20 mA / 0-10 V	Input of the dosing loop
Chlorine, raw water	Chlorine sensor → ESP32 PLC 42	Analog 4-20 mA / 0-10 V	Input of the dosing loop
pH and chlorine, treated water	2 sensors → ESP32 PLC 42	Analog 4-20 mA / 0-10 V	Confirms the result of the treatment
Chlorine dosing	ESP32 PLC 42 → solenoid valve	Digital ON/OFF	Adds the chlorine product
pH correction	ESP32 PLC 42 → solenoid valve	Digital ON/OFF	Adds the pH correction product
Water pump	ESP32 PLC 42 → pump	Digital ON/OFF	Moves water from the untreated to the treated tank
Dosing pump speed	ESP32 PLC 42 → dosing pump	Example: analog 0-10 V	Sets the dose rate. Signal not published
Values and set points	ESP32 PLC 42 ↔ Panel PC	Ethernet · MQTT	Display, records and remote settings

One PLC on the DIN rail, one Panel PC in the plant.



ESP32 PLC 42

The controller of the station. It reads the four analog sensors, drives the two dosing solenoid valves and the water pump, regulates the dosing pump and publishes the values over MQTT. You program it in C++ with the Arduino IDE.

Inputs	26: 14 digital optoisolated, 12 analog/digital (0-10 V)
Outputs	16: 10 digital optoisolated, 6 analog/digital/PWM (0-10 V), 5 to 24 Vdc
Network	Ethernet 10/100 (RJ45), Wi-Fi 2.4 GHz, Bluetooth LE
Serial	RS-485, RS-232, TTL
Power supply	12 to 24 Vdc
Mounting	DIN rail TS35, IP20

The analog inputs read 0-10 V. For a 4-20 mA sensor, add a shunt resistor or a signal converter. The outputs are optoisolated, without relays: a pump motor needs a contactor or an interface relay. The case does not publish its wiring. Check the ratings in the family datasheet.

[See the ESP32 PLC 42 ›](#)



TouchBerry Pi Panel PC 10.1"

The operator station in the plant. An industrial 10.1" Panel PC with a Raspberry Pi 4. It receives the values over MQTT, shows the state of the plant and sends the new set points to the PLC.

Role	Display, records and remote settings
Screen	10.1"
Computer	Raspberry Pi 4
Link to the PLC	Ethernet · MQTT

The case names a Touchberry Pi 10.1" Panel PC and does not publish the exact version. The image and the link show the current TouchBerry Pi Panel PC 10.1" FLEX.

[See the TouchBerry Pi 10.1" ›](#)

Open and free to program

Arduino IDE for the PLC, Node.js for the interface and the database. No licence fees, and you can change any part of the program.

Room to grow

This station uses 4 analog inputs and 3 ON/OFF outputs. The ESP32 PLC 42 has 26 inputs and 16 outputs, so you can add turbidity, tank levels or a second dosing line.

Engineers from day one

Our technical team supported the customer from the project definition to the commissioning. You get the same support for your plant.

SIMILAR PROJECT?

Tell us your water and your chemicals. An engineer will answer.

Tell us what you treat, which values you measure (pH, chlorine, turbidity, levels) and how you dose. We will tell you which controller fits and how to connect your sensors, valves and pumps.

READ IT ONLINE

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