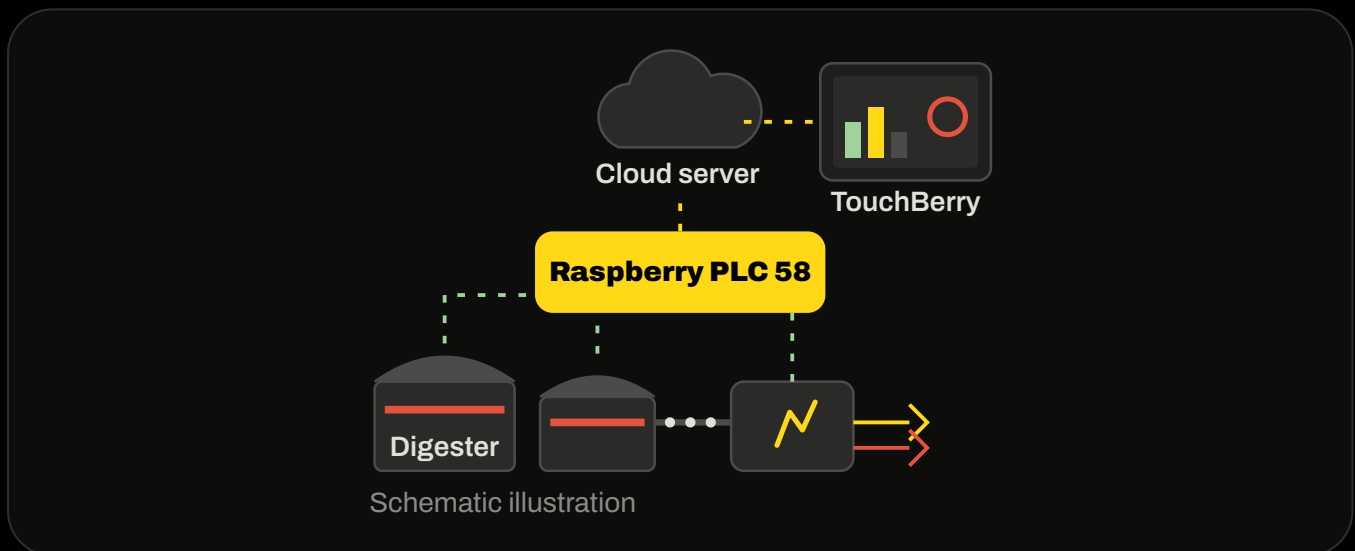


BIOGAS PLANT · RASPBERRY PLC 58

One PLC for the whole biogas plant.

Digester heat, gas pressure, user levels, data on Ethernet.

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


4

plant sections under one control system

1

Raspberry PLC manages all of them

5

operator functions on the TouchBerry Panel PC

Ethernet

link to the cloud server, chosen over Wi-Fi or GPRS

THE CHALLENGE

Four process sections. One place to manage and monitor them.

The customer wanted to manage and monitor every step of the biogas process from one place. That meant three jobs: the control system and the plant automation, a screen for local control and management, and data sent to the cloud. The plant processes biomass waste of vegetable or animal origin. Microorganisms break it down without oxygen, and the result is biogas. The plant has four sections, each with its own process. The plant also has sludge probes, air and biogas meters.

01

Substrate input and digestion

Biomass waste enters the anaerobic digestion module. After a period of time, the module produces biogas. A heating system keeps it at a set temperature.

02

Nitrogen removal

Part of the digestate goes to a nitrogen feed reactor, also under heating. Its product goes back to the digestion module: the plant recirculates.

03

Effluent extraction

The other part of the digestate goes to an operating accumulation pond.

04

Biogas to energy

The biogas feeds an engine that produces electric and thermal energy. Pressure is a vital parameter in any gas system, so a probe reads it in real time.



One control system, a local screen, the cloud

Control and automate the four sections, give the operators a screen next to the process, and send the plant data to a server. One PLC does the control, one Panel PC does the local management, and Ethernet carries the data.

HOW IT WORKS

Three loops: heat, pressure, operation.

Loop 1 · Heat: keep the tanks warm

The heating holds the temperature in the digester and the reactor.

The anaerobic digestion module and the nitrogen feed reactor work under a heating system that keeps a temperature over time. Temperature sensing tells the PLC where each tank is. A typical way to do it: on and off control with a band around the set point for each tank, and an alarm if the temperature falls too far. In the panel, raise the heat loss until the heating can no longer keep up.

Loop 2 · Pressure: watch the gas side

A pressure probe shows the gas side in real time.

Pressure is a vital parameter in gas management, so a specific probe reads it in real time. The engine uses the biogas to make electric and thermal energy. A typical way to do it: a high and a low threshold on the pressure, each with an alarm on the Panel PC and an entry in the history. In the panel, change the production and start or stop the engine.

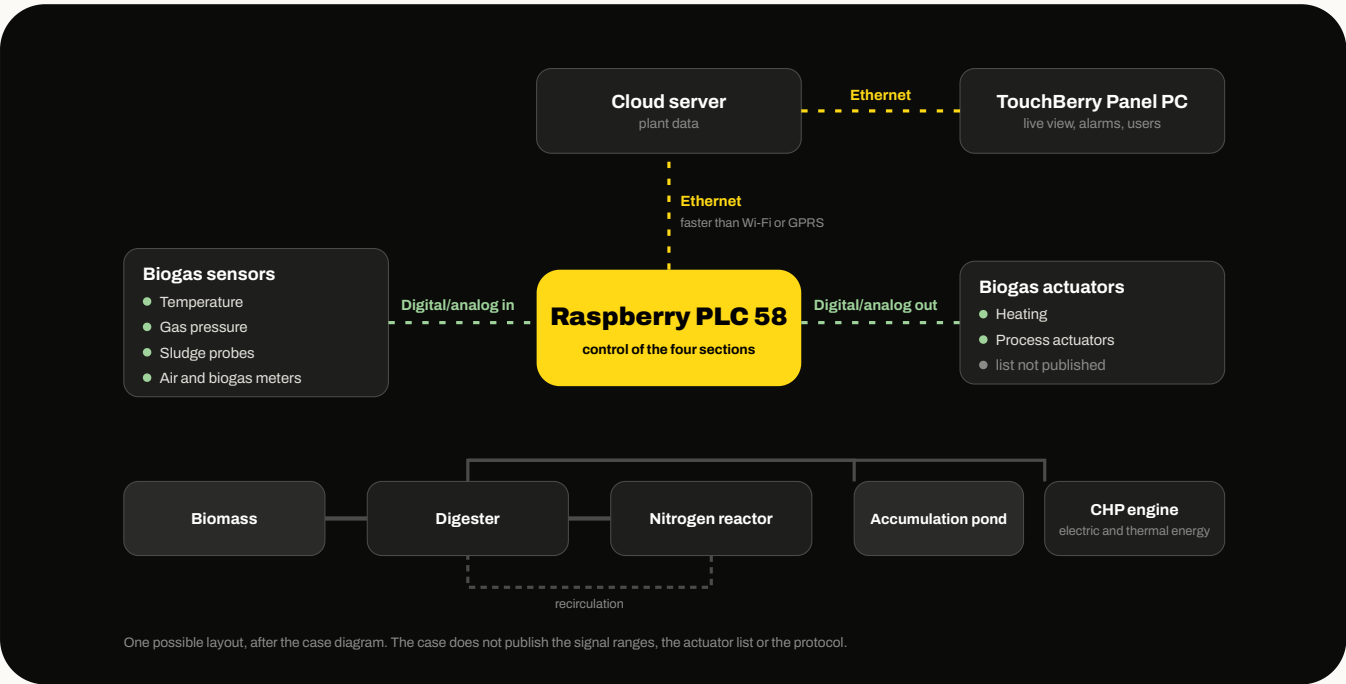
Loop 3 · Operation: users and data

The right people change the right things. The server gets the data.

The TouchBerry Panel PC shows the plant in real time, controls the operations, shows alarms and the history of sensors and actuators, and configures all available parameters. It also defines a hierarchy of users. The data goes to the cloud server over Ethernet. A typical way to do it: each user level unlocks more functions, and the PLC keeps the records while the link is down and sends them when it is back. Pick a user level, press the buttons, then cut the link.

How does one PLC automate and monitor a biogas plant?

The biogas sensors go to the digital and analog inputs of the Raspberry PLC 58. Its digital and analog outputs drive the biogas actuators. The PLC sends the plant data to a cloud server over Ethernet. The TouchBerry Panel PC shows the information and is the local control and management screen. In the case diagram, the Panel PC is also on Ethernet, next to the server.



— Digital and analog I/O — Ethernet — Process and example elements

Signals and data

Signal	Between	Type	Purpose
Temperature (heated tanks)	Temperature sensor → Raspberry PLC 58	Input	Temperature sensing for the digestion module and the nitrogen reactor, both under heating. Range not published
Gas pressure	Pressure probe → Raspberry PLC 58	Input	Real-time pressure on the gas side. Range not published
Sludge, air and biogas	Sludge probes, air and biogas meters → Raspberry PLC 58	Digital or analog in	Process values for the four sections
Heating and actuators	Raspberry PLC 58 → biogas actuators	Digital or analog out	Heating and the other actuators of the plant. List not published
Plant data	Raspberry PLC 58 → cloud server	Ethernet	Data to the server, chosen over Wi-Fi or GPRS. Protocol not published
Local screen	TouchBerry Panel PC	Ethernet	Live view, control, alarms and history, parameters, user levels

HARDWARE USED

Raspberry PLC 58 to control. TouchBerry to operate.

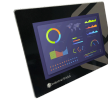


Raspberry PLC 58

Role	Control of the four sections, data to the cloud server
Inputs	39: 18 analog/digital (0-10 V, 12-bit), 21 digital optoisolated
Outputs	24: 9 analog/digital/PWM (0-10 V), 15 digital optoisolated
Comms	2 x Ethernet, 2 x RS-485, Wi-Fi, Bluetooth LE, I2C, SPI
Computer	Raspberry Pi 4, Debian 64-bit
Power and mounting	12 to 24 Vdc, DIN rail TS35, IP20

The case names the "Raspberry 58+ PLC". This product page sells the current Raspberry PLC 58.

[See the Raspberry PLC 58 ›](#)



TouchBerry Pi Panel PC 10.1"

Role	Live view, control, alarms and history, parameters, user levels
Screen	10.1"
Computer	Raspberry Pi 4
Network	Ethernet

The case says "a TouchBerry Panel PC" and does not publish its size. The image and the link show the TouchBerry Pi Panel PC 10.1" FLEX.

[See the TouchBerry Pi 10.1" ›](#)

Many signals on one PLC

The Raspberry PLC 58 has 39 inputs, 18 of them analog (0-10 V), and 24 outputs, 9 of them analog or PWM. Temperatures, pressure, probes, meters and actuators of four sections fit on one controller.

Processes at the same time

A Raspberry Pi 4 with Debian 64-bit runs several processes at once: control, logging, the link to the screen and the link to the server. You program it in Python, Node-RED or C/C++.

Ethernet for the data

The case chose Ethernet for its speed and bandwidth. The PLC has two Ethernet ports, so the plant network and the server link can use separate ports.

Other links when you need them

Two RS-485 ports for Modbus RTU meters and drives, Wi-Fi and Bluetooth LE on board, and one optional board for CAN, LoRa or 4G.

The data survives a power cut

A UPS with supercapacitors lets Linux shut down cleanly on power loss, and a real-time clock keeps the time stamps right.

Open and modular

An open solution with no license fees. The project can grow: more I/O, more devices, more screens.

SIMILAR PLANT?

Tell us your process and your signals. An engineer will answer.

Tell us the sections of your plant, the sensors and actuators of each one, how the operators work and where the data has to go. We will tell you which controller fits and how to connect it.

READ IT ONLINE

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