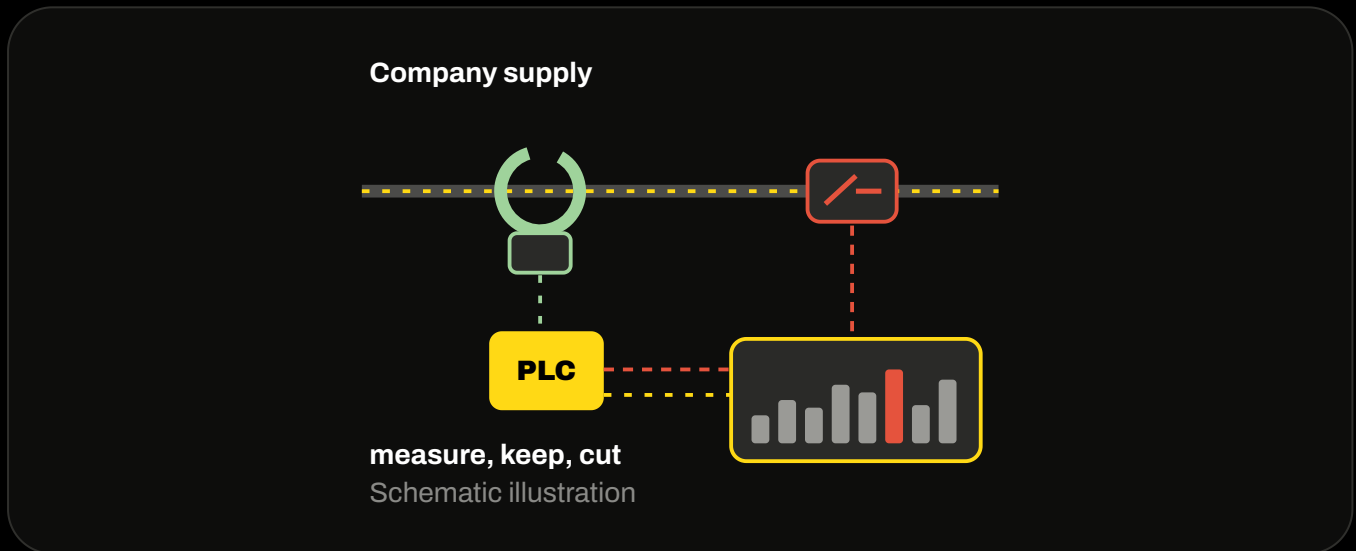


CURRENT METERING · M-DUINO 19R+

Read the current with a clamp. **Cut it at the limit.**

One current sensor, one Arduino based PLC, one Panel PC.

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

1

YHDC SCT010T-D clamp sensor on an analog input

2

control steps from the case: pre-cut and cut

1

relay output that cuts the current on an anomaly

0

people in the reading: no manual reading errors

THE CHALLENGE

Know the consumption, keep the history, stop the excess.

The company wants to measure the current it uses with a current sensor at a strategic point of the current flow. It wants statistics of the consumption for medium and long-term tracing, and it wants to stop the current when it goes over the allowed limit.

01

Accurate, with no people

Accuracy in the measurement. No person takes the readings, which protects against reading errors.

02

A history, not a snapshot

The data is stored, so the consumption can be followed over weeks and months, not only now.

03

Pre-cut and cut

Measure and control the pre-cutting and the cutting of the electrical energy from the control centre, in a fully automatic way.

04

The centre knows first

An event log with the lack of voltage and the lack of current. The system warns the centre at once, so nobody has to call to complain.



Remote access, with permission

The client also wanted to see the data from outside. The system is connected to a VPN, so a web client can reach the server, as long as it has permission.

HOW IT WORKS

Three jobs: measure, decide, keep the record.

Job 1 · Measure

A clamp on the cable, a voltage on the input.

The YHDC SCT010T-D is a split-core current sensor: it opens like a clamp and closes around one conductor, with no need to cut it. It gives a voltage that follows the current, and the PLC reads it on an analog input, again and again. Change the load, then lose the supply.

- Sensor at a strategic point of the current flow
- Analog input of the PLC, read periodically
- No people in the reading, no manual reading errors

Job 2 · Decide

Pre-cut first. Cut if it goes on.

The PLC compares the current with the allowed limit. The case asks for pre-cutting and cutting, fully automatic, controlled from the control centre. On an anomaly, a relay output of the PLC cuts the current. Add an overload, then reconnect from the centre.

- Limit kept in the PLC program
- Relay output cuts the current
- Events for the lack of voltage and of current

Job 3 · Keep the record

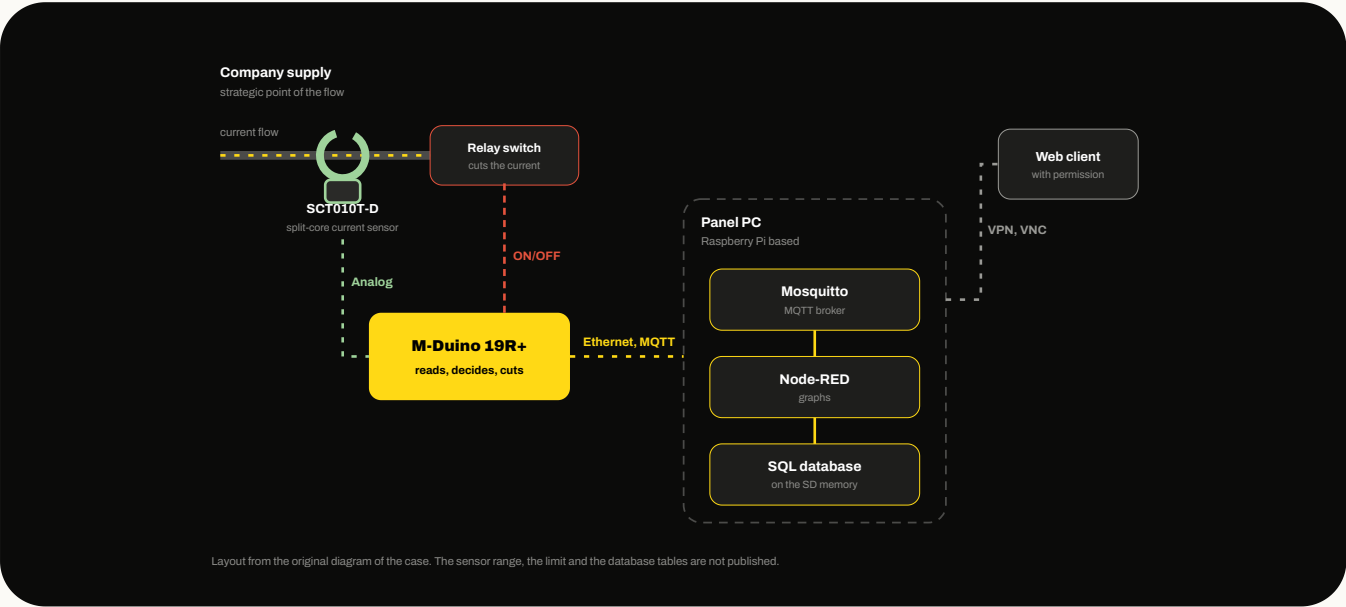
Every reading in a database. Graphs for the long term.

The PLC sends the data over Ethernet with MQTT. On the Panel PC, the MQTT broker (Mosquitto) receives it, the data goes to an SQL database on the SD memory, and Node-RED shows it in graphs for the medium and the long term. A VPN lets a web client with permission see it from outside. Change the period, then try both remote clients.

- MQTT broker and database on the Panel PC
- Node-RED graphs: day, week, month
- Remote access over VPN, only with permission

How do you meter the current of a company with a PLC?

A YHDC SCT010T-D current sensor sits on the cable, at a strategic point of the current flow, and goes to an analog input of the Ethernet PLC. The PLC reads it periodically, checks the limit and and, on an anomaly, cuts the current with a relay output. It sends the data over Ethernet with MQTT to a Panel PC based on Raspberry Pi. There, the Mosquitto broker passes the data to Node-RED, the data is stored in an SQL database on the SD memory, and Node-RED shows the graphs. A VPN gives remote access to web clients with permission.



— Analog signal — Digital ON/OFF to the relay switch — Ethernet, MQTT — VPN remote access

Signals and data

Signal	Between	Type	Purpose
Current	Cable → SCT010T-D	Split-core sensor, no cut	Measures the current at a strategic point of the flow
Sensor output	SCT010T-D → PLC	Analog in	A voltage that follows the current, read periodically
Cut	PLC → relay switch	Relay out, ON/OFF	Cuts the current on an anomaly or over the limit
Readings and events	PLC → Panel PC	Ethernet, MQTT	To the Mosquitto broker on the Panel PC
Storage	Node-RED → database	SQL on the SD memory	History for the medium and the long term, event log
Graphs	Node-RED → screen	Dashboard	The consumption in graphic form
Remote access	Web client ↔ Panel PC	VPN, VNC	Only for clients with permission

HARDWARE USED

A PLC that measures and cuts. A Panel PC that keeps and shows.



CURRENT EQUIVALENT

M-DUINO ETHERNET PLC ARDUINO 19R

The case names an Ethernet PLC based on Arduino and shows an M-Duino 19R. This is its current version, the M-Duino 19R+.

Role in this design	Reads the sensor, pre-cut and cut logic, relay cut, MQTT to the Panel PC
Inputs	6: 4 analog/digital (0-10 Vdc), 2 digital optoisolated with interrupts (5-24 Vdc)
Outputs	11: 8 relays (230 Vac 4 A / 24 Vdc 2 A, resistive load), 3 analog/digital/PWM (0-10 V)
Comms	Ethernet, RS-485, RS-232, I2C, SPI, TTL serial
Built in	Real-time clock, µSD slot
Programming	Arduino IDE

Reference IS.MDuino.19R+. To cut a power circuit, the relay output drives a contactor sized for the load.

[See the M-Duino 19R+ >](#)



CURRENT EQUIVALENT

TouchBerry Pi Panel PC 10.1" FLEX

The screen and the local server of the system. In this case it runs the MQTT broker, the SQL database on the SD memory and Node-RED, shows the graphs and opens the VPN.

Role in this design	Mosquitto MQTT broker, SQL database, Node-RED graphs, VPN access
Screen	10.1"
Computer	Raspberry Pi 4
Link to the PLC	Ethernet

The case used a Panel PC based on Raspberry Pi 3. The image and the link show the current model, the TouchBerry Pi Panel PC 10.1" FLEX, with a Raspberry Pi 4.

[See the TouchBerry Pi 10.1" >](#)

No cut in the cable

A split-core sensor closes around the conductor. You add the measurement to a running installation without opening the circuit to the sensor.

The PLC acts on its own

The limit and the relay cut run in the PLC program. The cut does not wait for the Panel PC, the network or a person.

Readings you can trust

No person takes part in the measurement, which the case sees as the answer to reading errors. Every value comes from the same sensor at the same rate.

METERING YOUR OWN SUPPLY?

Tell us what you want to measure. An engineer will answer.

Tell us how many circuits or phases, which currents, which limits and who must see the data. We will tell you which sensor, which controller and how to connect them.

READ IT ONLINE

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