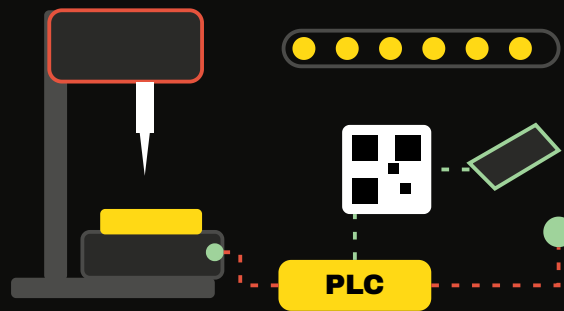


MANUFACTURING LINE · ARDBOX PLC

Three checks against bad parts. One small Ardbox PLC.

No drilling without the part in place, a LED test and a QR check.

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



drill, LEDs and QR code
Schematic illustration

3

checks added to the line:
hole position, LED strip
and QR code

7 %

of the QR codes were not
read correctly before the
project

1

Ardbox Relay PLC,
powered by a 12 V supply
the factory already had

230 V

drill supply switched by a
PLC relay, only with the part
in place

THE CHALLENGE

Fewer non-compliant parts, with small changes to the line.

The company needed to improve three verification processes to reduce non-compliant products. It is a small company, so it asked for a simple solution around the machines it already had.

01

Holes in the wrong place

The support that holds the plastic part was manufactured with a measurement error. The part does not fit perfectly, and the drill can make the holes in the wrong position.

02

LED strips that must work

The LED strips placed in the parts never had significant problems. The company still wants to verify them, even if it changes its LED supplier.

03

QR codes nobody can read

The QR sticker is used for traceability. Due to the environment of the factory it is sometimes printed badly, and 7 % of the codes were not read correctly.

04

Use what is already there

Where possible, the solution reuses what the factory has: the PLC runs from a 12 V / 2 A supply left from an old prototype.



Check, then let the operator decide

Each check gives the operator a clear signal: the drill only works with the part in place, the LED strip lights up on demand, and a lamp confirms the QR code before the part is finished.

HOW IT WORKS

Three checks: the part in place, the LEDs, the QR code.

Check 1 · The part in place

No part in position, no power to the drill.

A small button on the support is pressed only when the plastic part sits correctly. The PLC reads it and keeps the 230 V supply of the drill off with a relay until then. A misplaced part cannot be drilled. Place the part and try to start the drill.

- A button on the support, on a digital input
- A relay of the PLC on the 230 V supply of the drill
- Holes only with the part correctly placed

Check 2 · The LED strip

Push a button, see every LED.

The operator pushes a button. The PLC closes a relay that connects the LED strip to the 12 V supply, and the strip lights up. The operator sees at once if one LED does not work.

- Push button on a digital input
- LED strip powered through a relay from the same 12 V supply
- The operator checks the strip, whatever the supplier

Check 3 · The QR code

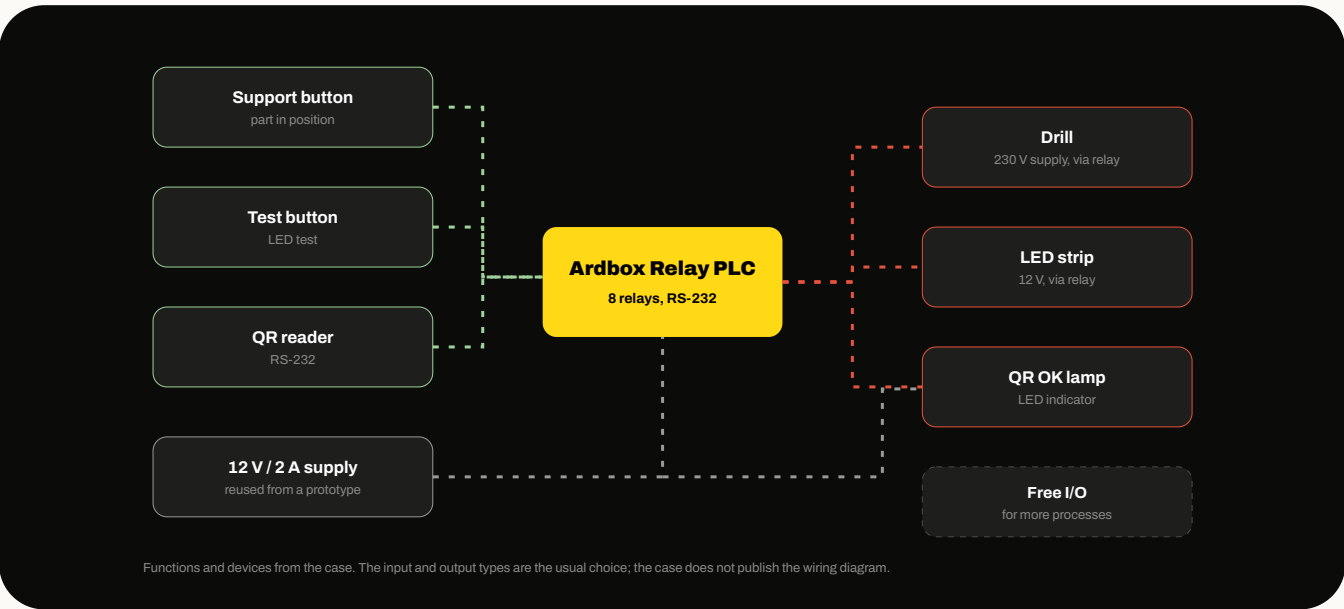
A lamp says the QR code can be read.

At the end of the process, a QR reader on RS-232 reads the sticker. If the PLC receives the correct reference, it lights a LED. If not, the operator checks the label before the part is finished.

- QR reader on the RS-232 port of the PLC
- The PLC compares the code with the reference
- A LED tells the operator the QR code is good

How do you add three checks to a line with one small PLC?

Everything goes to one Ardbox Relay PLC. The button on the support, the LED test button and the QR reader are its inputs. Its relays switch the 230 V supply of the drill, the LED strip and the QR OK lamp. A 12 V / 2 A supply that the company had from an old prototype powers the PLC and the LED strip. Inputs and outputs are still free for more processes.



- Inputs: buttons and QR reader
- Ardbox Relay PLC
- Outputs: drill, LED strip, lamp
- Existing 12 V supply

Signals (from the case; the input and output types are the usual choice)

Signal	Between	Type	Purpose
Part in place	Button on the support → PLC	Digital input	Active only when the part is correctly placed
Drill supply	PLC → 230 V supply of the drill	Relay output (to a contactor, typical)	No current to the drill without the part in position
LED test	Push button → PLC	Digital input	The operator asks for the LED test
LED strip	PLC → LED strip, from the 12 V supply	Relay output	The strip lights up so the operator can check it
QR code	QR reader → PLC	RS-232	The code of the sticker, read at the end of the process
QR OK	PLC → indicator LED	Relay or digital output	Lights when the reference is correct
Power	12 V / 2 A supply → PLC and LED strip	12 Vdc	A supply the company already had, no new one bought

An Arduino based PLC with relays, in 45 mm of DIN rail.



USED IN THE CASE

ARDBOX Relay ARDUINO based PLC

A compact Arduino based PLC with 8 relays and serial ports. The case used the ARDBOX PLC 20 I/Os RELAY HF; today it is the Ardbox Relay HF+.

Role in this case	Reads the support button, the LED test button and the QR reader; switches the drill supply, the LED strip and the QR OK lamp
Inputs	10: 6 analog/digital (0-10 V, 10-bit) and 4 digital optoisolated (5 to 24 Vdc), 1 with interrupt
Outputs	10: 8 relays (230 Vac 4 A / 24 Vdc 2 A, resistive) and 2 analog/digital (0-10 V)
Communication	RS-232 and RS-485, I2C, SPI, USB for programming
Controller	Arduino Leonardo, ATmega32U4, 16 MHz
Programming	Arduino IDE with the Industrial Shields boards

The relays are rated for resistive loads. A drill motor draws a high starting current, so a typical way is to switch it through a contactor.

[See the Ardbox Relay >](#)

At the source of the error

The support had a measurement error. Instead of a new support, the drill simply cannot run until the part sits right.

People stay in the loop

The operator sees the LED strip and the QR lamp, and decides before the part is finished. The PLC gives a clear signal.

Independent of the supplier

The LED test works with any strip, so the company can change its LED supplier and still check every part.

SIMILAR LINE?

Tell us where your defects start. An engineer will answer.

Tell us what goes wrong on your line, which machines and readers you have and how many checks you need. We will tell you which PLC fits and how to wire each check.

READ IT ONLINE

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