# Bransystems Coms Topology

Overview

This document shows exactly how to network, configure, commission and operate the DoBot CR5A as a Profinet IO. All safety functions remain on dedicated hardwired circuits—no safety over Ethernet.

Physical Network Connection

1. star topology off a managed industrial Ethernet switch.

1. Dedicate port on the switch exclusively to the DoBot CR5A Profinet link.

1. Use Cat-5e (minimum) with Profinet-rated RJ45 connectors.

IP Addressing Scheme (Example)

| Device | IP Address | Subnet Mask |
|---|---|---|
| DoBot CR5A | 192.168.10.20 | 255.255.255.0 |

Action: Jendamark assigns the DoBot’s IP and confirms no conflicts by liaising with automation team.

TIA Portal: DoBot Device Configuration

1. Add the DoBot GSDM file.

    - It’s done by adding GSDML-V2.42-Dobot-CR-IOD-20231122.xml via Project → Options → Manage GSD files.

1. Instantiate the DoBot IO-Device.

    - In Devices & Networks, drag DoBot CR5A into the switch graphic.
    - Assign IP = 192.168.10.20 and name it DoBot-CR5A.

1. Map I/O modules.

    - Expand DoBot CR5A IO-Device → Modules.
    - Link channels to PLC tags:
        - I0.0 → PartPresentSensor
        - Q2.3 → TowerLightGreen
    - Reference the Dobot Bus Communication Protocol Guide for all register mappings.

1. Set update interval & diagnostics.

    - Under General → Update Interval, enter 10 ms (32 ms minimum).

- Define any alarm thresholds in the Diagnostics tab.

DoBot Studio Pro: Robot-Side Setup

1. Apply the Profinet firmware key.

- In DoBot Studio Pro → Licensing, load the PN license file.

1. Enable Profinet IO-Device mode.

- In Settings → Communication, select Profinet IO Device and configure:
  - Device IP: 192.168.10.20
  - Subnet Mask: 255.255.255.0
  - IO-Controller IP: 192.168.10.10

1. Import EDS definitions.

- Load DobotCR.eds (or the provided UDT) so all custom registers auto-populate.

PLC Ladder Snippet (Example)

ladder

// Read “PartPresent” from DoBot (DI slot 1, ch 0 → MB 100.0)

AMB 100.0

= QB 0.0// Turn on green tower light

// Start DoBot cycle (DO slot 2, ch 0 → MB 200.0)

L 1

TMB 200.0

PLC-Robot Handshake & Status Signaling

1. PLC issues “Start”.

    - PLC sets the Start bit in the Command Word (e.g. MB200.0 = 1).

1. Robot acknowledges and runs.

    - Robot sees Start, immediately sets Busy (MB201.0 = 1) and clears Ready (MB201.1 = 0).
    - Robot executes the selected program.

1. Robot finishes or faults.

    - On success: Robot clears Busy, sets Done and Ready (MB201.0 = 0, MB201.1 = 1, MB201.2 = 1).

- On error: Robot clears Busy, sets Error (MB201.3 = 1) and leaves Ready = 0.

1. PLC monitors Status Word.

- PLC watches Done or Error bits.
- If Done, PLC proceeds (e.g. next cycle, tower light ON).
- If Error, PLC triggers fault handling (alarm, stop).

1. PLC resets for next cycle.

- PLC clears Start and Error bits (e.g. MB200.0 = 0; MB200.1 = 0) so robot returns to idle Ready state.

Sample ladder for handshake:

ladder

// Trigger robot

L 1

TMB 200.0// Set Start

// Wait for Done

AMB201.2// Done = 1

=QB 0.0// Turn on green light

// Reset robot for next cycle

L 0

TMB 200.0// Clear Start

TMB 200.1// Clear Error

Diagnostics & Commissioning

1. In TIA Portal’s Online & Diagnostics, confirm DoBot-CR5A shows State = OK (green).

1. Use Profinet IO view to watch I/O-bytes toggle during jogs or test runs.

1. Enable the IO-Controller watchdog on the S7-1513—any Profinet link loss forces the CR5A into safe-