


# How do you ensure that your cobot cart is perfectly aligned? | Cobots manual - part 2

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## How do you ensure that your cobot cart is perfectly aligned?

### Why is alignment crucial?

A cobot cart that you move regularly needs to be positioned correctly every time. Because even the best cobot can only perform its tasks accurately if it knows where it is in relation to its workpiece or environment. A reliable alignment system prevents errors, increases the commissioning speed and guarantees consistent results.

Sirris examined three methods of aligning a cobot cart: physical, tactile and visual alignment. Each has its strengths and areas of concern. In our demonstrator, we implement all three - so you can compare and assess for yourself which approach best suits your application.

Discover how Sirris and KU Leuven designed a robust, reconfigurable cobot cart for sheet metal applications. Download the COOCK+ ROBUST casebook for a practical, step-by-step guide to build your own cobot.

Download the ROBUST casebook

## 1. Physical alignment: mechanical precision

Physical alignment is done via a fixed docking mechanism. This involves pins and recesses in the floor and the cart so that both fit together perfectly.
Advantages:

- Highest accuracy
- No programming required
- Fast and robust
- Also helps level the cart

Disadvantages:

- Fixed setup required
- Less flexible when moving the docking point
- May be an obstacle for operators (Sirris is examining integration into the floor)

The alignment system aims to enable docking at different locations. When there are multiple stations, it can become expensive to build a separate docking station for each machine. Therefore, physical alignment is more appropriate when the number of docking locations per cobot cart is fairly limited.

## 2. Tactile alignment: smart via sensors

With tactile alignment, the cobot scans its environment using built-in force sensors. The system recognises its position by touching a number of fixed contact points.
Advantages:

- Low cost (no external cameras or markers required)
- Can be deployed flexibly at multiple locations
- Compensates for significant positioning errors
- No adaptation to the environment required

Disadvantages:

- Less accurate than physical alignment (typically ~1-2 mm)
- Programming required

- Slowest method (up to one minute per cycle)
- Requires an unobstructed working surface

Tactile alignment is particularly suitable for dynamic workplaces, where the cobot cart can operate in different locations. This method involves no additional cost when adding a location, other than inputting a number of positions on the cobot. Once programmed for the (specific) location, this method proves surprisingly reliable, as long as the environment remains manageable.

## 3. Visual alignment: flexible and scalable

With visual alignment, the cobot uses a camera to detect visual markers, such as QR codes or stickers, and determine its position.
Advantages:

- Great flexibility (markers can be placed anywhere)
- Faster than tactile method
- No adaptation to infrastructure required

Disadvantages:

- Sensitive to light conditions
- Limited accuracy, especially in rotary axes
- More expensive owing to use of visual systems
- Not always suitable for industrial environments

Visual alignment is an elegant solution for applications where physical docking is impossible or impractical. But the conditions must be right: good lighting, clear sightlines and limited dust exposure.

## Choose or combine?

There is no all-purpose winner. Each system has its ideal application. In the Sirris demonstrator, we combine the three methods to enable companies to test and compare. This allows you to make an informed choice based on your needs: speed, flexibility, cost, accuracy or safety.

## Correct alignment, better performance

Whether you choose a physical docking mechanism, sensor-based recognition or camera-guided readings, correct alignment is essential for repeatable results. By comparing the three methods in practice, you can find out which one best suits your production environment.

### ROBUST | Reconfigurable cOBotic prodUction AsSistanT

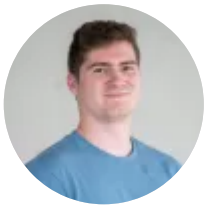
ROBUST helps sheet metal suppliers with high-mix-low-volume production to automate repetitive tasks using mobile, reconfigurable cobots. Because small batches and changing orders often stand in the way of standard automation, the project uses demonstrators to show how cobots can be flexibly deployed for a variety of tasks such as pressing, welding, deburring, and gluing. ROBUST offers companies practical tools and knowledge to work step by step toward more efficient, (semi-)automated production.

Discover the ROBUST project

### Discover the other parts of the Cobot cart manual


Part 1: building a cobot cart: sturdy, smart and ready for the workplace
Part 3: how does a cobot cart communicate with its environment?
Part 4: smart cobots thanks to 3D computer vision
Part 5: from workbench to mobile cobot assistant: make your production flexible
Part 6: making a mobile cobot plug and play using real-time pose tracking
Part 7: safety when using movable cobot cells: how ROBUST helps companies comply with the regulations
Part 8: smarter programming with cobots: how ROBUST is focusing on programming ease for flexible automation


## Authors




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