



# Inrotech-MicroTwin

Robotic Welding Systems

# WHAT IS THE CHALLENGE IN SHIPBUILDING?

1. Skilled Labor Shortages
2. Quality & Consistency Issues
3. Harsh Working Conditions
4. Productivity & Capacity Pressure
5. Adoption of Automation & Digitalization
6. Welding in Difficult Positions




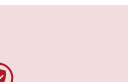
-  TIME/COST INTENSIVE
-  HIGHER RISK OF ERRORS
-  LACK OF REPEATABLE WELDING QUALITY
-  HEALTH AND SAFETY RISKS



# THIS IS OUR SOLUTION FOR YOU.

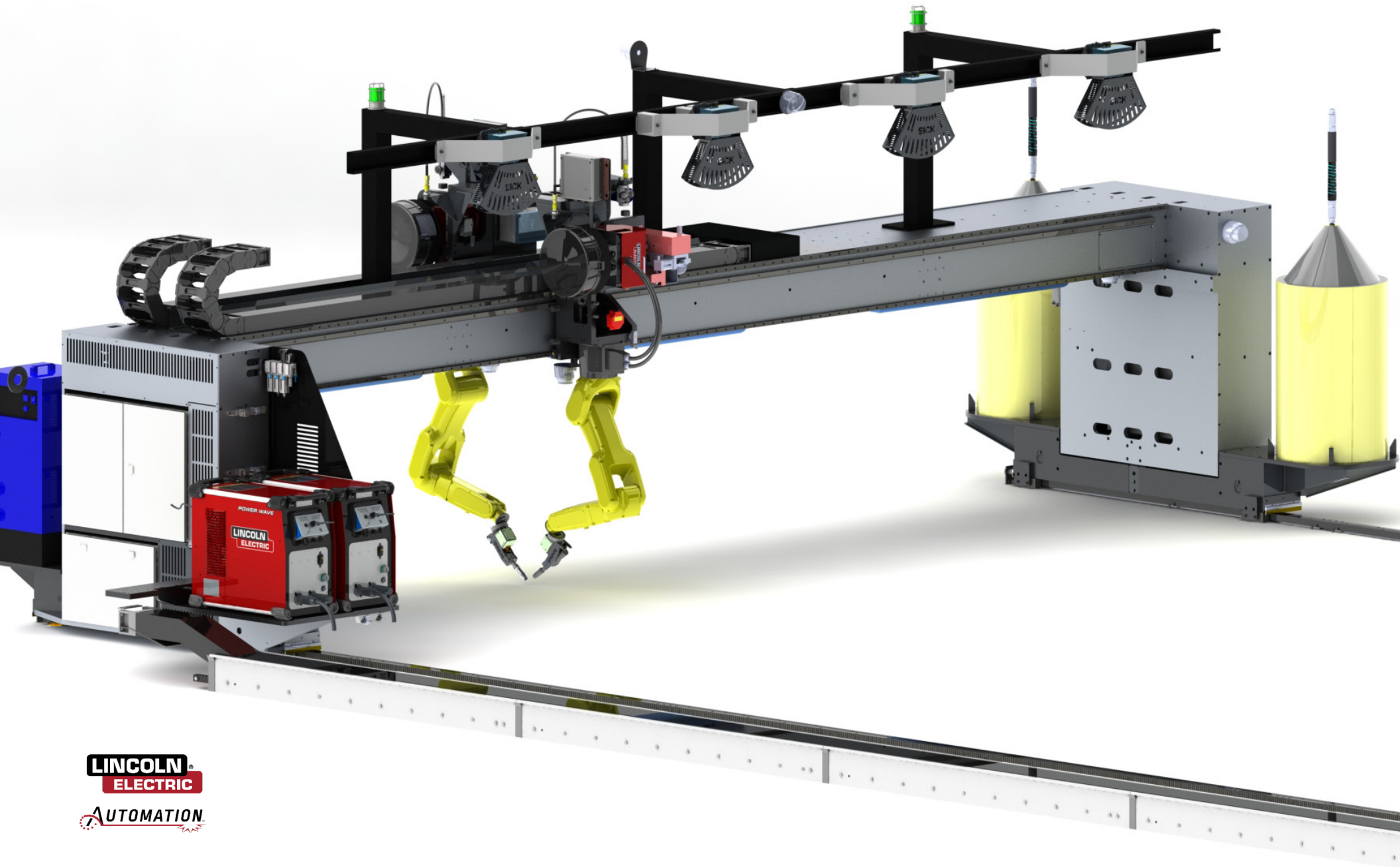
The Inrotech-MicroTwin® is specially developed for welding of micro/mini panels, sub-assemblies, T-beams and small-parts in a highly automated manner. No programming or transfer of CAD drawings is required, neither is any choice of macros or intermediate programming of any kind based on scans or photos.

Therefore, the robot does the programming for you. The Inrotech-MicroTwin® is delivered as a plug-and-play unit and is fully operational once the rails and safety fencing have been installed and the system has been connected to power, shielding gas and compressed air.

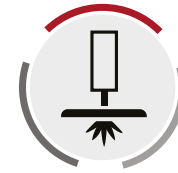
-  SAVE VALUABLE TIME
-  MAKE IT A ONE-PERSON-JOB
-  REDUCE ERRORS
-  IMPROVE SAFETY FOR OPERATORS



# VALUE PROPOSITION



# 6 VALUES.



## Optimized Welding Quality that provides consistency

The integrated laser sensor and multi-tool head help with precise weld placement without manual alignment. Combined with features like automatic wire cutting, anti-spatter spray, and gas nozzle reaming, the system delivers consistent, high-quality welds with minimal rework.



## No Programming Required

The Inrotech-MicroTwin<sup>®</sup> system features Inrotech's proprietary SensLogic™ Technology, enabling it to autonomously detect and weld micro panels, T-beams, and sub-assemblies without the need for CAD files, macros, or backend programming. Operators simply press "Start"—the system handles the rest.



## Compact Twin-Wire Welding for High-Volume Production

With dual Fanuc LR-Mate robots and twin-wire welding capability, this system delivers exceptional throughput for small to medium-sized panels. It is optimized for fast welding speeds—up to 110 cm/min in PB position—making it ideal for repetitive high-volume tasks.



## Plug-and-Play Installation with Minimal Footprint

Designed as a modular plug-and-play system, the Inrotech-MicroTwin<sup>®</sup> system can be deployed quickly with minimal infrastructure. Once the rails and safety fencing are installed and utilities connected, the system is fully operational—no complex integration required.



## Advanced Safety Zoning with Intelligent Scanner Integration

It features dual SICK safety scanners and a three-zone safety layout to help with operator protection and seamless production. The security zone prevents derailment and finger traps, while configurable orange and blue front zones adapt to varying panel heights.



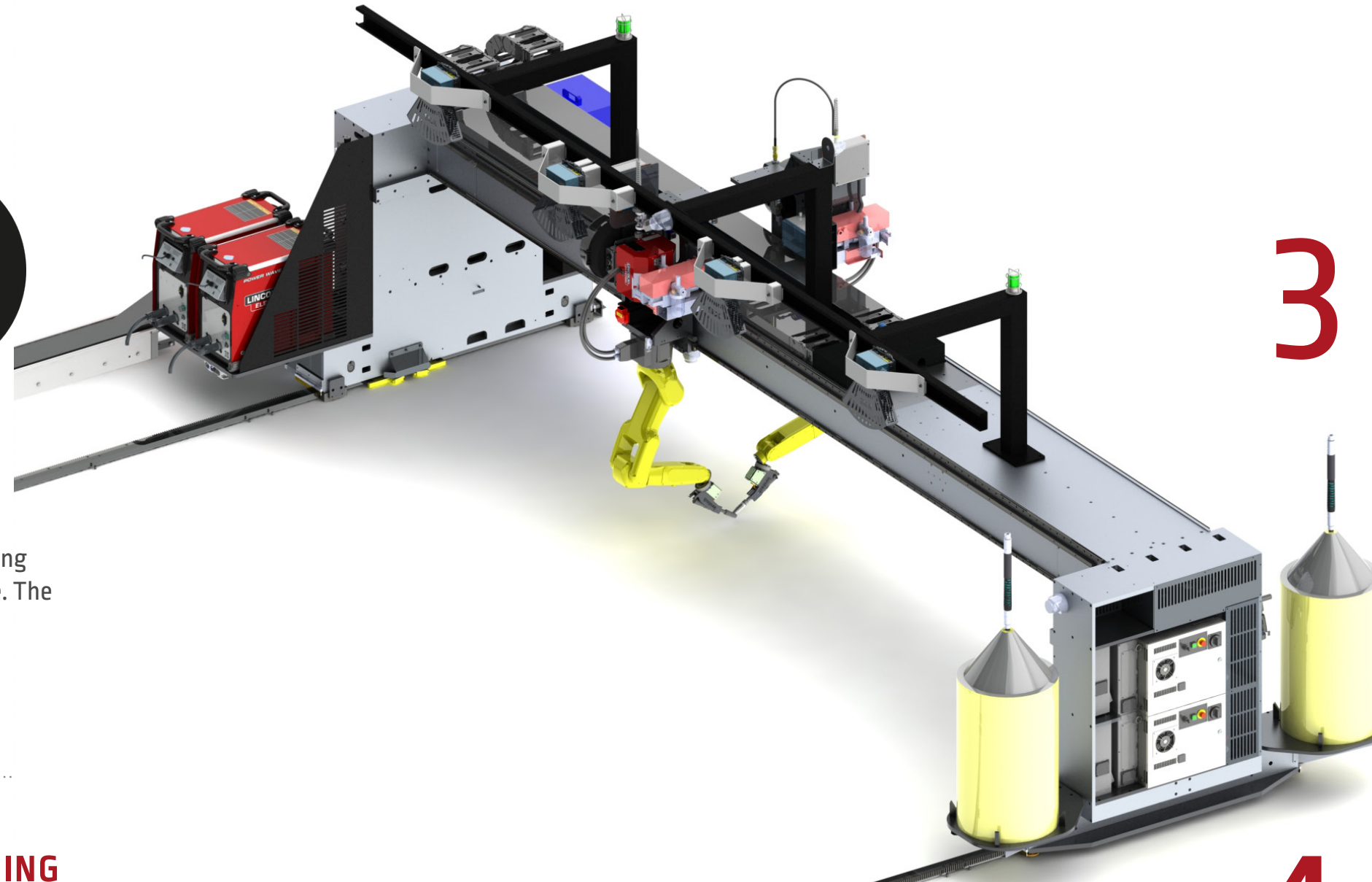
## Shipbuilding Industry Expertise

Inrotech, a Lincoln Electric company, is driving innovation in shipyard automation. Based on years of experience, Inrotech's design team strives to provide great technology and sophisticated software to facilitate first-class quality robotic welding.

# PROCESS OVERVIEW.

## ADVANCED WELDING TECHNOLOGY

The Inrotech-MicroTwin® system features Inrotech's proprietary SensLogic® Technology, enabling it to autonomously detect and weld micro panels, T-beams, and sub-assemblies without the need for CAD files, macros, or backend programming. Operators simply press "Start"—the system handles the rest accordingly.



## 1 STARTING

As a first step, the operator ensures by visual check that the welding area is free and available. No persons must be in the welding zone. The operation is initiated simply by pressing the „Start“ button on the touch panel.

## 2 SCANNING

The Inrotech-MicroTwin® now moves over the panels placed in the working area while making a scan of the panels. From the scan, a 3-dimensional topography of the panels is created. This image determines the structure of the jobs to be welded and gives the basis for definition of welding sequence, start-stop, etc.

## 3 WELDPLANNING

Once the scanning is completed, the operator has simple choices for customization like weldtype and size, before the welding starts. By means of sensor technology and the built in SensLogic®, the system can carry out welding of micro panels with longitudinal and transitional stiffeners, including vertical joints, without any programming.

## 4 WELDING

While performing the weld, the Senslogic® system monitors and logs the actual welding parameters, such as welding speed, volts and amps, which serves as verification and documentation of the whole weld.

# THE OPERATING SOFTWARE.



The general welding process is designed to require as little input from the operator as possible.

SensLogic® works with a combination of sensing (by means of the laser sensor integrated in the housing with the welding gun) and logic.

The combination of the scanning and SensLogic® is what makes the Inrotech-MicroTwin® unique amongst other micro-panel welding solutions in the market as it together deliver a level of adaptability, intelligence, and efficiency unmatched by traditional or semi-automated panel welding systems.

## The user interface or Human Machine Interface (HMI)

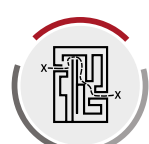
The HMI enables the operator to access all the functionalities available in the Inrotech-MicroTwin®. The HMI itself is very simple and intuitive to use with commands being either icon based or in clear language. HMI commands are in English and local language



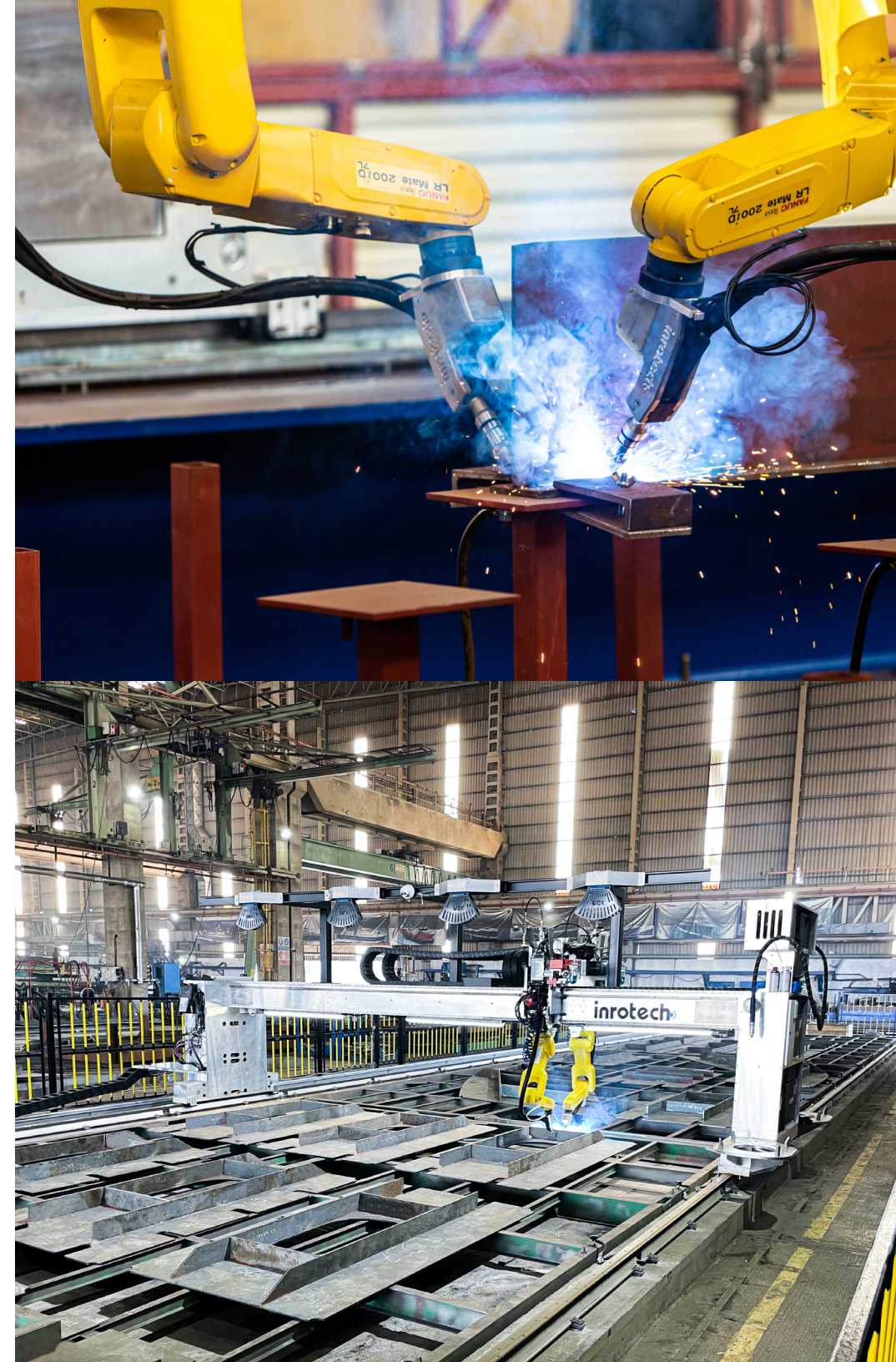
Intelligent planning



Reduce time in large welds



Detect and correct for deformations caused by heat during the weld



# AUTOMATE WITH THE SENSLOGIC TECHNOLOGY.



## DUAL-ARM ROBOT

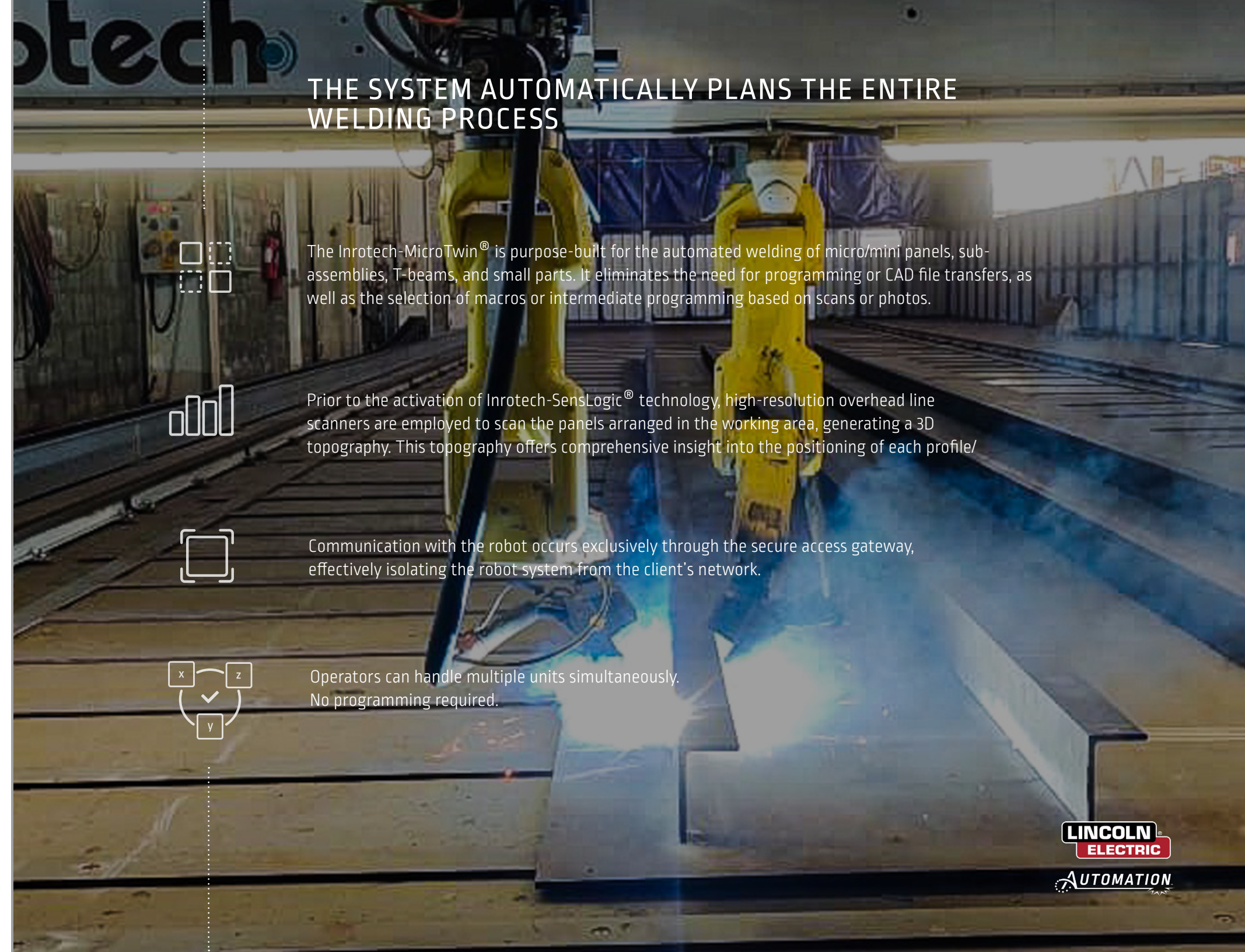
The two robotic arms can work simultaneously, handling different welding tasks in parallel, reducing overall welding time.

## HIGHER ARC TIME

Autonomous weld planning increases arc time compared to semi-automatic welding, resulting in greater efficiency and productivity.

## RAIL SYSTEM

The rail system consists of a heavy-duty tooth racks, which serves both as support for the wheels of the gantry as well as being part of the drive system. The rails can either be installed directly on top of a conveyor or bolted onto the or via supports/levelling bars.



## THE SYSTEM AUTOMATICALLY PLANS THE ENTIRE WELDING PROCESS

The Inrotech-MicroTwin<sup>®</sup> is purpose-built for the automated welding of micro/mini panels, sub-assemblies, T-beams, and small parts. It eliminates the need for programming or CAD file transfers, as well as the selection of macros or intermediate programming based on scans or photos.

Prior to the activation of Inrotech-SensLogic<sup>®</sup> technology, high-resolution overhead line scanners are employed to scan the panels arranged in the working area, generating a 3D topography. This topography offers comprehensive insight into the positioning of each profile/

Communication with the robot occurs exclusively through the secure access gateway, effectively isolating the robot system from the client's network.

Operators can handle multiple units simultaneously. No programming required.

# SPECIFICATIONS

| ROBOTICS                    |                                    |
|-----------------------------|------------------------------------|
| Robot                       | Fanuc® LR mate 200iD 7L (Dual arm) |
| Controller                  | R-30iB Plus controller             |
| External axis               | Servo motor                        |
| WELDING                     |                                    |
| Power source                | Power Wave R450®                   |
| Wire feeder                 |                                    |
| Welding torch (aircooled)   | Binzel® A500 Custom*               |
| Welding torch (watercooled) | Binzel® AUT 501D Custom*           |
| Fume extraction             | Yes*                               |
| Welding wire feed           | Roll or drum*                      |
| WELDING PROCESS             |                                    |
| Welding positions           | PB, PF                             |
| Welding wire                | Flux-cored**                       |
| Shielding gas               | Mixed gas or CO2**                 |
| TORCH CLEANING              |                                    |
| Reamer station              | Yes                                |
| Wirecutter                  | Yes                                |
| SENSORS                     |                                    |
| Distance sensor             | Leuze®**                           |
| 2D Line sensor              | Sick®                              |

| SAFETY                        |   |
|-------------------------------|---|
| Emergency stop                | Triggered by pressing the emergency stop button                         |
| Light fence or doorswitches   | Yes*  |
| Fanuc DSC                     | Limits speeds and position of the robot                                 |
| MAIN DIMENSIONS               |   |
| Gantry                        | W x H x D = [5,730-7,530] x 2,440x1,570 mm/<br>[226-297] x 96 x 62 in** |
| Weight                        | 2,800-3,500 kg / 6,172-7,716 lbs  |
| Gantry width options          | 4-6 m / 13-20 ft in between legs  |
| Rail length                   | 20-60 m / 66-197 ft   |
| Number of zones               | 1-4*  |
| SUPPLIES                      |   |
| Power                         | 3 Phase 400 V + N + PE, 63 A, 50 Hz**                                   |
| Gas                           | The gas specified in weld process; 30 l/min                             |
| Compressed air                | 6-8 bar ISO 8573-1:2010[7:4.4]; 1700 l/min                              |
| Internet connection           | LAN, WIFI or SIM-card   |
| ENVIRONMENT                   |   |
| Ambient temperature range     | +5°C to 40°C  |
| Humidity                      | 90% RH or less. No dew, nor frost allowed                               |
| Environment                   | For indoor use only   |
| COMMUNICATION                 |   |
| Secure access gateway         | Secomea® SiteManager  |
| Human Machine Interface (HMI) | Color display with touch screen   |
| Support camera                | IP camera   |
| Industry 4.0                  | Inrotech-Cloud  |

\*Options  
\*\*Can be customized



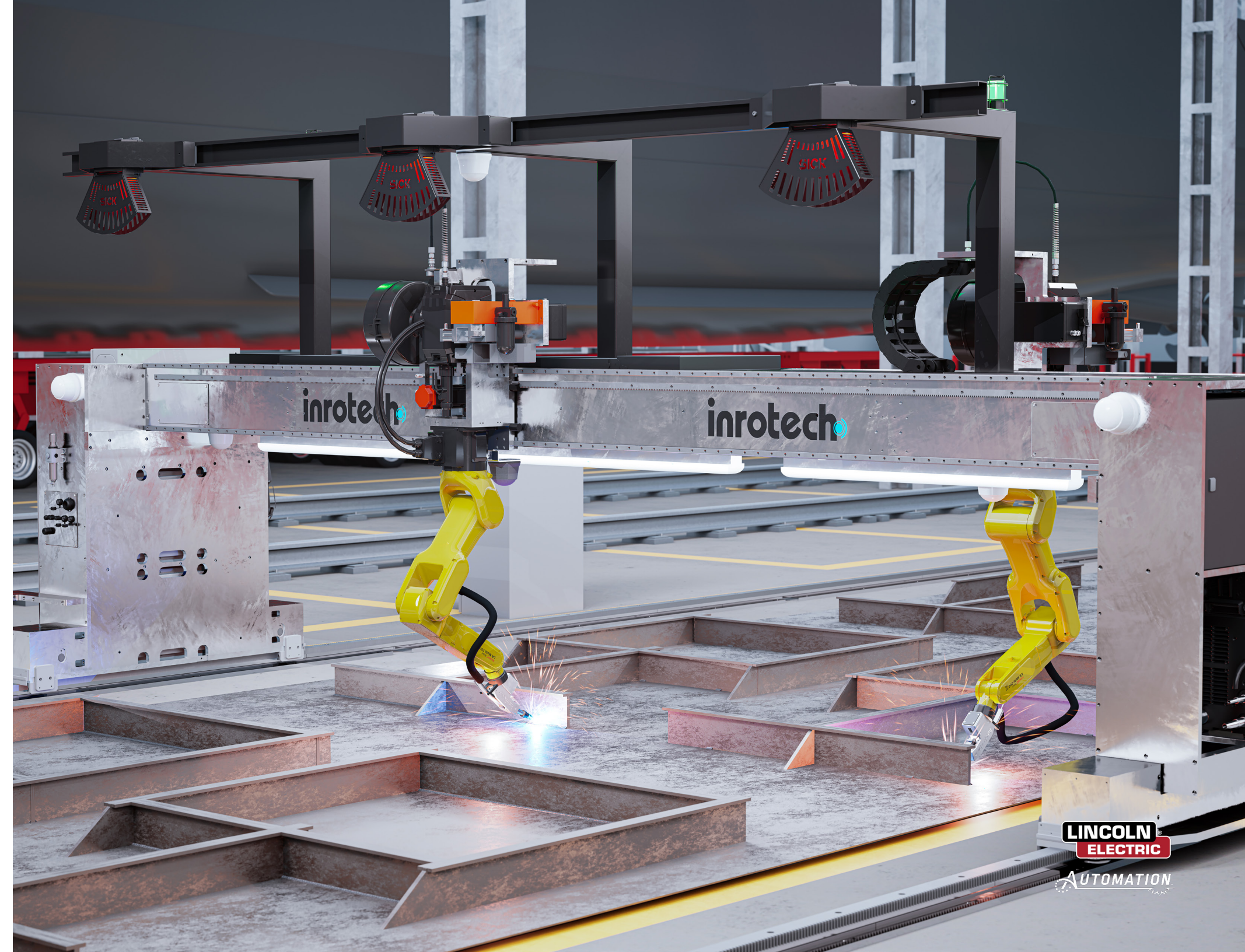
# WELDING SCOPE

The combination of the Scanning and SensLogic is what makes the Inrotech-MicroTwin<sup>®</sup> unique amongst other Micro Panel welding solutions in the market.

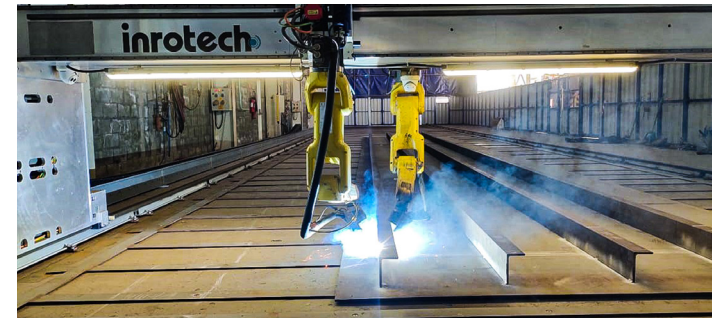
The typical operator for an Inrotech-MicroTwin<sup>®</sup> is the welder from the production. To start the process, simply push the green Start button. The Inrotech-MicroTwin<sup>®</sup> now runs the entire process in an automatic mode until it has completed welding of all panels in the working area.

- Initially developed for shipbuilding but deployable across many other industries, e.g. bridge building and offshore.
- Specifically designed for welding of micro panels, sub-assemblies and T-profiles.
- Scans the objects at a speed of 36 sqm per minute without the need for 3D drawing inputs.
- Random placement of items to be welded within the workspace and the robot can adapt automatically.

Inrotech-MicroTwin<sup>™</sup> can be applied within these industries:



## INNOVATION IN SHIPBUILDING: Albwardy Damen's Deployment of welding Robots



With a strong reputation for quality and reliability, Albwardy Damen operates multiple shipyards across the UAE, delivering top-tier services in shipbuilding and repair. The company's commitment to innovation has driven them to adopt advanced technologies, ensuring they remain at the forefront of the industry.

Albwardy Damen's portfolio includes a diverse range of commercial, civilian and naval vessels. The integration of welding robots has been a strategic move to enhance their production capabilities and maintain their competitive edge.

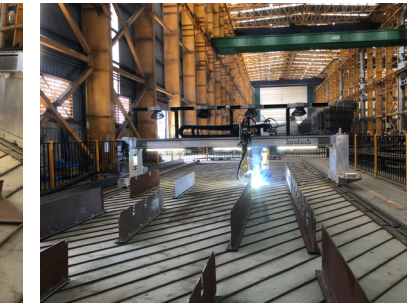
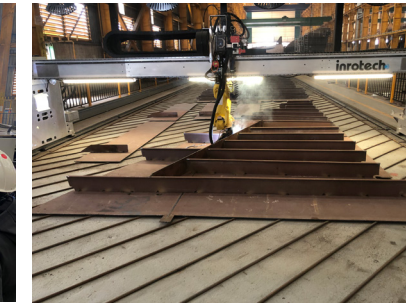
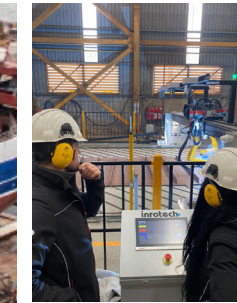
In 2023, Albwardy Damen deployed the Inrotech-MicroTwin® in the construction of various vessels, including tugboats, workboats, and offshore support vessels for clients. The deployment of the Inrotech-MicroTwin™ has brought significant improvements to their shipbuilding processes.

*"The introduction of this gantry system has benefitted our production flow, significantly improving the precision and consistency of our welding processes. We have become more efficient and have achieved higher quality standards in production for parts now done with the welding robot. Additionally, the Senslogic technology, which is integrated in the gantry, has reduced our reliance on manual welding, allowing us to reallocate skilled labor to other critical tasks,"* says Marius Ghinea, New Building Director, Albwardy Damen.

The operators at Albwardy Damen initiate the welding process by positioning the components randomly within the workspace of the welding robot and using the intuitive control panel to start the operation. The robot scans the components, a process that takes only a few minutes.

After the scan, the robot's integrated laser sensor verifies the exact position of each part. The welding process then proceeds autonomously, delivering precise and consistent welds without further input from the operator. This automation has not only increased efficiency but also enhanced the safety and reliability of the shipbuilding process.

## TURKISH SHIPYARD invests in high quality welding automation as a response to the increasing demand of high-tech-eco-friendly vessels

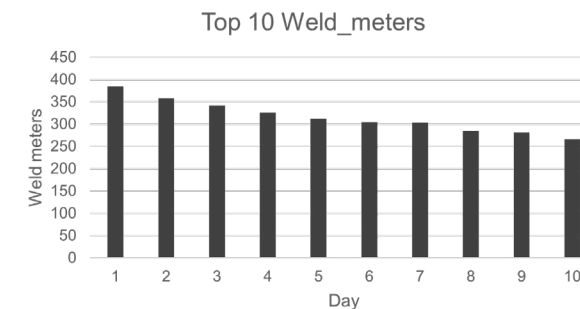


Located in Altinova, the heart of the Turkish Shipbuilding Industry, Cemre has become one of the top employers in the region where the company expanded into 160,000 m2 areas composed of two shipyard areas and 30.000m2 additional workshop areas which provide capacity for 21,000 tons steel processing annually.

Cemre Shipyard's hull manager Huseyin Basaran said: *"In response to the increasing demand in green-committed & futuristic vessels, we have been making modifications and significant enhancements in our yard during the last years in order to provide added value for our customers."*

*"In this regard, we are very pleased to be sourcing intelligent technology and equipment from Inrotech capable of supporting and enhancing our welding processes."*

The order from Cemre Shipyard consists of an Inrotech-MicroTwin® to weld micro panels, sub-assemblies and T-profiles. This welding solution will be installed at Cemre Shipyard in the beginning of 2023. The order also includes needed services like supervision installation, training, comprehensive spare parts packages, warranty with maintenance agreements, and production support.



- Average 314 meter of robot welding/ ~11 hours of robot activity per day
- Robot active 100 % of workdays/~200 m welding per day
- Few interventions by careful planning
- Creative use across weld applications (Webs, Bulkheads, Panels, T-beams, ..)
- High quality welds/low repair ratio
- Radical improvement in HSEQ

# AUTOMATION **SERVICE & SUPPORT.**

With every machine bought from Lincoln Electric Automation, you get the peace of mind that our expert engineers are available to support your operations

# JOIN THE INNOVATIVE WORLD OF **INROTECH MACHINES!**

Solutions that fit into your existing manufacturing.



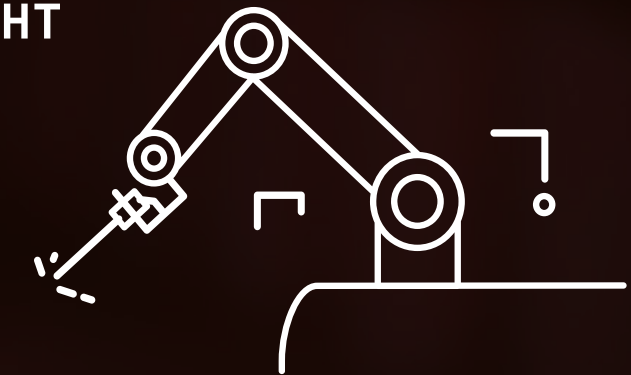
## WE PROVIDE FULL SUPPORT **WORLDWIDE**

- ✓ Fully trained field service engineers
- ✓ Fast spare parts fulfillment
- ✓ Online courses and trainings

## WE COLLABORATE WITH OUR CUSTOMERS TO DEFINE **THE RIGHT SYSTEM FOR THEIR NEEDS.**

We pay attention to:

- ✓ Given surroundings and onsite conditions
- ✓ Your future expansion plans
- ✓ Process implementation



# TAKE EFFICIENCY TO THE NEXT LEVEL.



Publication LEA-072224DP1-04

© Lincoln Global Inc. All Rights Reserved  
<https://www.lincolnelectric.com/automation>

All trademarks and registered trademarks are the property of their respective owners.

**LINCOLN  
ELECTRIC**

AUTOMATION

**Inrotech A/S**

A Lincoln Electric Company  
Tietgens Boulevard 26,  
5220, Odense SØ  
Phone: +45 6616 4100  
E-mail: [info@inrotech.com](mailto:info@inrotech.com)  
[www.inrotech.com](http://www.inrotech.com)

**The Lincoln Electric Company**  
22801 Saint Claire Avenue  
Cleveland CH 44117-1199 USA

