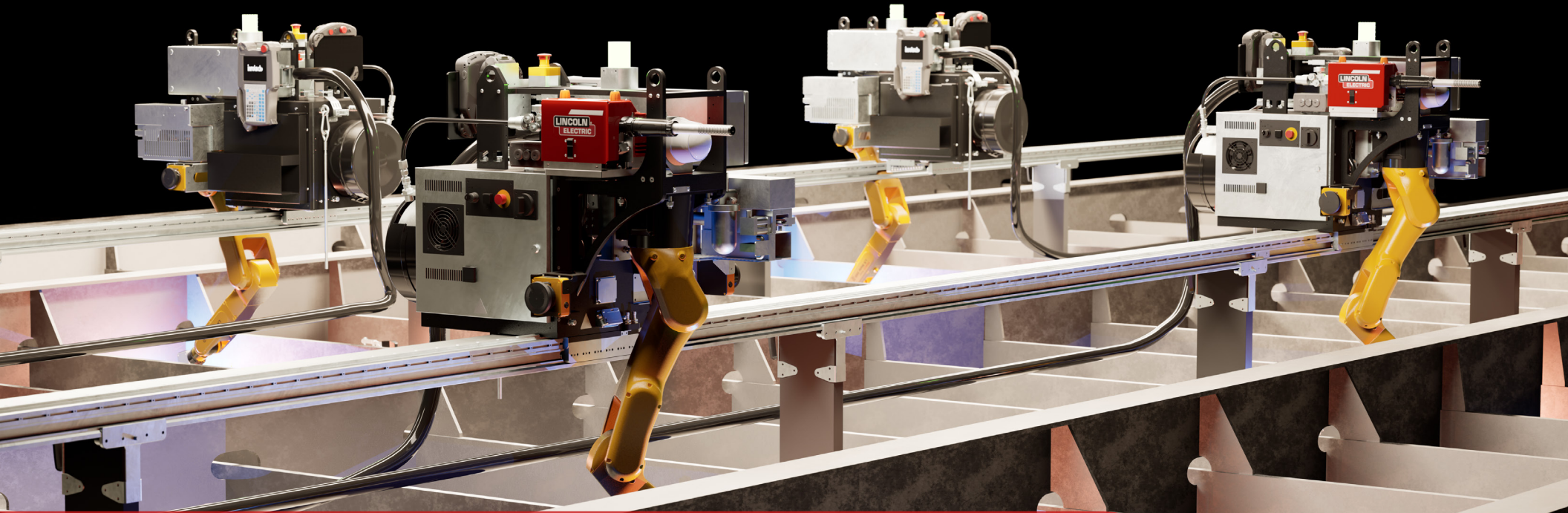


**LINCOLN**<sup>®</sup>  
**ELECTRIC**

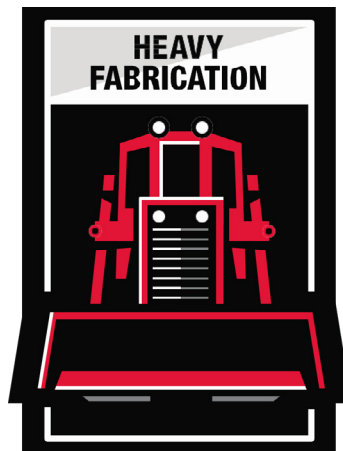
**AUTOMATION**



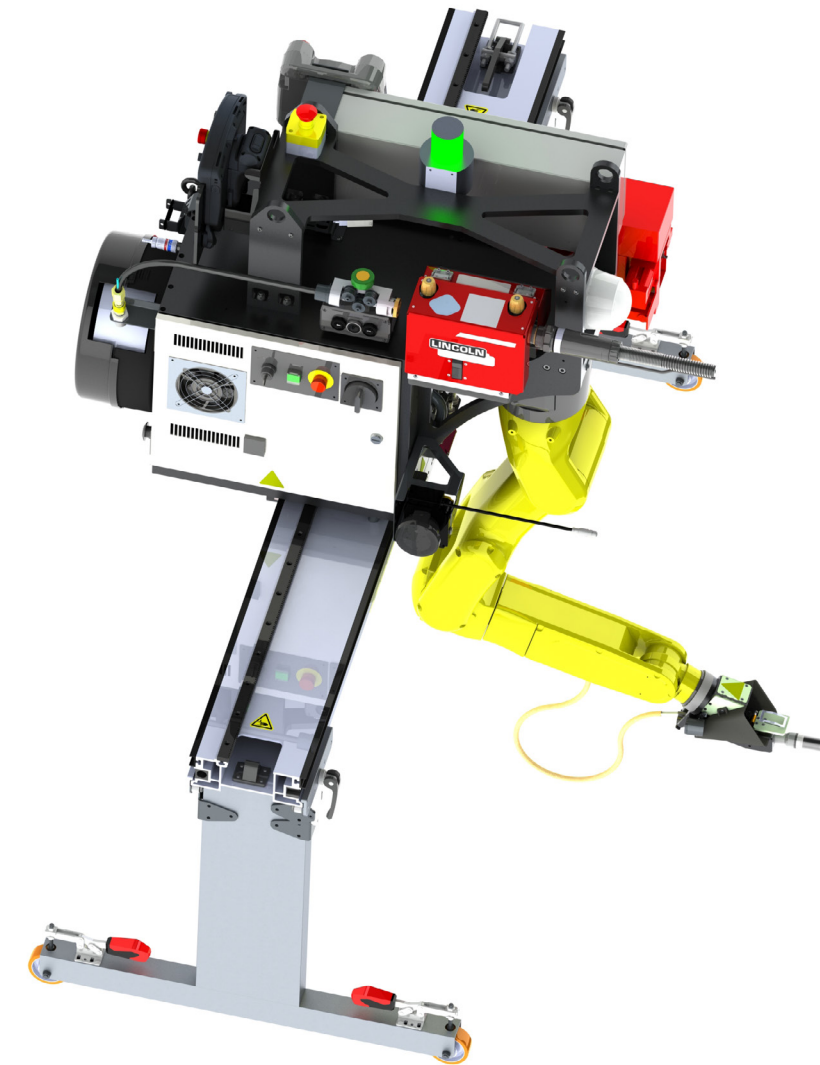
# Inrotech-Classical

Robotic Welding Systems

# Inrotech-Classic® systems fits in various industries.



Hatch Cover | Open Deck Assembly | Open Block Assembly | Closed Block Assembly |  
Offshore Pancake | Bulkheads | Webs | Crane Structures | Bridge Structures



## THIS IS OUR SOLUTION FOR YOU.

The Inrotech-Classic® system has been in operation at shipyards worldwide since 2008. Specifically designed for welding webs and bulkheads in the shipbuilding industry, it is also highly versatile and suitable for various other applications. As a fully mobile unit, the robot can be easily relocated within the production environment, providing exceptional flexibility.

This mobile welding robot system is both highly adaptable and user-friendly. It eliminates the need for CAD drawing transfers, programming, teach-in routines, macro selection, or any complex functions requiring skilled operators.



HELPS SAVE VALUABLE TIME



MAKES IT A ONE-PERSON-JOB

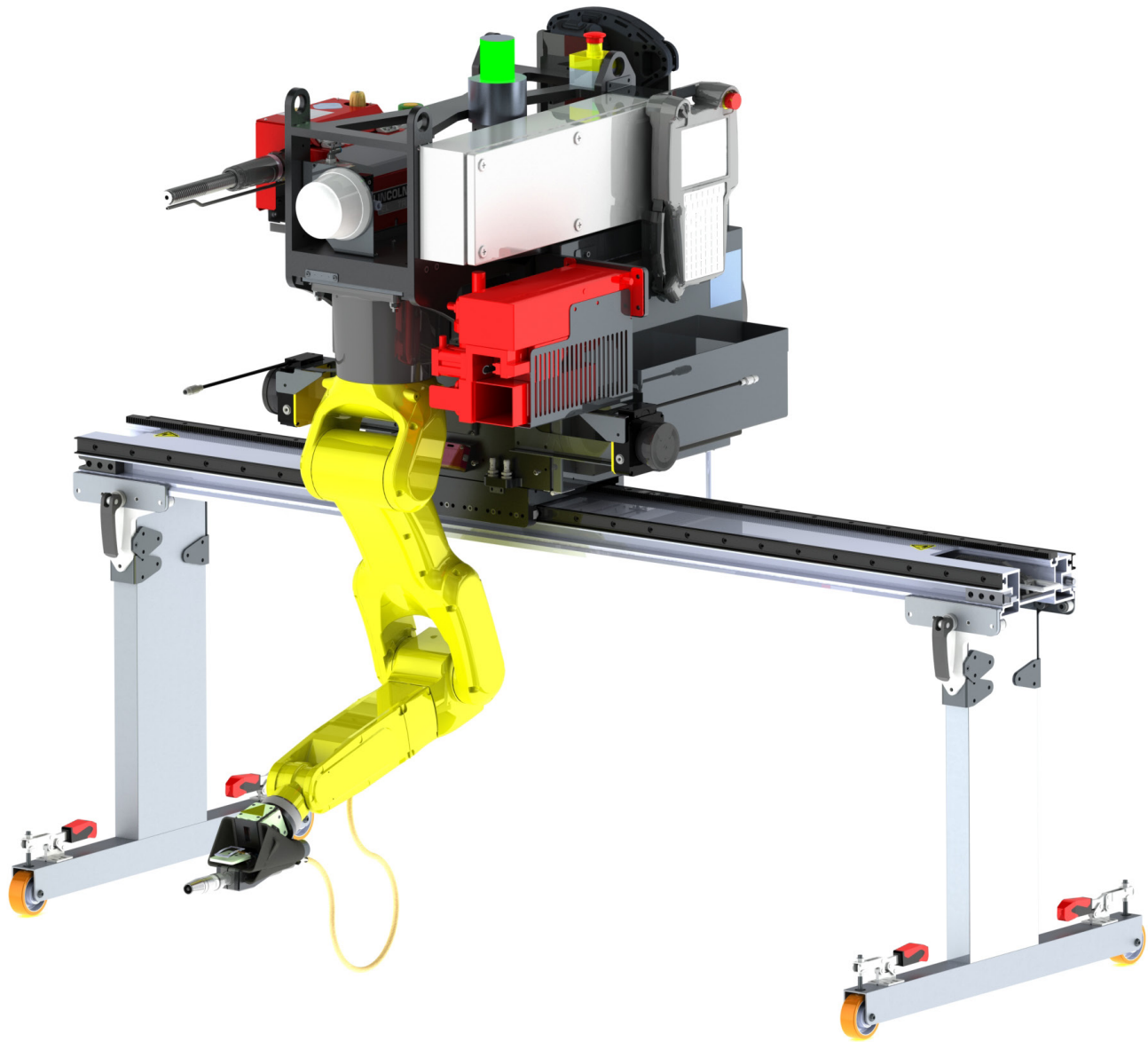


HELPS REDUCE ERRORS



IMPROVES SAFETY FOR OPERATORS

# SYSTEM BENEFITS.



## Production and Labor Efficiency

One operator can manage 4–6 Inrotech-Classic® systems simultaneously within the same area due to the intuitive HMI and autonomous operation. This helps improve labor efficiency.



## No Programming Required

Thanks to proprietary Inrotech-SensLogic® technology, the system autonomously identifies welding tasks without the need for CAD drawings, macros, or manual programming. This reduces the need for backend engineering support, setup time, and complexity.



## Plug-and-Play Mobility

The Inrotech-Classic® system is a fully mobile and modular robotic welding system that does not require fixed installation. It can be easily integrated into existing production lines and relocated across different welding zones, making it ideal for dynamic shipyard environments. Simply connect power, the shielding gas, and compressed air to quickly set up the system in a



## Scalable and Flexible Welding Capabilities

Designed specifically for shipbuilding, the system supports a wide range of welding tasks including fillet welds in PB and PF positions, collar plates, brackets, and more. Optional software upgrades enable multipass welding and accommodate thickness variations, making it adaptable to evolving production needs.



## Industrial-Grade Safety and Usability

Equipped with multiple emergency stops, safety scanners, and a user-friendly tablet HMI, the Inrotech-Classic® system prioritizes operator safety and ease of use. Manual and automatic modes allow safe operation even



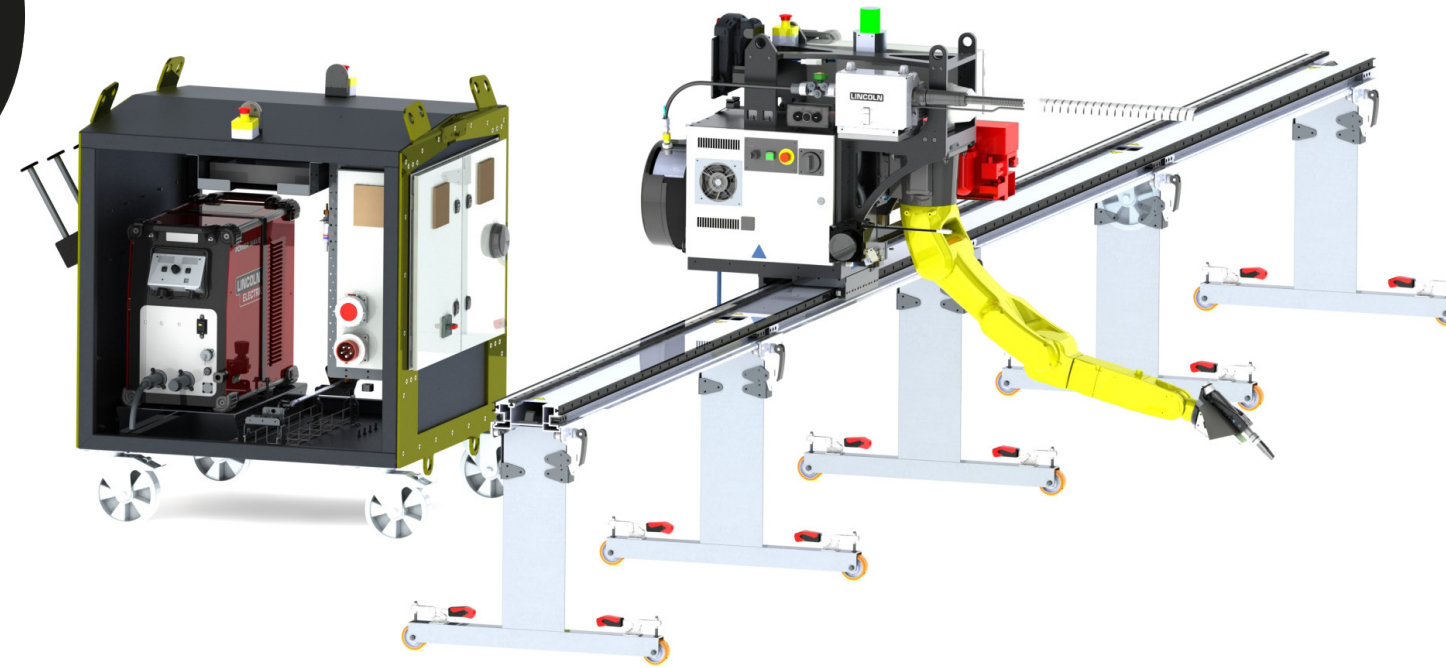
## Shipbuilding Industry Expertise

Inrotech, a Lincoln Electric company, has become an industry-leading innovator of shipyard automation. Inrotech's design team strives to provide great technology and sophisticated software to facilitate first-class quality robotic welding.

# PROCESS OVERVIEW.

## ADVANCED WELDING TECHNOLOGY

Designed specifically for shipbuilding, the system supports a wide range of welding tasks including fillet welds in PB and PF positions, collar plates, brackets, and more. Optional software upgrades enable multipass welding and accommodate thickness variations, making it adaptable to evolving production needs.



## 1 STARTING

The operator is only required to give two simple instructions to the robot in order to start up the welding process: Which direction (right or left) and how many jobs. Once the system has been given this information, it starts a short sensing sequence, where the object is identified by means of a laser sensor.

## 2 SENSING

At the core of the system is proprietary and field-proven Inrotech-SensLogic® technology. This innovative system operates through a unique combination of advanced sensing and intelligent logic, utilizing a laser sensor integrated within the welding gun's housing.

## 3 MEASURING PRECISE POSITIONS

By logically analyzing key parameters and comparing them, the system determines the appropriate design specifications and welding requirements.

The intuitive user interface allows operators to effortlessly adjust leg length and other process parameters in clear, icon-based language—eliminating the need for programming.

## 4 WELDING

While performing the weld, the Inrotech-SensLogic® system continuously monitors the seam using advanced tracking algorithms, ensuring precise end-closing and consistent weld quality. All data is logged and integrated with Lincoln Electric® CheckPoint® technology, providing full traceability and documentation of the welding process.

# THE OPERATING SOFTWARE.

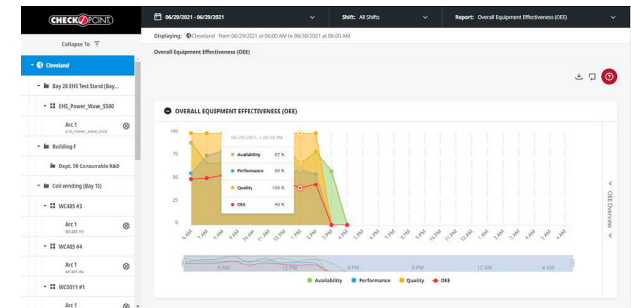


**CheckPoint** technology is a full production monitoring solution, including powerful data collection and reporting tools, to help you maximize welding productivity and performance.

The system features a Lincoln Electric Power Wave® R450 power source, it is setup to send data to the Lincoln CheckPoint via the Secomea® secure access gateway (see section 12). The client can access this data by contacting Lincoln Electric Automation.

## The Human Machine Interface (HMI)

The HMI enables the operator to access all the functionalities available in the Inrotech-Classic®. 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

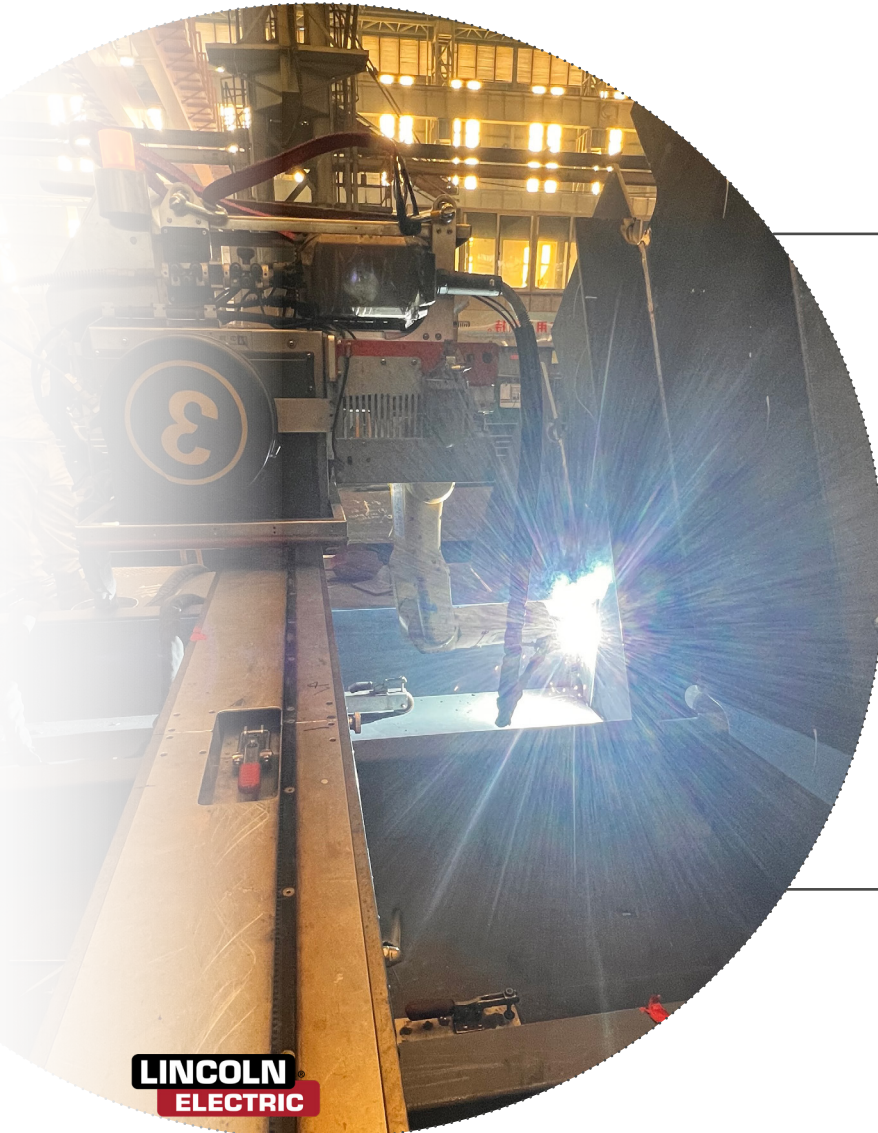


Lincoln Electric CheckPoint technology can display following data:

- Arc time
- Deposit
- Equipment efficiency



# AUTOMATE WITH THE INROTECH-CLASSIC SYSTEM.



## REPOSITIONING

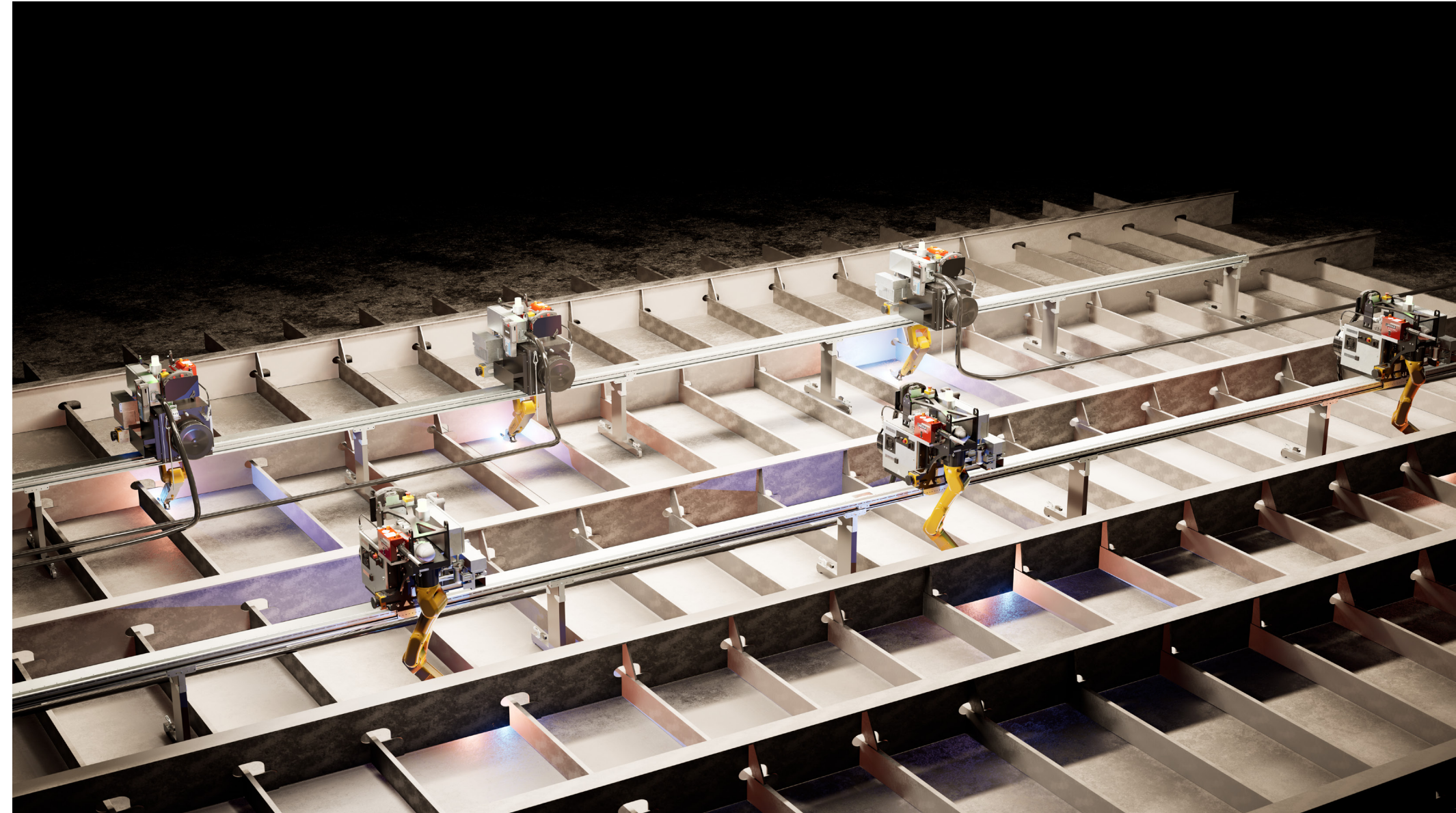
The Inrotech-Classic® system repositions itself numerically from web frame to web frame. One operator will achieve ~300 % arc time by operating 3-6 robots simultaneously.

## HIGHER ARC TIME

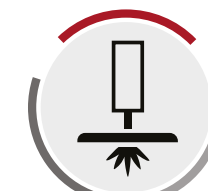
The Inrotech-Classic® applications offers the maximum arc density per assembly unit/m<sup>2</sup>.

## PLATE STRUCTURES

In typical ship, bridge and offshore plate structures, >90 % of welding amount is located <1.5 m above panel.



The only fully automatic self-adapting welding solution on the market



Smart laser sensing which identifies all design features



A flexible system which adapts to the objects and job at hand



# SPECIFICATIONS

ROBOTICS	
Robot	FANUC LR Mate® 200iD 7L Robot (Dual Arm)
Controller	FANUC R-30iB® Plus Controller
External Axis	FANUC® Servo Motor
WELDING	
Power Source	Power Wave R450® Power Source
Wire Feeder	Lincoln Electric 4R100® Wire Feeder
Welding Torch (Air-Cooled)	ABICOR BINZEL® A500 Welding Torch Custom*
Fume Extraction	ABICOR BINZEL® FES-200*
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	Thielmann® BRG-2000 D Station with Wire Cutter
Wirecutter	Yes
SENSORS	
Distance sensor	Leuze®** Sensor

SAFETY	
Emergency Stop	Triggered by pressing the emergency stop button
Safety Edges	The robot has a SICK™ safety scanner on each side of the console.
FANUC Dual Safety Check	Limits speeds and position of the robot
MAIN DIMENSIONS	
Console with Robot	160 kg
Rail (L=2000 mm) with 2 Legs	45 kg
Frame Welding Machine + 20m Cable Pack + 20m Grounding Cable	160+45+12 = 244 kg
Console with Robot + Rail (2m rail + 2 Legs)	160+45 = 205 kg
Total System	244+205 = 449 kg
SUPPLIES	
Power	Voltage: 3 x 208-550 V + PE AC
Gas	The gas specified in weld process; 30 l/min
Compressed Air	Compressed air: 6-8 bar, 1,700 l/min. (ISO 8573-1:2010[7:4:4])
Internet Connection	LAN, WIFI
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)	Android tablet
Support Camera	IP Camera
Industry 4.0	Inrotech-Cloud

\*Options  
\*\*Can be customized

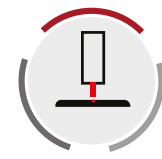


# WELDING SCOPE

Inrotech-SensLogic® software is based on a library of routines for numerous design features captured over 15 years of robot welding in shipbuilding and other plate constructions.



**15+ years of Expertise**  
Library of sensing & welding routines built from shipbuilding and plate construction experience.



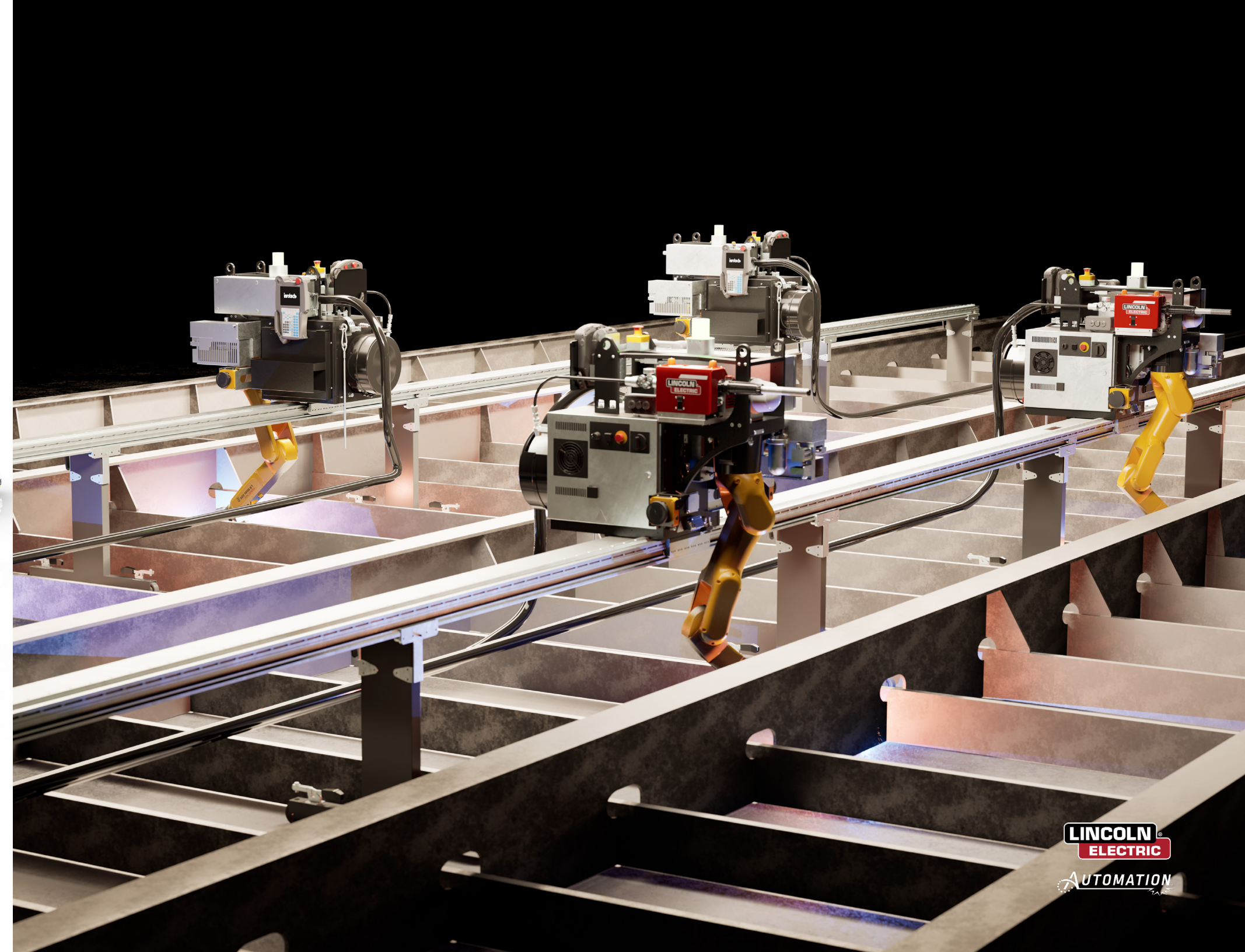
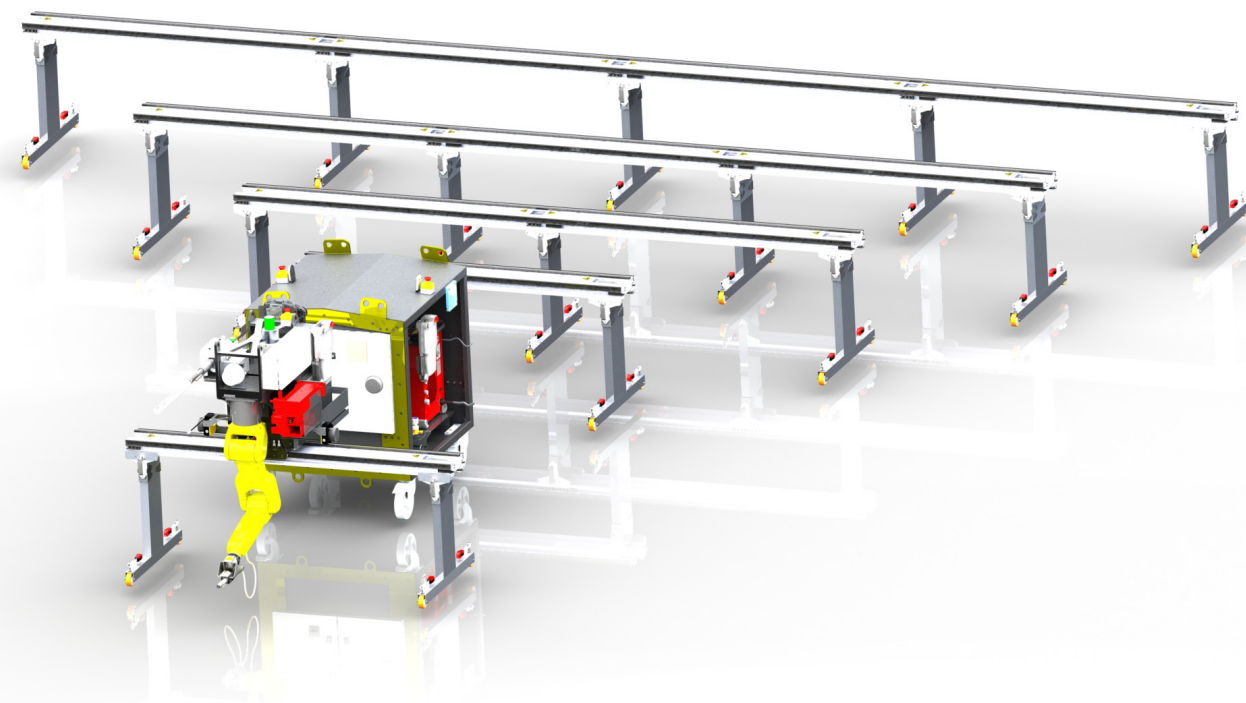
**Smart Laser Sensing**  
1. Identify design feature  
> Select adequate routines from software library.  
2. Measure precise positions  
> Adjust routines to match real-world dimensions.



**Automated Welding Process**  
> Chooses the right motion, sensing routines, and welding data.  
> Adjust in real time based on measurements.



**Customized Welding Parameters**  
WPS data retrieval:  
> Auto-loads customer-specific settings  
> Includes selected wire and gas for each application.



# CUSTOMER SUCCESS STORIES

## JAPANESE ACCELERATION IN SHIPYARD WELDING AUTOMATIZATION



In 2009, Oshima Shipyard did not have any welding robots in their assembly lines, and the shipyards understanding of robotics for productivity enhancement was limited. The idea of incorporating robots into its production, similar to the offline systems used by larger shipyards at the time, seemed unattainable.

However, during a visit to Odense Steel Shipyard in autumn 2009, Oshima Shipyard encountered a unique mobile welding robot in the production line that caught their attention.

*“Unlike the large gantry robots and offline systems they observed, this robot required minimal setup by operators. They simply input a few commands for the robot to follow, directing it on which direction to weld and how many jobs to complete. Remarkably, the operator did not need input data from CAD drawings or engage in any programming. Once set up, the operator could move on to other tasks while the robot autonomously carried out its welding assignments, even allowing for breaks. This demonstration left a profound impression on us.”* says Mr. Masahiro Shiraki, Project Manager, Oshima Shipyard, Japan.



Subsequent visits to Odense Steel Shipyard provided them with insight into the engineer behind this innovative mobile robot: Mr. Flemming Jørgensen, the founder of Inrotech A/S. Through multiple meetings, Mr. Jørgensen shared his ideas for welding robots and proposed unique solutions tailored to their needs. His expertise and ability to turn seemingly impossible challenges into viable solutions were evident, inspiring confidence in the shipyard's capabilities.

*“As we continue to introduce new products into our production line, we anticipate encountering new challenges. However, we are confident in Inrotech’s ability to address these obstacles. Over the past 13 years, Inrotech has proven to be receptive to our feedback, continuously offering innovative solutions. Moving forward, we envision Inrotech remaining our trusted partner in production, ensuring high welding quality. Currently, we have invested in additional robot solutions from Inrotech to further enhance our operations”*, says Mr. Masahiro Shiraki

In 2023 Oshima Shipyard invested for the third time in 5 welding solutions, giving them a total of 18 Inrotech-Classic® welding robots deployed. These have been used in building bulk carriers for many shipping companies in and outside of Japan. To date, they have built bulk carriers from twenty-five countries, including Japan, about 53% from Japan and about 47% from outside Japan.

## IWAKITEC AUTOMATES HATCH COVER WELDING WITH INROTECH-CLASSIC SYSTEM



Iwakitec Shipyard, a forward-thinking Japanese manufacturer specializing in maritime structures, was seeking a smart welding solution to boost productivity and maintain top-tier quality in its hatch cover production. Traditional automation lacked the flexibility for varying weld grooves and on-site conditions. The Inrotech-Classic®, a mobile and autonomous welding robot, was introduced specifically to handle welds on hatch covers—delivering improved consistency, reduced setup time, and enhanced safety on the production floor.

*“We needed a solution that could handle long groove welds on hatch covers without the hassle of teaching paths or pre-programming. The Inrotech-Classic® delivered exactly that.”*  
— Yuichi Yamaguchi, Deputy Group Manager, Iwakitec Shipyard.

The Inrotech-Classic® was deployed directly on Iwakitec’s hatch cover production line. Its “No Teaching – No Programming” technology allowed operators to position the robot and let it work autonomously—without CAD input or manual path definition. Equipped with SensLogic™, the system begins with a smart Laser Sensing, which identifies key design features and selects the appropriate routines from the integrated SensLogic® library. Once features are detected, it measures their exact positions and automatically adjusts the routines to match real-world dimensions with high accuracy.

*“With Inrotech, we’ve redefined how we build hatch covers. It’s not just automation—it’s intelligent welding adapted to shipyard reality.”*  
— Yuichi Yamaguchi, Deputy Group Manager, Iwakitec Shipyard.



# 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.



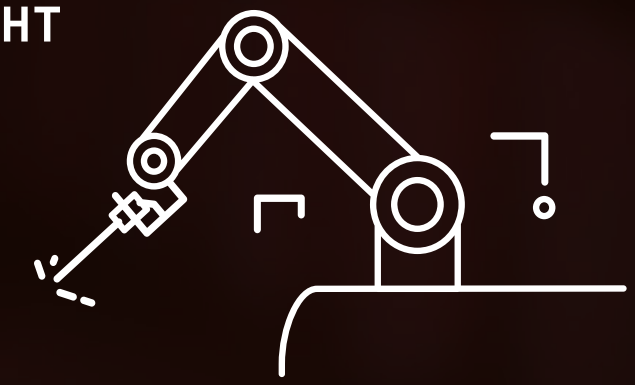
## WE PROVIDE FULL SUPPORT **WORLDWIDE**

- ✓ 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.

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