



# 上銀鐸接手臂系統 HIWIN Weld Robot System

HIWIN TECHNOLOGIES CORP.

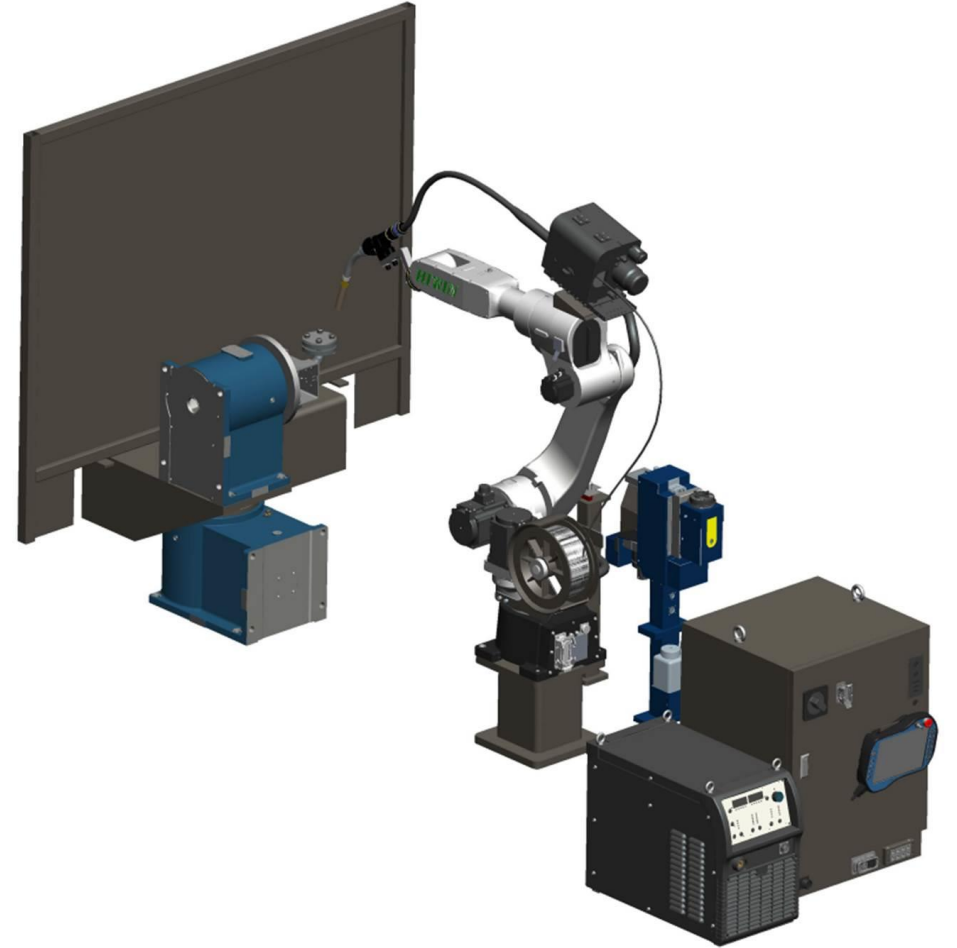
H15 Robotics Team

Cindy Shu Ting Chang



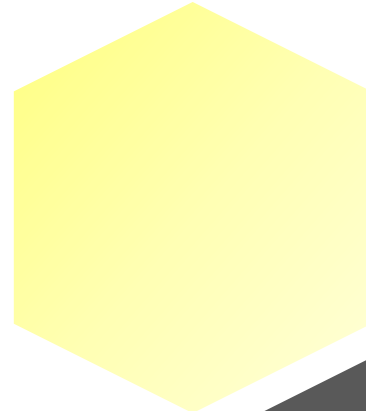
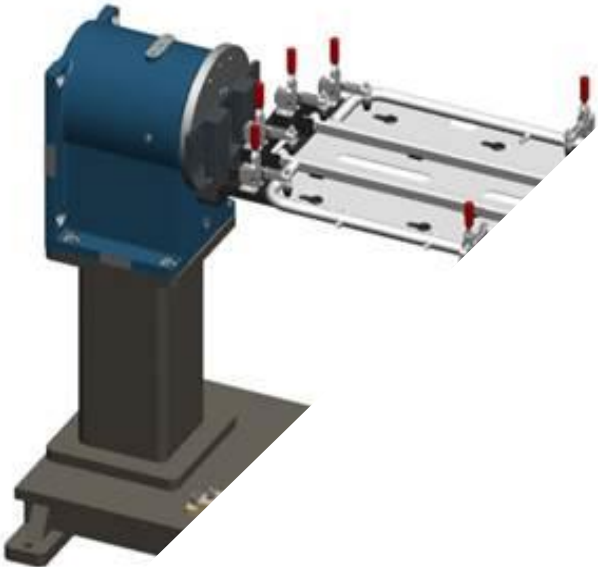
# 大綱 Content

1. 特色 Feature
  2. 系統架構 System Layout
    - 2-1. 鐸接手臂 Weld Robot
    - 2-2. 鐸機規格 Weld P/S
    - 2-3. 系統解決方案 System Solution
  3. 軟體 Software
    - 3-1. 模擬軟體 HRSim
    - 3-2. 手臂軟體 Robot Software
  4. 實機案例 Used Cases
    - 4-1. 定位器框架鐸接 Positioner Frame
    - 4-2. 底座零件鐸接 Base Support
    - 4-3. 醫療系統鐸接 Hygiene System
- Appendix 實用連結 Useful Links and next step



# FEATURE

# FEATURE



**EtherCAT 即時雙向通訊**  
EtherCAT-based Real Time Communication

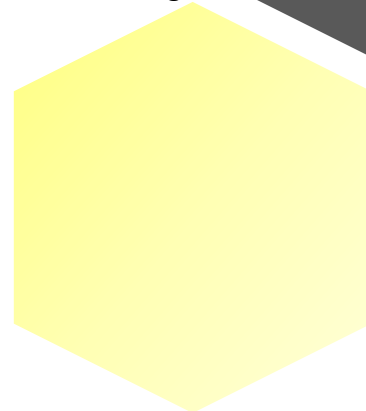
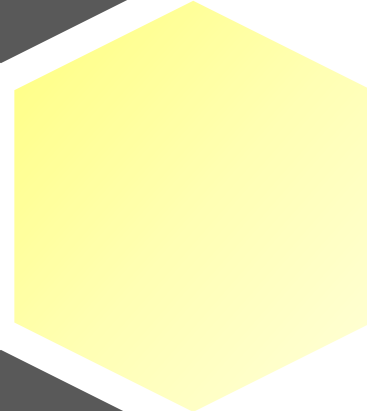
**附加六軸外部軸同步控制 (6+6)**  
Synchronized control (interpolation) for additional three axes (6 + 6)

**成套解決方案**

Total Solution by supporting Robot and Weld Peripheral Equipment

**完整文件與教育訓練**

Supportive Documentation & Training



**扮演手臂製造商與系統整合商**  
Robot Maker + System Integrator

**銲接週邊模組化設計**  
Modular Design for Weld Peripheral Equipment

## 2. 系統架構 System Layout

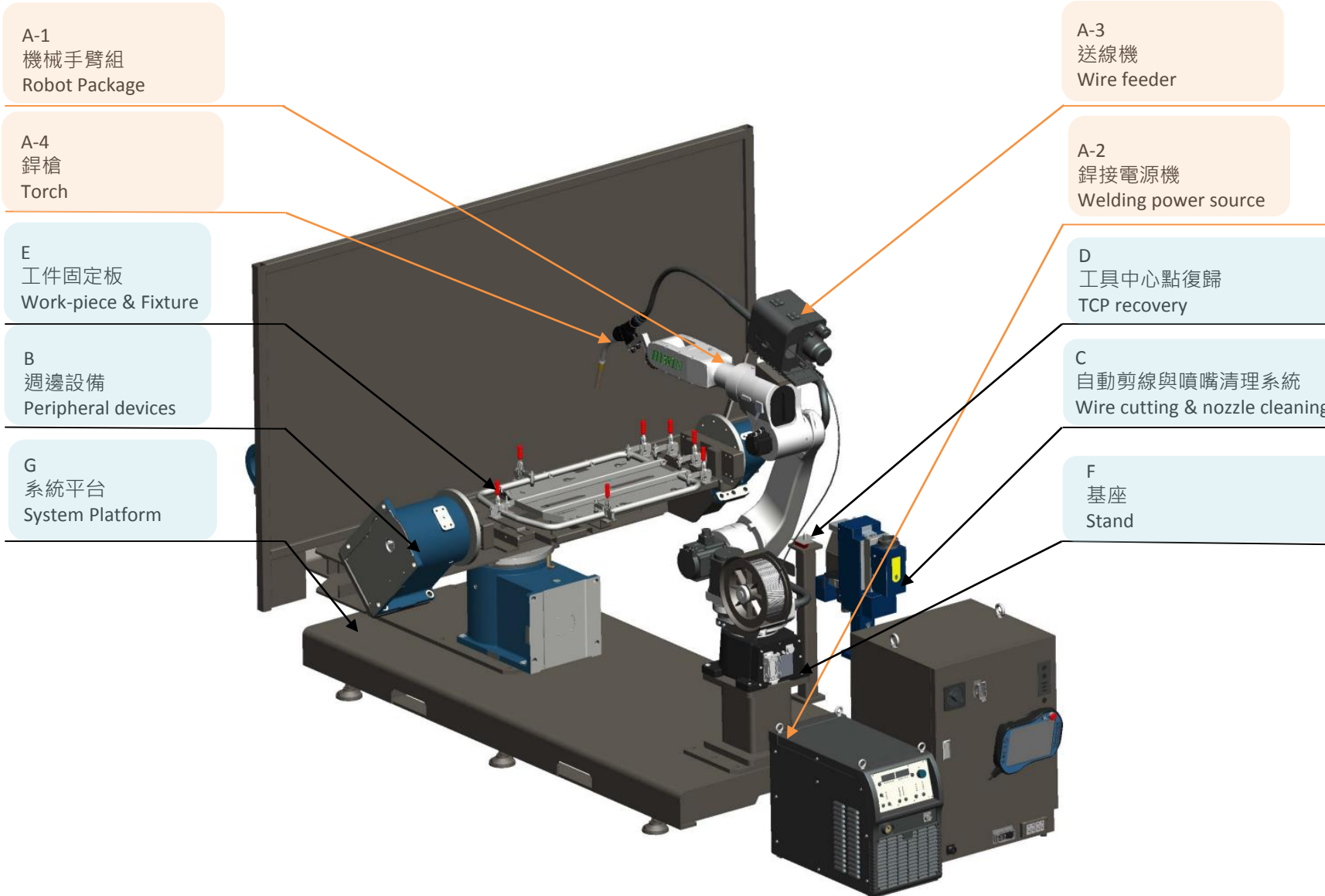
2-1. 鐸接手臂 Weld Robot

2-2. 鐸機規格 Weld P/S

2-3. 系統解決方案 System Solution



# 2. 系統架構 System Layout



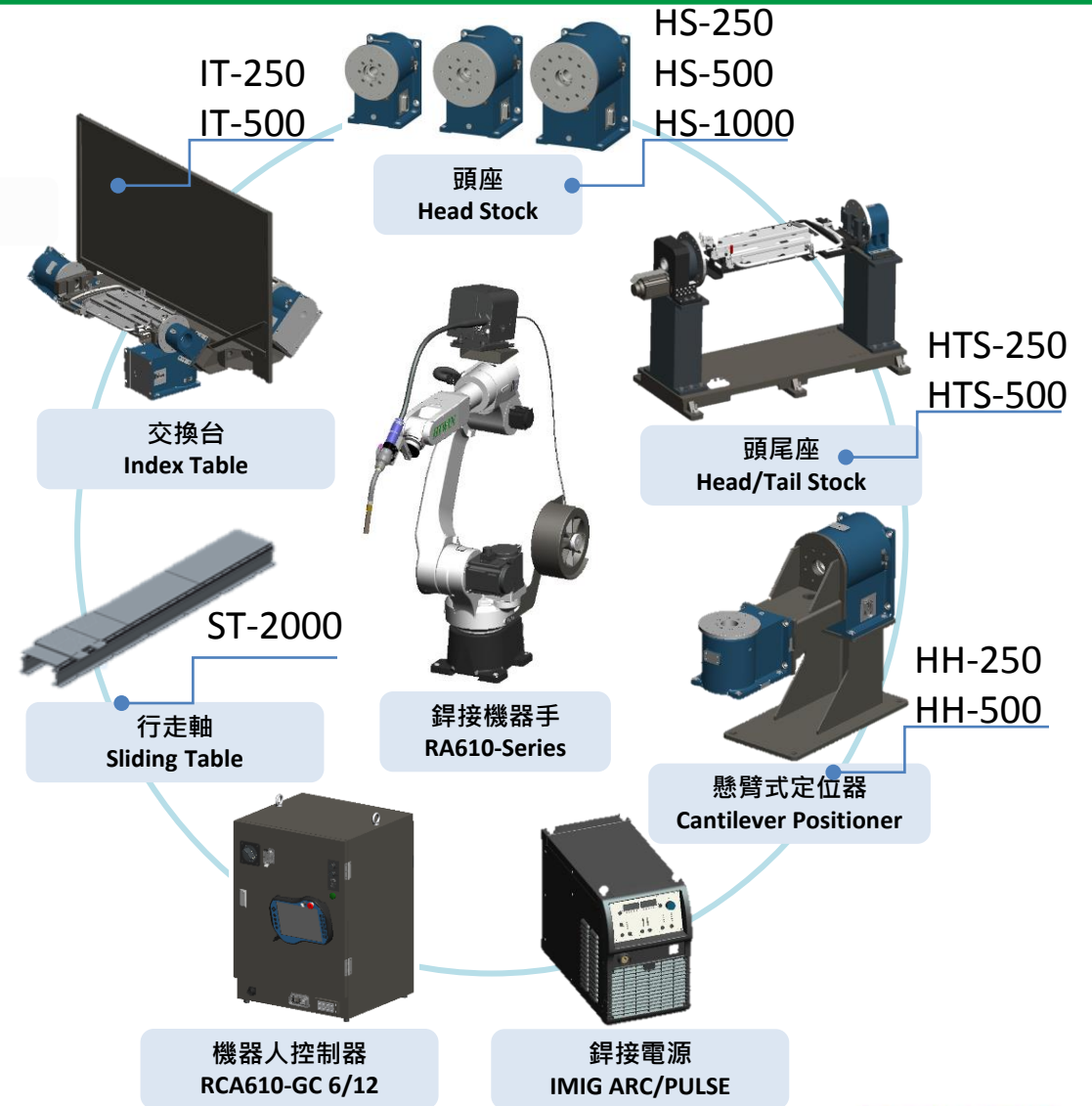
標配 Standard	選配 Optional
----------------	----------------

- 弧銲應用  
Arc Weld Applications
- 氣體遮護金屬電弧銲  
GMAW  
Gas Metal Arc Welding
  - 氬銲 (氬弧銲)  
GTAW Gas tungsten Arc Welding

# 2-1. 銲接手臂 Weld Robot

型號 Model Name	RA610-1476	RA610-1869
重複精度 Repeatability [mm]	±0.05	±0.06
運動範圍 Working Range [mm]	1476	1869
重量 Weight [kg]	147	152
防護等級 Protection rating	J5~J6: IP65 J1~J4: IP54	

\*Optional 5kg payload arc weld robot



## 2-2. 鐸機規格 Weld Power Source



碳鋼 Mild Steel  
鍍鋅鋼板 Galvanized Steel



80%  
Less  
Spatter



碳鋼 Mild Steel  
不銹鋼 Stainless Steel  
鋁合金 Aluminum alloy



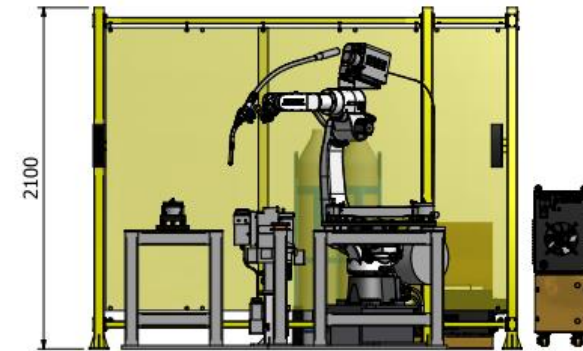
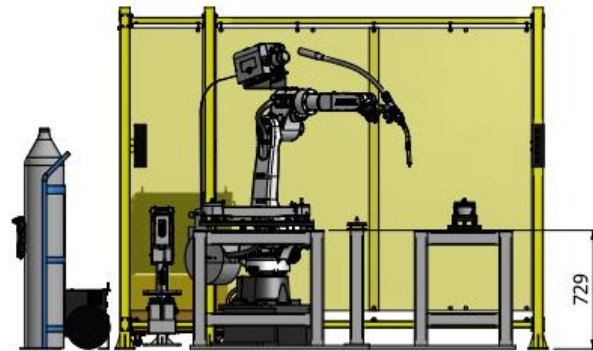
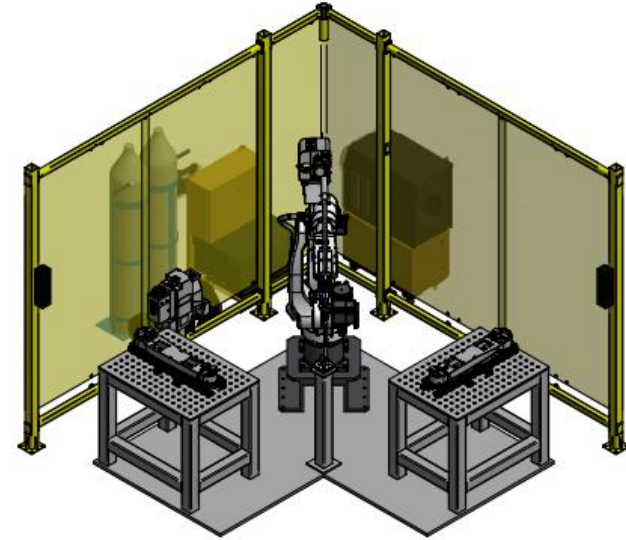
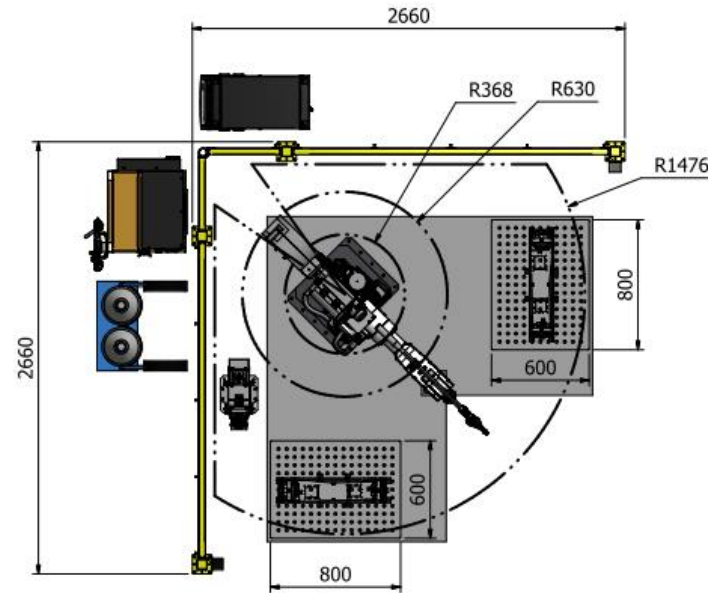
型號 Model Names	iMIG ARC 350 RS	iMIG PULSE 350 RS
主電壓 / 頻率 Main voltage/frequency	3 phase, AC380±10%, 60Hz	
額定輸入 Rated input power	15KVA	15KVA
額定輸入電流(A) Rated input current (A)	23	23
額定使用率(%) Rated duty cycle (%)	60	60
輸出電流(A) Output current (A)	60~350	60~350
輸出電壓(V) Output voltage (V)	17~35	14~40
輸出開路電壓(V) Output open circuit voltage(V)	79	101
絕緣等級 Insulation class	H	
冷卻型式 Type of cooling	AF / Fan	
尺寸(cm) Dimension (cm)	66×32×56	
重量(Kg) Weight (Kg)	55	48

## 2.3 系統解決方案 System Solution (1/5)

### 型式一 - 銲接工作台系統 HIWIN Weld Robot System with Welding Table

適合情境：  
工件型式簡單

工件尺寸：  
600mm \* 800mm





## 2.3 系統解決方案 System Solution (2/5)

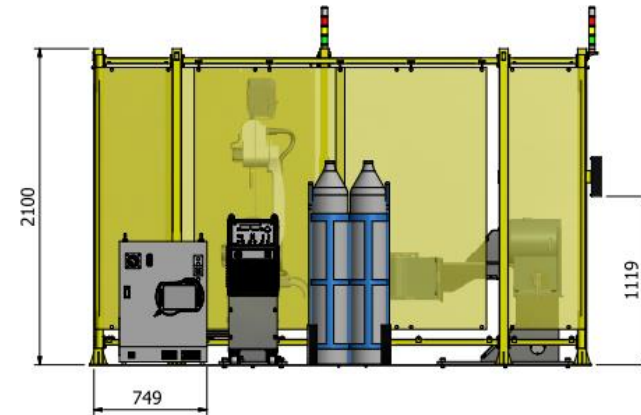
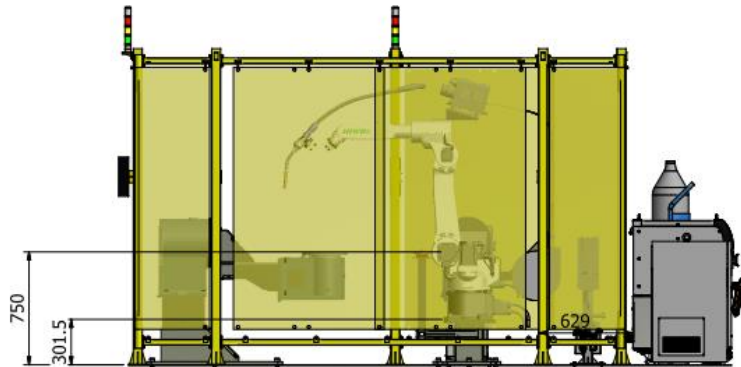
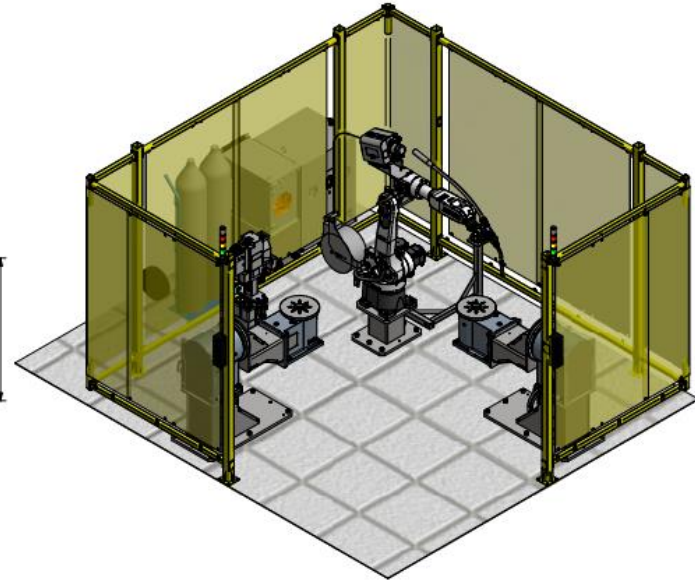
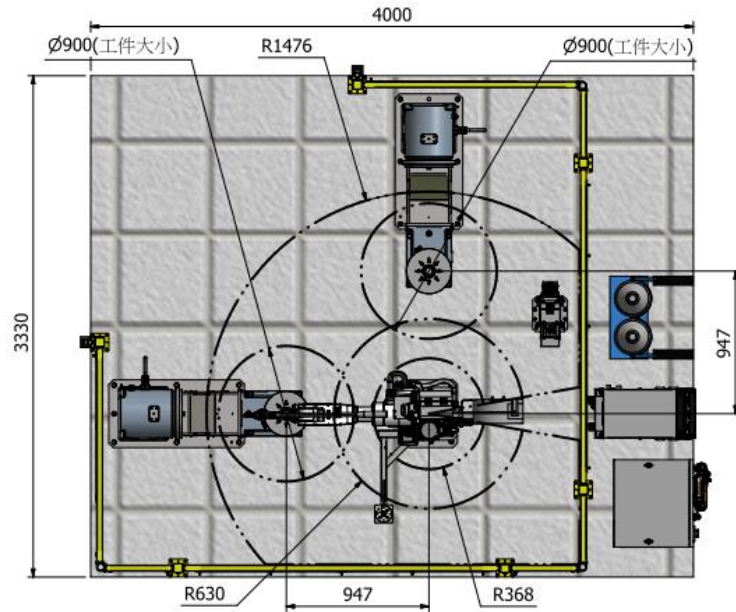
### 型式二 - 銲接雙懸臂系統

HIWIN Weld Robot System

with Two Cantilever Positioner

適合情境：  
特定工件變化

工件尺寸：  
Φ900mm

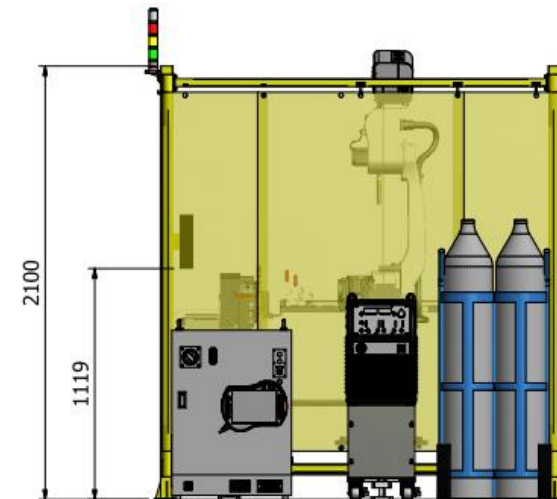
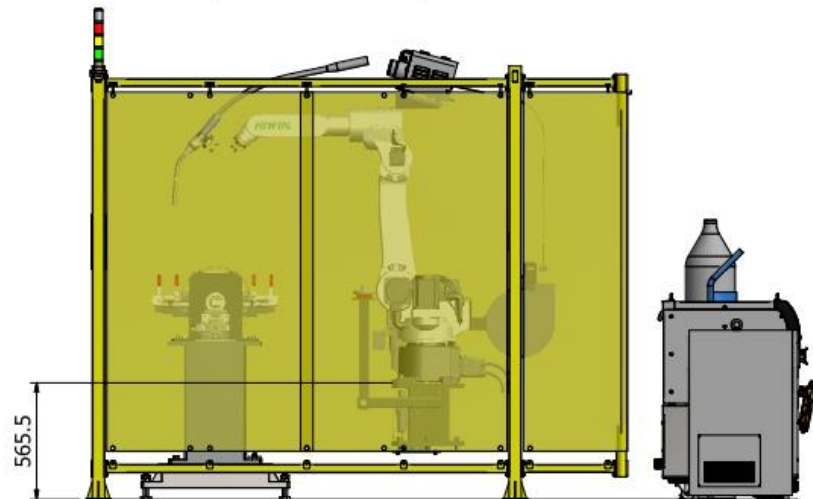
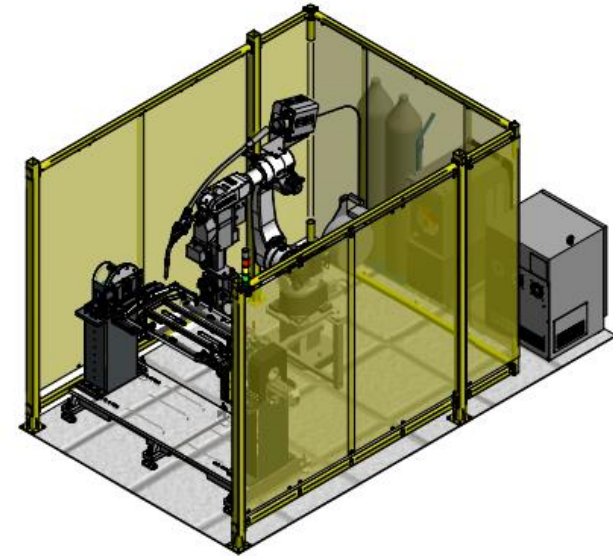
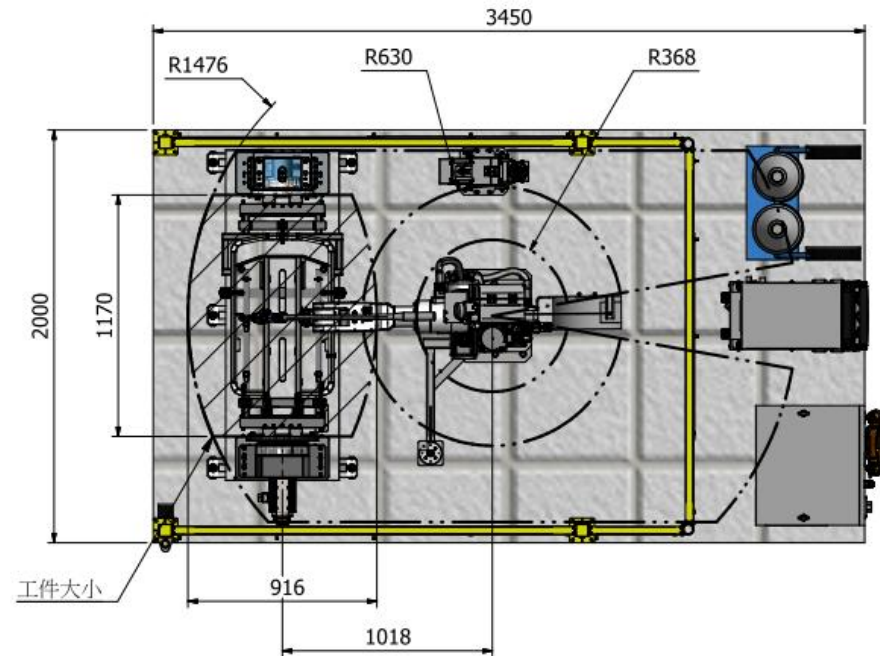


## 2.3 系統解決方案 System Solution (3/5)

型式三 - 銲接頭尾座系統  
HIWIN Weld Robot System  
with Head /Tail stock

適合情境：  
板型或尺寸較大工件

工件尺寸：  
1170mm \* 916mm

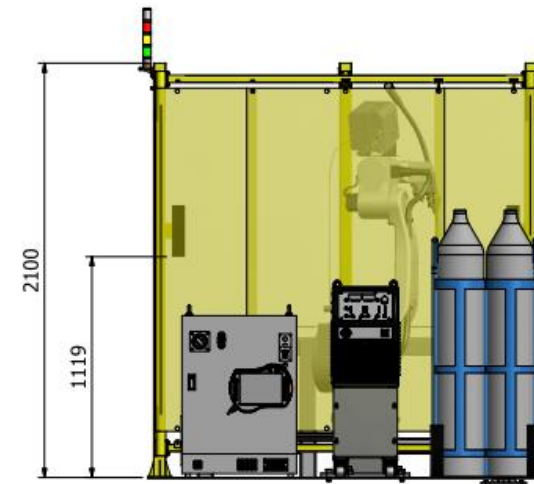
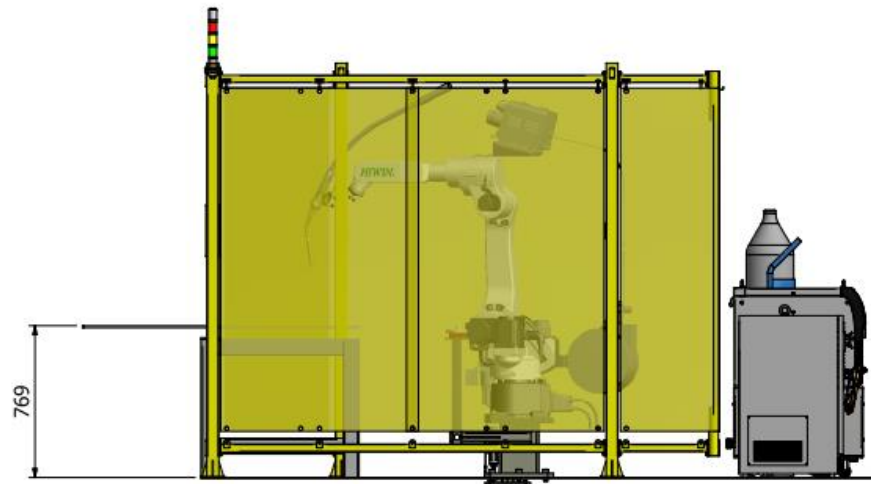
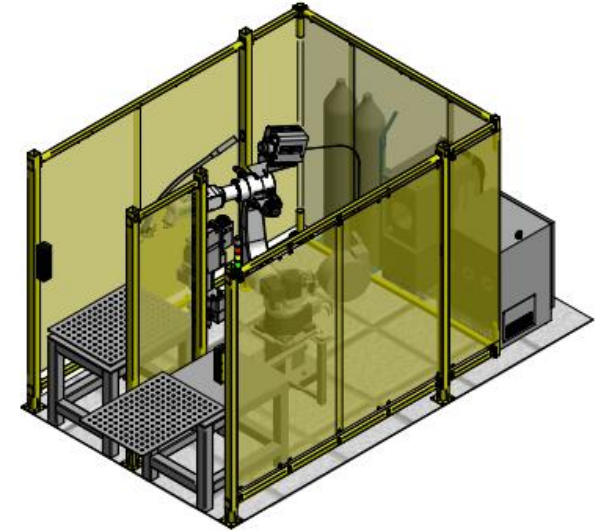
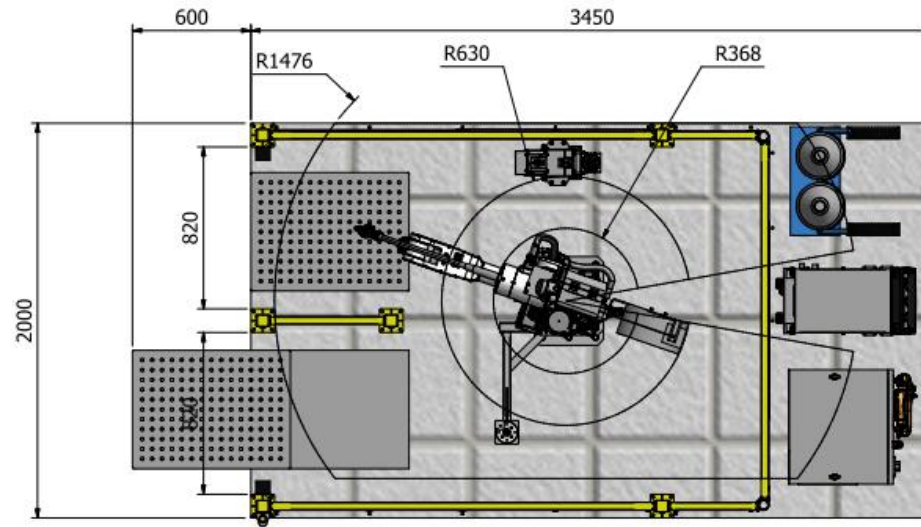


## 2.3 系統解決方案 System Solution (4/5)

### 型式四 - 銲接飛梭式系統 HIWIN Weld Robot System with Mobile Welding Table

適合情境：  
產量大且小型工件

工件尺寸：  
600mm \* 820mm

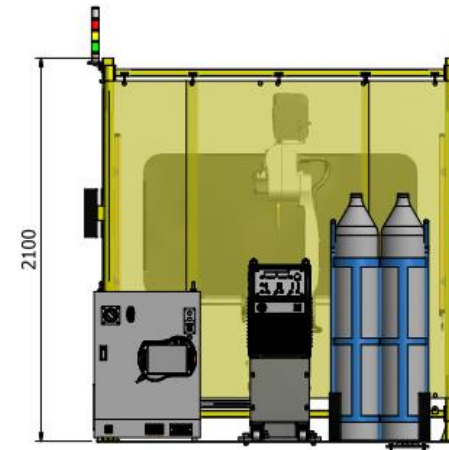
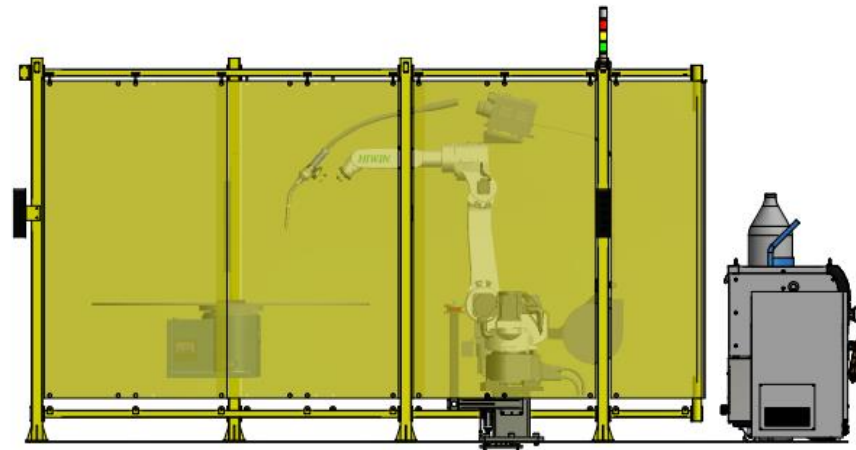
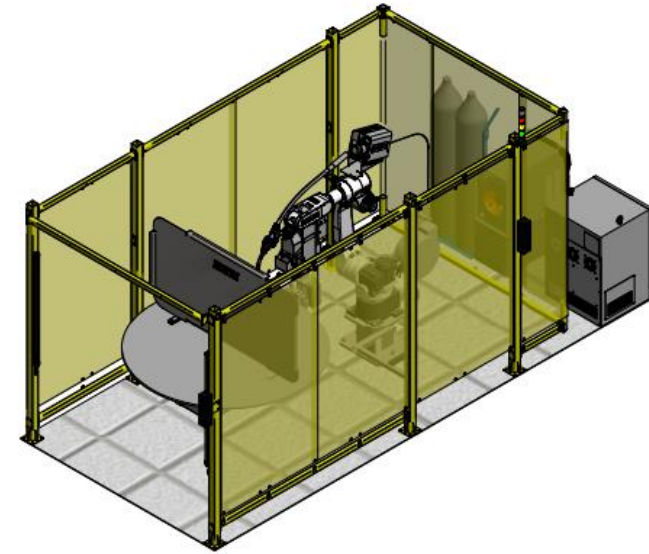
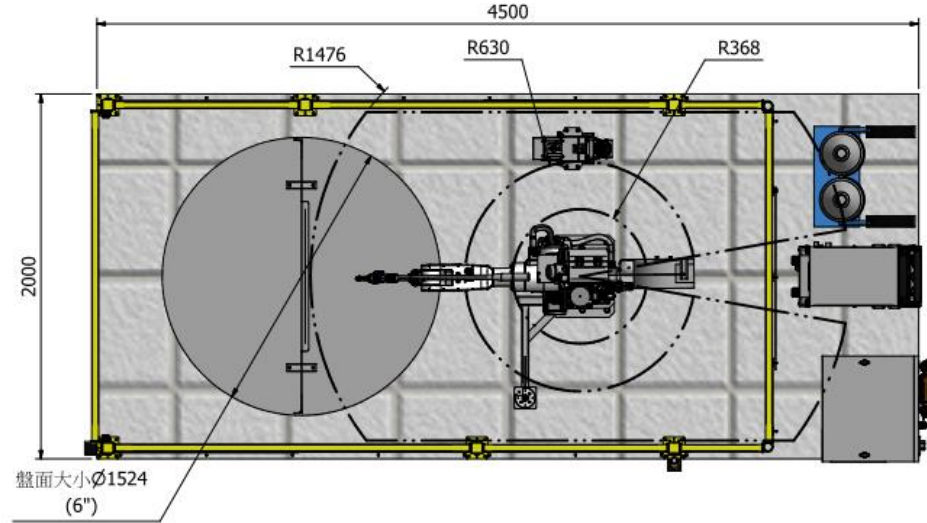


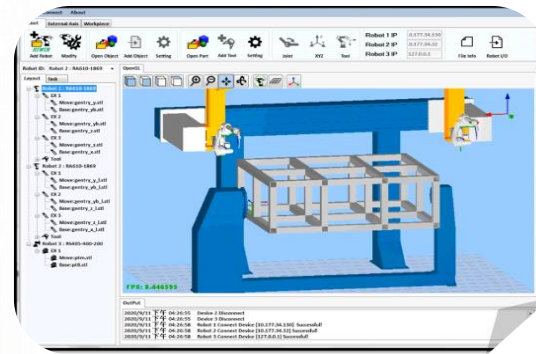
## 2.3 系統解決方案 System Solution (5/5)

### 型式五 - 銲接交換台系統 HIWIN Weld Robot System with Index Table

適合情境：  
產量大且中型工件

工件尺寸：  
Φ1524mm





### 3. 軟體 Software

#### 3-1. 模擬軟體 HRSim

#### 3-2. 手臂軟體 Robot Software

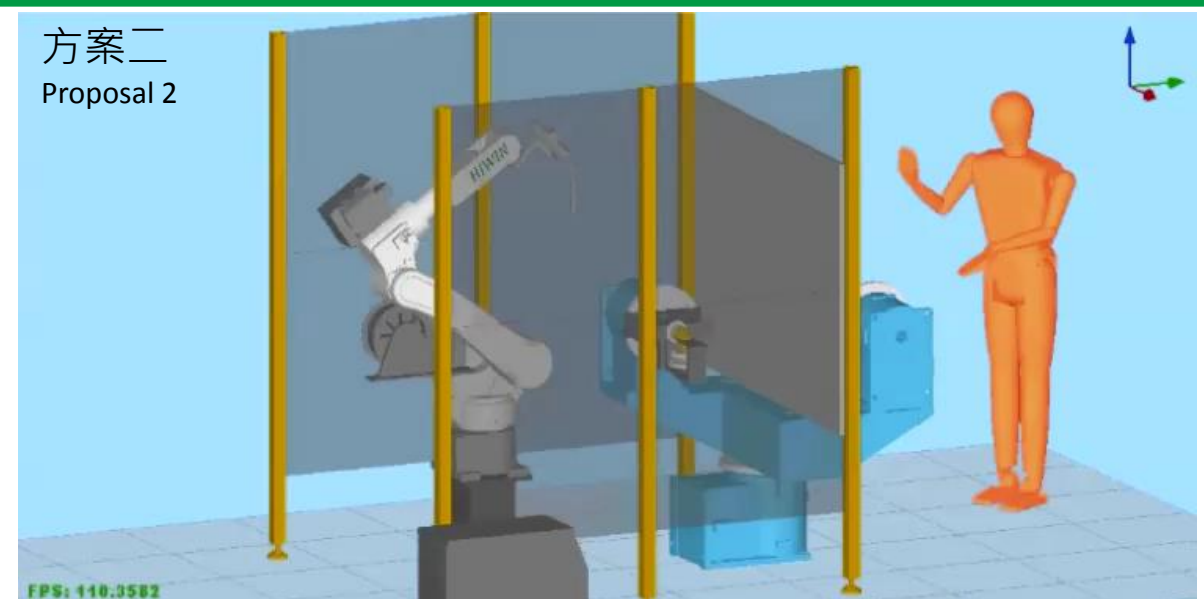
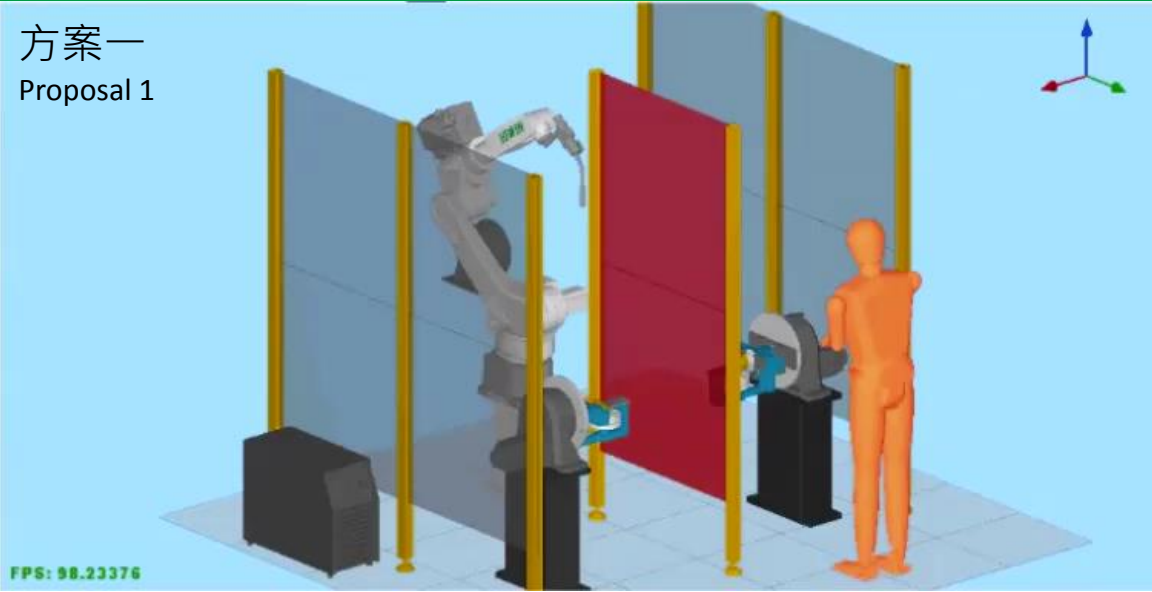
### 模擬軟體 HRSim

透過HRSim將工件、周邊輔具、外部軸建入系統，並以手臂進行**離線模擬**取得銲接程序規劃、銲接時間與銲接的可行性評估。

### 手臂軟體 Robot Software

全新的銲接介面，透過**簡易圖示按鈕**功能顯示：銲接參數設定、銲接程序設定、銲接系統座標（使用者、工具座標等）

# 3-1. 模擬軟體 HRSim (1/3)



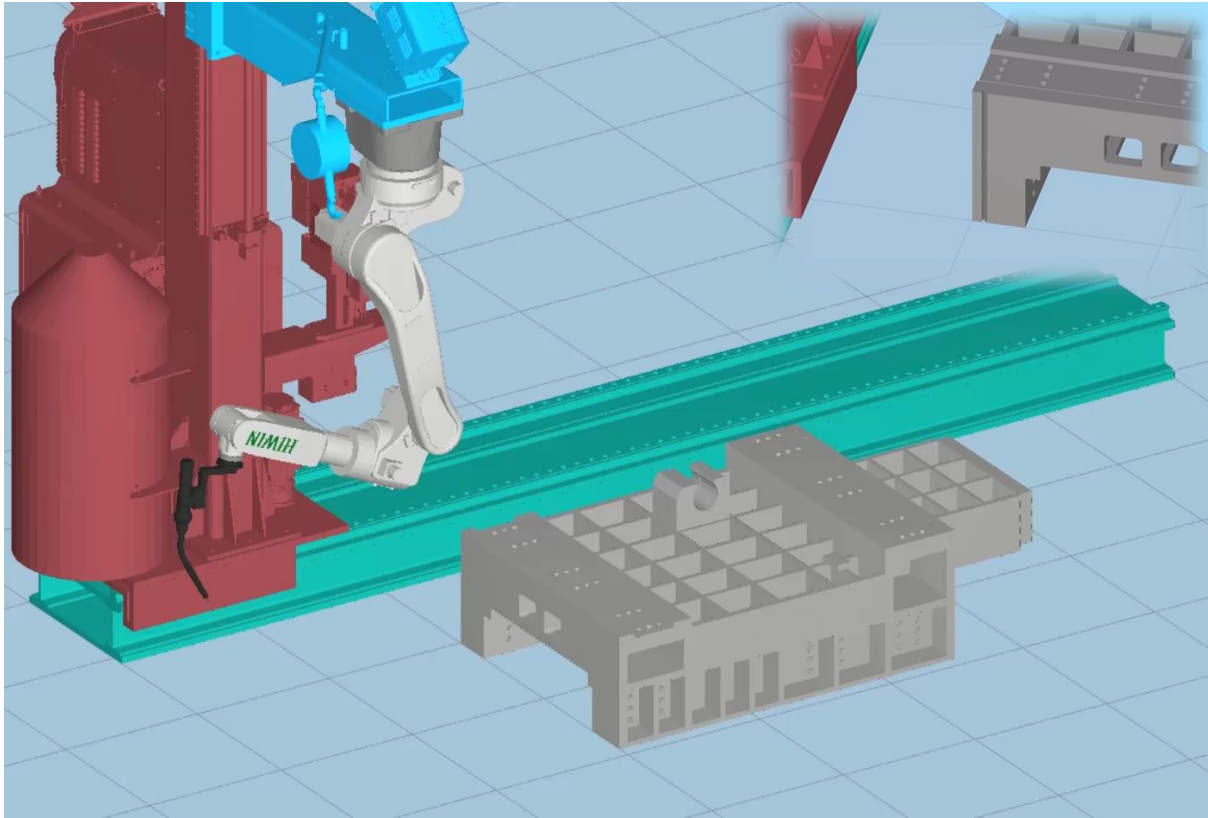
Day	Month	Year
8 hrs.	25 days	12 months

	敘述 Description	週期(s) Cycle time (s)	產能 (pc/min) Productivity (pc/min)	產能(pc/hr.) Productivity (pc/hr.)	產能(pc/year) Productivity (pc/year)
原方案 Original Solution	手動 Manual	181	0.33	20	48,000
方案一 Proposal 1	上銀鐳接手臂系統 HIWIN Weld Robot System	68	0.88	53 ↑	127,200
方案二 Proposal 2	上銀鐳接手臂系統 HIWIN Weld Robot System	64	0.94	56 ↑	134,400
差異 (方案二 - 方案一) Difference (Proposal 2 - Proposal 1)					7,200

Twice Better

# 3-1. 模擬軟體 HRSim (2/3)

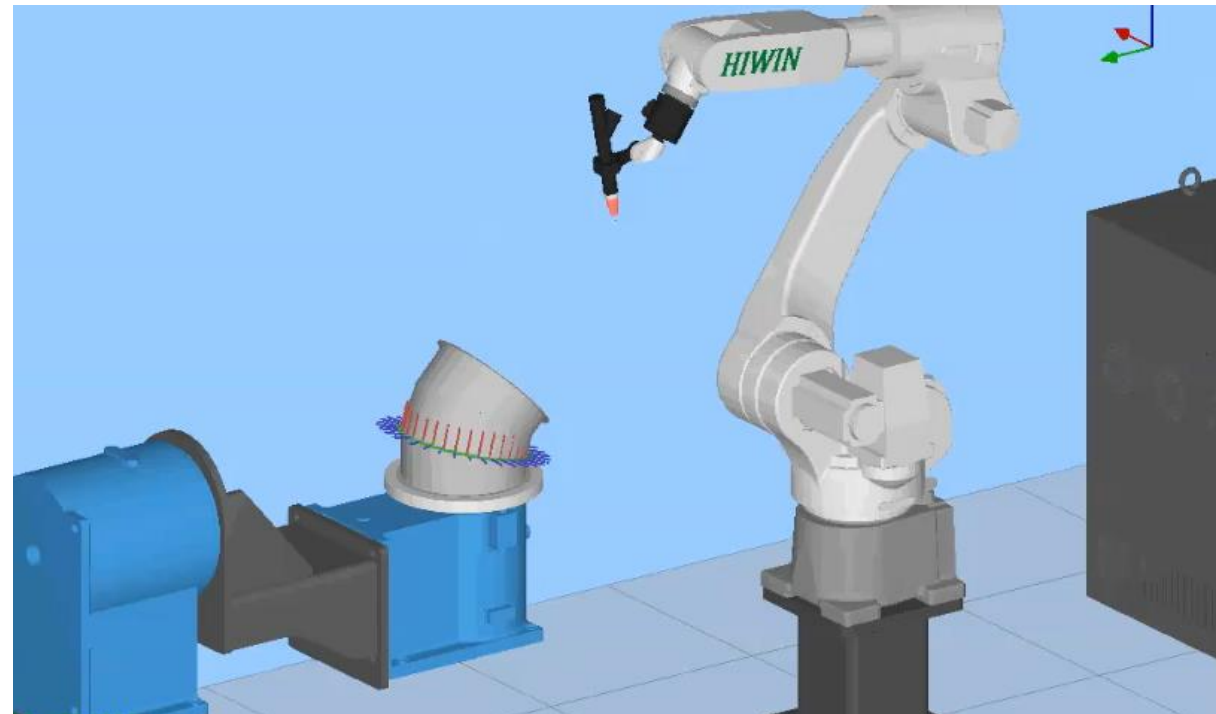
## ➤ 行走軸銲接 Sliding Table Weld



Robot	RA610-1476-GC
-------	---------------

Weld P/S	Pulse MIG Weld
----------	----------------

## ➤ 風管銲接 Duct Tube Weld



Robot	RA610-1476-GC
-------	---------------

Weld P/S	AC/DC TIG Weld
----------	----------------

# 3-2. 手臂軟體 Robot Software Interface (1/5)

## 精心設計銲接軟體介面

都可呈現在手臂教導器內

## Smart-weld designed Interface

Inside Robot Teach Pendant



### Weld Setting 銲接設定

Weld Setting

Weld Enable  Connect

Weld Speed (mm/s)

Gas Purge Time (sec)

Gas Purge

Torch Collision Detect.

Power Source Setting

Power Source

Wirestick detect

Arc start error time (sec)

Arc loss error time (sec)

Save

### Weld Procedure 銲接流程

Weld Procedure

Procedure  Job Mode

Weld Mode

Material  Gas

Wire

Gas flow Parameter Schedule

Gas preflow [sec]

Gas postflow [sec]

Save

### Weld I/O 銲接I/O

NO.	Weld Signal	Signal Type	DO
1	Voltage	0	
2	Current	0	
3	Wire Feed Speed	0	
4	Ignition	<input type="checkbox"/>	DO
5	Power Source Ready	<input type="checkbox"/>	DO
6	Main Current Signal	<input type="checkbox"/>	DO
7	Torch Collision Protection	<input type="checkbox"/>	DO
8	Power Source Fault	<input type="checkbox"/>	DO
9	Torch Switch Fault	<input type="checkbox"/>	DO
10	Given Parameter Abnormal	<input type="checkbox"/>	DO
11	Voltage Feedback Abnormal	<input type="checkbox"/>	DO

### Weld Weaving 擺弧

Weaving Schedule(default)

Dwell delay type   Blend weave end

Elevation (deg)  L angle (deg)

Azimuth (deg)  Peak output port

Center rise (mm)  Peak output pulse (sec)

Radius (mm)  Peak output shift (sec)

Weaving Schedule

NO.	FREQ(Hz)	AMP(mm)	LD(sec)
1	0	0	0
2	0	0	0
3	0	0	0

Save

### Weld TCP Recovery 工具中心復歸

Torch Setting TCP Recovery

Schedule status Torch recovery TCP Recovery

Search settings

Tool  Base

Z Compensation

Input type

Input signal

Search speed (mm/s)

Search acc (ms)

Speed to starting point (mm/s)

Acc to starting point (ms)

Wire diameter (mm)

Next

### 參數監控 Weld Monitor

Monitor

Arc Detect  
Torch Sensed  
Wire Stick  
Disconnect

Voltage 0.0 V  
Current 0.0 A  
WFS 0.0 IPM

Power Source: Binzel iMIG ARC



# 3-2.擺弧 Weaving (2/5)

## 控制電極路徑

以增加銲道寬度與熔填量

## Control the path of electrode

to improve the weld bead width and metal fill

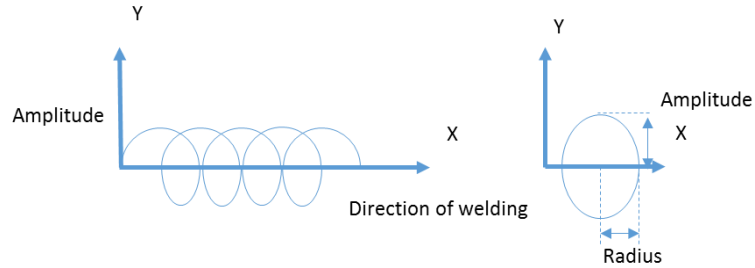
## 三種擺弧方式

對應不同銲道設計

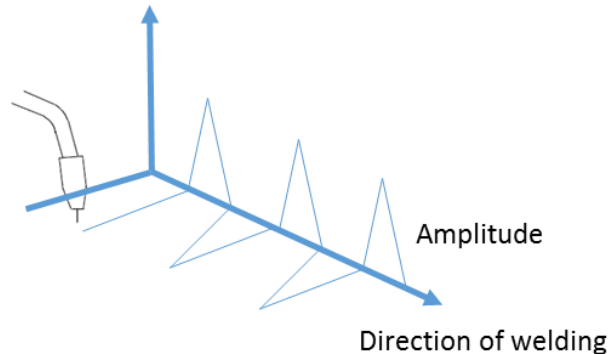
## Three weaving functions

based on different weld bead design are provided

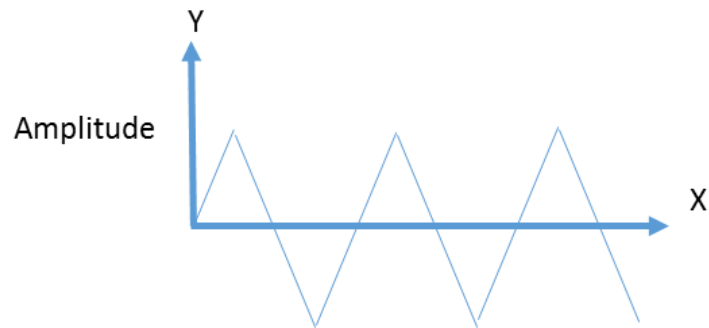
### Weave Circle



### Weave L



### Weave Sine



## 擺弧 Weave setting

Weld Weaving [X]

### Weaving Schedule(default)

Dwell delay type:   Blend weave end

Elevation (deg):  L angle (deg):

Azimuth (deg):  Peak output port:

Center rise (mm):  Peak output pulse (sec):

Radius (mm):  Peak output shift (sec):

### Weaving Schedule

NO.	FREQ(Hz)	AMP(mm)	LD(sec)
1	0	0	0
2	0	0	0
3	0	0	0

Save

# 3-2.工具中心復歸 TCP Recovery (3/5)

## 提供TCP校正治具

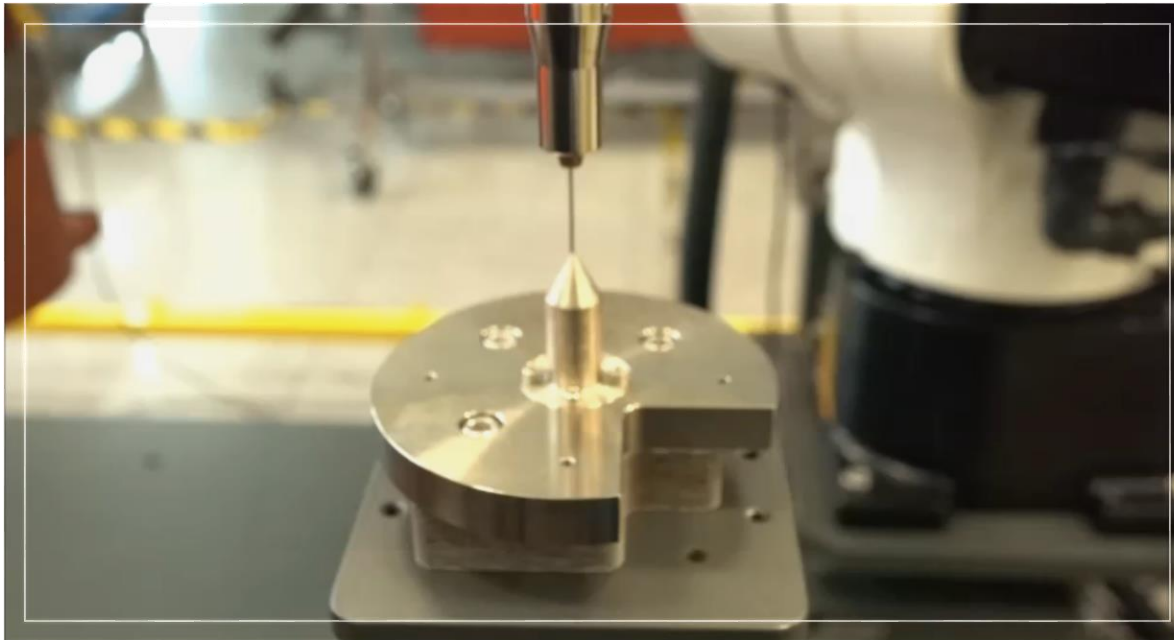
TCP Calibration Fixture is available

## 具備TCP復歸功能

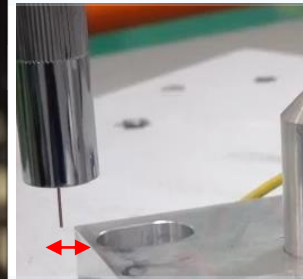
With TCP Auto Recovery Function

## 簡單且快速的工具中心復歸功能

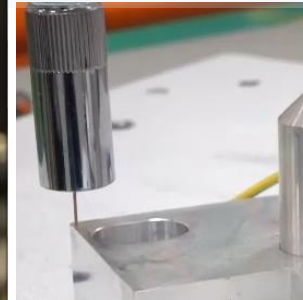
Easy and Quick TCP Recovery Function



Before



After



## 工具中心復歸 TCP Recovery Setting

### Weld TCP Recovery

#### Torch Setting

① ————— ② ————— ③

Schedule status      Torch recovery      TCP Recovery  
Search settings

Tool  Base

Z Compensation

Input type

Input signal

Search speed (mm/s)

Search acc (ms)

Speed to starting point (mm/s)

Acc to starting point (ms)

Wire diameter (mm)

Next

## 3-2. 暫停復歸 Resume (4/5)

### 簡單復歸銲接過程

適用於在操作中有暫停需求的情境

### Welding Process is resumed

after the program is paused by a hold request or an alarm during operation



### 暫停復歸設定 Resume Setting

```
RESUME_PROG = WIRE_CUT
```

```
WELD_START WP=1 WS=1
```

```
LIN P3 FINE Vel =5mm/s Acc=100% TOOL[0] BASE[0]
```

```
WELD_END WP=1 WS=1
```

```
CLEAR_RESUME_PROG
```

```
LIN P4 CONT Vel=100mm/s Acc=100% TOOL[0] BASE[0]
```

# 3-2.巨集按鈕盒Macro button (5/5)

## 簡易工作站設計

具有容易教導與簡易架設特色

## Workstation Setup

With friendly teaching and simple setup features

### 專家 Expert

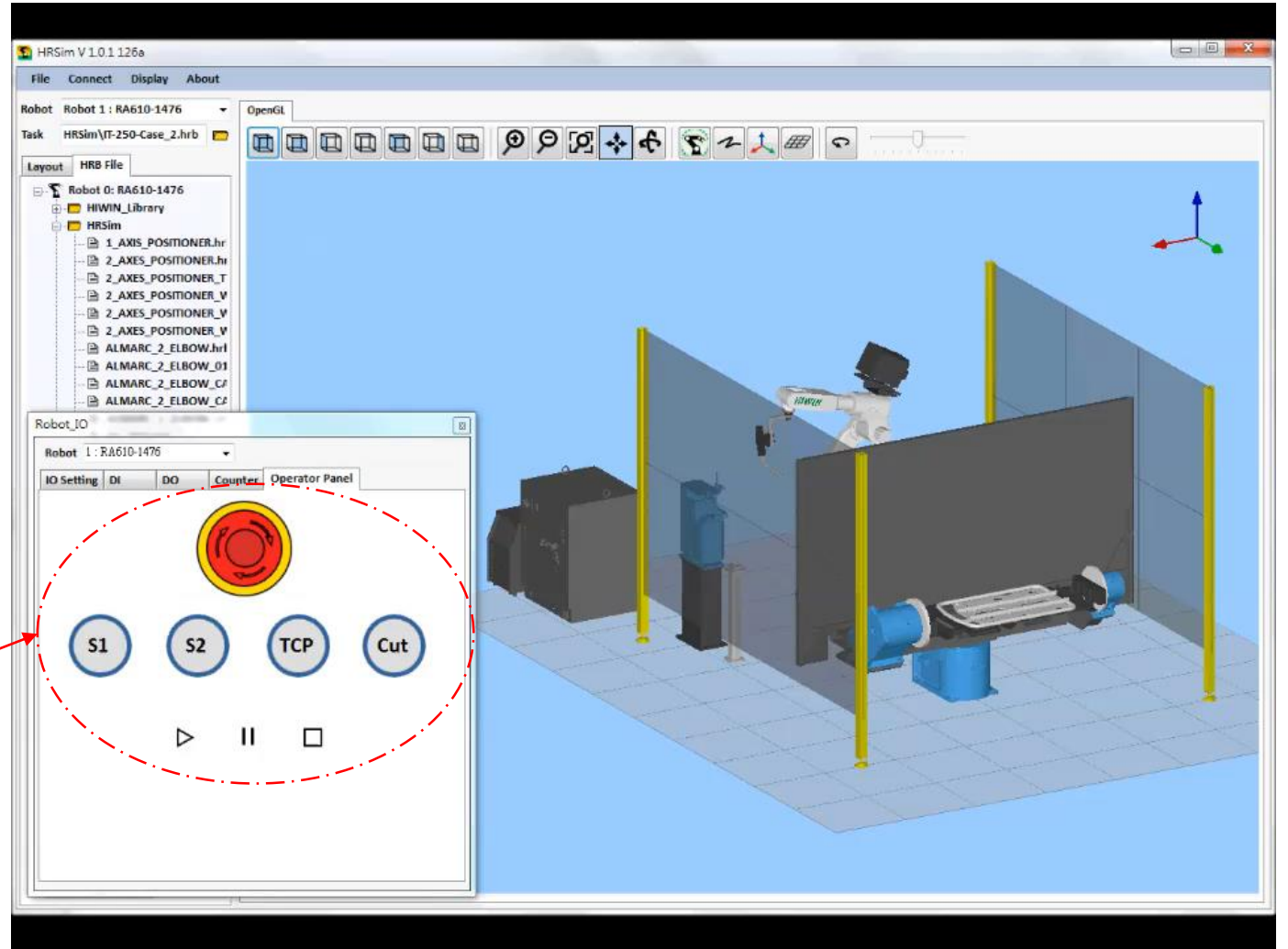
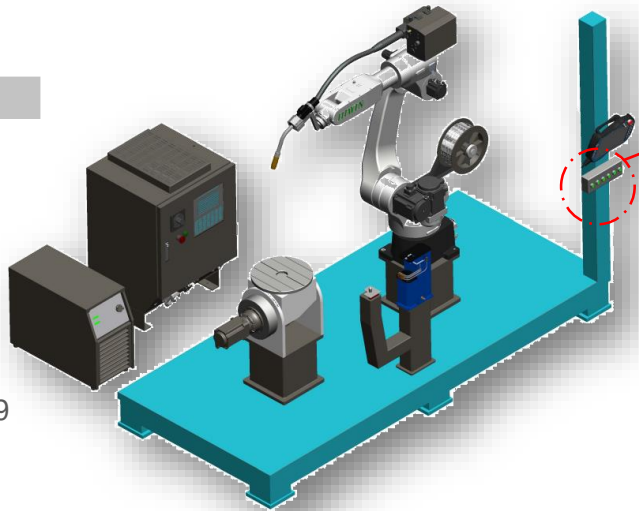
維修與保養 Troubleshooting & Maintenance

### 工程師 Engineer

程式撰寫與校點 Programming & Commissioning

### 操作員 Operator

工站預約&點位修正 Book Station & Modify Points



## 4.

### 實機案例 Used Cases

4-1. 定位器框架銲接 Positioner Frame

4-2. 底座零件銲接 Base Support

4-3. 醫療系統銲接 Hygiene System



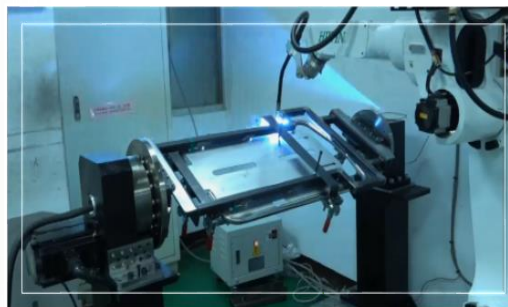
定位器框架銲接

Positioner Frame



底座零件銲接

Base Support



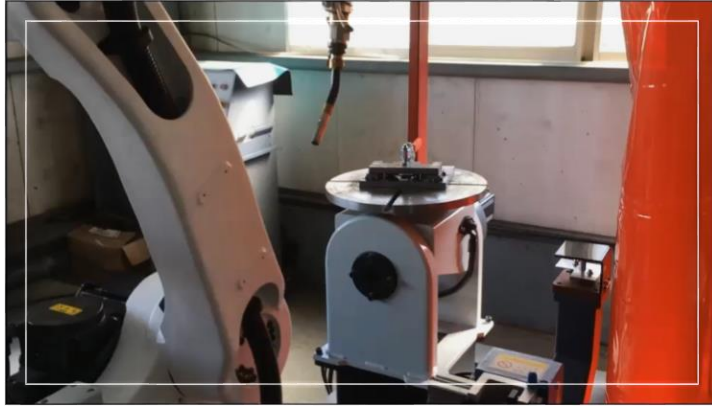
醫療系統銲接

Hygiene System

# 實機案例 Used Cases

## 底座零件 Base Support Component

- T型鐸道  
Welding on T Joint
- 板厚20mm  
Material Thickness 20mm



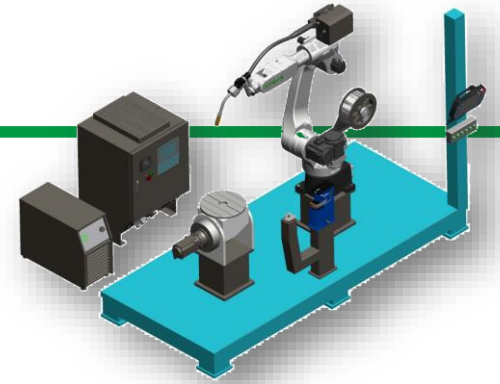
## 醫療系統鐸接 Hygiene System

- 搭接式鐸道  
Welding on Overlap Joint
- 板厚2mm  
Material Thickness 2mm



## 定位器框架 Positioner Frame

- T型鐸道 Welding on T Joint
- 板厚4.5mm Material Thickness 4.5mm



Delta Robot



Articulated Robot



SCARA Robot



Wafer Robot



## Useful Links

- HIWIN Webpage: [www.hiwin.tw](http://www.hiwin.tw)
- HIWIN Industrial Multi-axis Robot: [hiwin.tw/products/mar/multi\\_axis\\_robot\\_list.aspx](http://hiwin.tw/products/mar/multi_axis_robot_list.aspx)

## Contact us

- For evaluations, inquiries or for any doubt you are welcome to email us at: [business@hiwin.tw](mailto:business@hiwin.tw) ; [iusd33@hiwin.tw](mailto:iusd33@hiwin.tw)
- Contact us to get **inquiry forms** for speedily robot application assessment.

**HIWIN®**

**Thanks for listening**

