QJAR Robot Intelligent Welding System

QJAR welding industry

Catalog

Introduction to the definition of smart welding

Limitations of welding robots

Limitations of traditional welding robots

Teaching operation is difficult and time-consuming, taking up too much production time

Multiple product types, multiple specifications, small batches, and many customized products

The blanking group has poor accuracy and poor consistency

Operators have limited skill levels and high turnover

Tooling fixtures are expensive to produce and require high professionalism.

Problems solved by smart welding

Problems solved
by smart welding

Eliminate manual teaching programming method

Adapt to multi-specification product structures within the robot's working range

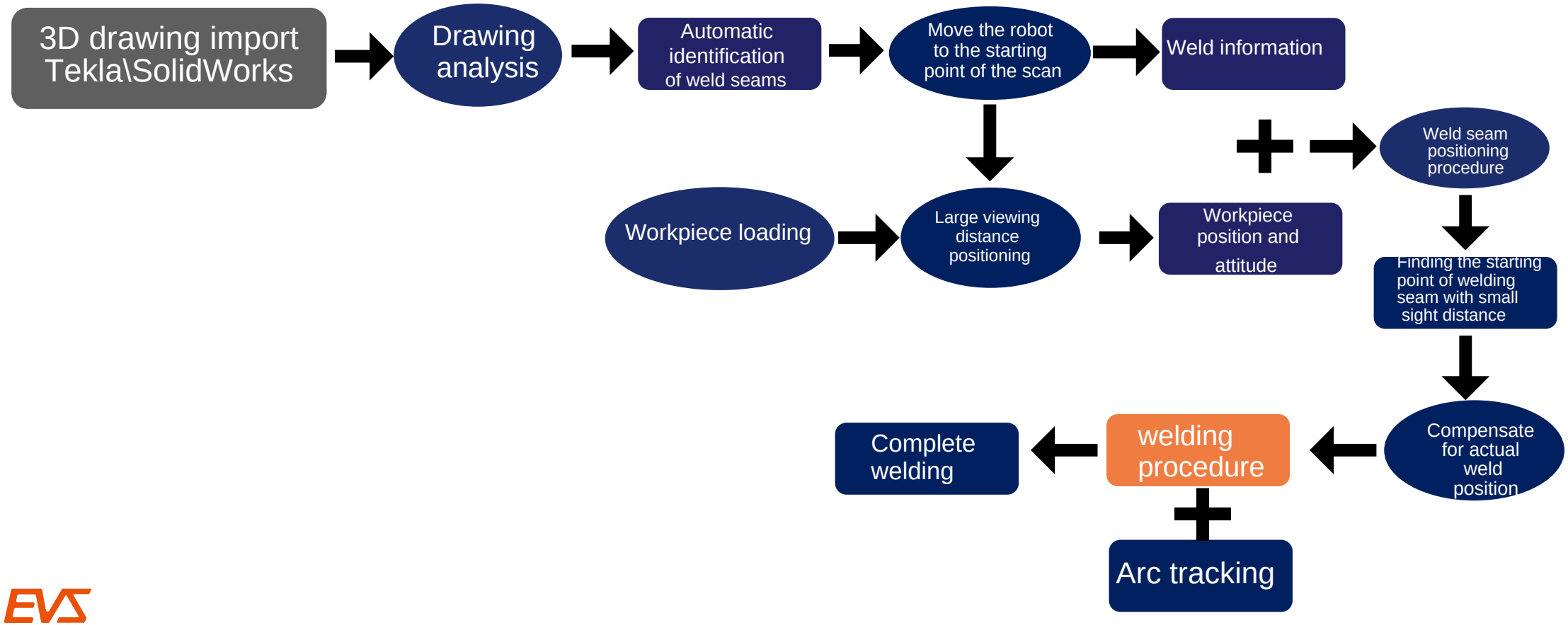
Due to the inclusion of positioning procedures, the accuracy requirements for the workpiece assembly group are reduced.

Simple operation, quick to get started, reducing labor requirements

The tooling fixture is omitted and the workpiece is required to be fixed in advance.

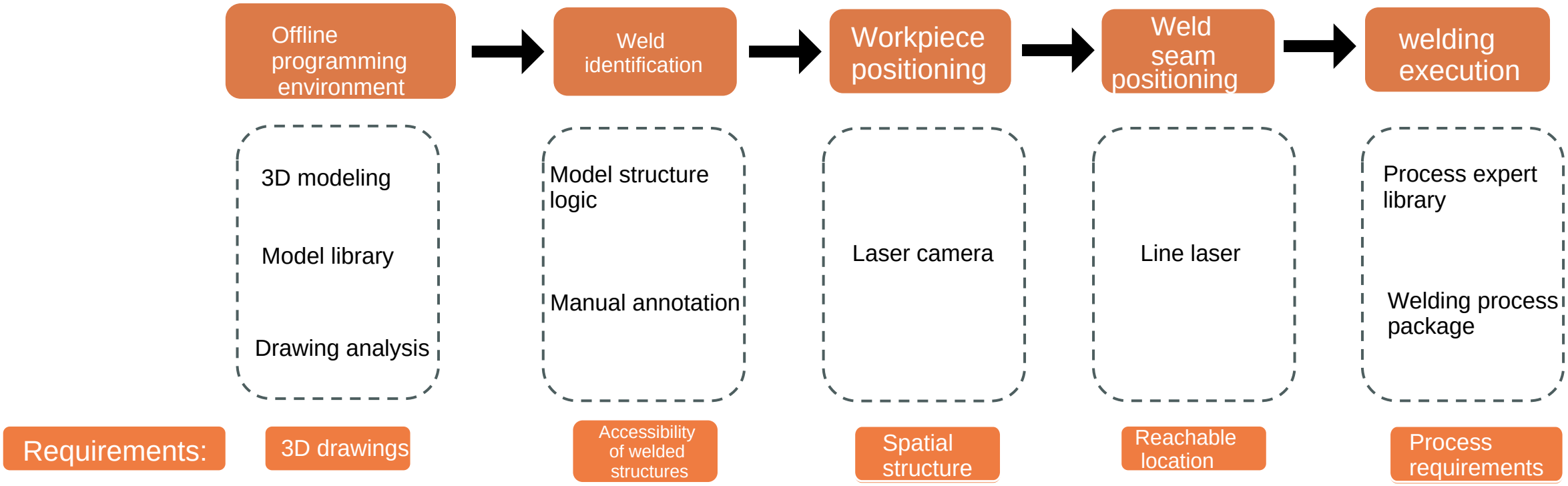
QJAR Intelligent Welding Process

- The system is based on the offline programming method driven by the model + expert library, and realizes the automatic generation of positioning paths without teaching.Through the independently developed welding expert software, it can also realize multiple functions such as multi-layer and multi-pass, continuous welding, fillet welding, automatic positioning, weld tracking, breakpoint recovery, collision detection, etc. It can flexibly handle workpiece deformation and adapt to complex Changeable application environment, efficiently complete the processing tasks of small batches of non-standard parts.



QJAR intelligent welding restrictions

Meet the requirements for intelligent welding



Two directions of smart welding

01

Intelligent trajectory planning based on drawing import

02

Line scanning post-welding based on graphic modeling comparison

Drawing import module composition

- Full module integration, providing overall solution

Robot kinematics

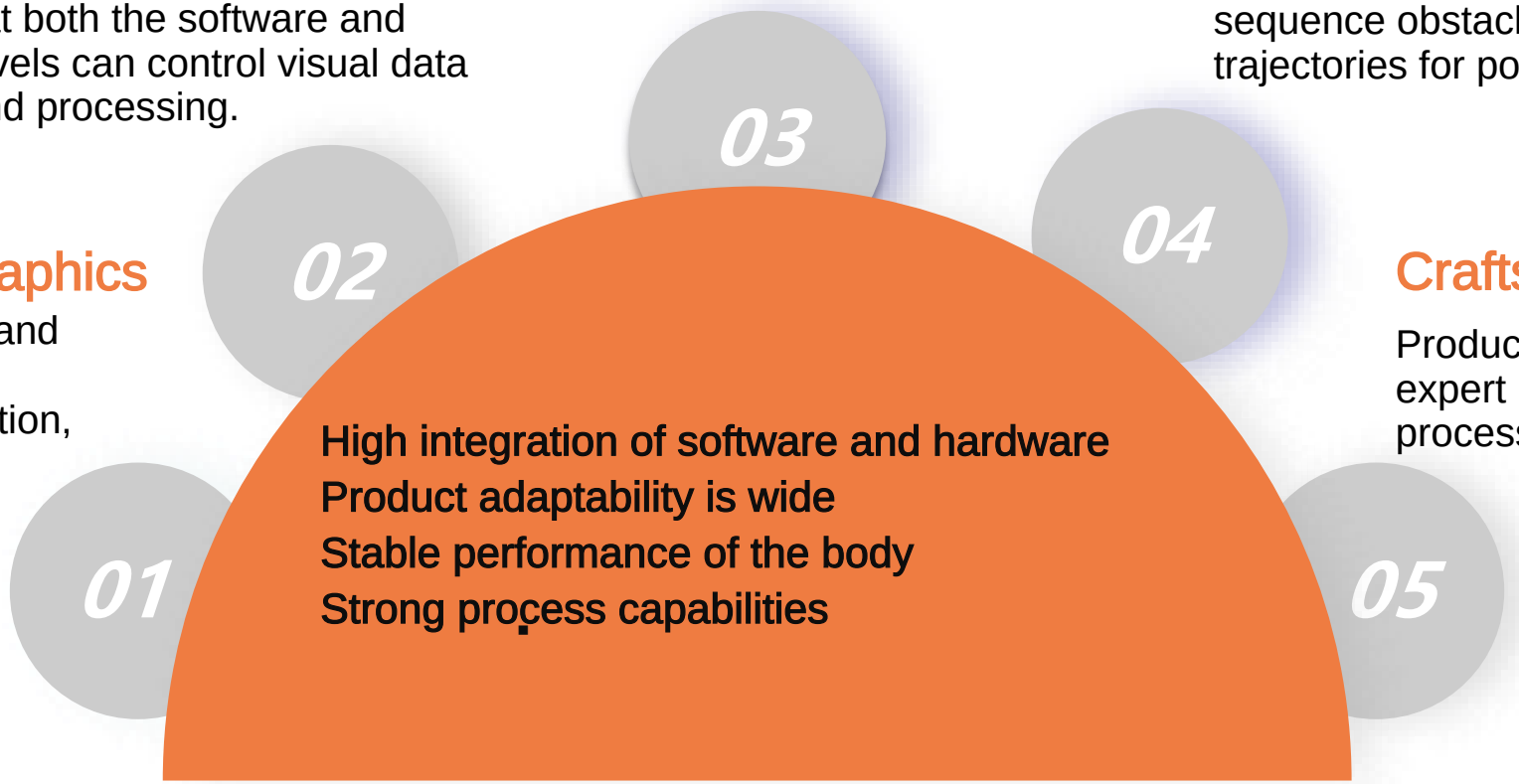
Robot motion control

Visual technology

Self-developed welding vision equipment at both the software and hardware levels can control visual data collection and processing.

Trajectory planning control

Automatic production of reasonable sequence obstacle avoidance trajectories for positioning planning



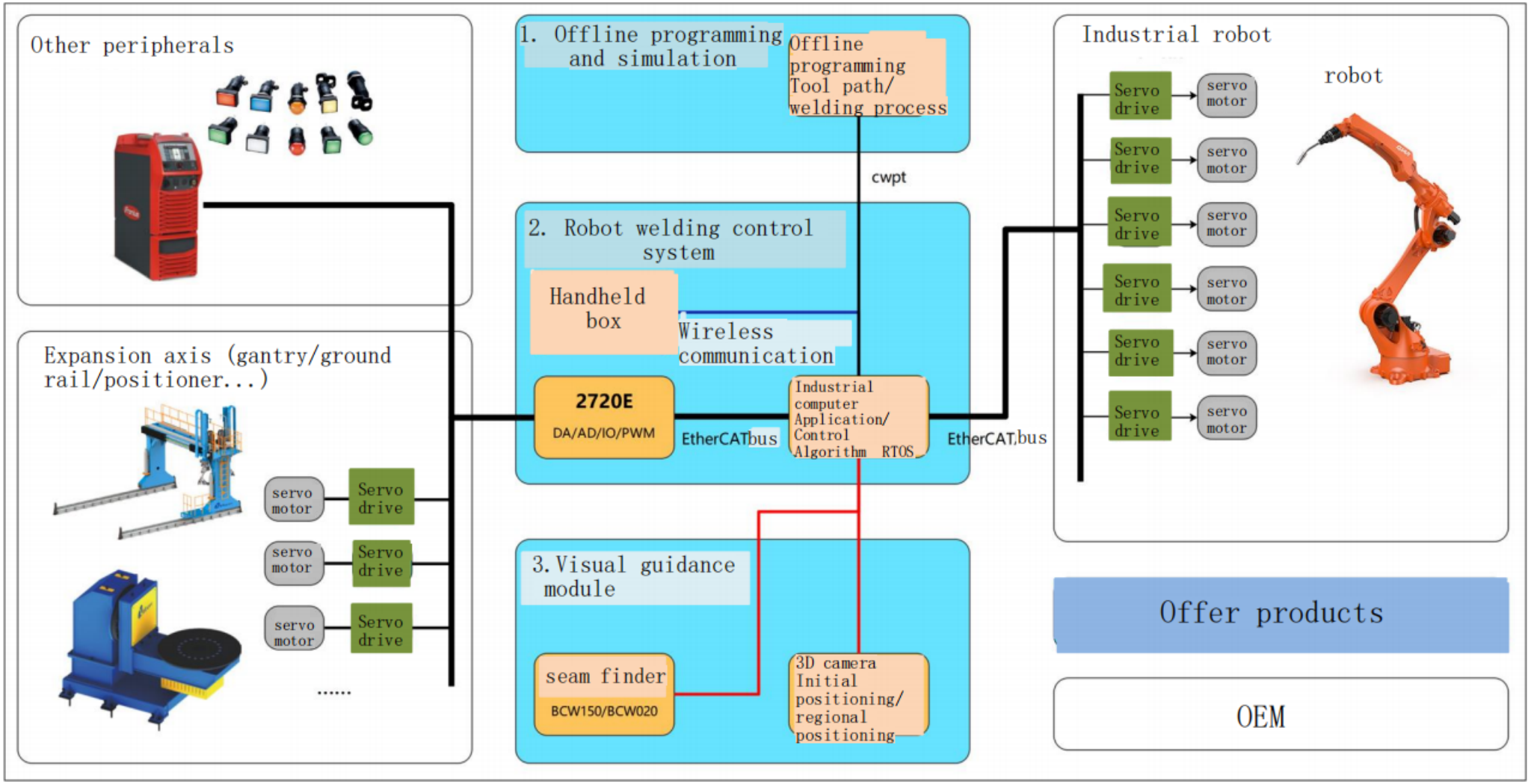
Graphics

Able to read, analyze and process models
Automatic weld extraction, collision detection...

Craftsmanship

Product structure process expert library software process package

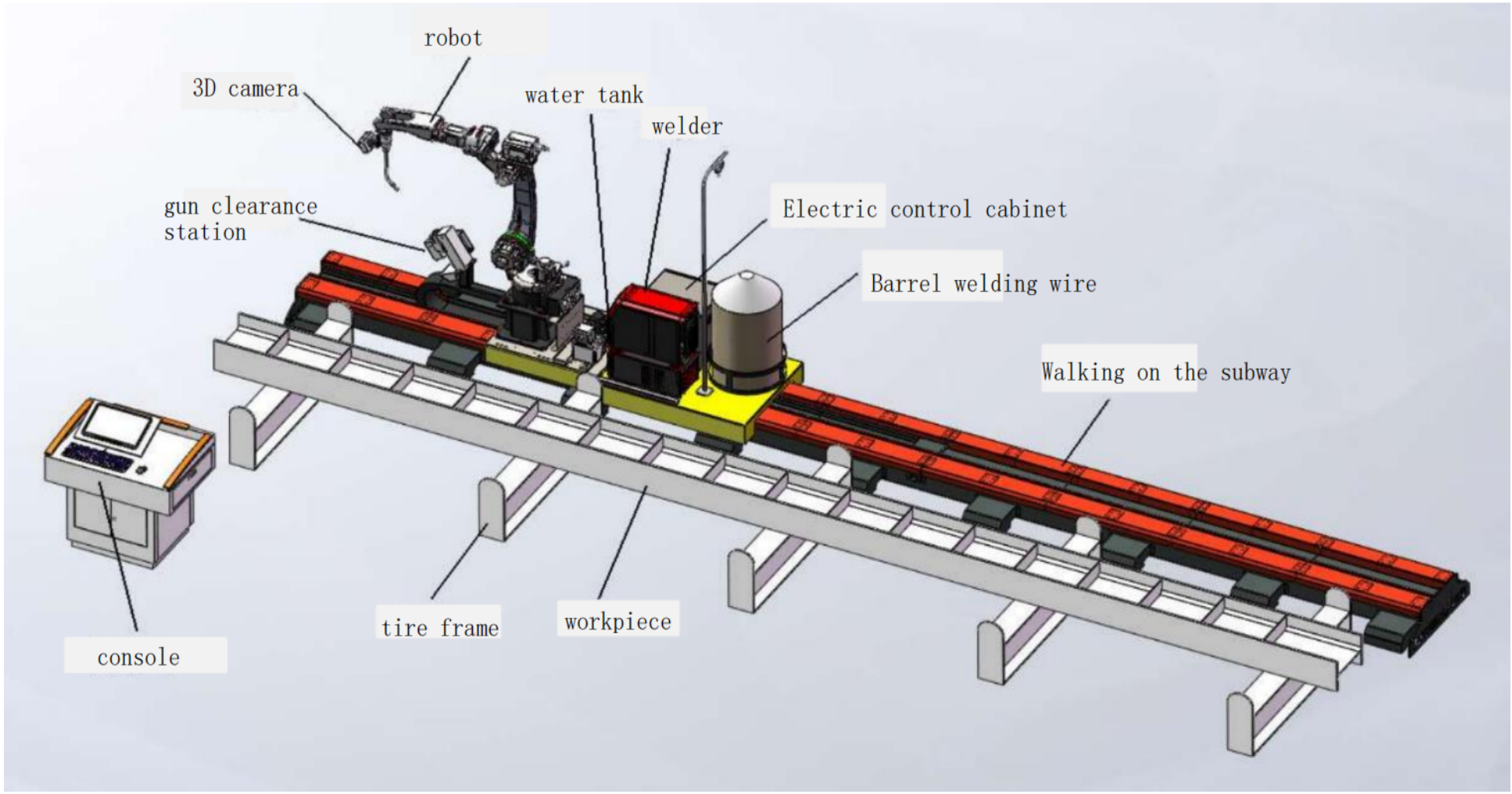
Intelligent welding hardware composition



QJAR plan layout and scope of supply

Smart welding layout

Seven-axis plan layout

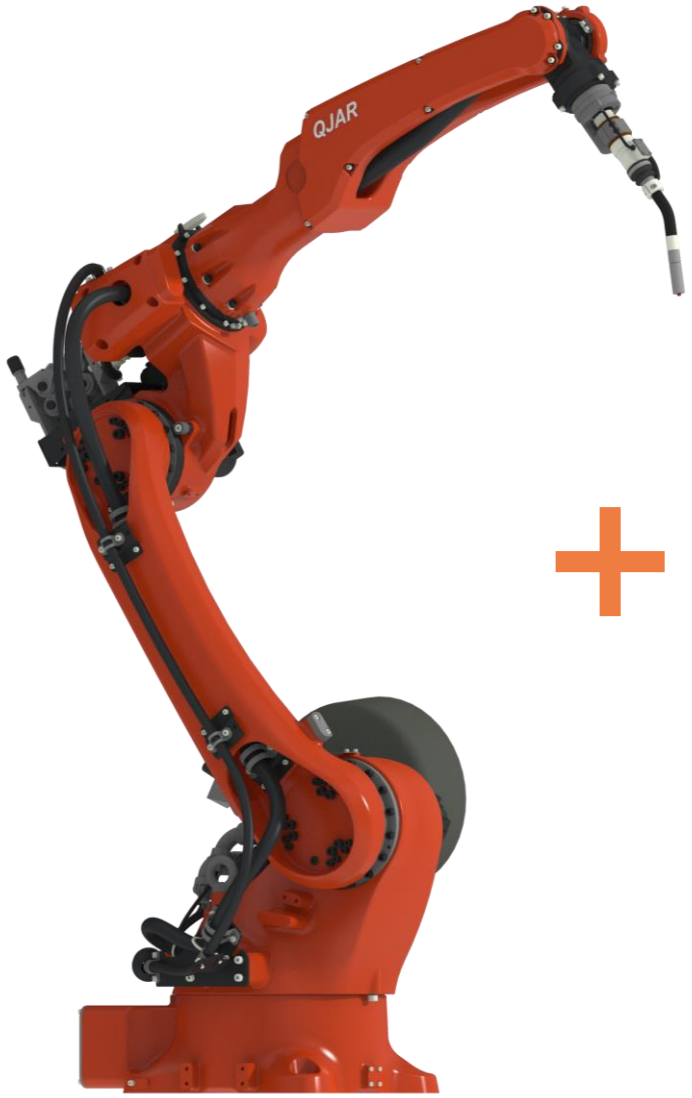


Welding robot configuration

Welding robot configuration

QJR6-2000H
Load: 6kg
Wingspan: 2014mm

QJR6-1400H
Load: 6kg
Wingspan: 1456mm

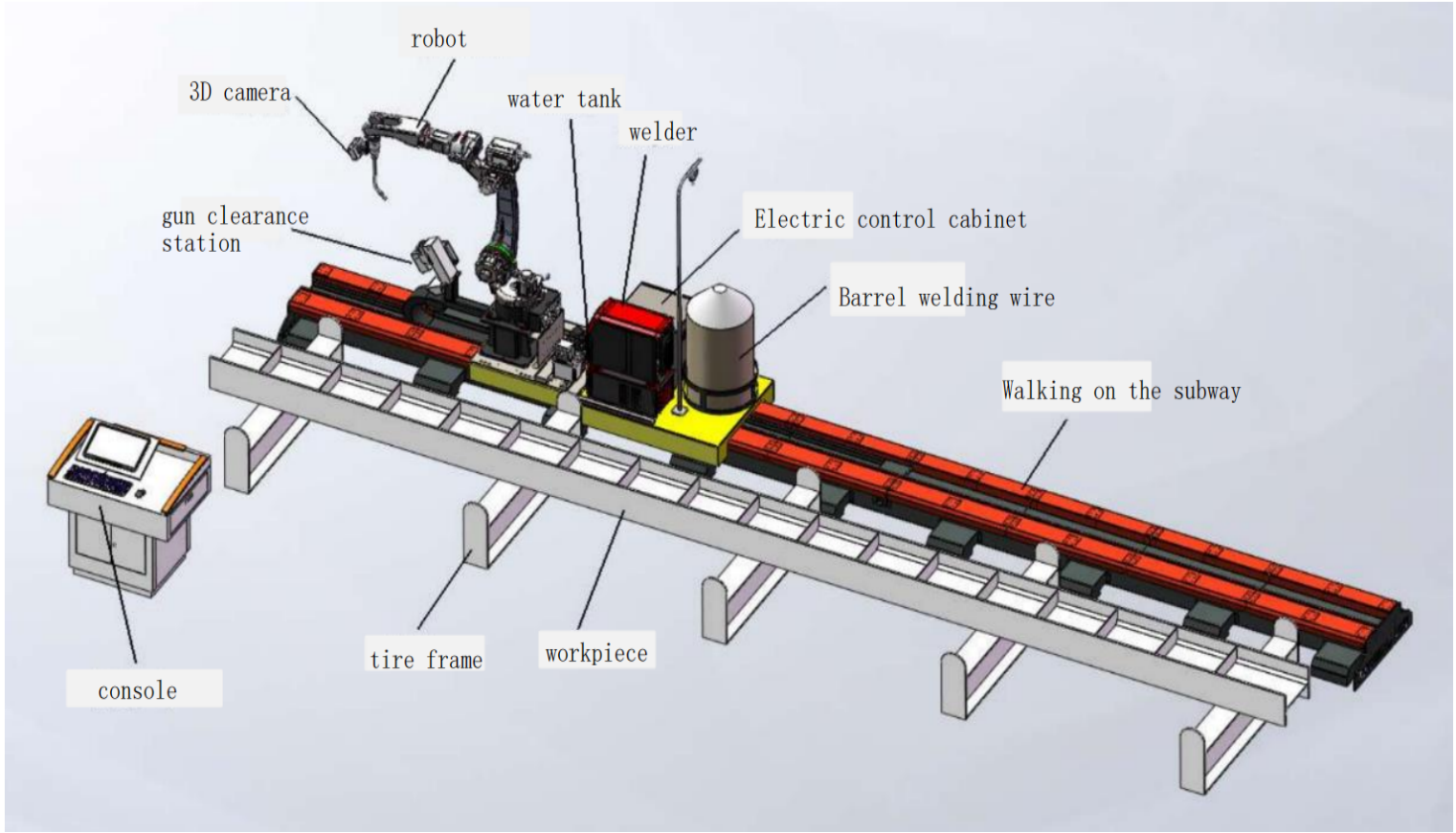


+

NBC500RP Plus

DEX2 500MPR

Welding machine selection and functional advantages



High speed and high current DC welding

Process features:

- Wide low spatter area: thin plate carbon steel 1.2mm welding wire can achieve low spatter within 210A
- Wider output voltage range, stable welding within the voltage correction range of +/-15, easy for welders to operate
- High dynamics: strong arc stability and rapid recovery from disturbances
- Under most working conditions, there is no need to connect the arc voltage sampling line
- Strong adaptability to changes in stem elongation
- Use high-speed calculation to simulate the high-current and low-voltage welding algorithm of the tap machine. Under high current DC, the speed is comparable to that of the tap machine, and the spatter is less than that of the tap machine.

Critical pulse

Process features:

· Low spatter and low heat input, suitable for high-speed welding of medium and thick plates
· Compared with standard pulse walking speed, it can be increased by 1.2~1.5 times
· The arc is more concentrated, the penetrating power is stronger, and the penetration depth is deeper
· Wide voltage matching range, good welding adaptability, simple operation

Welding machine selection and functional advantages

NBC-500RP Plus

Inverter MIG/MAG arc welding machine

Fast pulse

carbon steel
stainless steel

Performance features:

- Multifunctional digital pulse gas shielded welding product, using platform design concept, can integrate a variety of advanced welding process modules
- Equipped with multiple welding modes such as pulse, double pulse, fast pulse, constant voltage, etc., and can customize and develop process modules according to customer needs
- Adopting ultra-high inverter frequency, real-time refined management of droplet energy, concentrated arc energy and high stiffness
- Adopting the latest energy control scheme, the loop cable can be up to 45 meters long during pulse welding, and the full current range is stable welding
- The mixed gas adaptability range is wider, the long dry extension current consistency is more accurate, and the arcing mode can be switched freely
- Aluminum alloy welding has stronger ability to break oxide films, strong arc directivity, uniform droplet transfer, and fine and beautiful weld formation.
- The main control system adopts dual 32-bit high-speed and high-precision processors with nanosecond-level response speed
- The newly designed double closed-loop wire feeding control system, combined with a high-torque permanent magnet motor, ensures accurate and smooth wire feeding.
- The manual version can be equipped with a relay wire feeding system to achieve long-distance operations in a small space.

Technical Parameters:

Model	NBC-500RP Plus
Rated input voltage/frequency (V/Hz)	Three-phase 380±10% 50
Rated input capacity (KVA)	24
Rated input current (A)	38
Rated output voltage (V)	39
Rated load duration (%)	100
Output no-load voltage (V)	106
Output current/voltage range (A/V)	60/17~500/39
Welding wire diameter (mm)	0.8、1.0、1.2、1.6
Gas flow (L/min)	15~20
Enclosure rating	IP23
Insulation level	H
Overall dimensions: L×W×H (cm)	66×32×56
Weight (Kg)	55

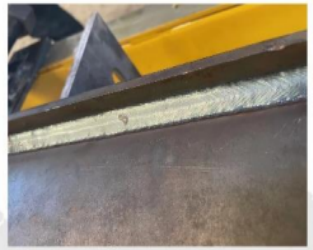
Fast pulse process

Fast pulse process:

- The rapid pulse process developed for carbon steel welding has been improved on the basis of the original pulse welding process, which not only retains the low spatter and high quality of pulse welding, but also improves the welding efficiency.

Process features:

- The wire feeding speed can reach up to 25m/min, which increases the efficiency by 20% compared with ordinary pulse welding.
- High arc stiffness and better directivity
- Suitable for semi-automatic engineering machinery, automatic welding machine supporting and other industries



Wider adaptability

Wide voltage adaptability, which can meet the voltage input of 300V-440V; gas adaptability is enhanced, and when the carbon dioxide content of mixed gas welding reaches 20%, it can achieve stable welding, continuous arc, and no blasting.

80%Ar 20%CO2 160A
MIG-Plus

80%Ar 20%CO2 160A

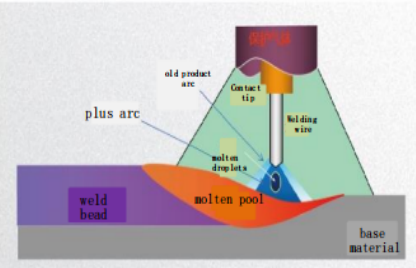
Enhanced output capabilities

The length of the carbon steel pulse current control cable is 45 meters to ensure stable welding and arc starting.

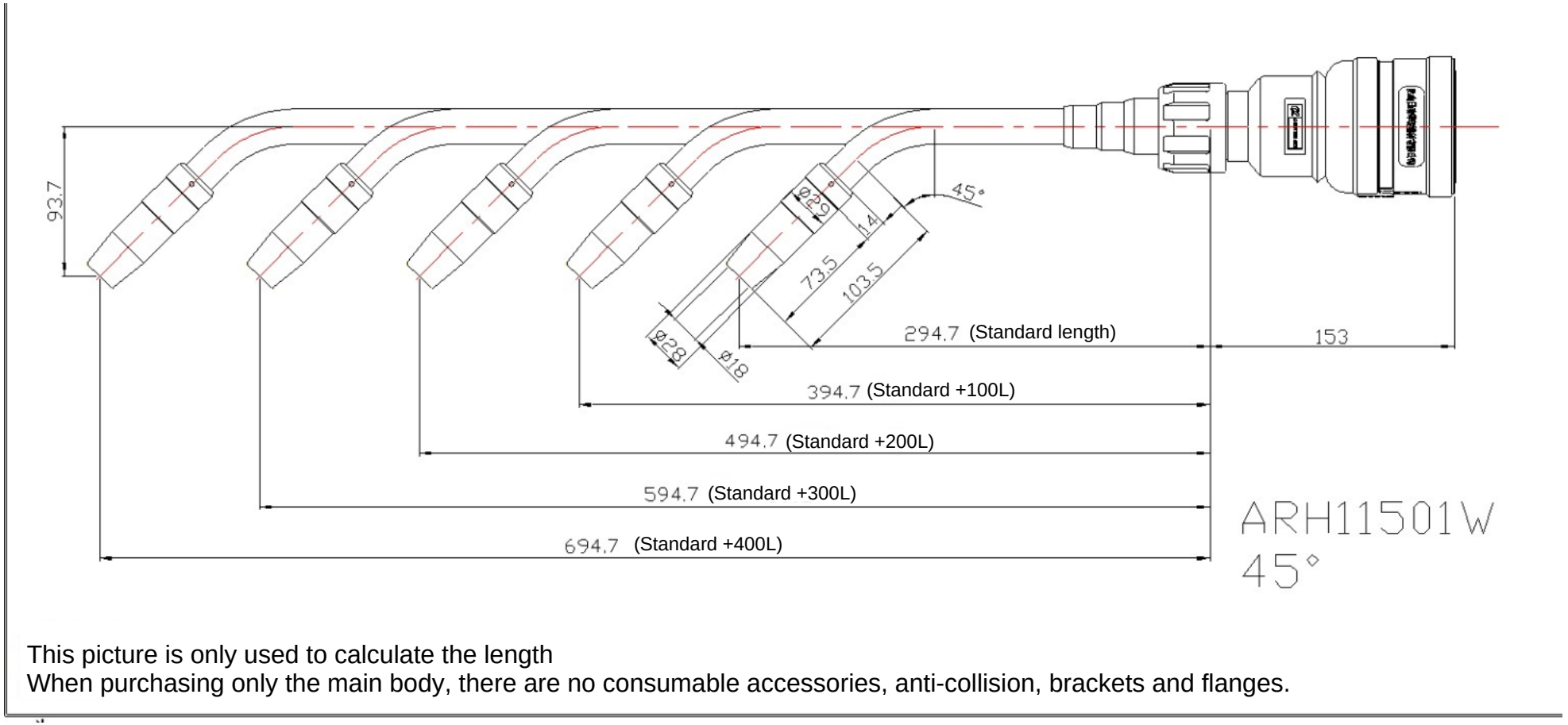
Arc stiffness enhancement

Plus arc has good arc stiffness, and the arc acts inside the molten pool, which not only improves the appearance and shape, but also increases the penetration depth.

The most intuitive improvement is that the penetration depth of aluminum alloy spot welding has increased 40% compared with the original



Welding gun gooseneck selection

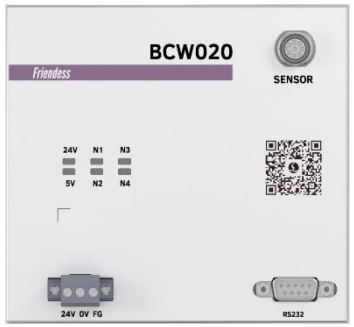


This picture is only used to calculate the length
When purchasing only the main body, there are no consumable accessories, anti-collision, brackets and flanges.

Intelligent trajectory planning product composition

Intelligent welding hardware

Control host



Switch

Position finder

Wireless handheld box

Communication connection

QJAR Intelligent welding version control cabinet

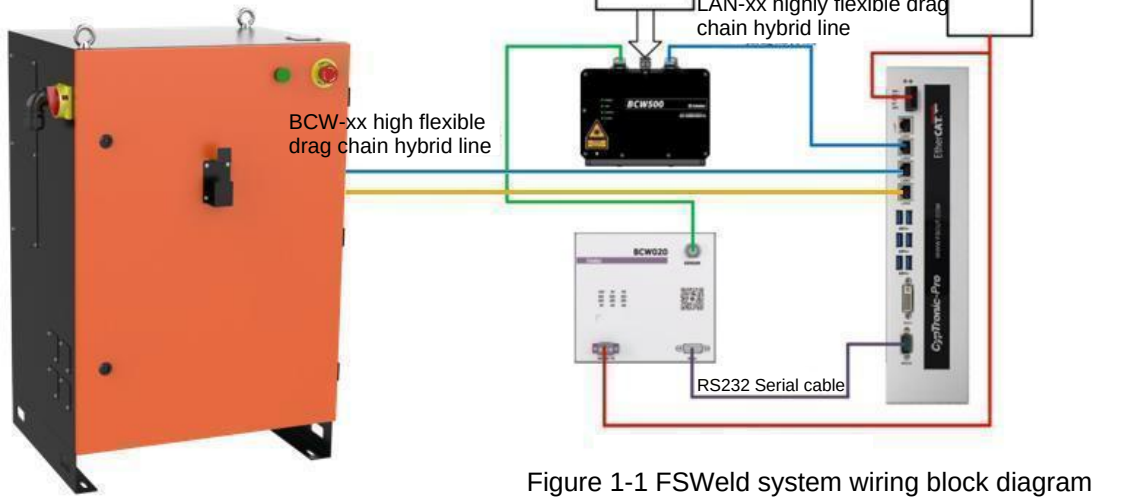
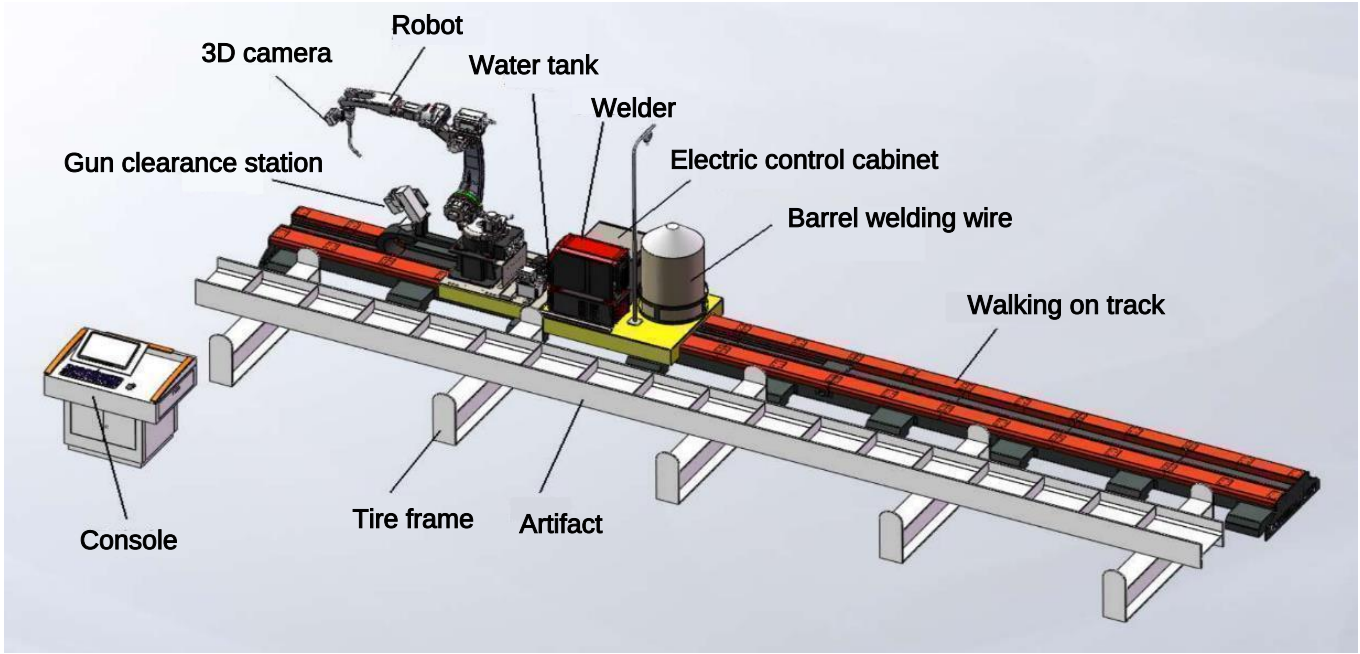


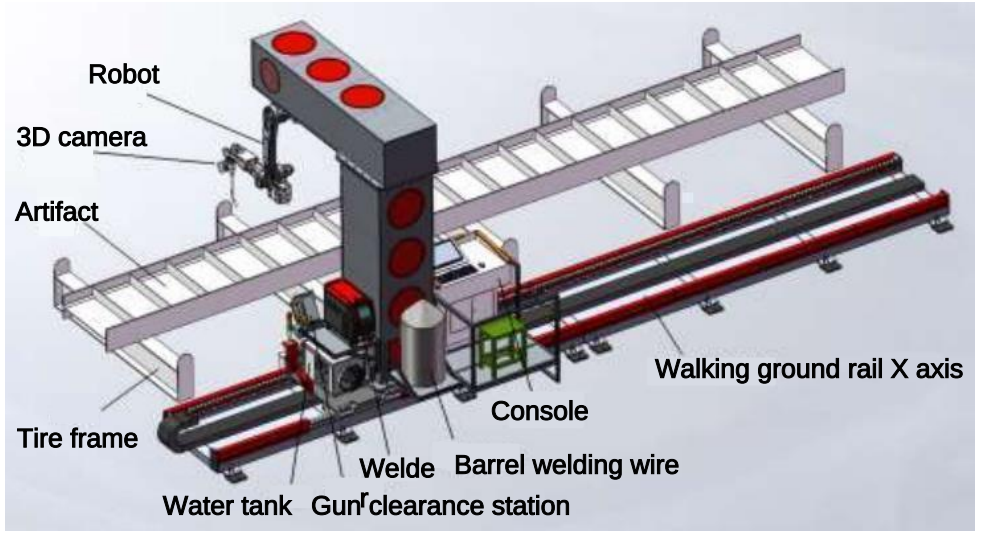
Figure 1-1 FSWeld system wiring block diagram

Smart welding layout

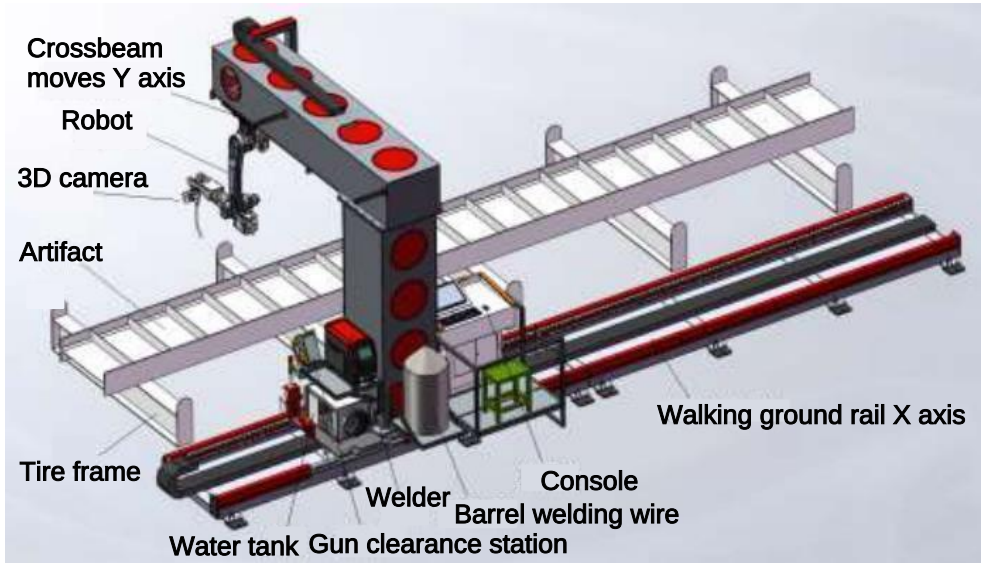
Seven-axis plan layout



Seven-axis upside-down layout



Eight-axis layout



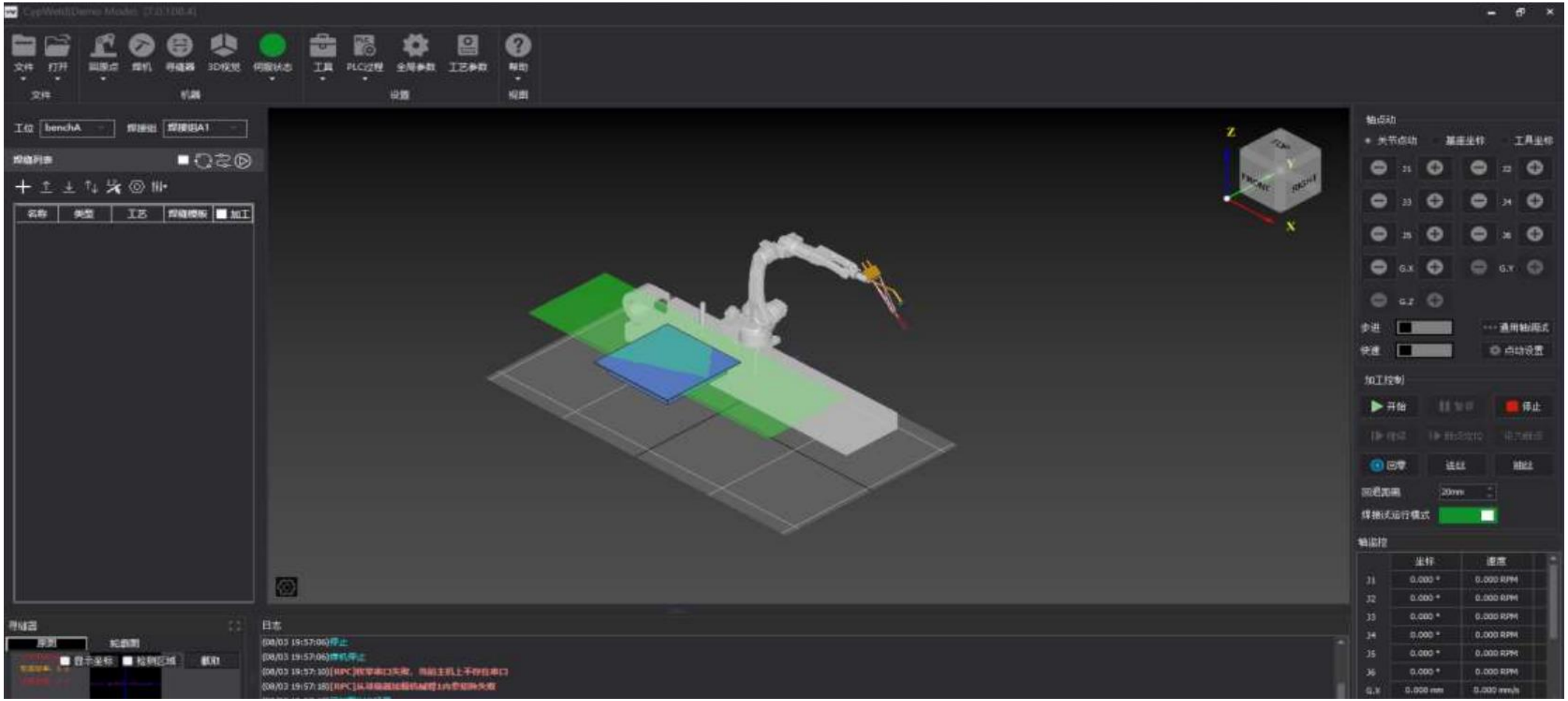
Intelligent welding configuration sheet

NO.	Project	Content	Scope of supply
1	Robot body	QJR6-1400H intelligent welding version, QJR6-2000H intelligent welding version	Include
2	Welding machine and wire feeding system	Aotai NBC500RP Plus, Megmeet Dex2 500MPR	Include
3	Water cooled welding gun	Daily consumption ARH11501W, standard length 294.7, +100L, +200L, +300L	Include
4	Intelligent welding system	Laser, industrial computer and other control systems	Include
5	External axis control	3+2 expansion axis	
6	Gun clearance station	Three-in-one, (gun cleaning, cutting, oiling)	Optional
7	Operation desk/control cabinet	Including mouse, keyboard, monitor, installation of industrial computer and switch	No
8	Ground rails and slides L-shaped inverted beam	Formal 500kg load floor rail, upside down 2T floor rail. The sliding table carries the robot, control cabinet, welding machine, and vat of welding wire.	No
9	Tire frame/ platform	Workpiece support	No

Intelligent welding process features

Digital twin

1. Use digital twin technology to build a twin welding workstation in the computer.
2. 3D model data analysis, automatic calibration of welds or extraction of drawing process information
3. Automatically generate inevitable path obstacle avoidance program



Parametric modeling

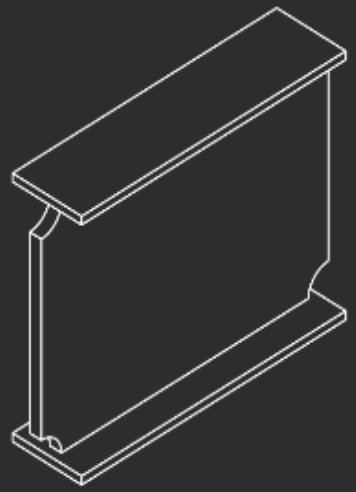
For commonly used structural software, built-in parametric model function

Complex structures still require 3D models

In graphics processing, the column and corbels models of the three-dimensional drawing cannot be separated. When imported into the offline software, you can only keep the corbels and delete the columns.

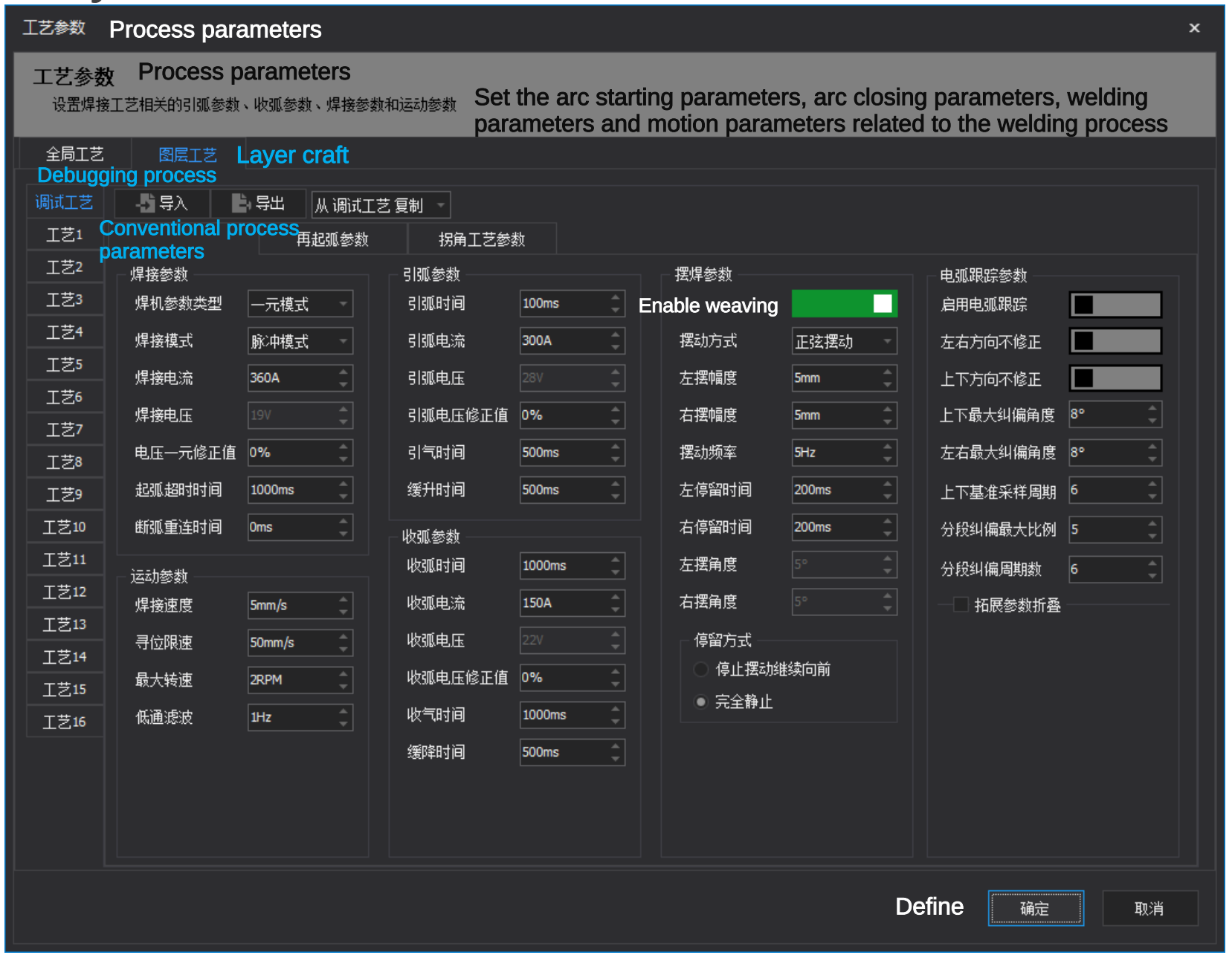
Parameter	Numeric
Web length	600.00 mm
Web height	600.00 mm
Web thickness	8.00 mm
Through welding hole R corner radius-left side	35.00 mm
Through welding hole R corner radius-right side	35.00 mm
Flange plate thickness	18.00 mm
Upper flange plate width	300.00 mm
Upper flange plate retraction distance-left side	0.00 mm
Upper flange plate retraction distance-right side	0.00 mm
Lower flange plate width	300.00 mm
Retraction distance of lower flange plate-left side	0.00 mm
Lower flange plate retraction distance-right side	0.00 mm

Schematic diagram



Welding process expert library

- Standard structure technology expert library
- Custom welding process library



Welding application cases

Case site

Intelligent welding application cases

Weld status

Intelligent welding adaptive structure

H-shaped structural stiffener welding

Tower corner welding

Transformer tank

Corbel welding

QJAR Intelligent Development Plan

Intelligent development of welding robots

Stage 1

Model development

Stability

Stage 2

Welding software development

Platformization

Stage 3

Visual guidance

Industry customization

Stage 4

Production adaptive

Digitizing