

**AUTOMATION
Welding System**

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Longitudinal Seam Welding Series

Overview

Longitudinal seam fixture is used to weld inside and outside seams for middle wall thickness tank, it could fit out PAW, TIG, MIG/MAG welding process. It could weld carbon steel, stainless steel, aluminum alloy, titanium and other material. The fixture is applied to weld food machinery, dyeing and finishing equipment, tank of power switch bus bar, medical instrument, special material pressure vessels for the chemical industry, pipeline for electric power, the shell of air condition and so on. The fixture could be added heighten and protection devices. The welding process controls by program to make welding reliable and high efficiency.



Features

- Use finger clamp for small welding distortion and high welding quality
- Suitable for 0.4mm–10mm wall thickness cylinder and sheet welding
- Suitable for TIG, MIG/MAG, PAW welding process
- Suitable for various materials, such as carbon steel, stainless steel, titanium alloy and aluminum alloy etc.
- According to work piece structure, optional to choose standard or customized mechanism

Technical Specification

	HL small size	HL middle size	HLN inside seam			
Model	HL1500	HL2000	HL3000	HLN4000	HLN6000	HLN7500
Maximum welding length for single torch (mm)		2000	3000	4200	6900	8400
Maximum welding length for double torch (mm)	1500	1600	2600	3800	6100	7600
Maximum clamping length (mm)	1590	2100	3075	4200	6900	8400
Maximum clamping diameter for outside welding (mm)	Φ850	Φ1100	Φ1200			
Minimum clamping diameter for outside welding (mm)	Circular mandrel	Φ110	Φ180	Φ180		
	Quadrate mandrel		Φ330	Φ330		
Minimum clamping diameter for inside welding (mm)		Φ2000	Φ2000	Φ1600	Φ1600	Φ1600
Minimum clamping wall thickness (mm)	0.4	1.0	1.0	1.5	1.5	1.5
Maximum clamping wall thickness (mm)	3.0	12	12	12	12	12
Adjustable fingers distance (mm)	7 ~ 33	5 ~ 40	5 ~ 40	10 ~ 40	10 ~ 40	10 ~ 40
Maximum single side pressure (kgf/cm)	15	30	30	30	30	30
Mandrel vertical traverse (mm)	15	30	30	60	60	60
Supporter adjustment (mm)	10	20	20	30	30	30
Centralizing adjustment (mm)	10	10	10	10	10	10
Welding trolley speed (mm/min)	60 - 1200	60 ~ 1200	60 ~ 1200	60 ~ 1200	60 ~ 1200	60 ~ 1200
Maximum trolley traverse (mm)	1600	3000	4000	6300	9000	10750
Dimension (LxMxH)	2530x820x1600	3500x1150x2300	4900x1200x2400	7100x1200x1800	9100x1200x1800	11050x1200x2000



Sheet To Sheet Longitudinal Seam Welding Series

Overview

The sheet to sheet welding fixture is used for welding carbon steel, stainless steel, titanium alloy, aluminum alloy, if could fit out PAW,TIG,MIG/MAG welding process

Technical Specification

Model	HP3000	HP6000	HP8000	HP10000
Maximum welding length for single torch (mm)	3200	6160	8160	10160
Maximum welding length for double torch (mm)	2700	5700	7700	9700
Sheetwall thickness (mm)	1.0 ~ 12	2.0 ~ 12	2.0 ~ 12	2.0 ~ 12
Maximum single side pressure (kgf/cm)	30	30	30	30
Adjustable fingers distance (mm)	10 ~ 40	10 ~ 40	10 ~ 40	10 ~ 40
Welding trooley speed (mm/min)	60 ~ 1200	60 ~ 1200	60 ~ 1200	60 ~ 1200
Cushion vertical traverse (mm)	Motor driven 60	Motor driven 60	Motor driven 60	Motor driven 60
Dimension (LxMxH) (mm)	6120x1200x1650	9200x1200x1650	11150x1200x1700	13150x1200x1800



Features

- Use finger clamp for small welding distortion and high welding quality
- Suitable for 0.4mm–10mm wall thickness cylinder and sheet welding
- Suitable for TIG,MIG/MAG,PAW welding process
- Suitable for various materials, such as carbon steel, stainless steel, titanium alloy and aluminum alloy etc.
- According to work piece structure, optional to choose standard or customized mechanism



Manipulator Welding Series

Overview

Manipulator is the main technological equipment for welding boiler, pressure vessel, pipeline and structural metal; it is composed to automatic welding system with roller, positioner, and integrated circumferential frame mechanism, that used for welding pressure vessel, spherical head welding, inside cladding for barrel and shell cover. it could fit out TIG, PAW, TIG, MIG/MAG, SAW welding process.

Features

- Modula design, easy to customize the circumferential seam welding according to customer requirements
- Suitable for circumferential seam edge joint welding and angular joint welding structure etc
- Suitable for TIG, MIG/MAG, PAW welding process
- Suitable for various materials, such as carbon steel, stainless steel, titanium alloy and aluminum alloy etc
- According to work piece structure, optional to choose standard or customized mechanism



Technical Specification

Model	HCJ2000	HCJ3000	HCJ4000	HCJ5000
Beam vertical traverse (mm)	2000	3000	4000	5000
Beam horizontal traverse (mm)	2000	3000	4000	5000
Beam vertical speed (mm/min)	850	850	840	840
Beam horizontal speed (mm/min)	110~1100	110~1100	120~1200	120~1200
Column rotation (°)	Motor-driven	+/-180	+/-180	+/-180
	Manual	+/-180	+/-180	+/-180
Dimension (LxWxH) (mm)	2000x3400x4200	2000x4400x5100	2300x5500x6500	2300x6500x7500
Welding trolley speed (mm/min)	4000	4000	2100	2100

Roller Welding Series

Overview

Roller is wide range used for welding circular barrel; It is necessary device to automatic welding pressure vessel. The roller has advantages as reliable quality, advanced performance, simplicity of operator.

Features

- Roller is divided into adjustable roller and self-aligning roller. Foundation and wheels base are both welding structure with remove welding stress process for avoiding deformation
- Magnify the width of wheels to reduce possibility of plastic deformation on surface, especially for thin-walled barrel
- Drive motor could insure the system smooth running under low speed
- The reducer is multiple geared reducer with big torque output
- The peripheral speed of wheels are stable and homogeneous



Technical Specification

HGJ-C Adjustable roller	Maximum load (kg)	Structure type	Load work piece diameter(mm)	Roller speed(mm/min)	Speed adjustment type
HGJ-2C Radial adjusting	2000	Master and slavery rollers	Φ300-Φ2500	100-1000	Frequency control
Bolt adjusting			Φ200-Φ2500		
HGJ-5C Screw mandrel adjusting	5000	Master and slavery rollers	Φ250-Φ2300	100-1000	Frequency control
HGJ-10C Screw mandrel adjusting	10000	Master and slavery rollers	Φ300-Φ2800	100-1000	Frequency control
HGJ-20C Screw mandrel adjusting	20000	Master and slavery rollers	Φ500-Φ3500	100-1000	Frequency control
HGJ-40C Screw mandrel adjusting	40000	Master and slavery rollers	Φ600-Φ4200	100-1000	Frequency control
HGJ-5 Adjustable roller	Maximum load (kg)	Structure type	Load work piece diameter(mm)	Roller speed(mm/min)	Frequency control
HGJ-10S Wheel dip angle 90°	10000	Master and slavery rollers	Φ320-Φ2800	100-1000	Frequency control
Wheel dip angle 120°			Φ320-Φ3600		
HGJ-20S Wheel dip angle 90°	20000	Master and slavery rollers	Φ500-Φ3500	100-1000	Frequency control
Wheel dip angle 120°			Φ500-Φ4300		
HGJ-40S Wheel dip angle 90°	40000	Master and slavery rollers	Φ600-Φ4200	100-1000	Frequency control
Wheel dip angle 120°			Φ600-Φ5000		
HGJ-60S Wheel dip angle 90°	60000	Master and slavery rollers	Φ750-Φ4800	100-1000	Frequency control

Positioner Welding Series



Overview

Positioner could be used in automatic welding and manual welding for butt joint, end face joint, and welding shaft, plate, barrel and others. Positioner has advantages as structure compact, attractive appearance, light, easy operation. Position is the welding auxiliary equipment for pressure vessel, metallurgy, electric power, chemical machinery, metal structure and other industry.

Features

- Foundation is welding structure with remove welding stress process for avoiding deformation
- There are 4 and more T type groove on the positioner table for easy connecting with fixture as chuck
- Be installed spring guide device to connect the ground wire into the position to avoid twine of cable

Technical Specification

Model	HB250	HB500	HB1000	HB2000	HB3000	HB20000
Maximum load (kg)	250	500	1000	2000	3000	20000
Overturn speed (rpm)	0.75	0.6	0.33	0.33	0.65	0.23
Range of overturn angle (°)	Manual 0-120 Moto-driven 0-135		Moto-driven 0-120	Manual 0-120	Moto-driven 0-120	Moto-driven 0-90
Rotation speed (rpm)	0.3-5.0	0.13-1.3	0.12-1.2	0.1-1.0	0.05-0.5	0.005-0.25
Table diameter (mm)	Φ500	Φ800	Φ900	Φ1100	Φ1200	Φ3000
Maximum eccentricity (mm)	50	150	150	150	200	200
Maximum centre of gravity (mm)	150	200	350	300	300	500

Circumferential Seam Welding Series

Features

- Module design, according to customer requirement to compose welding system
- Suitable for barrel and hydro-cylinder circumferential welding
- According to requirement to choose TIG, MIG/MAG welding process, and choose single torch or double torches
- Suitable for various materials, such as carbon steel, stainless steel, titanium alloy and aluminum alloy etc
- Suitable for pneumatic load material, hydraulic puller fixture

● Small size circumferential welding seam fixture

Small size circumferential welding fixture is used for welding vessel diameter less than $\Phi 1000$. It is composed by head stock, tailstock hydraulic pump, beam, pneumatic bracket, welding trolley, slider, arc protection cover, and controller etc. The work piece is clamped by adjustable chuck on the head stock; the work piece could be adjusted to coaxial with main spindle by ruler on the chuck. The tailstock clamps the work piece by hydraulic pump; according the requirement, it could use pneumatic support in the middle of work piece.



Technical Specification

Item	Parameters
Welding diameter (mm)	$\Phi 300-\Phi 1000$
Maximum welding length (mm)	2500
Rotation speed (rpm)	0.05 ~ 1.0
Rotation motor	Frequency conversion motor
Speed regulation	Step loss speed regulating
Distance of hydraulic pump movement (mm)	500
Support type	Pneumatic
Distance of slider vertical movement (mm)	450
Clutch type	Manual
Distance of oscillation slider movement (mm)	60

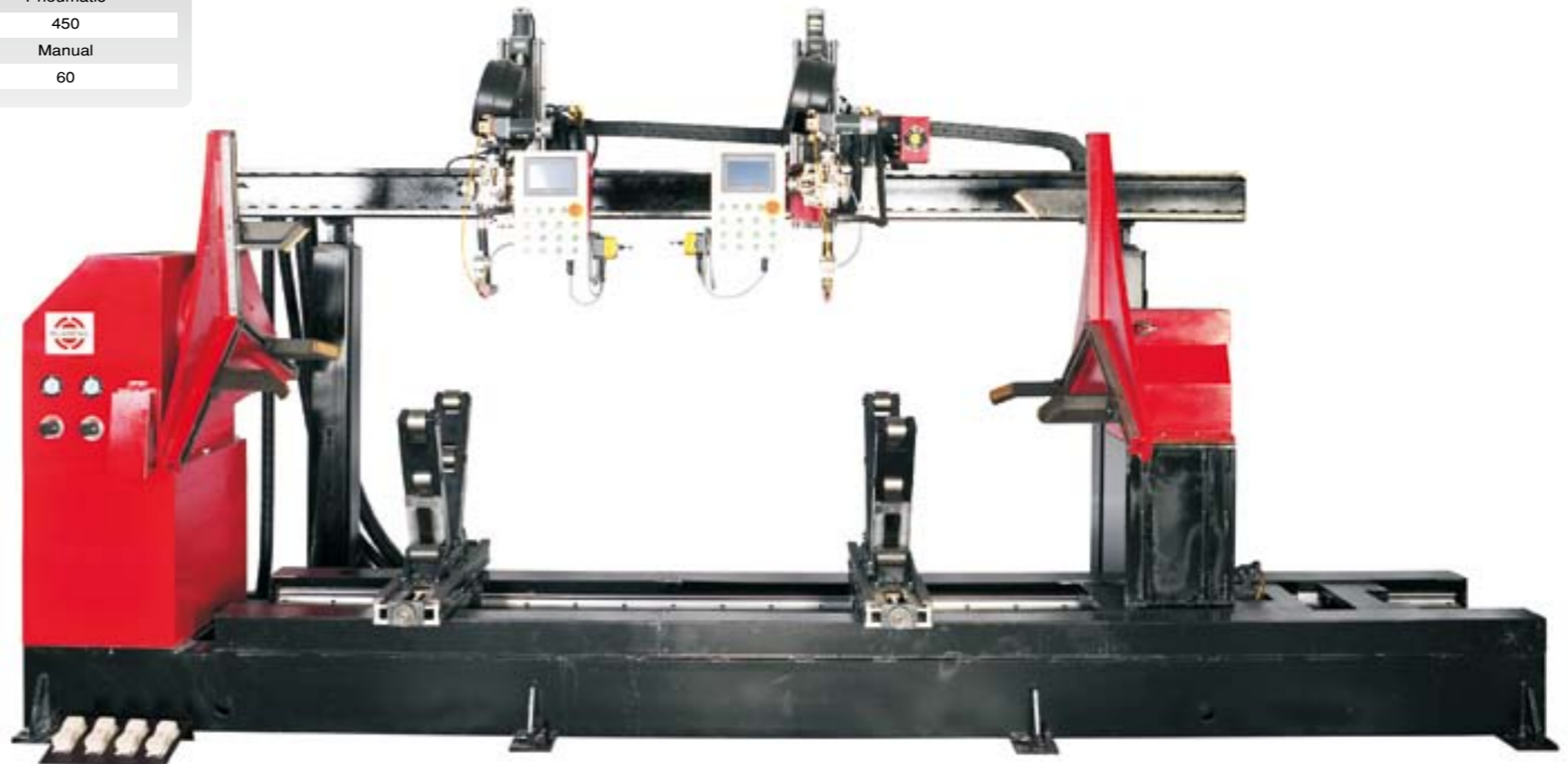
● Hydro-cylinder circumferential welding series fixture

It suits for welding diameter $\Phi 50 \sim 300$ mm, maximum length is 3000mm. The fixture is composed by main spindle box, lathe bed, pneumatic support, pneumatic tailstock, trolley, motor-slider, protection cover, controller, MIG torch system and automatic heating system. The work piece is clamped by adjustable chuck on the head stock; the work piece could be adjusted to coaxial with main spindle by ruler on the chuck. The tailstock clamps the work piece by pneumatic device; according the requirement, it could use pneumatic support in the middle of work piece.



Technical Specification

Item	Parameters
Welding diameter (mm)	$\Phi 50-\Phi 300$
Maximum welding length (mm)	3000
Rotation speed (rpm)	0.1 ~ 2
Rotation motor	0.55 kw, 1500 rpm
Clutch type	Manual
Movement distance of cylinder for pneumatic support (mm)	270
Diameter of cylinder for pneumatic support (mm)	$\Phi 160$
Movement distance of tailstock cylinder (mm)	250
Diameter of tailstock cylinder (mm)	$\Phi 160$
Maximum load of pneumatic support (kg)	3000(2 supports)
vertical distance of MIG torch slider (mm)	300
Movement distance of MIG torch AVC motor slider (mm)	60
Trolley move type	Manual
Dimension (LxWxH) (mm)	4700x1000x1800



Gantry Frame Beam Welding Series

Overview

The fixture is used for welding circumferential seam and longitudinal seam of barrel; it has vantage as small floor space, easy load. It always works with rotation table, work piece support, fixture of rollers. It could fit out with MIG/MAG or PAW, suitable for welding stainless steel pipe or vessel.

Features

- Suitable for longitudinal seam of big diameter pipe, barrel
- Weld circumferential seam with rollers, headstock
- Suitable for carbon steel, stainless steel
- Suitable for TIG, MIG/MAG, PAW welding process
- Small floor space, easy to load



Technical Specification

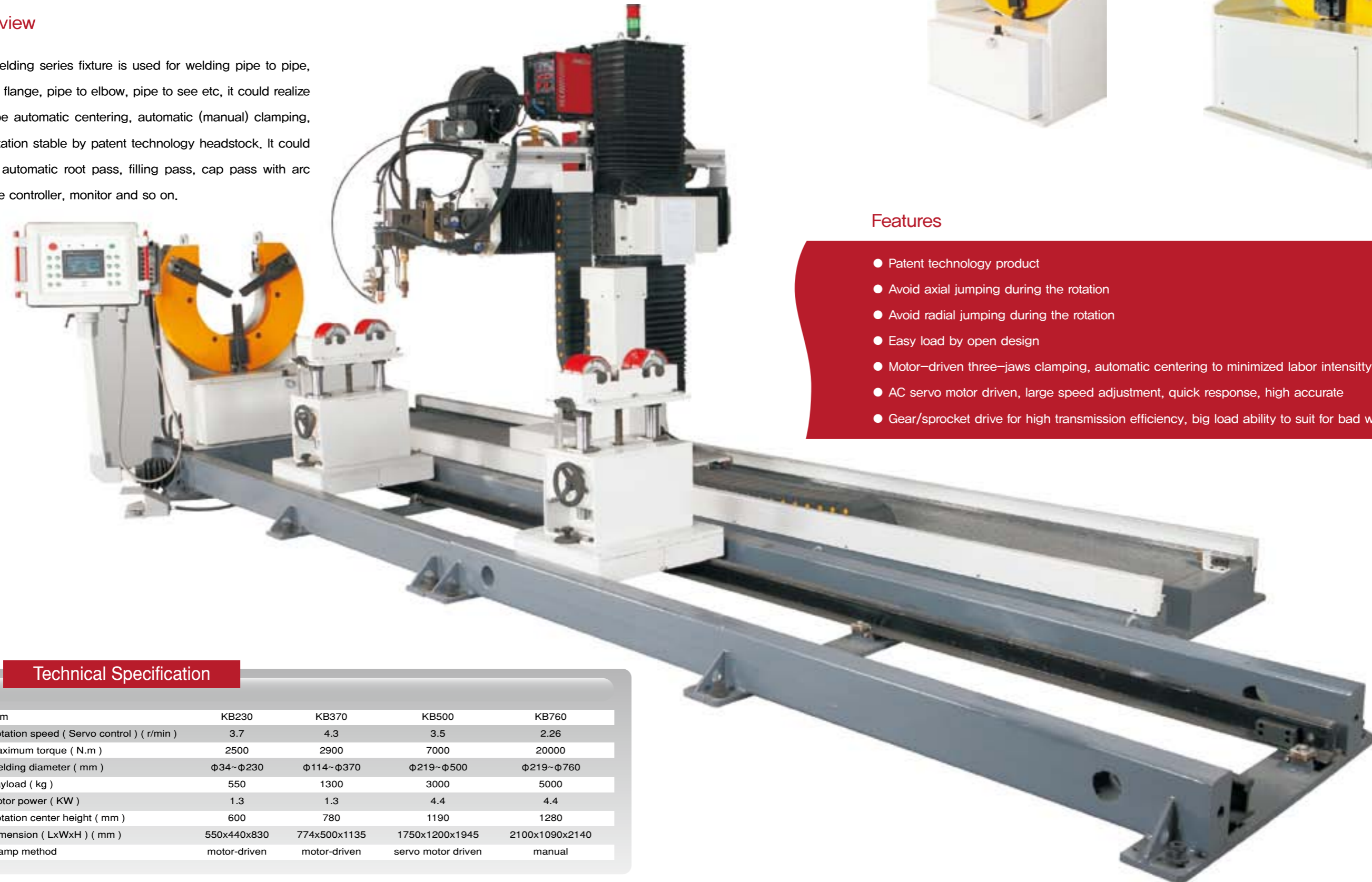
Item	HLM5000	HLM6500
Maximum welding diameter (mm)	5000	6500
Column speed of promotion and demotion (mm/min)	560	560
Trolley speed (mm/min)	80~800	80~800
Dimension (LxWxH) (mm)	5800x1800x2500	7600x1800x2500



Pipe Welding Series

Overview

Pipe welding series fixture is used for welding pipe to pipe, pipe to flange, pipe to elbow, pipe to see etc, it could realize the pipe automatic centering, automatic (manual) clamping, and rotation stable by patent technology headstock. It could realize automatic root pass, filling pass, cap pass with arc voatage controller, monitor and so on.



Features

- Patent technology product
- Avoid axial jumping during the rotation
- Avoid radial jumping during the rotation
- Easy load by open design
- Motor-driven three-jaws clamping, automatic centering to minimized labor intensitty
- AC servo motor driven, large speed adjustment, quick response, high accurate
- Gear/sprocket drive for high transmission efficiency, big load ability to suit for bad working environment.

Technical Specification

Item	KB230	KB370	KB500	KB760
Rotation speed (Servo control) (r/min)	3.7	4.3	3.5	2.26
Maximum torque (N.m)	2500	2900	7000	20000
Welding diameter (mm)	φ34~φ230	φ114~φ370	φ219~φ500	φ219~φ760
Payload (kg)	550	1300	3000	5000
Motor power (KW)	1.3	1.3	4.4	4.4
Rotation center height (mm)	600	780	1190	1280
Dimension (LxWxH) (mm)	550x440x830	774x500x1135	1750x1200x1945	2100x1090x2140
Clamp method	motor-driven	motor-driven	servo motor driven	manual



Welding technique and features

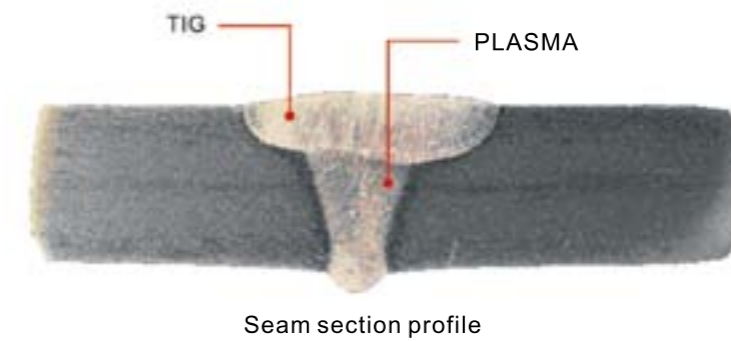
Use the plasma keyhole penetration to ensure the stable and high quality backside shaping; in order to get faster welding speed, we combing TIG welding for convering to follow the plasma welding to ensure surface stable and high quality shaping

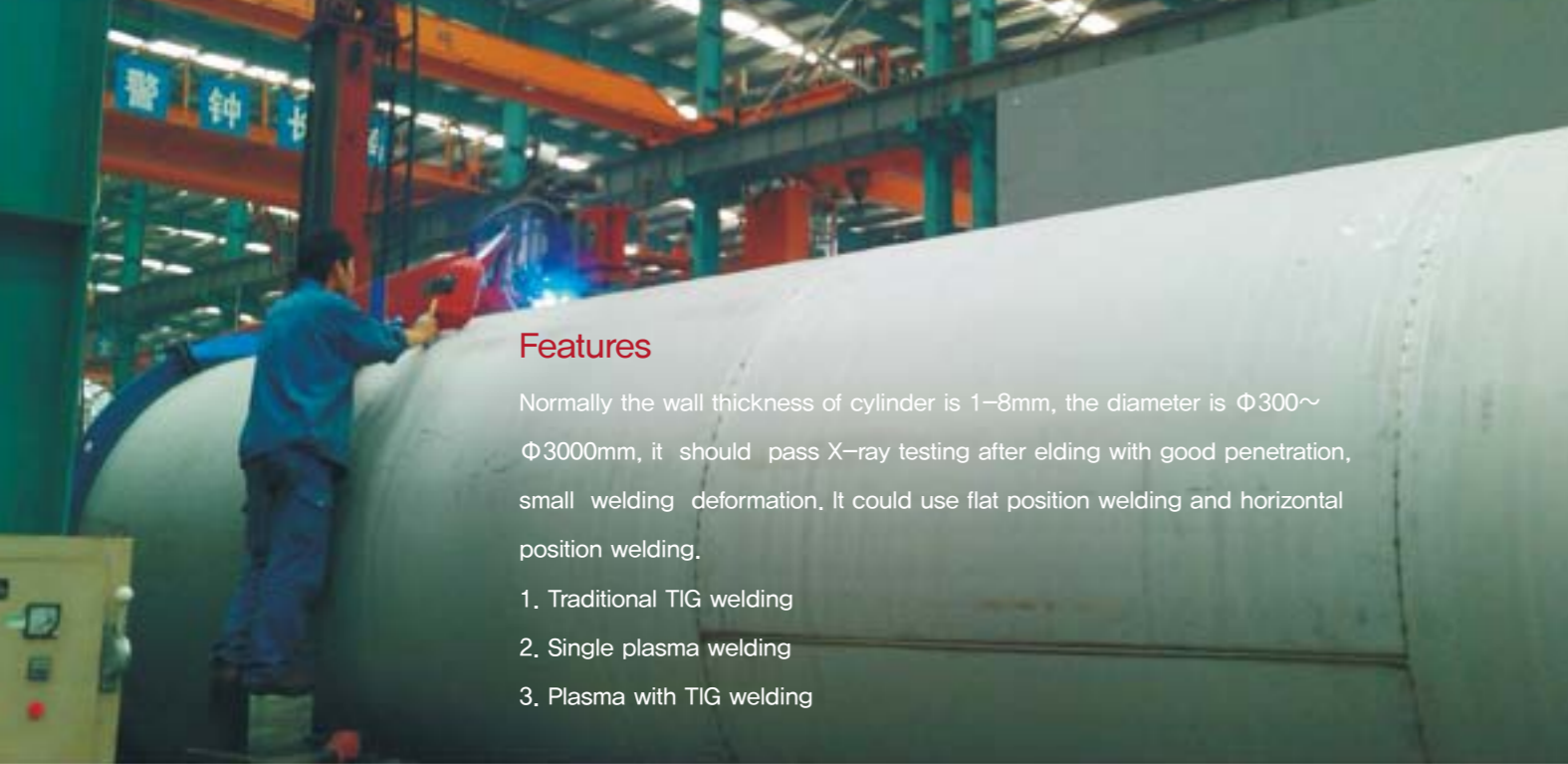
- Use P+T welding process, plasma welding in root pass, then TIG welding in cap pass, two torches welding to ensure higher speed welding faster 1.3–1.5 times than single torch
- Use stable industrial controller, ensure the system running a long time
- Module design, reduce the time of designing and producing that good far scale producing and maintaining
- We have more than 10 year experience in using plasma, we have professional teaching material, complete welding process guidance and service ability.

Tank Container P+T Automatic Welding System

Tank container features

- Used to store and transport various gas, liquid and power
- Material: stainless steel SUS316, SUS304
- Thickness: 3mm–8mm
- Tank Length: 5000–7000mm
- Tank diameter: $\Phi 1500$ – $\Phi 2300$ mm
- Welding requirement: one side welding double side shaping; good penetration and welding quality pass by x-ray





Features

Normally the wall thickness of cylinder is 1-8mm, the diameter is $\Phi 300 \sim \Phi 3000\text{mm}$, it should pass X-ray testing after elding with good penetration, small welding deformation. It could use flat position welding and horizontal position welding.

1. Traditional TIG welding
2. Single plasma welding
3. Plasma with TIG welding



Stainless Steel Cylinder Automatic Welding System





Big Diameter Stainless Steel Seamed Pipe Welding System

Stainless steel pipe welding feature

Stainless steel pipe manufacture uses continuous compaction plate and UOE method. For pipe diameter $\Phi 219\text{mm}$ and below thin wall thickness, continuous compaction plant is applied; for pipe $\Phi 219\text{mm}$ above, UOE is applied.

Normally, continuous compaction plant uses single torch, multi-torch or P+T welding technique; while UOE is used for thick wall, approximately 6m long stainless steel pipes for each, and uses plasma welding, P+T welding, and combing of plasma, TIG, SAW welding for various thickness welding.

For higher requirement of inside welding shaping, re-melting is required.

UOE pipe welding:

Diameter: $\Phi 219\text{--}\Phi 1220\text{mm}$

Length: $\leq 6\text{m}$, excluding customization

Thickness: 4–14mm

Material: SUS321, SUS304, SUS316, SUS316L, titanium alloy etc

Welding technique

Plasma welding technique is used for wall thickness 4mm and above, the plasma keyhole is good for penetration, which is easy to get one side welding double side shaping. For example, wall thickness 3–8mm without beveling, we only needs one pass welding process. For wall thickness 8mm above, beveling and land are required, plasma welding for root pass, and plasma covering/TIG covering/SAW covering (alternative to choose according to wall thickness and welding technique); or P+T welding technique applied. Presently single plasma torch is comprehensively used for practical application.



High Precision Tig Automatic Welding System

Feature

The system is suit for high precision TIG welding for thin wall thickness stainless steel, titanium alloy, nickel base alloy etc. it is stable and limits welding deformation.

Product specification:

Length: $\leq 1500\text{mm}$

Thickness: 0.4–3mm

Material: austenitic stainless steel and other material such as titanium alloy, nickel base alloy.

Welding process features

Welding procedure;

For wall thickness 3mm and below, to use single TIG welding to get one side welding double side shaping is reasonable, on the other hand it is able to get perfect front-side shaping and less welding remaining. In order to minimize the welding distroton during the welding process, automatic welding mechanism is necessary and used for better heat elimination. According to work piece wall thickness and particular requirement, it could choose wire feeding or fusion. Under condition, fusion is applied for wall thickness 2,5mm below to get on side welding double side shaping. Wire feeding is applied for wall thickness 3mm above.





Large-scale Plate To Plate Automatic Welding System

Feature

Special purpose vehicle industry is increasing very fast, especially for van or tank car which are used for environmental protection. For engineering infrastructure projects such as duming tanks.

Tank car description:

Material: low carbon steel, austenitic steel, aluminum alloy etc

Length: ≤9500mm

Thickness: 4,5,6,8mm etc

Connection: sheet to sheet longitudinal seam welding

Welding techniques

Stick welding is the normal way for welding low carbon steel and for this particular structure material wall thickness is 8mm and below. In order to change for better welding process, more advanced pulse MAG welding is applied, which increases welding seam quality and minimizes welding distortion, and also increases welding speed and welding deposition. Automatic MAG welding is 3-4 times efficient than manual welding.



Pipe Station Automatic Welding System

- Using the patent machine open headstock to realize pipe and fitting automatic centering, motor-driven clamping and rotation stable; with AVC and monitor system to realize automatic root welding, filling and cap welding.
- The open headstock could avoid axial jumping during the rotation; due to the welding joint closes to the position of clamping, it could avoid radial jumping during rotation.
- Using stable PLC controller for ensure welding system work stable and reduce the fault rate.
- Module design for reducing time for designing and producing, it is beneficial to production and maintain.
- Suitable for angle welding joint, butt welding joint and others.
- According customer requirement to provide standard, non-standard production.
- It could compose to a automatic production line with logistics system.





Bent Pipe-Flange Automatic Welding System



- Both inside and outside two seams welding simultaneously, which minimize labor intensity and skills
- Open designed headstock rotator which is convenient for load/unload work piece
- High efficiency, e.g $\Phi 155$ pipe welding time less than 60s for two seams at the same time
- Unique welding process for two seams
- Patent design open headstock rotator with AC servo motor for stable rotation and high accurate control
- Suitable for variable OD bent pipe-flange inside and outside seams welding simultaneously





Pipe-Flange Automatic Welding System

- Advanced profiling tracking device which ensures constant distance between torch and pipe
- Integrated fit-up, tack welding, conveyer system and welding system together to improve efficiency
- Automatic pipe load/unload
- Suitable for OD 2" – 8" pipe to welding
- Specially designed for slip-on flange four seam welding simultaneously
- Suitable for shipbuilding and construction machinery





Automatic pipe pre-fabrication welding production line



- The system is designed for pipe pre-fabrication, according to productivity requirement to choose the welding station and designing, all welding stations are connected by effective logistics system, realize all work processes as fixed length, load, bevel, fit-up, spot welding, root pass, filling, cap, it increases efficiency of pre-fabrication.
- Fixed length solves automatic root pass problem in in pre-fabrication.
- Using stable PLC controller for ensure welding system work stable and reduce the fault rate.
- Welding station could transport by container, that is easy to realize field operation and place change requirement.
- Module design for reducing time for designing and producing, it is beneficial to production and maintain.
- Be widely used in ship building and off shore industry.





Automatic Cladding Welding System

Cladding welding is a very important process in welding, according cladding Welding work piece could get more heat resistance, abrasion resistance, corrosion resistance and so on. Now cladding welding procedure is always used in surface producing and re-producing the discarded parts.

- TIG cladding welding
- MIG cladding welding
- Plasma spraying cladding welding
- SAW/strip cladding welding





Welding technique

According to work piece structure and from quality control point of view, TIG,MAG and plasma welding are recommended; from productivity point of view, MAG welding is more reasonable and economic, MAG welding is not only high efficient, but also lower requirement for welding preparation. inner bile welding process (longitudinal seam; circumferential seam): TIG,MIG,PAW External bile welding process (longitudinal seam; circumferential seam): PAW,MAG

In order to get better welding quality for single side welding, the covering after the torch is required; the gas should be argon or nitrogen.



Low Temperature Heat Insulation Gas Cylinder Automatic Welding System

Low temperature heat insulation gas cylinder features

Low temperature gas cylinder is vacuum and multi-layer heat insulation and moveable low temperature liquid container and used for storage and transportation liquefied gas, such as oxygen, liquid argon and liquid nitrogen. It is made up of stainless steel inside and outside stainless tank, vacuum heat insulation layer, internal carburetor, and valve pipe safety system.

Low temperature heat insulation gas cylinder:

Material: stainless steel 304/316

Diameter: $\Phi 300-\Phi 900\text{mm}$

Barrel length: $\leq 2500\text{mm}$

Thickness: 2.5mm-6mm

Welding seam requirement: pass X-ray inspection for inside tank





Construction Machinery Automatic Welding System

● Concrete mixer production line welding system

Construction machinery concrete mixer tank wall thickness is thin; usually MAG welding is applied to minimize distortion

Production line is composed by three systems

1. Plate to plate longitudinal seam welding system
2. Barrel longitudinal welding system
3. Circumferential seam welding system

It is time consuming for concrete mixer circumferential seam because there are pairing and welding supporting preparation during the whole welding process, therefore we use two stations design to save time to maximize productivity.



● Crane components welding system

The crane boom is butt joint welding. Traditional welding procedure is manual MAG for root pass and automatic covering welding, which is low efficiency. We use double wire MAG welding to achieve root pass and covering welding simultaneously, which is higher efficiency, its two-station design is applied, efficiency will increase obviously. Back-end crane chassis welding is a heavy workload procedure. Traditional welding procedure is welding cart, manual turning after one layer welding. We use dual-torch welding with automatic turning, which is applied for similar products.





■ Hydraulic cylinder welding system

Feature

Construction machinery, mining machinery industry hydraulic cylinder requires high technology and with high market demand. The hydraulic cylinder is comprehensively used for wheel loader, graders, roller, construction crane, forklift, and concrete mixer etc.

The hydraulic cylinder:

length: L=180–3000mm

Diameter: Φ 70– Φ 600mm

Material: 27SiMn, 45#, 16Mn etc



Welding technique

Welding method: there are two types of circumferential seam structure. One is plug-in butt joint welding, another is plug corner welding. According to hydraulic cylinder structure, and from welding quality and efficiency point view, pulse MAG welding is applied.

Welding process: The hydraulic cylinder is carbon steel or low carbon steel. In order to get stable welding and minimize spatter, pulse MAG welding is used to ensure welding quality and high efficiency, the welding speed is approximately 200–500mm/min.

It uses argon 80%–82%, carbon dioxide 20%–18% for welding gas.

Filling wire: ER50–6, diameter Φ 1.2mm

Because of the thickness of the work piece, pre-heating is required before welding according to requirement, if pre-heating needed flame device is required. In normal condition, pre-heating is not required, but we use multi-layer welding, and it is possible to choose current, torch oscillation and AVC parameter during the welding process, and it is also possible to pre-set the parameter before welding.



Welding technique

Welding method: aluminum alloy is rapid heat conduction, so it is better to use centralized pulse MAG welding. One point is to improve working condition to get better welding seam; another point is to improve working efficiency. In order to improve welding seam shaping, we use AC TIG welding to modify the cover.

Welding process: it is possible to use expert JOBS to get optimal welding parameter, and to get stable and one pulse one drop welding, which is also good for better even shaping and perfect welding quality. In order to improve welding shaping, dual pulse MIG welding technique is applied, which is also to get as similar welding quality as TIG welding.

Welding gas: Argon or Argon with helium (30% or 50%)

Filling wire: ER5356, diameter $\Phi 1.2\text{mm}/\Phi 1.6\text{mm}$

The longitudinal seam is not only finished on longitudinal seam welding system, but it is also applied in automatic welding system, which is made up of column&boom, inclined roller, and positioner. It is used for longitudinal seam welding, circumferential seam welding and comer welding.

Power busbar Switch Automatic Welding System



Power busbar switch feature

With the development of high voltage switchgear industry, SF6 metal-enclosed switchgear, known as Gas Insulated Switchgear, GIS. It plays a significant role in transporting and transferring electricity. Circuit breakers, busbars and their shell mainly use aluminum-magnesium alloy, Aluminum shell is one of the main components of the GIS suit product.

Power busbar switch:

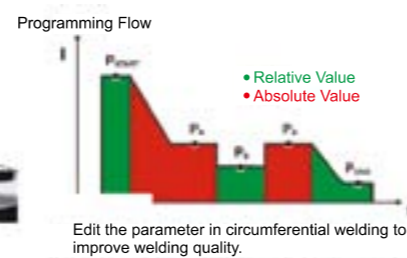
Material: 5052 Al-Mg alloy and aluminum alloy

Thickness: $\leq 16\text{mm}$

Diameter: $\leq \Phi 1000\text{mm}$

Structure type: cylinder longitudinal seam, butt joint circumferential seam, pipe-flange inside and outside

comer welding Welding seam requirement: pass X-ray inspection





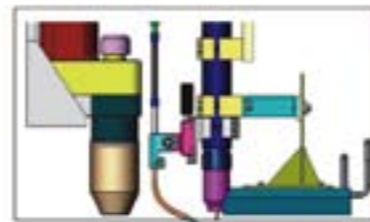
Welding procedure features

Thickness less than 8mm stainless steel and 10mm titanium alloy without beveling; more than above thickness, using plasma root pass with V bevel 75° and 5–6mm tank, with plasma or TIG in filling and cap pass. It is a welding process with high quality, saving material, small heat input for protecting material.

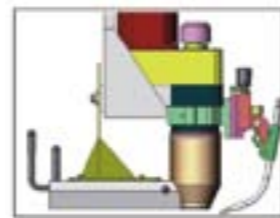
Fit-up requirement: misalignment less than 10% wall thickness and less than 0.8mm.



Special Material And Composite Plate Plasma Welding System



P+T



Single Plasma



Pressure vessel introduction

Work piece features:

Material: stainless steel, nickel base alloy, titanium alloy, zirconium alloy etc.

Thickness: 3–12mm

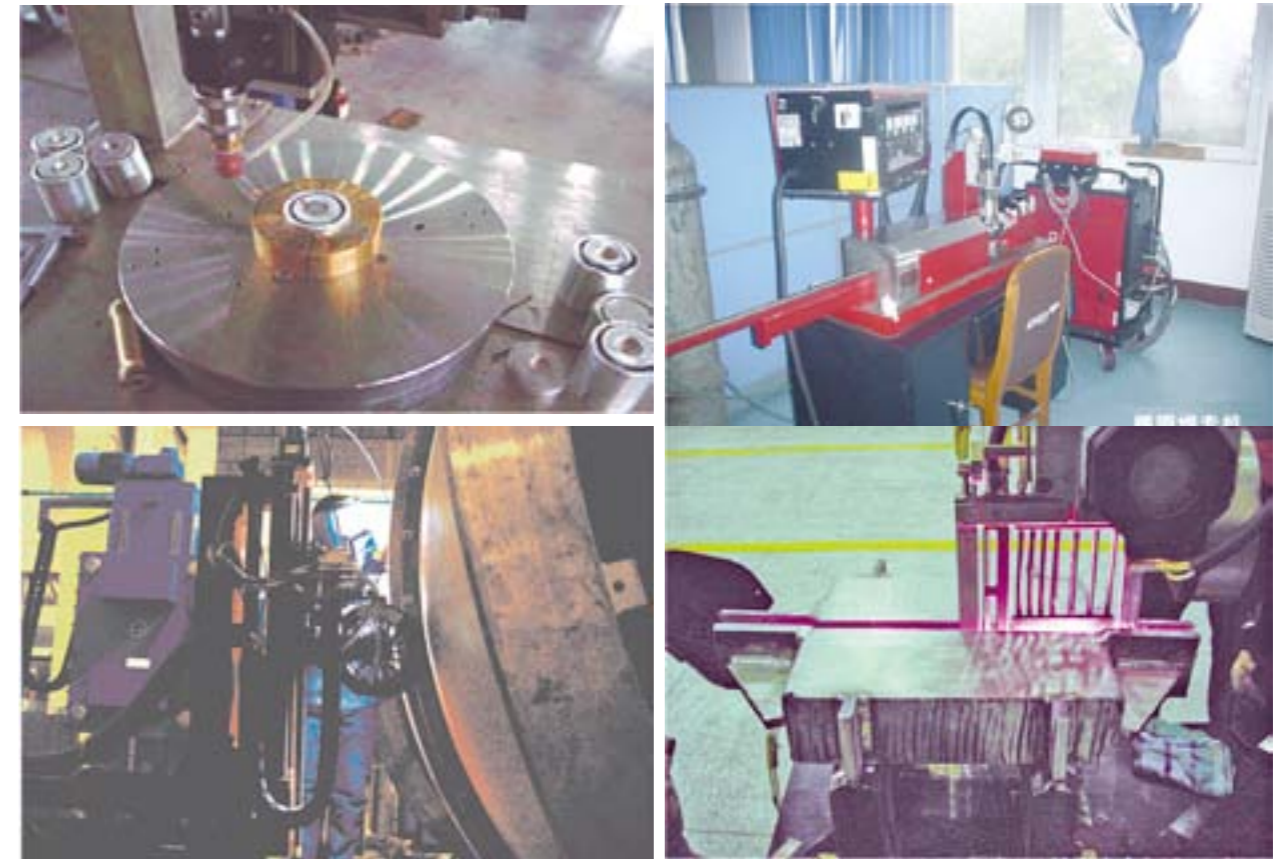
Diameter: $\Phi 1000\text{mm}$ – $\Phi 2500\text{mm}$

Length: 1500mm–6500mm

Structural style: multi-circumferential seam and longitudinal seam

Type of welding: plasma single torch or plasma and TIG double torch

Welding seam requirement: single face welding and double face shaping, pass X-ray testing, surface shaping, protective seam and reproducibility.



Features

Requirement: precise circumferential seam system, longitudinal seam system, and others with high reliability, high precision, high quality seam and 100% repeatability.

Technology features: We have more than 10 years experience in designing and producing machines for military industrial. And more experience in welding procedure.

Military Industrial Automatic Welding System





Others Automatic Welding System



Automatic Mag Root Pass Welding Technique

We dedicate to reserch on automatic MAG root pass welding procedure and get a significant breakthrough, which use automatic welding for fit-up gap within 2-6mm, and pass mechanical test and X-ray test. It is the important perforation. It is suitable for straight pipe with various fittings connection, especially for long pipe with fittings on both ends.

Advantages of automatic MAG root pass welding

- Welding quality stable and reliable, welding reproducible is 100%
- Minimize worker's skill intervene in welding
- Minimize fit-up preparation requirement
- Unfitness of butt joint and fit-up gas is not a main problem within 0-6mm

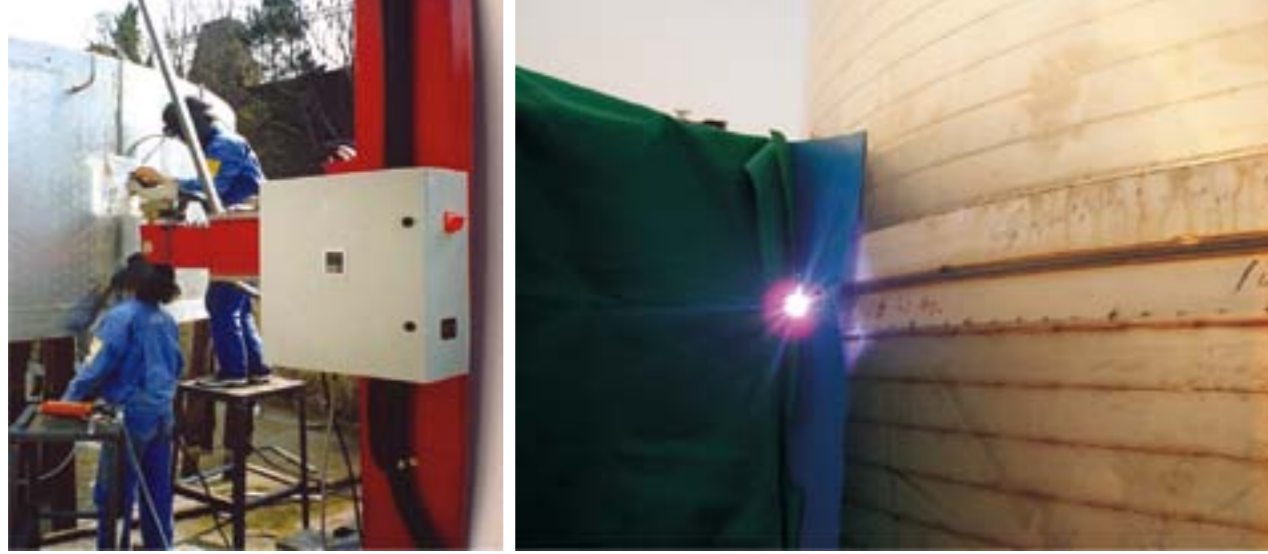


Automatic Tig Root Pass Welding Technique

Conditions of automatic TIG root pass welding:

- Technology of TIG arc voltage control (AVC)
- Patent design open headstock, which avoids radial and axial jumping during the rotation therefore TIG root pass welding is assured
- Mature welding procedure experience
- Machining bevel or beveling machine bevel preparation

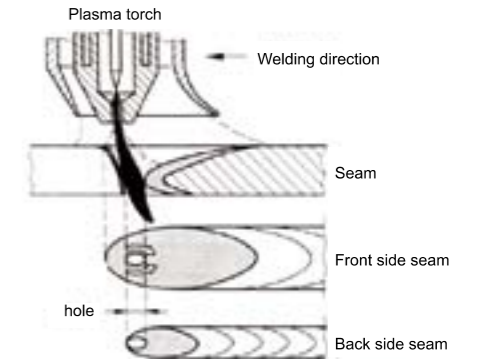
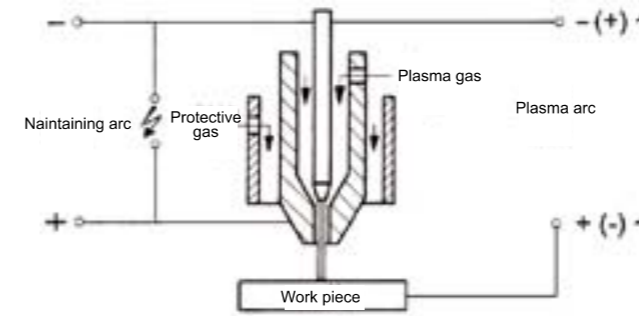




Plasma Horizontal/vertical Welding Technique

Application range: big diameter cylinder and container stainless steel welding

Application place: plant prefabrication, field site welding



Principle

The arc between electrode and work piece is compressed by special torch structure and formed stable compressed plasma arc, to melt the work piece to get deep penetration. There are three types of arc, i.e. transferred arc, non-transferred arc is common used.

Welding technique

Normally, plasma gas is pure argon gas, which has good ionization ability and arc stable effect. Protective gas depends on material.

For stainless steel: 95%–97%Ar, +3%–5%H₂

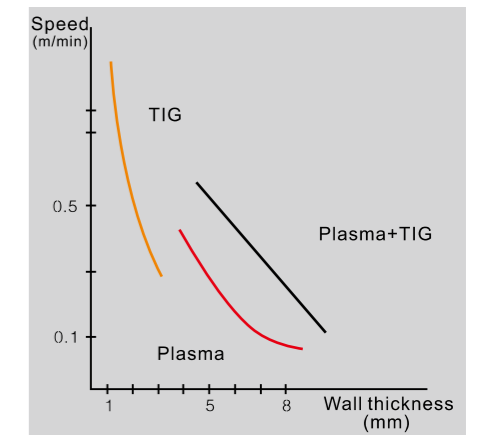
For carbon steel: pure argon gas or argon gas with helium

Plasma welding technique choosing depends on work piece thickness and material

There are many advantages to use plasma welding, therefore plasma welding technique is gradually used in food machinery, biomedical machinery, chemical container, piping industry, dyeing and finishing equipment and other industries

Welding process features

- Strength in penetration, 8mm below without beveling to minimize welding preparation time.
- Energy concentration arc to get small heat affect zone, and small distortion
- High welding speed, plasma welding saves 4–5 times compare to manual TIG welding
- Excellent welding quality performance repeatability
- Rigid arc and keyhole effect to ensure stable and one side welding double side shaping solution
- Electrode is inside of the nozzle which is not easy to be polluted and burned therefore it is good for long lifetime using
- Good welding quality performance and filling material saving plasma arc has good controllability and adjustability



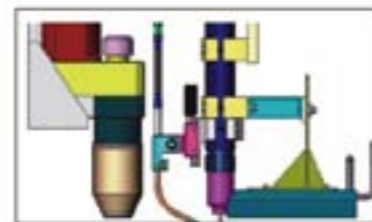
Advanced P+t Double Torch Welding Technique

Principle

To use plasma keyhole effect to get reliable and stable backside shaping, and TIG welding with wire feeding 200–300mm after plasma welding to get better front seam performance. The seam profile is screw shape.

Advantage

- Much effective and better welding performance compare to single plasma torch welding
- High and reliable welding quality
- 30%–50% efficient more than TIG/PAW welding
- Suitable for stainless steel, titanium alloy, zirconium alloy or other rare metal material welding



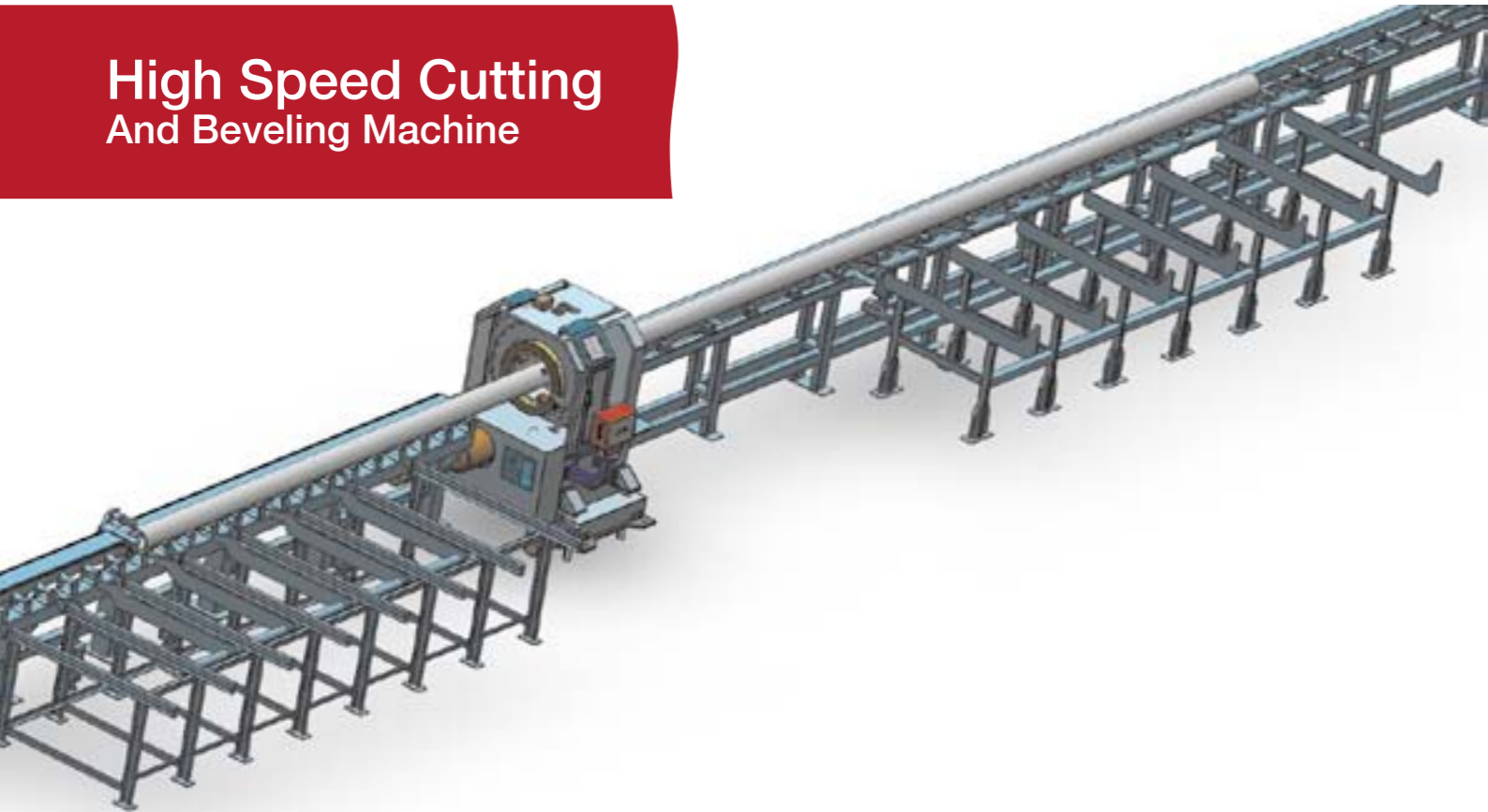
P+t



Technical Specification

Thickness (mm)	P+T welding speed (mm/min)	Plasma gas flow (L/min)	Plasma welding current (A)	TIG welding current (A)	Single plasma welding speed (mm/min)
3	300-500	2.5-4	150-170	200-220	250-450
4	280-500	2.5-4	165-195	220-250	260-400
5	280-460	3.5-4.5	180-210	230-260	200-400
6	250-400	4.0-5.5	190-220	240-275	180-330
7	250-330	4.5-5.5	195-230	270-290	160-280
8	200-250	4.5-6	210-240	280-330	140-200

High Speed Cutting And Beveling Machine



- Efficiency: ≤ 2 min/two seams (DN200 SCH40)
- Hollow design, automatic clamp, fixed pipe with tool bit rotation, two bevels at the same time
- Suitable material: carbon steel, stainless steel, alloy steel
- Bevel type: V-bevel
- Suitable OD: DN30-300 ($\Phi 60-325$ mm)
- Thickness: 3-18mm
- Feed mode: radial feed
- Drive mode: motorized
- Clamp method: pneumatic clamp, four-chuck
- Cutting stainless steel: using cooling liquid for preventing be oxygenated
- Control mode: CNC + PLE + Touch screen
- Self-alignment adjustment: automatic elevation device is used to compatible with pipe center height
- Optional to compatible with conveyor system and length measurement system to make up automatic pipe cutting and beveling production line



Stainless Steel Auxiliary Processing Equipment Polishing System

Principle

Constant pressure and floating head grinding working together with work piece, rotation to achieve tank, cylinder and dish-end seam or body grinding and polishing. Use variable frequency converter to achieve positioner and head stepless speed regulation. The column and beam is easy to move, which is for high efficiency and low labor intensity automatic grinding and polishing.

Features

For the stainless steel product inside and outside surface grinding and polishing to achieve stainless steel product manufacture requirement. It is motorized amount with sand belt, due to the heavy workload for dish-end and big cylinder, and it is possible to use two systems simultaneously if needed.



Functional Module

● HPT400 plasma torch

- One layer welding using plasma keyhole for 3–8mm thickness
- High duty cycle: 400A, 35%
- Tungsten electrode diameter: $\Phi 3.2\text{mm}/\Phi 4.0\text{mm}$, length: 150mm
- Choose ceramic nozzle for different thickness work piece: $\Phi 2.4\text{mm}/\Phi 2.8\text{mm}/\Phi 3.2\text{mm}$
- Use plasma cover to get better protection after welding
- Compatible with automation system



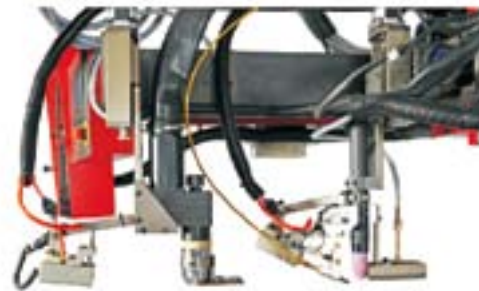
● HPT500 plasma torch

- Water-cooling system and gas protection cover design
- Tungsten electrode self-centralizing function, easy to install and adjust
- Built-in airway to ensure excellent compression and protection effect and enable to get perfect welding performance and backside shaping
- High duty cycle: 300A 100%; maximum loading current: 500A
- Tungsten electrode diameter: $\Phi 2.4\text{mm}/3.2\text{mm}/\Phi 4.0\text{mm}/\Phi 4.8\text{mm}$, length: 150mm
- According the wall thickness to choose 2.5mm/3.2mm/4.0mm nozzle
- Use big size nozzle and extend electrode to get TIG welding purpose
- Suitable for material such as stainless steel, titanium alloy, aluminum alloy, zirconium alloy welding
- Compatible with automation system



● Monitoring system

- TIG/MIG/PAW torch monitoring during welding process
- 6 x CCD zoom in camera with 9" displayer to get better observation
- Use compatible filler for TIG/MIG/PAW welding to get clear real time picture
- Radiation-proof device and gas cooling structure to ensure long time working
- Special high frequency insulation device is suitable for instant high frequency under normal condition.



● TIG/PAW wire feeder

- DC motor to ensure stable and low speed wire feeding
- TIG wire feeding speed: 100–1200mm/min;
PAW wire feeding speed: 300–2800mm/min
- Wire diameter: $\Phi 0.8\text{mm}/\Phi 1.0\text{mm}/\Phi 1.2\text{mm}/\Phi 1.6\text{mm}$, the roller is easy to change depends on different application.
- Wire feeding speed is center controlled or separately control by control box.



● Automatic TIG torch

- Water cooling structure design, high duty cycle 500A, 60%
- Torch length is optional to choose 270mm/380mm/500mm
- Gas flow divider to ensure better protection; optional nozzle: $\Phi 6\text{mm}/\Phi 12\text{mm}/\Phi 19\text{mm}$
- Easy to install and adjust tungsten electrode
- Optional electrode diameter: $\Phi 2.4\text{mm}/\Phi 3.2\text{mm}/\Phi 4.0\text{mm}/\Phi 4.8\text{mm}$; length: 150/750mm
- Torch cable is 1500mm, suitable for various systems
- High duty cycle, in mixed gas or argon state, MG501 torch duty cycle is 500A 60%, MG5015 duty cycle is 500A 100%
- Torch and protection nozzle are saved by cooling system to make torch with a long using time, and decrease the consumption of parts.
- Suitable to wire diameters: $\Phi 0.8\text{mm}/\Phi 1.0\text{mm}/\Phi 1.2\text{mm}/\Phi 1.6\text{mm}$; suitable to material as carbon steel, stainless steel, and aluminum alloy



● Dual water cooling MAG/MAG torch

- Duty cycle: 500A 60%
- Continental interfaces
- Dual water cooling with cooling in nozzle



● Motorized slider

- AVC and OSC execute structure to TIG/PAW
- Step motor to ensure stable motion, adjustable stroke: 60mm
- Effective speed: AVC, 0–700mm; OSC, 150–1500mm/min
- Suitable for torch oscillation and torch height adjustment during welding process



● Welding control center

- Optional to choose PLC control model
- Easy to install and maintenance, good thermal diffusivity and dustproof design
- Extendable and easy to upgrade without changing mainframe device
- Control function: torch motion speed, work piece motion speed, welding current/voltage, arc voltage, and oscillation speed etc.
- Optional to use moveable remote control or hanging control box to easy control and achieve all functions.

