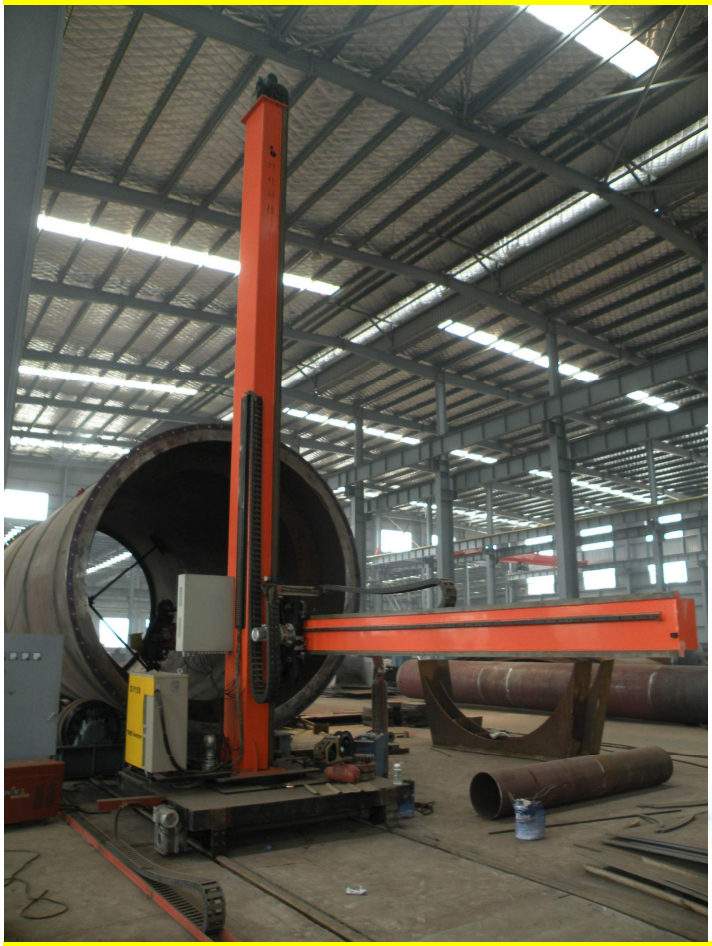
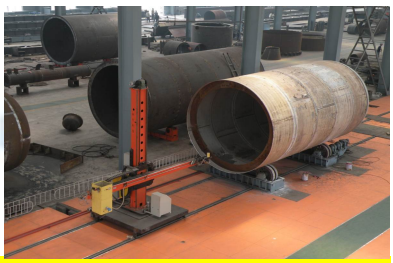




Welding Center Technical Solution

Welding/Cutting expert

www.timewelder.com

BEIJING TIME TECHNOLOGIES CO.,LTD.

北 京 时 代 科 技 股 份 有 限 公 司

The automatic welding center comprises manipulator, rotator/positioner, welding power source, and welding head to make sure the high quality welding to be achieved. Beijing TIME Technologies co., ltd., is a industrial integrator capable of designing, manufacturing, installing and testing, serves the customers with high-technology, excellent quality products, and professional service.

Welding centers are widely applied in wind turbine, pressure vessel, petrochemical, nuclear electric, repair welding and many other industries.

1. Welding center composition

1.1. Welding manipulator

1.1.1. Introduction

Welding manipulator is divided into standard (TZ), heavy duty (TZH) types, suitable for inner and outer of the circumferential seam and longitudinal seam welding. According to customers' requirements, it can be installed with electrical extension unit inside boom, chair carrier and safeguard ladders. Manipulator control system uses digital or analogous control with the characteristics of easy operation and precise control.

Heavy duty welding manipulator is compatibly equipped with single or twin welding head, or strip cladding/narrow gap welding head. It has high rigidity, great capability and high safety factors. There are also TZ1, TZ2, TZ3 and TZ4 series to meet your specific needs.

1.1.2. Parameter of all sizes of TZ series manipulator

Specification	2×2	3×3	4×4	5×5	6×6	7×7	8×8
Vertical movement distance of boom(m)	2	3	4	5	6	7	8
Horizontal movement distance of boom(m)	2～4	2	3～7	3～8	8	8	4～8
Rotating angle of column(degree)	±180 degrees						
Vertical speed of the boom(mm/min)	1150						

Horizontal speed of the boom(mm/min)	140～1400						
Rotating speed of column(r/min)	0.2						
The total equally distributed load of the boom	100	200	300	400	500	500	500
Center distance of the track(optional)	P43/2000(P43/2000)						

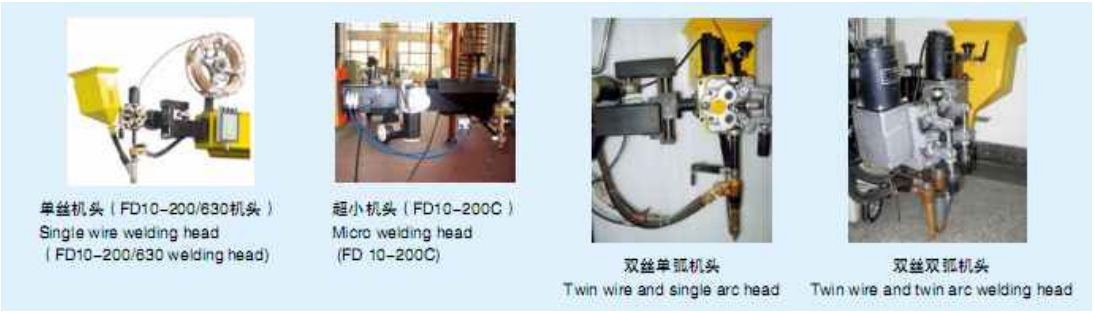
1.1.3. Specification

1) The column is shaped by one piece of steel and welded precisely, flat guide design with excellent solidarity. Boom lifting driven by AC motor, smooth moving with double anti-fall protection. High safety guaranteed.
2) Boom uses stepless frequency conversion timing, constant torque output, smooth speed, #45 guide rail, stress relieving annealing treatment, non-deformable.
3) Boom driven by pinion and rack, high precision, smooth moving, all data shown in digits and can be preset.
4) Boom lifting with electrical plus mechanical double protection device.
5) Welding head and electrical slide carriage can be selected.
6) Reliable, good-looking, durable, convenient, safe.
7) Manual operator connected to the control station makes the remote control feasible, adopting all-digit computerized technology, all parameters can be shown in digits and preset, easy to operate. It can be jointly used with welding rotator or positioner.

1.1.4. Advantages

1) It is designed and tailored for customers to meet their professional needs with beautiful structure. Our company only uses manual operator, all functions can be executed through this device. It decreases the labor cost and increases efficiency.
2) Unique cross section design of column and boom, excellent quality with reasonable price.
3) Digital interface screen, all welding parameter (Speed, current, voltage) can be preset and shown in digits, easy to operate.
4)To ensure product quality, we use all excellent outsourcing famous brand products, the important parts from imported famous brands to make sure the equipment reliable and endurable.

1.2. Welding head and slide carriage



Of welding head range, there are single wire welding head (FD10-200/630), mirco welding head (FD10-200C), twin wire and single arc head, twin wire and twin arc welding head.

Slide carriage can be selected from ST1-E, ST2-E, and ST3-E.

Specification of FD10-200

1) Including one electrical fine tuning slide carriage, one wire feeding adjusting device, and one flux feeding system.
2) Electrical fine tuning slide carriage moving distance depends on model.
3) With automatic outer-circumferential seam tracker to make sure filler metal in best position. Welding seam tracker consists of sensor, control system and implementation device. Sensor probes the work piece, detects the changing welding surface, and at last implementation device adjusts the distance between welding torch and work piece to be perfect. Good welding quality is to be achieved.
4) High quality micro motor adjusts the position of welding torch during welding, easy to operate.
5) With rotator and clamper devices integrated in welding head, welding torch can rotate 360 degrees, the axial deflection is 45 degrees, applicable to angle, longitudinal and circumferential welding.
6) With wire feeding motor and planetary gear reducer integrated, it is compact, moment of force output increases, wire feeding is stable. Wire feeding wheel has double drive to prolong its life span.
7) The standard welding head can do the smallest diameter Φ800mm of cylinder inner welding.
8) This structure is patented (The first company in China), having open-style wire feeding wheel, which can save the consuming amount of filler metal.

Standard filler metal plate weight: 25Kg

Diameter of filler metal applicable：	φ3.2mm－φ5.0mm
Wire feeding speed：	50-250cm/min
Voltage adjusting range：	20V-50V

1.3. Welding power source (See the catalog of welding power source)

TIME welding power source TIME MZ-630/800/1000/1250 or other brands, like ESAB(800/1000/1200) or Lincoln(1000/1500)

MZ-Series products are automatic submerged-arc welding machines with IGBT inverter technology, which consists of large capacity arc welding power source and welding tractor.

They are suitable for all kinds of steel.

Main functions

1. Alternation of characteristics of constant voltage/current.
2. Wide range of output current.
3. Welding current and welding voltage as well as travel speed of welding tractor can all be preset and displayed digitally.
4. Adjustable: arc force, welding current and welding voltage.
5. Remote/panel control selection.
6. MMA welding and air carbon arc gouging with suitable carbon electrode.
7. Protective functions: over-current, under-voltage and over-load etc.
8. Tractor travelling mode and direction control function.
9. Welding head site adjustment function.
10. MZ-1000 is digital control.

Technical specifications

Model	MZ-630	MZ-800	MZ-1000	MZ-1250
Rated input voltage	3-380v ±(15-20)% 50-60Hz			
Rated input current(A)	50	64	80	100
Rated input power(KW)	33	42	52	65
Voltage adjusting range(V)	20-50	20-50	20-50	20-50
Current adjusting range(A)	120-630	150-800	150-1000	150-1250
Duty cycle	100%	100%	100%	60%
Welding tractor travel speed(m/h)	6-72	6-72	6-72	6-72
Wire feed rate range(m/min)	1-6.5	0.5-2.5	0.5-2.5	0.5-2.5
Suitable welding wire Dia(mm)	Φ1.6-2.4	Φ3.2-5.0	Φ3.2-5.0	Φ3.2-5.0
Efficiency(η)	90%	90%	90%	90%
Power factor(cos Φ)	0.95	0.95	0.95	0.95
Insulation grade	F	F	F	F
Case protection grade	IP23	IP23	IP23	IP23
Dimensions of power source(mm)	810*345*1022	810*345*1022	810*345*1022	810*345*1022
Net weight of power source(kg)	90	90	98	98

1.4. Welding rotator

Welding rotators are used predominately in the petrol chemical industry, onshore and off shore oil and gas industries, conventional power and nuclear industries and many other fabrication industries where pipes or vessel required to be rotated for semi or automatic welding processes.

1.4.1. Characteristics

1) It includes one powered rotator and one idle rotator, each with four rollers. Powered rotator is driven by double motors to make sure the higher torque available, smooth rotating and reliable operation.
2) Both powered and idle rotator base are welded by section steel with stiffener. It has excellent solidarity and anti-twisting.
3) Both powered and idle are treated by annealing and further machining to make sure the job stable during long time working.
4) Roller rotating smoothly.
5) There are rubber and steel rollers in powered and idle rotators, the body frame processed by heat treatment.
6) Automatic angle adjusting according to the diameter of the work piece (for self-aligning rotator).
7) AC Stepless frequency conversion timing, imported transducer, high low-speed torque, excellent quality, wide range of speed regulating, and over-current, over-voltage, over-loading multi-protection functions.
8) High quality spindle wheel swing reducer, planetary gearbox, transmission rolling contact method. It has the lowest loss, and mechanical efficiency is high than 95%.
9) Control system includes electrical cabinet and manual operator.
10) With linkage interface, it can be jointly controlled with manipulator, SAW to form an automatic welding center.

1.4.2. TR1 welding rotator

Self-aligning welding rotator can adjust the swing angle automatically according to the diameter of work piece.

Model(TR1-)				5	10	20	30	40	50	60	80	100	150
Loading capacity				5t	10t	20t	30t	40t	50t	60t	80t	100t	150t
Rotator group	Two	Steel	Diameter (mm)	-	-	-	340	340	390	390	490	490	540
			Width(mm)	-	-	-	30	30	40	40	60	60	100
	one	Rubb	Diameter(mm)	250	250	300	350	350	400	400	500	500	550
			Width(mm)	120	120	140	120	120	120	120	120	120	120

		er									
Diameter of workpiece	Min(mm)		350	350	600	600	600	750	800	900	900	1000
	Max(mm)		2500	2500	4000	4500	4500	5000	5000	5500	5500	6000
Roller speed(m/h)			6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60
Motor power(kw)			2*0.25	2*0.25	2*0.25	2*0.37	2*0.55	2*0.75	2*0.75	2*1.1	2*1.5	2*2.2
Speed regulating mode			Stepless speed regulation									
Overall size	Length(mm) Power/idle		1450/1450	1450/1450/	2124/2124/	2410/1410/	2410/2410/	2596/2596/	2596/2596/	3012/3012/	3012/3012/	3420/3420
	Width(mm) Power/idle		887/392	926/392	1002/422	1269/552	1299/552	1336/588	1452/588	1746/760	1771/760	1889/1080
	Height(mm)		667	667	943	1064	1064	1130	1130	1408	1408	1640

1.4.3. TR2 welding rotator

Adjustable welding rotator can adjust the center distance by reserved holes or lead screw in order to adapt to diameter of work piece.

Model(TR2-)				5	10	20	30	40	50	60	80	100	150	200
Loading capacity				5t	10t	20t	30t	40t	50t	60t	80t	100t	150t	200t
Rotator group	Two	Steel	Diameter(mm)	-	-	-	340	340	390	440	510	510	620	600
			Width(mm)	-	-	-	30	30	40	50	240	240	240	250
	one	Rubber	Diameter(mm)	250	250	300	350	350	400	450	-	-	-	-
			Width(mm)	120	120	140	120	120	120	120	-	-	-	-
Diameter of workpiece	Min(mm)			250	300	350	600	600	850	850	850	1000	1000	1000
	Max(mm)			1800	3500	3600	4200	4200	5000	5000	5000	5500	6000	6500
Roller speed(m/h)				6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60	6-60
Motor power(kw)				1*0.25	2*0.25	2*0.37	2*0.55	2*0.55	2*0.75	2*0.75	2*1.1	2*1.5	2*2.2	2*3
Speed regulating mode				Stepless speed regulation										
Overall	Length(mm) Power/idle			1260/126	1760/176	1960/196	2440/244	2440/244	2800/280	2800/280	3010/301	3310/331	5220/402	5330/4900

size		0/	0	0	0	0	0	0	0	0	0	
	Width(mm) Power/idle	772/ 280	772/ 280	830/ 320	1027 /400	1027 /400	1187 /480	1270 /480	1419 /560	1444 /560	1145 /770	1230/ 770
	Height(mm)	525	525	570	649	649	740	765	863	863	1085	1210

2. System specification

System outline and configuration (It is variable, and up to specific needs)

Project	Item	Model	Quantity （Set）	Remark
Automatic welding center	Welding manipulator	TZ/TZH	1	Details based in contract
	SAW power source	TIME/Lincoln/Esab	1	
	Welding head	FD Series	1	
	Electrical slide carriage	ST1/2/3-E	1	
	Adjustable/Self-aligning rotator	TR1/2	1	

3. Equipment manufacturing standard

GB1266-1990 Machining safety standard
JB/T9187-1999 Welding rotator
GB/T 1184-1996 Common difference of shape and position
GB/T 10089-1988 Cylinder turbo and worm precision
GB4064-1983 Principles of design for electrical equipment safety

4. Installation and operation environment

4.1. Power source

1) Controller: 380V，Three phases 55KVA.
2) Grounding：10 Ω Maximum overall grounding electrical resistance.

4.2. Installation environment

1) Environment temperature: -10-45℃.
2) Environment humidity: No higher than 75% RH : no frost.
   No higher than 95%RH in a short period(Less than one month).
3) Environment air: No specific requirement (No corrosive and explosive environment).
4) Others: No radio interference.

5. Safety

TIME prompts customers take protection measures to make sure the safety of staff and machine is guaranteed. TIME does not take responsibilities of the accidents caused by not installing corresponding machines properly.

1) Equipment not operated by unqualified people.
2) No entering the operation area when equipment is in use.
3) Read and understand fully the operation manuals, and provide the training to the operating staff.
4) Confirm the necessary conditions when starting up the machine and other equipments.

Must read manuals carefully before operation and understand them fully.

To make sure it's safe; operate according to the technical agreement.

Make sure the person operating the equipment fully aware of the specifications, he/she should be qualified, trained or received the safety education.

6. Working condition

1) TIME provides the graphic drawing of floor; lead rail and construction will de finished by customer.
2) Power will be supplied by customer.
3) During the installation and testing of the system, customer should provide necessary support, including forklift, crane, work piece, filler metal and welding flux etc.
4) Customer should provide the correct power to the controller.
5) Check the function of the equipment during testing.
6) Check the control function of system controller during testing.
7) All parts' tested before welding.
8) Customer assists with other necessary conditions.

7. Welding center application photos

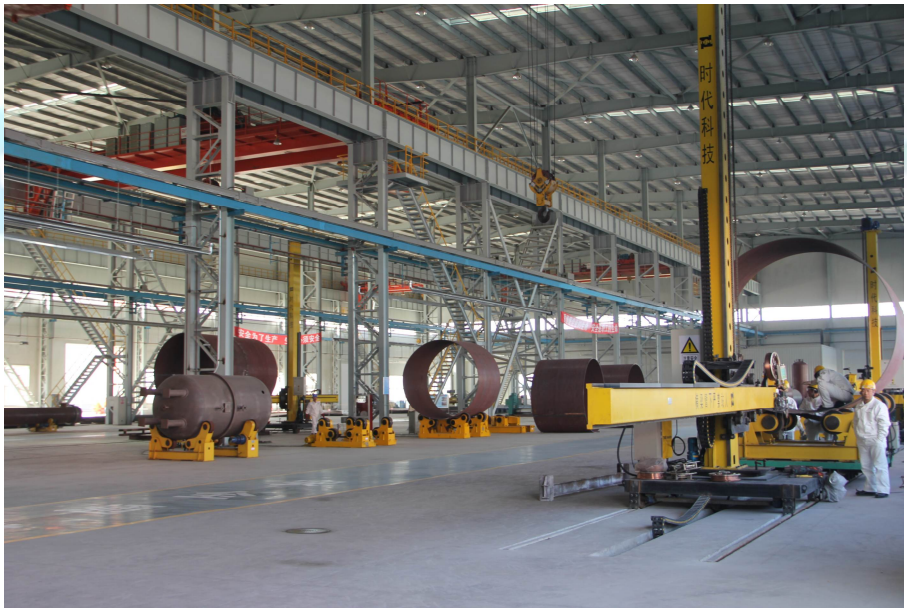
After development over the years, TIME's welding solutions have been widely adopted in the boiler pressure vessel, nuclear electricity, thermal power generation, water conservancy, shipbuilding, bridge, steel structure, wind power generation and other industries. We have clients all over the world, and TIME products play important roles in many giant projects.

Here are some examples in different industries.

Welding center in chemical industry

Welding center in wind power industry

Welding center in pressure vessel industry



Welding center in petroleum industry

Presented by welding & cutting automation exports department

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