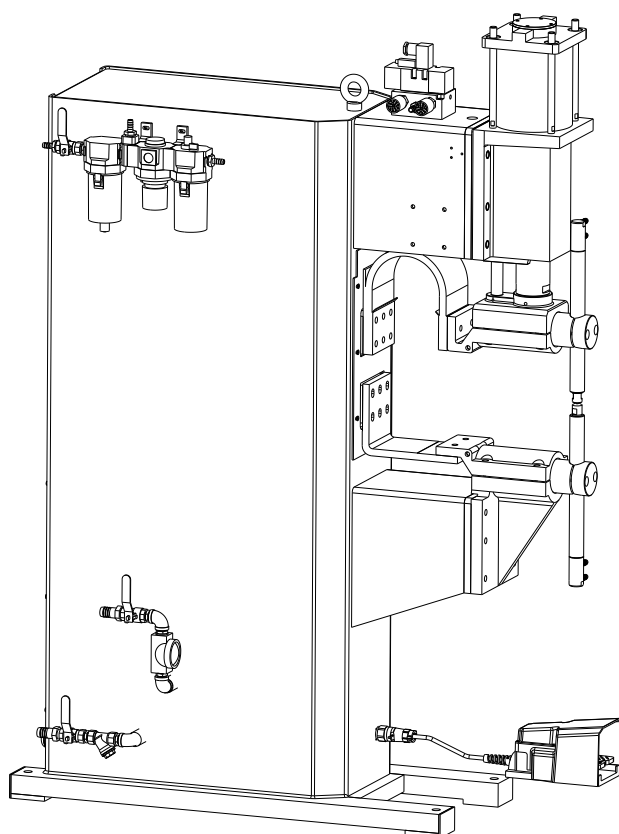


DN Series

Stationary AC Spot Welder

Instructions



Obara (Shanghai) Company Limited
Obara Nanjing Machinery & Electronic Co., Ltd.

C o n t e n t s

- I The Complete Machine**
- II STS21 Timer User Instructions**

I. The Complete Machine

C o n t e n t s

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1. Safety Cautions

To use this machine properly, please do read thoroughly this *Use Instructions* first.

- 1.1. For the sake of safety, installation and technical maintenance of the machine should be carried out only by qualified technicians or people who are very familiar with welding machines.

For the sake of safety, operation of this machine should be carried out by skilled workers who are familiar with contents herein and could execute necessary safety controls.

Those who are mentally or physically disabled, anesthetic taker, cardiac pacemaker user, or people of long hair are forbidden to operate this machine.

- 1.2. Never touch any electrical component other than the 2nd circuit.

Operator should wear dry or sufficiently insulated gloves.

Never use cables with capacity inferior to criteria, which are damaged, or which are exposed with conductors. Welding machine should not be used with cover opening.

Maintenance should only be done at least 5 minutes after powering off: just ensure it is voltage free since capacitor is still electrified after powering off.

- 1.3. Ensure to connect the gas and water first, and then the electricity before powering on. Please don't place any ironworks or similar near the machine during the welding, in case that it might be absorbed or magnetized by the major magnetic field generated by 2nd circuit. Hands or anything else are strictly forbidden to be placed between the electrodes which might get them harmed or damaged, since upper electrode would drop down naturally and gradually out of gravity when the welder has been powered off.

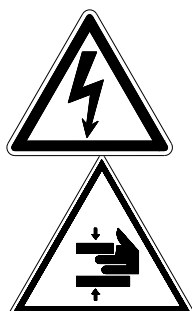
- 1.4. After a long time of welding, copper accessories of 2nd circuit would be very hot; don't touch it with hand which might get it scalded.

- 1.5. Never ever place any body parts (hands, fingers, arms etc.) between electrodes or the moving part of cylinder, otherwise it might lead to severe harm or even disability.

It is advisable to choose Obara nut feeder to help nut welding, ensure safety and promote efficiencies.

- 1.6. Operator should wear specified devices to protect them from splashes out of welding. Check the circumstance around welder before connecting with water and gas.

- 1.7. Welding splashes and welded workpieces are very hot and might cause fire, so please keep them safe from easily flammable materials, and prepare fire extinguisher onsite in case of anything.



Caution: Electric shock would cause badly injuries, or even death!

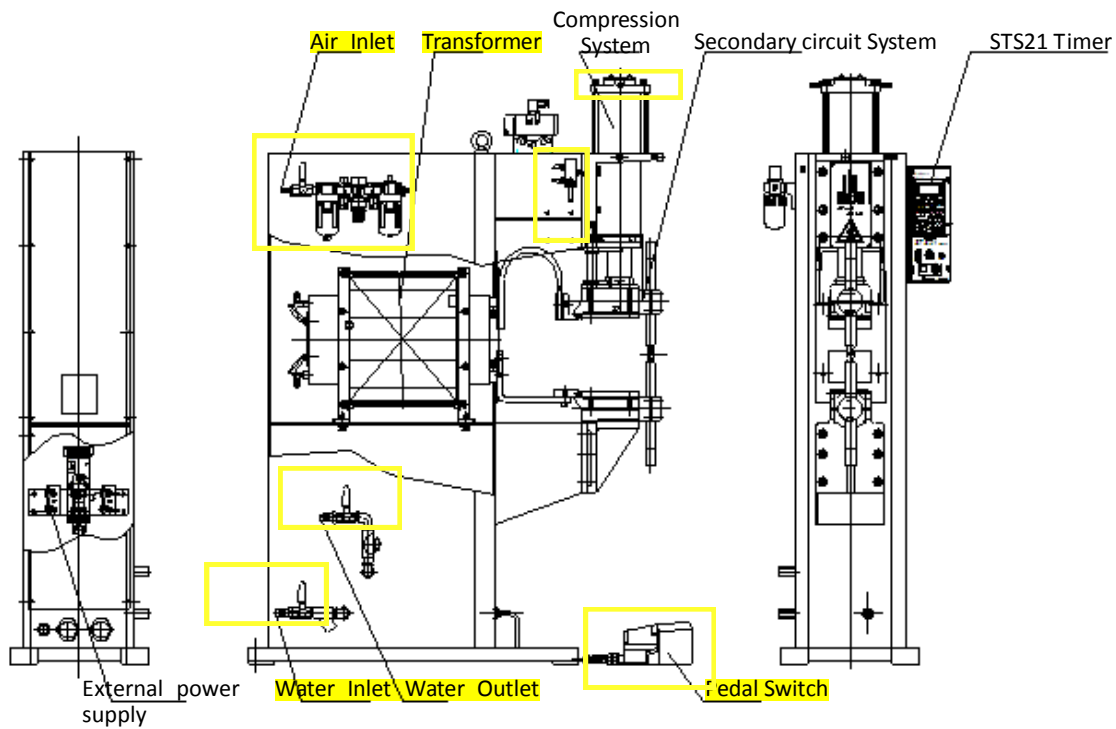
Please DO power off the machine before wire connection!

Caution: Pressure between welder electrodes can be 2,000 KG or higher!

Take particular cautiousness to operate or power off the welder!

Never put hands or anything else between the electrodes!

2. Product Layout



Compact, Reasonable, Beautiful
 Easy Operation
 Convenient Maintenance

3. Product Performance & Features

3.1. Body

Folded and then welded with high quality steel plates, and featured with excellent rigidity, high strength, rational structure and nice looking; 2 covers on back shall ease quick mounting / dismounting, and facilitate checking & repairing.

3.2. Pressing System

Japan SMC or CKD pneumatic elements, which are reliable and have consistent qualities;
Aluminum alloy tubes in the cylinder, which have wearing proof surface and long service life;
Switchable between two strokes;
Continuous configurable working stroke is available (for type with special specification).

3.3. 2nd Circuit System

Rational adoption of high quality steel to promise low impedance, high conductivity and good durability of welding circuit, including imported SBA as cast material and imported CrCu for electrode.

3.4. Cooling System

Our standard welder uses an enclosed water loop with 4 inlets and 4 outlets for respective cooling of thyristor, transformer, and upper/lower electrode components, and a water flow indicator for direct view of water supply.

Safety and effective separation of water and electricity are ensured with reasonable deployment of waterway and electric circuit. Among them, inlet and outlet water valves and flow indicator are placed on external shell of machine, while conflux is at lower part inside the shell, which would promise tidy and nice out-looking, and also provide convenience to various maintenance.

3.5. Transformer

Iron core is made of high-quality mid-frequency silicon steel blades;
Cooling waterway in the 2nd coil is of reasonable deployment, less wasting, higher working efficiency, and longer service life;
Both 1st and 2nd coils are made with vacuum epoxy casting, which would ensure excellent water proof;
Temperature alarm shall guarantee safe workings;
Up to F grade insulation;

3.6. Control System

STS21 Timer;
Main board CPU is a quasi 32-digit SCM with chip elements, which is smaller and have more reliable performance;

Maximum 60 programs available;
16-step function, with self-defined step numbers;
3-section powering on and welding allowed;
Multi pulse welding;
Single / continuous spot welding;
Complementary welding (if current is too low;
Constant current control and voltage compensation control;
Electrical level start / pulse start switchable;
Self diagnosis;
Self-adaptive power factor, and auto configurable constant current gain;
Proportional valve control;
2nd current inspection;
Self-defined linear step until maximum 15;
4 series of welding completion signals (respect output to each welding gun);
Internal/external power supply of input signal switchable;
External configurable functions by programmer;
4 line LCD with backlight for programmer;
Parameter and data configuration with programmer;
Displayable 3 sections of currents and time, including the effective and peak current values;
Most convenient configuration, e.g. just key in 1,000 to set 1,000;
Directly displayable alarm contents, including 100 alarms available for inquiry and sequent display;
Parameters may survive ten years of powering off;
Preserved CCS group control interface;
Interlocking (between 2 welders).

4. Main Technical Specifications & Parameters

SSAN series standard stationary spot welder is equivalent to DN series GB stationary spot welder

Type		AC Welder				
		DN 55	DN 100	DN 160	DN 200	DN 300
Power Voltage	V	380	380	380	380	380
Rated Frequency	Hz	50	50	50	50	50
50% Nominal Power Sn	kv.A	55	100	160	200	300
40% Nominal Power Sn	kv.A					
Max Welding Power Smax	Kv.A	146	271	343	435	619
2 nd Idling Voltage U	V	7.6	10.6	11.9	13.6	15.8
Max Short Circuit Current I	A	24,000	32,000	36,000	40,000	49,000
Electrode Arm Gap e	mm	205	205	205	210	260
Electrode Arm Gap e (platform)	mm	175	175	175	190	240
Electrode Arm Extension L ₁	mm	400	450	500	530	530
Electrode Platform Center Length L ₂	mm	292.5	329.5	372.5	402.5	390
Max Electrode Force Fmax	N	6100	8800	10000	10000	12700
Feeding Pressure Pa	MPa	0.5	0.5	0.5	0.5	0.5
Rated Cooling Flow Q	L/min	8	10	16	24	35
Working Stroke	mm	20	20	20	20	20
Max Stroke	mm	80	80	80	80	80
Electrode Consumption Preserved Stroke	mm	20	20	20	20	20
Transformer Turns Ratio		50	36	32	28	24
ID of Internal Water Tube	mm	∅ 10	∅ 10	∅ 10	∅ 10	∅ 10
ID of Internal Gas Tube	mm	∅ 10	∅ 10	∅ 10	∅ 10	∅ 10
ID of Main Water Inlet Tube	mm	∅ 19	∅ 19	∅ 19	∅ 19	∅ 19
ID of Main Gas Inlet Tube	mm	∅ 10	∅ 10	∅ 10	∅ 10	∅ 10
Power Cable	mm ²	70	70	95	120	2×(95~120)
Thyristor	A	500	500	500	800	800
Aperture of Anchor Bolt	mm	∅ 17	∅ 17	∅ 17	∅ 17	∅ 17
Gap Length of Anchor Bolt	mm	760	880	970	1000	1110
Gap Width of Anchor Bolt	mm	290	320	320	320	410
External Length C	mm	1000	1210	1280	1380	1450
External Width D	mm	510	550	550	590	650
External Height E	mm	1690	1720	1720	1740	1800
Weight	kg	310	430	470	510	590
Air Switch	A	100	180	315	400	630

5. Working Conditions & Circumstances

5.1. Elevation

Elevation is <1000m

5.2. Power Source

Power Voltage: Single phase AC380V $\pm$ 10%, Frequency: 50Hz $\pm$ 2%

To shorten the power line maximum possible, always install the welder nearest to the power supply or power transformer, for if the power supply is too far away, the voltage decrease will be great to impact the output of maximum welding current. The voltage fluctuation should be 5%~10% of general rated voltage when powered on.

5.3. Cooling Water

Flow of cooling water: 6-35L/min or above

Equipment inlet temperature of cooling water: 5-30°C

Electric resistance of cooling water >5000 Ω /cm

CaCO₃ in the cooling water <50PPM

PH value of cooling water 7.0-9.0

5.4. Compressed Air

Pressure of compressed air: 0.5-0.7MPa

5.5. Ambient Circumstance

No existence of excessive vibration or bumping

Free of severe dusts, vapor, or corrosive / explosive gases

5.6. Ambient Temperature

Max <40°C, Daily Average <30°C, and Min >5°C

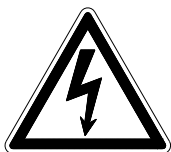
5.7. Ambient Humidity

Humidity is no more than 90%, no condensation.

6. Installation of Stationary Spot Welder

Do check integrity of all accessories before installation and see if any of them has been damaged, or any loosen connection between accessories and water/air tubes. Please contact our business bearer immediately for any potential abnormality or doubt; or, if everything is fine, please install the equipment as following:

- 6.1. Place the spot welder steadily, keeping electrode vertical to the ground, and then fix with anchor bolt.
- 6.2. Plug the water tubes into water inlet/outlet with proper direction of water flow. Working thyristor might be damaged by overheating if the tubes have been counter connected. Then, when the water is running, flow indicator should turn clockwise. Refer to *Main Technical Specifications & Parameters* for ID of water tube.
- 6.3. Plug the air tube onto gas inlet. Then, when the gas is running, electrode should be open. Refer to *Main Technical Specifications & Parameters* for ID of gas tube.
- 6.4. Connect with copper-core flexible cables the AC380V 50Hz (single-phase) power with “01, 02” binding posts (i.e. conductive plate) on lower back of machine, and the power inlet line should be provided with a breaker on it. If the welder itself has a breaker, connect the external power cable with the inlet line port of breaker. Please refer to *Main Technical Specifications & Parameters* for cable specifications.



Caution: Electric shock would cause badly injuries, or even death!

Please DO power off the machine before wire connection!

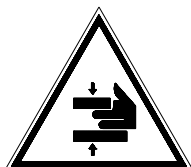
- 6.5. Spot welder should be well “grounded”! Grounding point has been marked under the machine. The grounding cable should be no less than 1/2 section area of main power cable, or minimum 16mm².
- 6.6. Insert the aviation plug on the pedal switch cable into the aviation socket on lower front surface of shell.
Note: align notch on the aviation socket.
- 6.7. Spin off the sealing head bolt on the oiling port above the atomized lubricator, and fill in the 1# turbine oil (ISO VG32 lubricant) till 2/3 level storage. Spin fast the sealing head bolt to generate vaporous lubricant inside the gas line, and lubricate the moving parts inside the cylinder. (Skip if no oil cylinder exists.)
- 6.8. There are 3 oil cups on the shell. Press appropriate sparse grease into it to lubricate the sliding of main shaft and guiding axle.

7. Commissioning of Stationary Spot Welder

Done with installation, check all the parts of spot welder, especially fasteners of key moving parts, confirm everything is fine, and then start the commissioning.

- 7.1. Connect the water and air supplies first, and then the electricity supply before starting the machine. Now the upper electrode should be at its max stroke. Set the regulating valve and get specified gas pressure for welding process. (Generally relief valve = 0.2~0.5MPa)
- 7.2. Check the water and air lines for any leakage, or otherwise turn off the power for checking.
- 7.3. Power indicator on STS21 Timer should be turned on with certain contents revealed on LCD. Turn the welding switch to "NO WELD" (i.e. action without welding current). Now with the panel keys, you can configure the welding parameters as required by process. Please refer to User Instruction of STS21 Timer for using of control box.
- 7.4. Done with configuration, step on the pedal switch to enable up/down movement of electrode, then check and adjust the stroke & tip of electrode:
For a welder with a 2-chamber cylinder, when you step on the pedal switch to move the electrode downward, it'll be the maximum stroke of electrode when you pull out the limiting handle on the compressor seat, or the working stroke of electrode when you push in the limiting handle.
For a welder with a 3-chamber cylinder, it'll be the maximum stroke of electrode when you toggle upward the manual gas valve beside the compressor seat, or the working stroke of electrode when downward.
For a welder with a cylinder of adjustable strokes, please adjust the hand wheel position on the cylinder to get the needed working stroke of upper electrode, and then combine fast the two hand wheels.
- 7.5. Done with all procedures above fine, turn the welding switch on the operation panel of control box to "WELD", and the safety switch indicators to off, and now you can start welding.

Note: Always press down the safety switch on the control box panel when checking the wearing of electrode, and now the safety switch indicator lights green. Electrode won't act if you have stepped on the pedal switch by accident.



Caution: Pressure between welder electrodes can be 2,000 KG or higher!
Take particular cautiousness to operate or power off the welder!
Never put hands or anything else between the electrodes!

8. Maintenance

To get the best status, equipment shall be subject to maintenance and appropriate adjustments during its service time. So please check the following:

8.1 Cooling System

- 8.1.1 Check every day the smooth running of water flow, if the rated flow has been reached, and for any potential water leakage or partial heating of electrode and handle. We advise to install a water flow switch on the equipment, which shall forbid welding if the rated flow isn't reached.
- 8.1.2 Check every week the smooth running of cooling system, remove all the obstructs of water filter, check each water connector, eliminate promptly any potential infiltrations, thus ensure the safe service of key components (transformer, thyristor, etc.) and the normal processing of welding work.
- 8.1.3 Check every year the water tubes for any aging and damage. Replace when necessary.

8.2 Pressing System

- 8.2.1 Check every day the air filter for any water accumulation. Drain them immediately if any.
- 8.2.2 Check every week the atomized lubricator and air filter. Keep certain lubricant (ISO VG32) in the atomized lubricator, to ensure normal lubrication of pneumatic system (skip if no oil feeding cylinder exists). Add new sparse grease into the 3 oil cups, and a little grease onto the surfaces of pressing shaft and guiding axle.
- 8.2.3 Take care to keep clearance of pore by removing dusts and obstacles from silencer every month.
- 8.2.4 Disassembly the filter of atomized lubricator every 6 months, which shall be then cleaned or replaced as may be necessary.
- 8.2.5 Check the perfection and effectiveness of sealing ring inside the cylinder every year, and remove any contaminations therein.

8.3 Control System

- 8.3.1 Check the control system every day, including verifying the parameters of welding.
- 8.3.2 Clean the thyristor and other components of main board by removing dusts, greases, and any other contaminations thereon every month. (cut off the power supply first)
- 8.3.3 Verify the welding current with instruments against preconfigured parameters every month. (by professionals if possible)
- 8.3.4 Check the aging status of all power supplies and control lines every year. Change them if necessary, in case electric leakage or other safety accidents might happen.

8.4 Electrode System

- 8.4.1 To ensure the quality of welding works, electrode tip should accord with the process requirements of surface. Grind or replace it immediately on detection of wearing, deforming or other abnormalities.
- 8.4.2 Electrode gap should ensure sufficient pressure from impacting upper electrode; or, readjust it immediately if not good, for otherwise it might lead to splashing or poor welding, or even threaten the safety of operator.
- 8.4.3 Upper and lower electrodes should be aligned and impacted firmly to each other. If any gap exists therein, the electrode surfaces should be polished and upper & lower holding poles should be aligned, otherwise

it would cause rosin joint of work piece or even electrode explosion.

8.4.4 To adjust the electrode, push in a copper rod or tap it with a wood hammer. Never knock the electrode holder or similar with an iron hammer etc. Then screw fast all fasteners to ensure steady and reliable function of electrode.

8.4.5 Bolts of all conductors of 2nd electrode circuit should be always well fastened. They should be checked regularly in case of overheating, which might even harm the component.

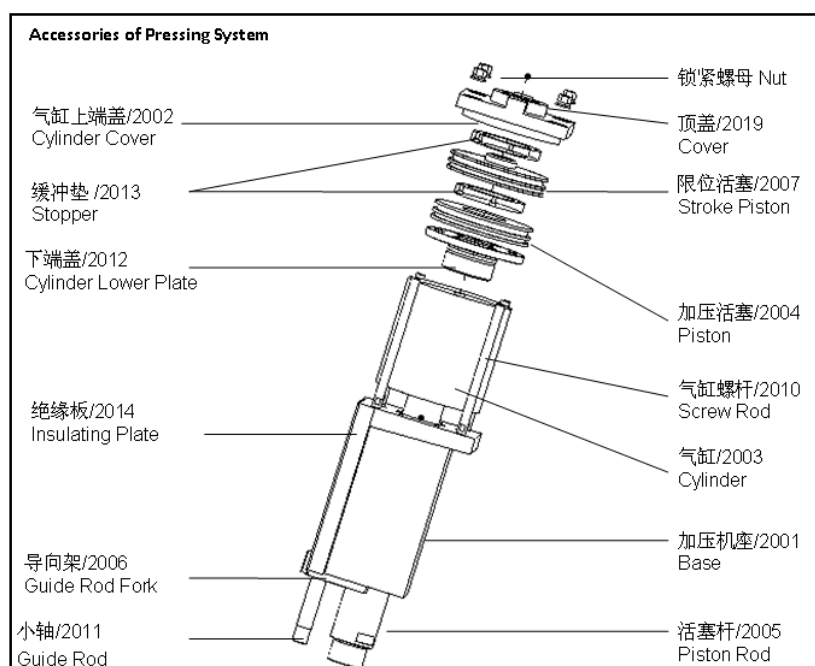
8.5 Blow off the water inside the machine in winter or cold area, in case that the machine damaged by frozen water system.

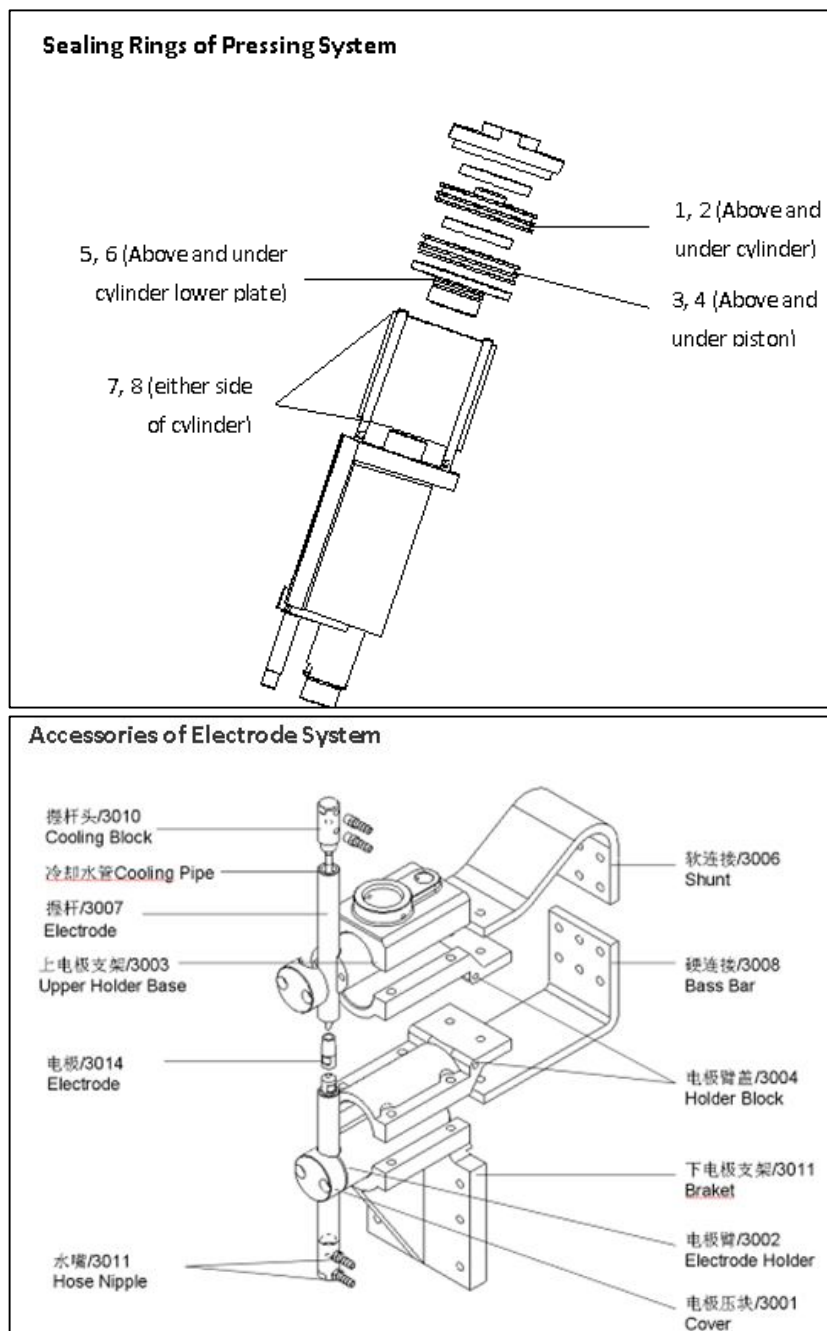
8.6 A fork truck should be used to hold the channel bar at bottom of welder for its conveyance or installation, or, pull a steel wire with sufficient strength through the suspension rights for hoisting and conveyance.

8.7 Replacement of Regular Quick-wear Parts

Please replace in time the quick-wear parts with the ones bought from us as may be deemed necessary by the service frequency and loading of machine. A list of quick-wear parts shall be delivered with the equipment, which shall include usually: electrode tip, electrode of particular specification, holder, soft connector, guiding sleeve, pedal switch, O sealing ring in the cylinder, pneumatic FRL, thyristor, and water/air hose etc. If you are not clear about specification of certain quick-wear parts, please inquire with ex-works number on the nameplate of stationary welder, or the product drawing number.

8.8 Accessories of Pressing & Electrode Systems





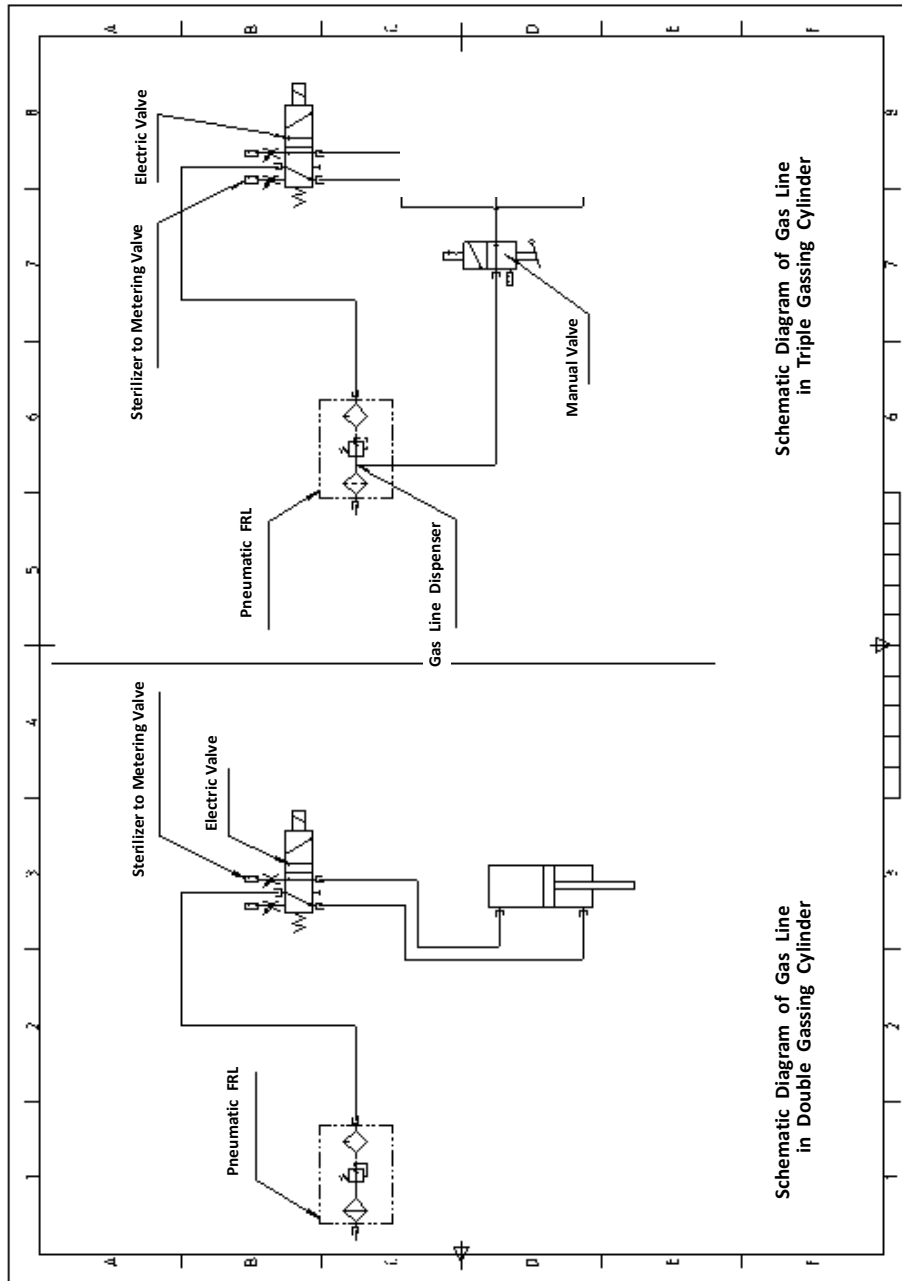
9. Attached Documents

DN series stationary spot welder is provided with STS21 control box and a pedal switch. The control box is mounted onto the main frame, while the pedal switch is sent together with machine (or according to order prototype for non-standard welder).

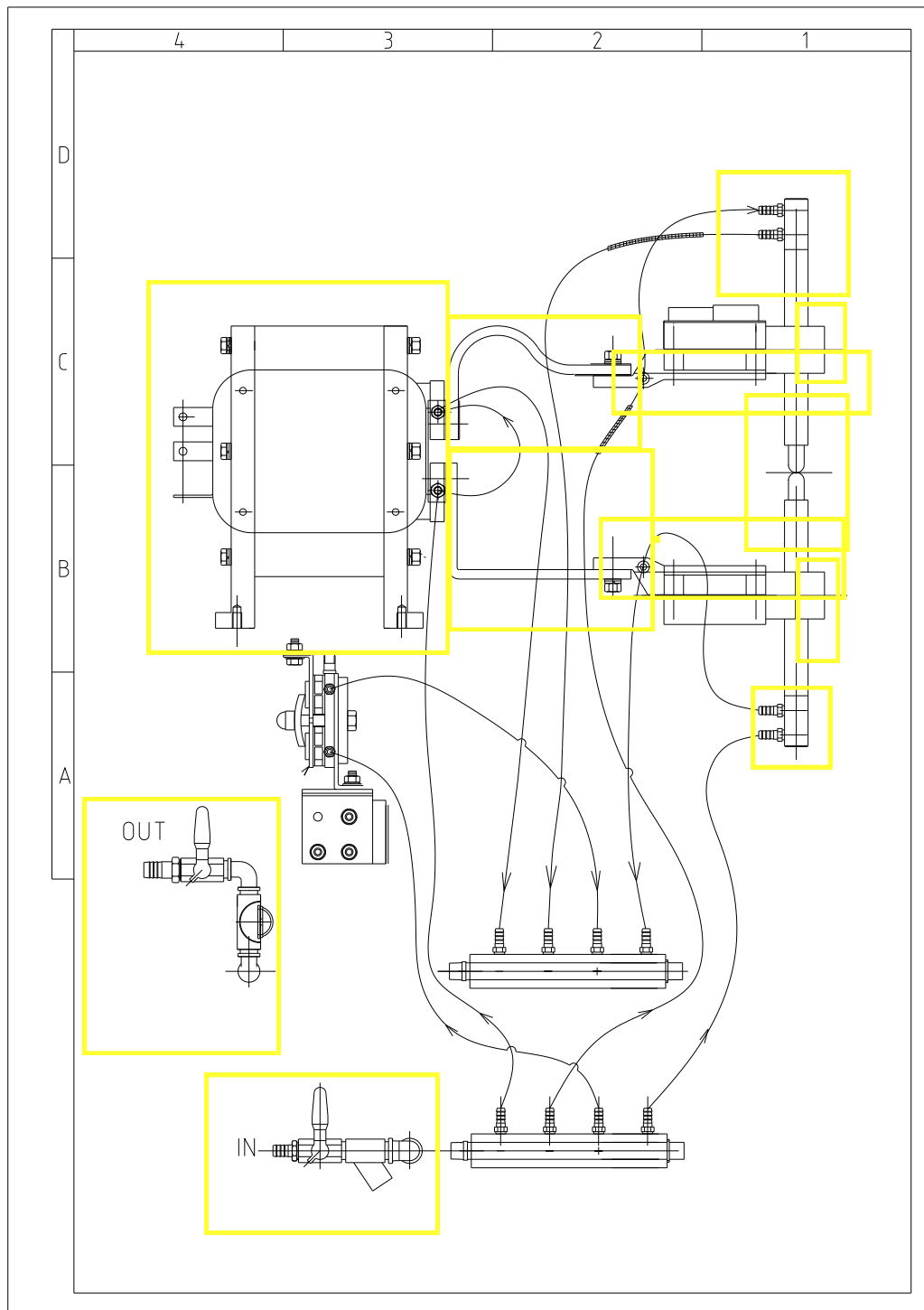
Attached documents:

- 9.1. A packing list.
- 9.2. One User instruction of stationary AC spot welder
- 9.3. A product certificate

Annex 1: Pneumatic System Diagram



Annex 2: COOLING WATER DIAGRAM



Annex 3: Reference Welding Conditions

Welding conditions below are from Japan. They are for reference only since test materials and equipment might differ. The best welding conditions should be based on repetitive tests by process technicians of plant as final user, and shall be subject to confirmation by inspector of the plant.

Spot welding conditions for mild steel plate (60Hz)

Thickness	Optimal welding conditions					Medium welding conditions					General welding conditions				
	Time	Pressure	Current	Nugget Dia.	Strength	Time	Pressure	Current	Nugget Dia.	Strength	Time	Pressure	Current	Nugget Dia.	Strength
mm	cycles	KN	A	mm	KN	cycles	KN	A	mm	KN	cycles	KN	A	mm	KN
0.4	5	1.15	5,200	4.0	1.80	10	0.75	4,500	3.6	1.6	20	0.40	3,500	3.3	1.25
0.5	6	1.35	6,000	4.3	2.40	11	0.90	5,000	4.0	2.1	24	0.45	4,000	3.6	1.75
0.6	7	1.50	6,600	4.7	3.00	13	1.00	5,500	4.3	2.8	26	0.50	4,300	4	2.25
0.8	8	1.90	7,800	5.3	4.40	15	1.25	6,500	4.8	4.0	30	0.60	5,000	4.6	3.55
1.0	10	2.25	8,800	5.8	6.10	20	1.50	7,200	5.4	5.4	36	0.75	5,600	5.3	5.3
1.2	12	2.70	9,800	6.2	7.80	23	1.75	7,700	5.8	6.8	40	0.85	6,100	5.5	6.5
1.4	14	3.05	10,600	6.6	9.30	26	2.10	8,500	6.3	8.5	46	1.00	6,600	5.9	7.8
1.6	16	3.60	11,500	6.9	10.60	30	2.40	9,100	6.7	10.0	52	1.15	7,000	6.3	9.25
1.8	18	4.10	12,500	7.4	13.00	33	2.75	9,700	7.1	11.8	58	1.30	7,500	6.7	11
2.0	20	4.70	13,300	7.9	14.50	36	3.00	10,300	7.6	13.7	64	1.50	8,000	7.1	13.05
2.3	24	5.80	15,000	8.6	18.50	44	3.70	11,300	8.4	17.7	77	1.80	8,600	7.9	16.85
2.8	28	7.00	16,200	9.4	23.80	52	4.30	12,100	9.2	23.0	95	2.20	9,400	8.9	21.7
3.2	32	8.20	17,400	10.3	31.00	60	5.00	12,900	9.9	28.5	105	2.60	10,000	9.4	26.65
4.0	40	11.00	19,000	11.6	42.00	73	6.30	15,000	11.2	38.0	130	3.40	11,000	10.6	35
5.0	50	14.00	22,500	13.2	58.00	80	8.00	16,500	12.7	52.0	170	4.40	12,500	12	48
6.0	60	17.50	25,000	14.6	76.00	110	9.70	18,000	14.0	68.0	210	5.40	14,000	13.5	63
7.0	70	22.00	27,000	16.0	95.00	130	11.50	19,500	15.3	85.0	250	6.50	15,000	14.8	78
8.0	80	25.00	30,000	17.3	114.00	150	13.00	21,000	16.5	104.0	290	7.50	16,000	16	95
9.0	90	29.00	32,000	18.6	135.00	165	15.00	22,500	17.7	123.0	320	8.80	17,000	17	112
10.0	100	32.00	34,000	19.7	160.00	180	17.00	24,000	18.7	144.0	340	10.00	18,000	18	131

Welding Conditions of Projection Welding Nuts

Nut		Steel Plate		I			II		
Type	Spec.	Thickness	Bore	Electrode Pressure	Time	Welding Current	Electrode Pressure	Time	Welding Current
		mm	mm	KN	cycle	A	KN	cycle	A
Square Nut	M5	1.6	6	2.0	5	11,000	1.2	9	9,400
	M6	1.6	7	2.6	6	12,000	2.0	12	10,000
	M8	1.6	9	3.0	6	13,500	2.4	12	12,000
	M10	2.0	11	3.9	6	15,500	3.0	12	13,500
	M12	2.3	13	4.6	6	22,500	3.6	12	19,500
Hex. Nut	M6	1.6	7	2.6	6	13,500	2.4	9	11,000
	M8	1.6	9	3.2	6	15,000	2.8	12	12,000
	M10	2.0	11	3.8	6	16,000	3.2	12	13,000
	M12	2.3	13	4.3	6	19,000	3.6	12	17,000

Welding Conditions of Projection Welding Bolts

Bolt	Projection Spot		Steel Plate		I			II		
Spec.	Dia./Ht.	Qty.	Thickness	Bore	Electrode Pressure	Time	Welding Current	Electrode Pressure	Time	Welding Current
			mm	mm	KN	cycle	A	KN	cycle	A
M5	2.0/0.7	3	1.6	5	2.4	5	7,500	1.2	6	6,000
M6	2.5/0.8	3	1.6	6	3.5	6	13,000	2.4	6	8,000
M8	3.0/0.8	3	1.6	8	3.5	6	15,000	2.4	12	13,000
M10	3.0/1	3	2.0	10	4.0	6	16,000	3.0	12	14,000
M12	4.0/1	3	2.3	12	4.0	6	17,000	3.0	12	16,000

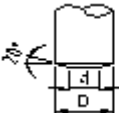
Selection of Welding Conditions for Specific Targets

	Welding Element	2pc Stack	3pc Stack	4pc Stack
Different Thickness & Same Material	Current	Per thin plate side	Sum & average	Sum & average
	Welding Time	Sum & average	Maximum	Per superior plate thickness above the maximum value
	Pressure	Per thin plate side	Sum & average	Sum & average
Same Thickness & Different Material	Current	Sum & average	Sum & average	N/A by principle
	Welding Time	Sum & average	Per senior material	
	Pressure	Sum & average	Sum & average	
Same Thickness & Different Material	Current	Per senior material of thin plate side	Sum & average	N/A by principle
	Welding Time	Sum & average	Per senior material	
	Pressure	Per senior material of thin plate side	Sum & average	

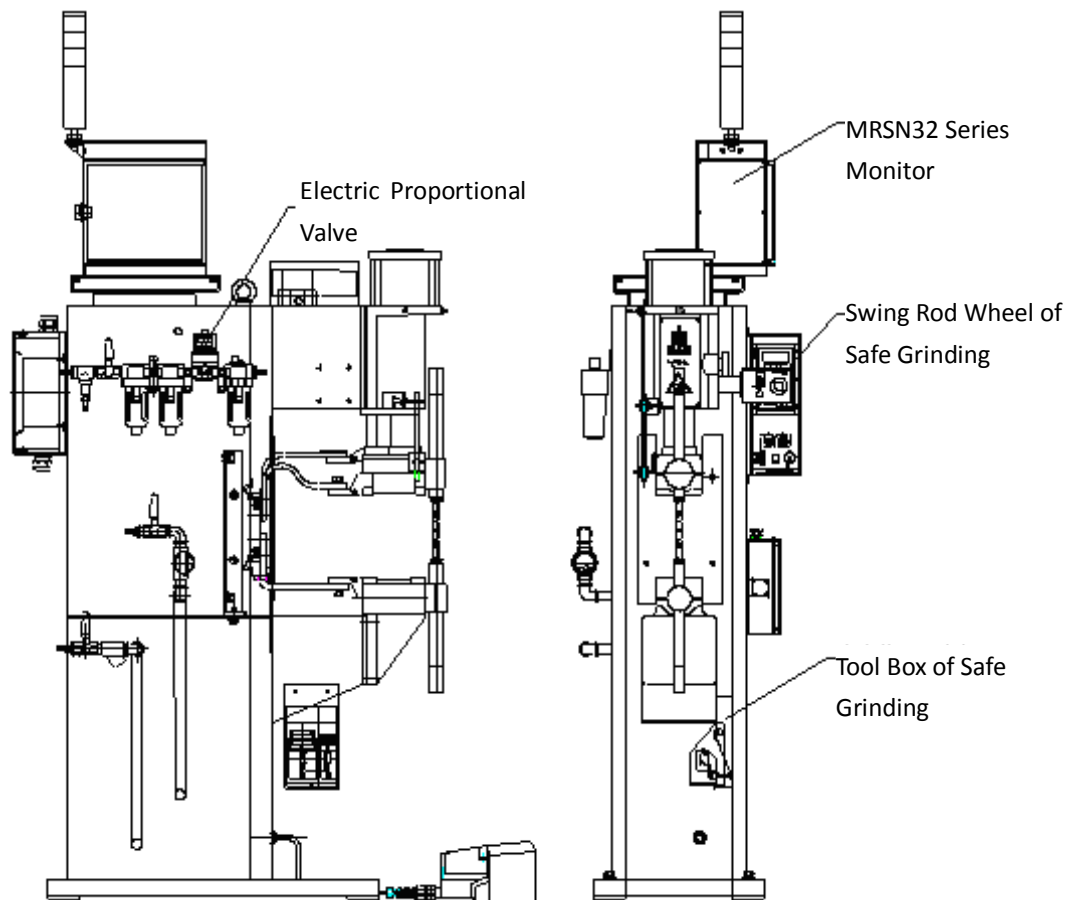
Welding Conditions of Hot Galvanized Steel Plate

Steel Plate	Galvanized Layer	A Class			B Class		
		Welding Current	Electrode Pressure	Power-on Time	Welding Current	Electrode Pressure	Power-on Time
mm	μ m	A	KN	cycle	A	KN	cycle
0.4	10~15	7,900	1.20	6	6,500	1.00	8
0.5		8,800	1.45	7	7,300	1.25	10
0.6		9,700	1.75	8	8,000	1.50	12
0.8		11,200	2.35	11	9,200	2.00	16
1.0		12,500	3.00	14	10,300	2.50	20
1.2	15~20	13,700	3.55	17	11,300	3.00	24
1.6		15,800	4.70	22	13,000	4.00	32
2.0	20~25	17,700	5.90	28	14,600	5.00	40
2.3		19,000	6.70	32	15,600	5.80	46
2.8		20,900	8.00	40	17,200	7.00	56

Welding Conditions of SS Plate (single-phase AC welder)

Plate Thickness "T"	Dimensions of Electrode Tip		Pressure	Power-on Time (cycles)	Current	
					Raw Material Elongation Strength < 980N/mm ²	Raw Material Elongation Strength > 980N/mm ²
Outside Thin Plate						
mm	d.mm	D.mm	KN	60cps	A	A
0.23	3.0	6.0	1.00	3	2,000	2,000
0.25	3.0	6.0	1.05	3	2,000	2,000
0.30	3.3	6.6	1.15	3	2,100	2,000
0.35	3.5	7.0	1.30	4	2,450	2,150
0.40	3.6	7.2	1.45	4	2,900	2,450
0.50	3.9	7.8	1.78	4	3,800	3,000
0.60	4.2	8.4	2.15	5	4,700	3,700
0.70	4.4	8.8	2.55	5	5,500	4,350
0.80	4.7	9.4	3.00	6	6,250	5,000
0.80	5.0	10.0	3.50	6	7,000	5,500
1.00	5.2	10.4	4.00	7	7,700	6,100
1.20	5.7	11.4	5.00	8	9,000	7,200
1.60	6.7	13.4	7.00	11	11,400	9,200
1.80	7.2	14.4	7.90	12	12,600	10,200
2.00	7.6	15.2	8.90	14	13,700	11,000
2.30	8.3	16.6	10.40	16	15,400	12,300
3.20	10.2	20.4	15.10	20	18,800	15,600

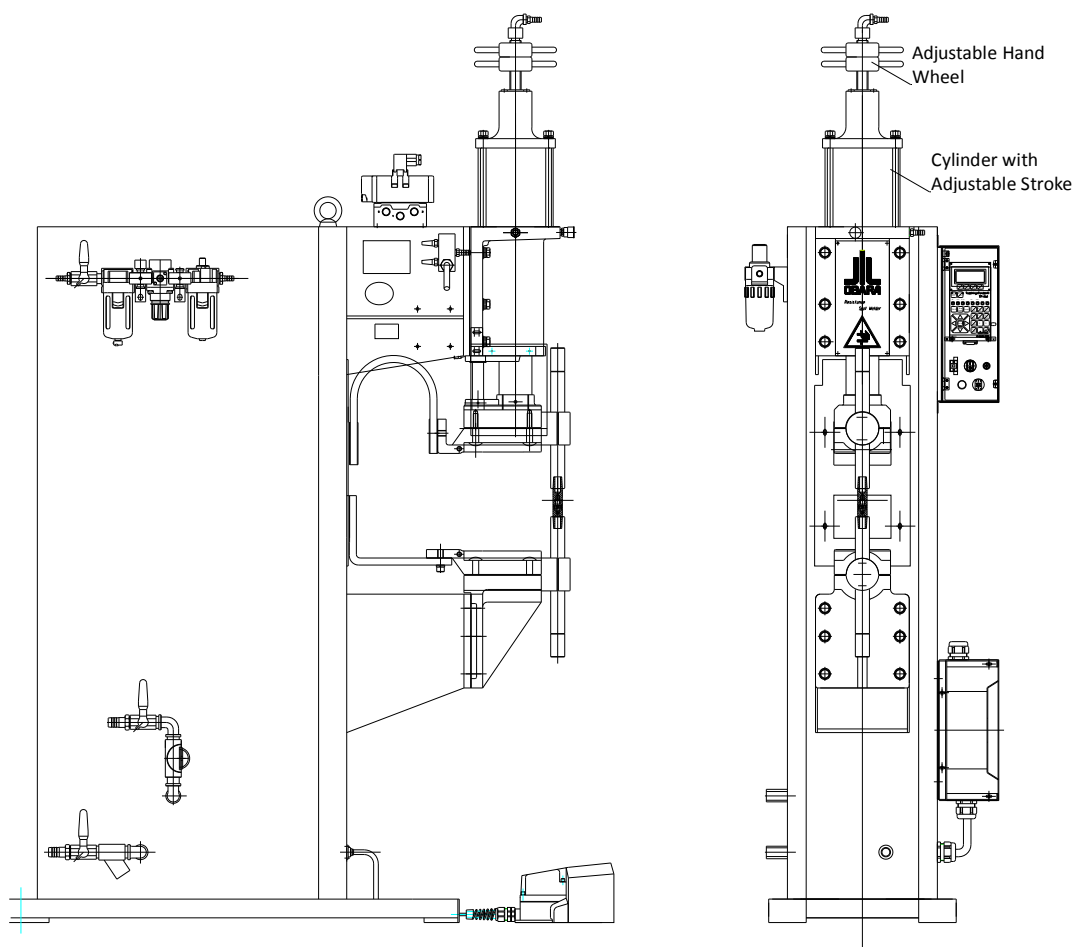
Annex 4: Safe Grinding and Using of Nut Inspector



If the welder is equipped with a MRSN series monitor, please refer also to *User Instructions of MRSN 32 Dotted Monitor*. In particular, the upper electrode's running speed during safe grinding shall vary along with the specific resistance of each machine as a result of manufacture error or service wearing. It can be adjusted with an electric proportional valve, and multi adjustments are possible over the long time service of equipment. Method of adjusting the electric proportional valve: Unlock by pressing UNLOCK key, press SET key repeatedly till P2, then $\triangle$ ∇ keys to achieve the target grinding pressure value, which is usually between 0.05~0.15MPa, and finally press LOCK key to confirm.

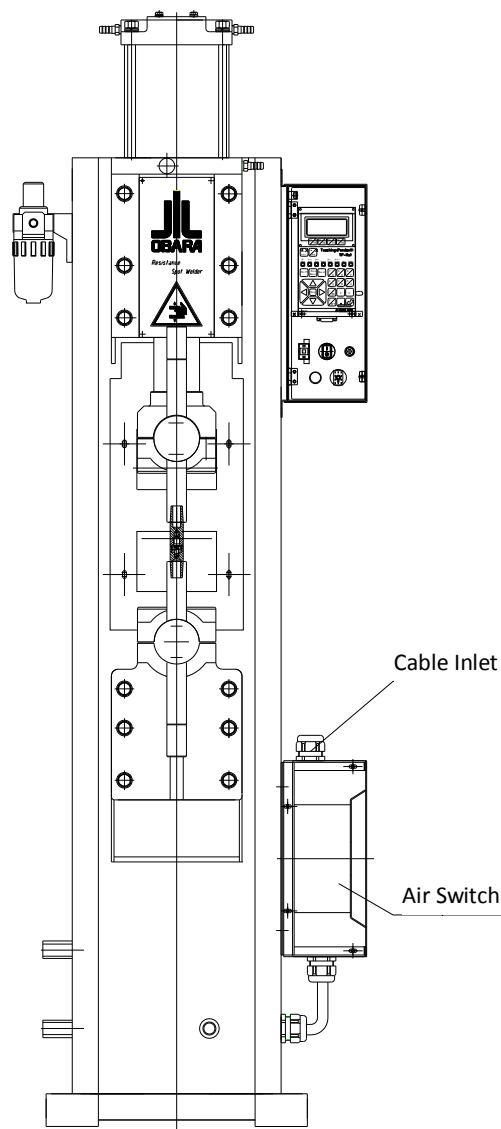
If the welder is equipped with a nut detector, adjust the position of detection switch based on the nut thickness, which is usually 2~3mm less than the nut thickness. Then turn the welding switch of control box to "No Weld", step on the pedal switch (or press the start button) to enable no current action of electrode once, then confirming the welder alarms on detection of no nut feeding, resume the welding switch to "WELD", and now the electrode would perform normal welding works.

Annex 5: User Instructions for Cylinder with Adjustable Stroke



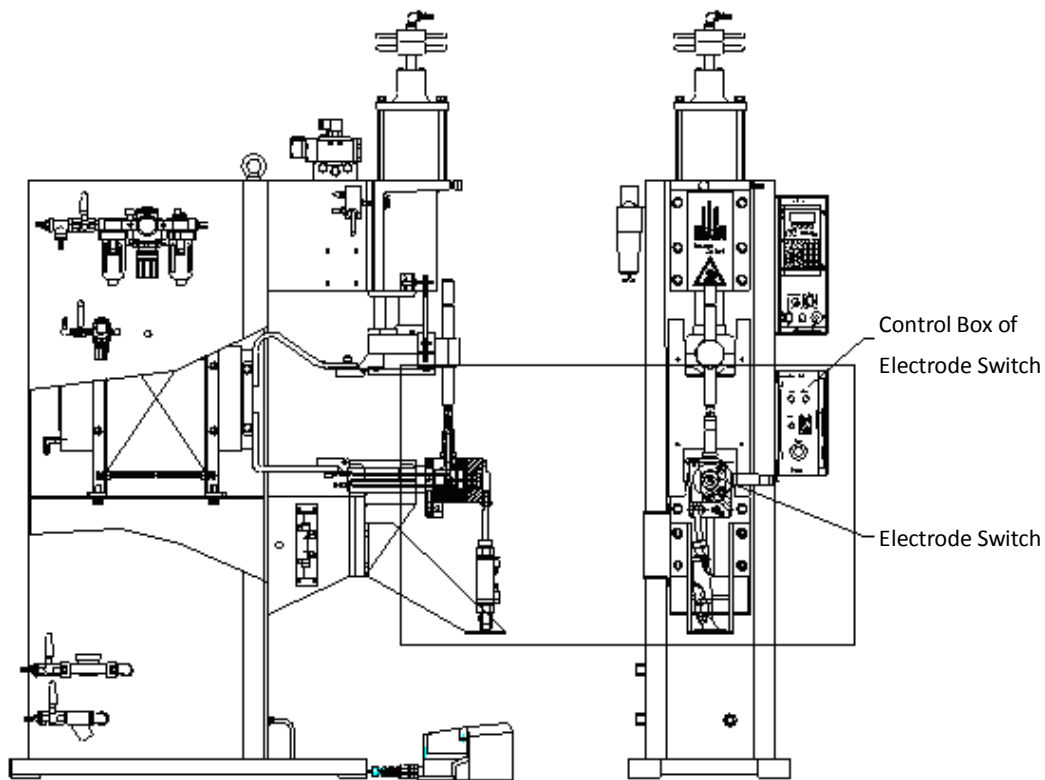
Working stroke of a welder equipped with an adjustable cylinder can be changed with the adjusting hand wheel on top of cylinder: it gets larger when turning the hand wheel downward, or smaller when upward.

Annex 6: User Instructions of Air Switch



If the welder is equipped with an air switch, the external power cable shall be mounted as following: Choose the cable and grounding lines matching with the welder, open the box of air switch and loosen the shrink nozzles, connect the two power cables via shrink nozzles to the inlet of air switch, screw fast the bolts and shrink nozzles, and finally mount the cover. Close the air switch when the welder status is confirmed fine, and now the welder is powered on.

Annex 7: User Instructions of Rotary Electrode Switch



If the welder is equipped with a rotary electrode switch, follow these steps to switch the electrode:

1. Toggle the cylinder position handle (or manual valve) to enable “Max Stroke” of electrode;
2. Turn the switch on electrode switch control box to “Turn”;
3. Press “Turn On” Button to enable electrode switch. Each pressing on this button shall switch the electrode once;
4. Done with turning, resume the turning switch to “Spot Weld”, toggle the cylinder position handle (or manual valve) to enable “Working Stroke” of electrode;
5. Turn the welding switch in the control box to “No Weld”, step on pedal switch (or press start button) to enable no current action of electrode once, then confirming the normal working of electrode, resume the welding switch to “Weld”, and now the electrode would perform normal welding works.

Revision History

[illegible]

This user instruction was written in December 2015. Contents herein are subject to potential modifications resulted from design alteration etc. without prior notice. Would appreciate your kind understanding!

Thanks for choosing OBARA. We will be happy to receive your kind comment & proposal on application of products from OBARA.

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