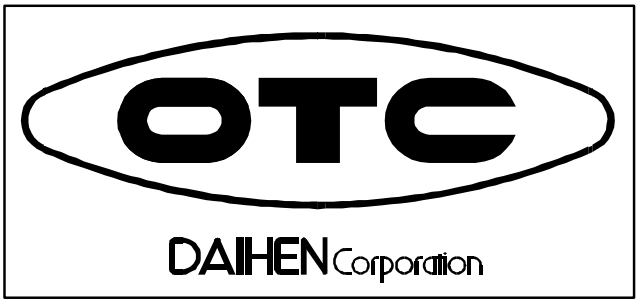
MSJ-164-9E0

A. C. Spot Welding Machine

Model SL－AJS50－600（CUSTOM）

INSTRUCTION MANUAL



Contents

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1. SAFETY INFORMATION

- Before using the machine, please go through the operation manual carefully.
- The precautions guide you to use the machine correctly and prevent you and other people fro m injury or damage
- This welder has been carefully designed and fabricated to assure safe operation.
  However, the users are requested to observe safety precautions hereof.
  Failure may cause serious trouble that may lead users or other people to death or serious injur y.
- Mishandling of the machine may cause danger or injury to the user in various levels.
  This operation manual classifies such dangers into three divisions as follows and expresses its level of danger with warning symbols as follows.

Warning symbol	Signal term	Contents
	Very **dangerous**	If erroneously handled, extremely dangerous trouble may occur, which may lead the user to death or serious injury.
	WARNING	WARNING gives information regarding possible personal injury or loss of life.
	CAUTION	CAUTION refers to minor personal injury or possible equipment damage.

- Warning symbols indicate dangers in general occasion.
- Serious injury as described above means loss of sight, injury, burning (high or low temperature), electric shock, fracture of bone or intoxication which may cause after-effect or hospitalization or long term care at hospital.
  Medium level of injury means injury, burning or electric shock, which do not require hospitalization.
  Material damage means damage of estate or breakage of machine or devices.

This manual also notifies the user of the "things must be done" and "things must not be done" as follows.

	**Compulsory**	Things must be done. For example, grounding.
	**Prohibited**	Things must not be done.

- The symbols indicate matters in general occasion.

2. WELDING SAFETY PRECAUTIONS

WARNING	To avoid serious physical injury, please observe the following precautions without fail.

- This welder has been carefully designed and fabricated to assure safe operation.
  However, users are requested to observe safety precautions hereof.
  Failure may cause serious trouble that may lead users or other people to death or serious injury.
- For construction of power source at input side, selection of installation site, handling, storage and piping of high-pressure gas, storage of products after welding and disposal of waste, users shall comply with the law and company standard.
- Provide proper means around the welder and the welding area to prevent unauthorized persons from entering the welding area unintentionally.
- Any one who has a pacemaker for heart disease implanted shall keep away from the welding machine or welding site unless he gets doctor□s permission.
  The welding machine, while welding, generates magnetic field to near-by area, having an adverse effect on the pacemaker function.
- This welder shall be installed, operated, maintained and repaired by qualified workers or ones who have understood well the welder.
- An operator who has gone through this manual carefully and has sufficient knowledge and technique to handle the machine must operate this welding machine.
- Never use this welding machine for any purpose other than welding.

WARNING	To avoid electric shock, please observe the following precautions without fail.
	* Do not touch the live electrical part other than secondary conductor. Otherwise, you may get a fatal electric shock or burn. * Touching your hands to both ends of the secondary conductor may cause critical electric shock.

- Do not touch the live electrical parts other than secondary conductor.
- The welder shall be grounded by qualified workers according to the laws.
- Before installing, maintaining or repairing of the welding machine, be sure to turn off the switches in the distributor box and all the power sources at input side and wait for 5 minutes.
  Even though the input power source are turned off, the condenser may have charge.
  Be certain to start the work after confirming there is no charged voltage in the condenser.
- Do not use a cable of insufficient capacity, damaged or the one having bare conductor.
- Tightly connect the cable joints and insulate.
- Never use the welder unless the case and cover are in place.
- Do not use torn or wet gloves.
  Always use dry insulating gloves.
- Perform periodic inspection and repair a damaged part as soon as it is found.
- Use cooling water of 5000Ω-cm or more of resistance with less deposits.
- Use cable, pneumatic hose, water hose which are sufficiently pressure-tight ones.
- When the welder is not used, please turn off all the power supplies.

WARNING	Never insert your hand or finger into a space between electrodes.

＊ Do not insert a part of your body, such as arm, hand or finger, otherwise, you will be caught by the electrodes and have serious injury or fracture of bone.

- Never put your hand, finger or arm between the electrodes.
- Make sure of the safety around the welding machine when the power source is put on, or compressed air is supplied.
- When the welding machine is not used, put off all power sources, and stop compressed air and cooling water.

CAUTION	Be sure to wear safety gears to protect you and other people from splash or spatter or noise.

＊ Welding and noise can cause inflammation in eyes, burn skin and injure hearing.

- Wear goggles to protect your eyes from scattering sparks.
- Wear protection, such as leather gloves, clothing with long sleeves, leg covers and leather apr on.
- Install a protective curtain around the welding spot so that scattering sparks will not hurt pe ople near-by.
- When noise is heavy, use ear protection.

CAUTION	Observe the following precautions to avoid fire, explosion or bursting.

＊ Spatter or heated base metal immediately after welding can cause fire.
＊ Insufficient connection at cable joint may cause fire due to heating by welding.

- Remove any flammable items in the welding area so that spatter will not come in contact with such flammable items.
  If not removable, then cover it with a non-flammable material.
- Do not weld in the presence of flammable gas.
- Do not bring heated base metal just after welding close to any flammable items.
- Precisely tighten the cable joint section and insulate.
- Make fire extinguishers available in the welding area for emergency use.

③ GENERAL NOTICE OF OPERATION

CAUTION

- Use cooling water of 5000Ω−cm or more of resistance with less deposits.
- There is fear of the abnormal generation of heat, the electric shock and the short circuit when the water quality is bad. And, there is fear of the damage of the cooling water hose.
- Cooling water inlet port temperature 30℃ or less.

Thank you very much for your purchasing "DAIHEN" Brand spot welding machine. Please read through thi s instruction manual with your best care for proper operation and maintenance.

■ ④ Construction

The construction of this machine is as follows.

·Body of spot welding machine

·Welding timer (Refer to separate instruction manual)

·Foot switch

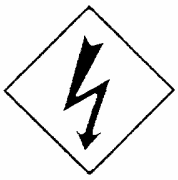
⑤ Necessary facilities on user's site

Spot welding machine	Welding power source					Control power		Cooling water		Compressed air		
	Rated capacity	Power source Voltage	Capacity of site power switch 2P 250V	Site switch fuse	Site connection cable	Power source voltage	Connection cable	Water volume	Water supply Port	Compressor capacity	Air supply port	Earth cable
type	kVA	V	A	A	mm2	V	mm2	L/min	mm	k W	mm	mm2
SL-AJS50-600	50	480	125 or more	125	38 or more			10	Φ20	2.2	Φ20	14

- Every capacity value mentioned in the above list is just reference, and applicable only when the facility of receiving transmitted electricity is 50kW or more.
- If the facility of receiving transmitted electricity is less than 50kW, the value in the above list is not applicable. Please establish the facility of receiving transmitted electricity applying to the regulation of electric Power Company.
- Water pressure: 0.1 ～ 0.3 MPa. ·Air pressure: 0.5 Mpa
- The quality of cooling water shall conform to industrial water. An electric resistivity should be 5,000Ω·cm or more, a cooling water inlet port temperature 30℃ or less.

⑥ Transport and Installation

■ Transport

 **WARNING**	**Keep the following strictly to prevent an accident and the damage of the welding machine by the conveyance.**
	・ Do not touch live electrical parts. ・ Before carrying, transport of the welding machine, be sure to turn off the switches in the distributor box and all the power sources at input side and wait for 5 minutes. Even though the input power source are turned off, the condenser may have charge. Be certain to start the work after confirming there is no charged voltage in the condenser.
	・ For hanging the welding machine, use the eyebolts at the upper part of the body. Securely tighten the eyebolts and fix the cover

■ Installation

 **CAUTION**	**When a welding machine is installed, the following is kept strictly.**

- Don't install a welding machine near the combustible and the inflammable gas.

  Don't put a spray can and a volatility combustible on the surface of the welding machine and the neighborhood.

- Don't install the welding machine in the place subject to direct sunlight and rain.

  The machine should be installed at the place avoiding high temperature, damp and dust.

- Install the welding machine in the place where the ambient temperature is between +5 and +40℃.

  Install the welding machine in the place not to exceed height above sea level 1000m.

- Please be sure to remove the stand frame for carry, and fix the machine with an anchor

  bolts on a firm and solid floor lest it should be vibrated during welding work.

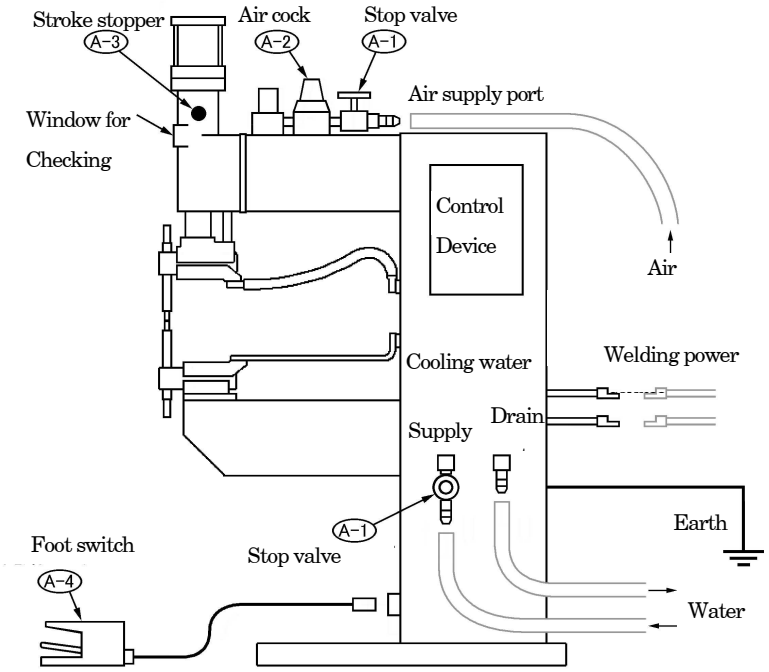
- Prevent person's easy admittance in the place where a welding machine is installed.

■ ⑦ Connection procedures

WARNING	To avoid electric shock, please observe the following precautions without fail.
* Do not touch the live electrical part other than secondary conductor. Otherwise, you may get a fatal electric shock or burn. * Touching your hands to both ends of the secondary conductor may cause critical electric shock.	
● Do not touch the live electrical parts other than secondary conductor. ● Grounding to the case of the welding machine should be performed by persons qualified electric work and according to the laws and regulations in your area. ● With the line disconnect switch inside the switch box all turned off, ground and connect the welding machine. ● When the connection is made, be sure that site power switch should be turned off. ● Do not use a cable with lack of capacity or a cable seriously damaged. ● Tighten and insulate the connections of cables. ● Surely attach the cover of the welding machine after connection of the cables.	
Compulsory	Be sure ground the case of the welding machine. Use a grounding cable of which is more than 14㎟.

・The perfect connection should be made so that any inferior contact or gas leakage may not occur.
・Connect the cables or hoses matching the facilities.

Connection of air hose and water hose
↓
Installation of welding proper
↓
Connection of welding power
↓
Connection of foot switch
↓
Completion



Connection drawing

■ ⑧ Operation procedures

CAUTION

* An operator who has gone through this manual carefully and has sufficient knowledge and technique to handle the machine must operate this welding machine.
* Use this welding machine at the rated frequency. Use except for the rated frequency may result in damage to the welding machine.
* Use this welding machine at or under the rated duty cycle. Exceeding the rated duty cycle limitation may result in damage to the welding machine.
* Don't do the operation of the switch during welding.
  It causes the trouble of the switch.

Refer to the connection drawing in the previous page.

Open the air & water valve — A-1 Look out for the rising of electrode

↓

Adjust the air pressure — A-2

↓

Adjust the stroke for the work by stopper — A-3 Adjust the stroke when the electrode falls down

↓

Turn on the primary welding power source

↓

Turn on the control power source, and establish the welding condition — In case of the first time, make a trail spot welding by setting to 「TEST」 side.

↓

Turn on the foot switch — A-4 Adjust the action speed of the electrode

↓

Welding (or Action test)

↓

Turn off the primary welding power source

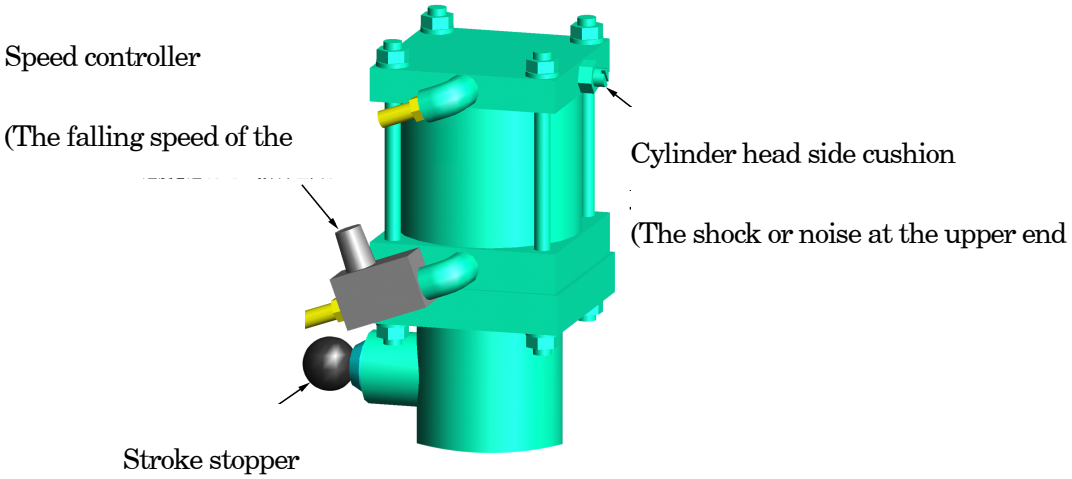
↓

Close the air & water valve — A-1

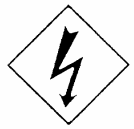
↓

Completion

Regarding the adjustment of electrode speed & stroke, refer to the picture below.



⑨ Maintenance and Inspection

WARNING	**To avoid electric shock, please observe the following precautions without fail.**
	・ Do not touch live electrical parts. ・ Turn off all of the line disconnect switches before touching the parts inside the welding machine. ・ Perform the maintenance checks periodically. If any damaged parts are found, only use the welding machine after troubleshooting or repairing. ・ Only certified operators should maintain, inspect, or repair the welding machine. ・ When carrying out the maintenance, wait more than five minutes after powering off all input power supply by turning off the line disconnect switch in the switch box. Capacitor may be discharging even after powering off all input power supply. Check to make sure that charging voltage does not exist before carrying out the maintenance.

Make the following inspection and maintenance works to keep the machine under the proper condition.

(1) Daily maintenance and inspection
- Check the abnormal vibration, howl, stench, overheating (conductive), air leak and water leak.
- Case Earth is surely connected.
- No excessive heat is generated from the cable connections.
- Check whether or not each switch functions properly.
- Connection and insulation of cables are surely made.
- There are no break in cable.
- Form the electrode so that the tip end always can be uniformed, and correct the center discrepancy between upper and lower electrode.
- Remove the dust or moisture in the drain cup inside the air filter, for preventing the trouble on air device.
- In winter, drain the water completely after the welding job is finished. If not drained well, the transformer or hose can be broken by the freeze of cooling water.

(2) Monthly maintenance and inspection
- Check the breaking of secondary cable.
- Check if regulator, solenoid valve and pressure gauge work well.
- Clean off the guide shaft (2ps) at pressure unit after taking off the air and setting the guide shaft to the lowest position. Next, give a greasing from the window for checking after letting in the air and setting the guide shaft to the highest position (electrode is open).
- Remove the fur by blowing compressed air to water supply port.

(3) Maintenance and inspection every 6 months.
- There are no loose connections or no poor contacts caused from rust, on input side of the welding machine.
- Disassemble all the connective parts of secondary side of the welding transformer and secondary conductor. Clean all the contacting points and fasten each part well in order to avoid any inferior welding owing to the inferior contactness there.
- By using the electrode pressure gauge, check if the pressure force between electrodes indicates proper value.
- The welding machine is properly grounded.

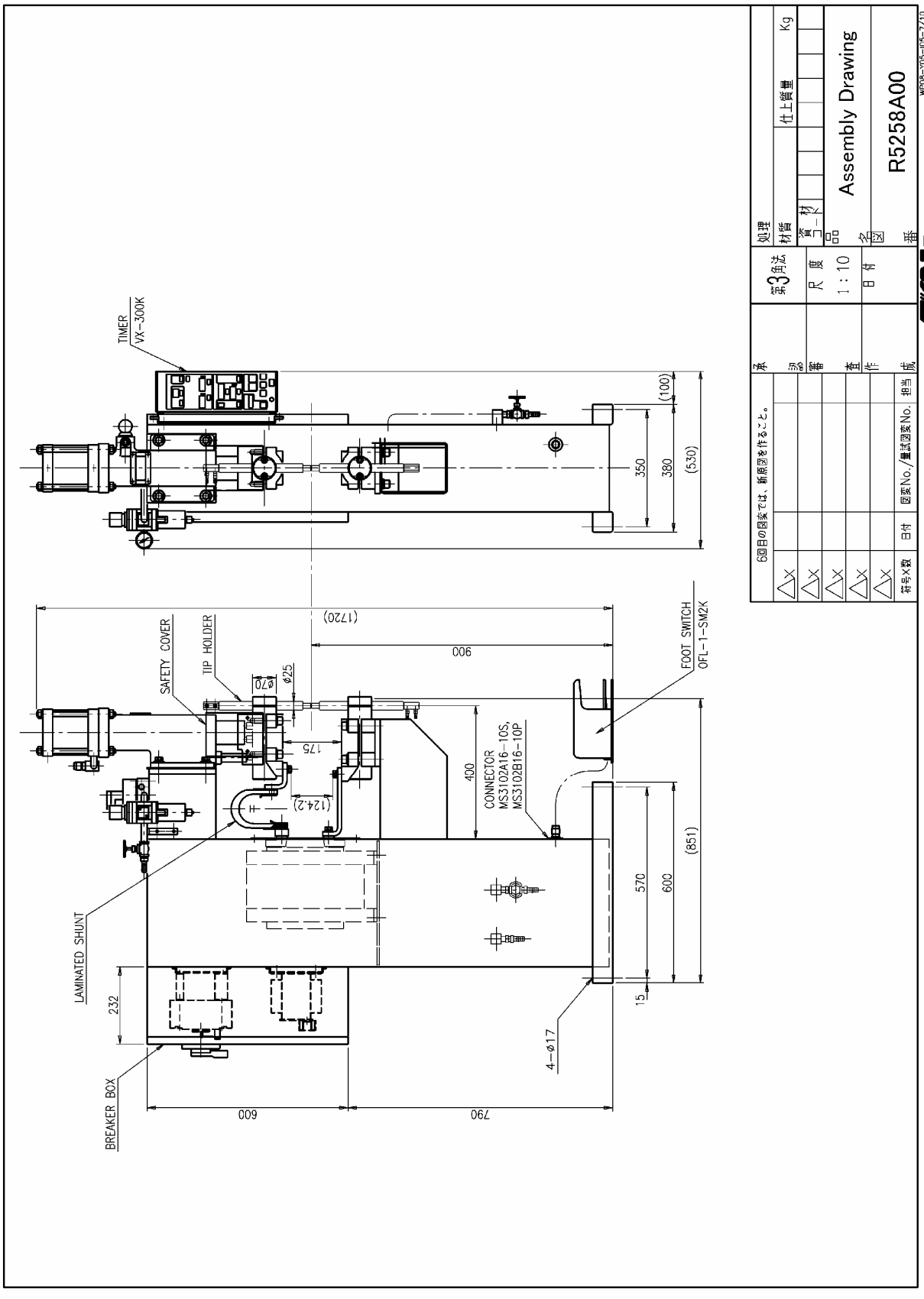
⑩ Parts List

SL-AJS50-600(Custom)				
	Code No.	Parts Name	Drawing No. Specification	Q'ty
		Laminated shunt	R5026K06	1
		Solenoid valuve	VS7-6-FG-S-3ZA03(SMC)	1
	3FA854-00002	Speed controller	AS4000-04(SMC)	1
	3FA754-00002	Silencer	SLW-10L(CKD)	1
	3F2A01-27500	Air cylinder	SCS-N-00-125H-75-MM	1
	SJ6000-01231	Springs	SWB50-50	1
Tr1		Transformer (for control power)	11-9746	1
SCR1		Thyrister	SKKT250/16E	1
				2
C1、2	1CA42W-10500	Condensor	45FAEN105UJA(E)	2
R1		Resistance	WMGO 15W 20Ω	1
				2
		BREAKER	NF-SFW 3P 100A	1
		POWER SUPPLY	S8VM-10024C	1
Tr2		Transformer (for control power)	R5258E02	1
FU1、2		Fuse	059-0112 5A (Bussmann)	2
		Fuse holder	0031.1631 0031.1616	2 2
				1

⑪ Specification

Spot welding machine	Rated capacity	Rated input Voltage	Rated frequency	Maximum welding input	Maximum short-circuit current	Duty cycle	Throat depth	Pressure force	Stroke	Electric tip	Horn	Thyristor	Weight
TYPE	kVA	V	Hz	kVA	A	%	mm	kN	mm		mm	type	kg
SL-AJS50-600 (CUSTOM)	50	480	60	133	21000	7	400	5.4	Working 20 Normal 60		Diameter Φ70		340

⑫ Appearance Drawing



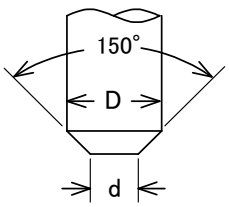
■ ⑬ Welding condition for mild steel

Thickness *1	Electrode tip (C type) *2			Min. pitch *3	Min lap *4	Best condition (ciass A)					Middie condition (ciass B)					Standard condition (ciass C)				
						Time		Pressure force		Current	Time		Pressure force		Current	Time		Pressure force		Current
						50Hz	60Hz				50Hz	60Hz				50Hz	60Hz			
mm	dmm	Dmm	Rmm	mm	mm	cycle	cycle	kN	kgf	A	cycle	cycle	kN	kgf	A	cycle	cycle	kN	kgf	A
0.25	3.2	10		6	10	3	4	0.882	90	4,000	4	5	0.588	60	3,700	13	15	0.294	30	3,000
0.4	3.2	10		8	10	4	5	1.13	115	5,200	7	8	0.735	75	4,500	17	20	0.392	40	3,500
0.5	3.5	10		9	11	5	6	1.32	135	6,000	8	10	0.882	90	5,000	20	24	0.441	45	4,000
0.6	4.0	10		10	11	6	7	1.47	150	6,600	10	12	0.980	100	5,500	22	26	0.490	50	4,300
0.7	4.3	10		11	11	7	8	1.67	170	7,200	12	14	1.11	113	6,000	24	28	0.539	55	4,700
0.8	4.5	10		12	11	7	8	1.86	190	7,800	13	15	1.23	125	6,500	25	30	0.588	60	5,000
1.0	5.0	13		18	12	8	10	2.21	225	8,800	17	20	1.47	150	7,200	30	36	0.735	75	5,600
1.2	5.5	13		20	14	10	12	2.65	270	9,800	19	23	1.72	175	7,800	33	40	0.833	85	6,100
1.4	6.0	13		23	15	12	14	2.99	305	10,600	22	26	2.06	210	8,500	38	46	0.980	100	6,600
1.6	6.3	13		27	16	13	16	3.53	360	11,500	25	30	2.35	240	9,100	42	50	1.13	115	7,000
1.8	6.7	16		31	17	15	18	4.02	410	12,500	28	33	2.70	275	9,700	45	54	1.27	130	7,500
2.0	7.0	16		35	18	17	20	4.61	470	13,300	30	36	2.94	300	10,300	48	58	1.47	150	8,000
2.3	7.6	16		39	19	19	23	5.44	555	14,600	35	42	3.48	355	11,100	53	63	1.72	175	8,500
2.5	8.0	16		41	20	21	25	5.98	610	15,300	38	46	3.77	385	11,500	56	67	1.86	190	8,800
3.0	8.8	16	75	48	22	24	29	7.45	760	16,900	47	56	4.70	480	12,500	63	75	2.35	240	9,700
3.2	9.0	16	75	50	22	25	30	8.04	820	17,500	50	60	5.10	520	12,900	65	78	2.55	260	10,000
3.5	10.0	22	100	55	27	32	38	8.85	903	18,000	58	69	5.39	550	13,400	80	96	2.70	275	10,500
4.0	11.1	22	100	67	32	42	50	10.1	1,030	18,900	73	88	6.27	640	14,100	104	125	3.14	320	11,000
4.5	11.5	22	100	80	40	56	67	11.7	1,190	19,900	98	117	7.45	760	15,000	139	167	3.72	380	11,600
5.0	12.5	22	150	87	44	70	84	12.6	1,290	20,800	118	142	8.43	860	15,800	169	203	4.21	430	12,100
5.5	13.5	22	150	98	48	79	95	14.3	1,460	21,800	138	166	9.51	970	16,450	198	237	4.80	490	12,500
6.0	13.8	22	150	109	55	90	108	15.6	1,590	22,500	158	190	10.4	1,060	17,200	225	270	5.19	530	13,000
6.5	15.0	25	200	118	59	101	122	17.4	1,780	23,300	178	213	11.7	1,190	17,900	253	304	5.88	600	13,400
7.0	15.1	25	250	133	67	117	140	19.2	1,960	24,400	204	245	12.7	1,300	18,700	292	350	6.47	660	14,000
7.5	15.1	25	250	140	70	127	152	20.6	2,100	25,100	222	267	13.7	1,400	19,300	317	381	6.86	700	14,500
8.0	15.9	25	250	147	74	137	164	22.1	2,250	25,900	240	288	14.7	1,500	19,900	343	411	7.35	750	14,900

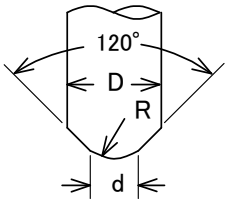
＊1 When the weiding of two workpieces with different thickness, see the smaller thickness.

＊3 Minimum pitch means the practical limitation which is able to ignore the branch effect by the close-by spot.

＊2 Electrode tip

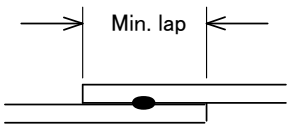


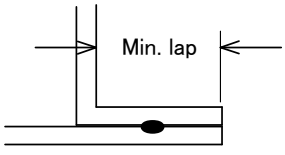
thickness under



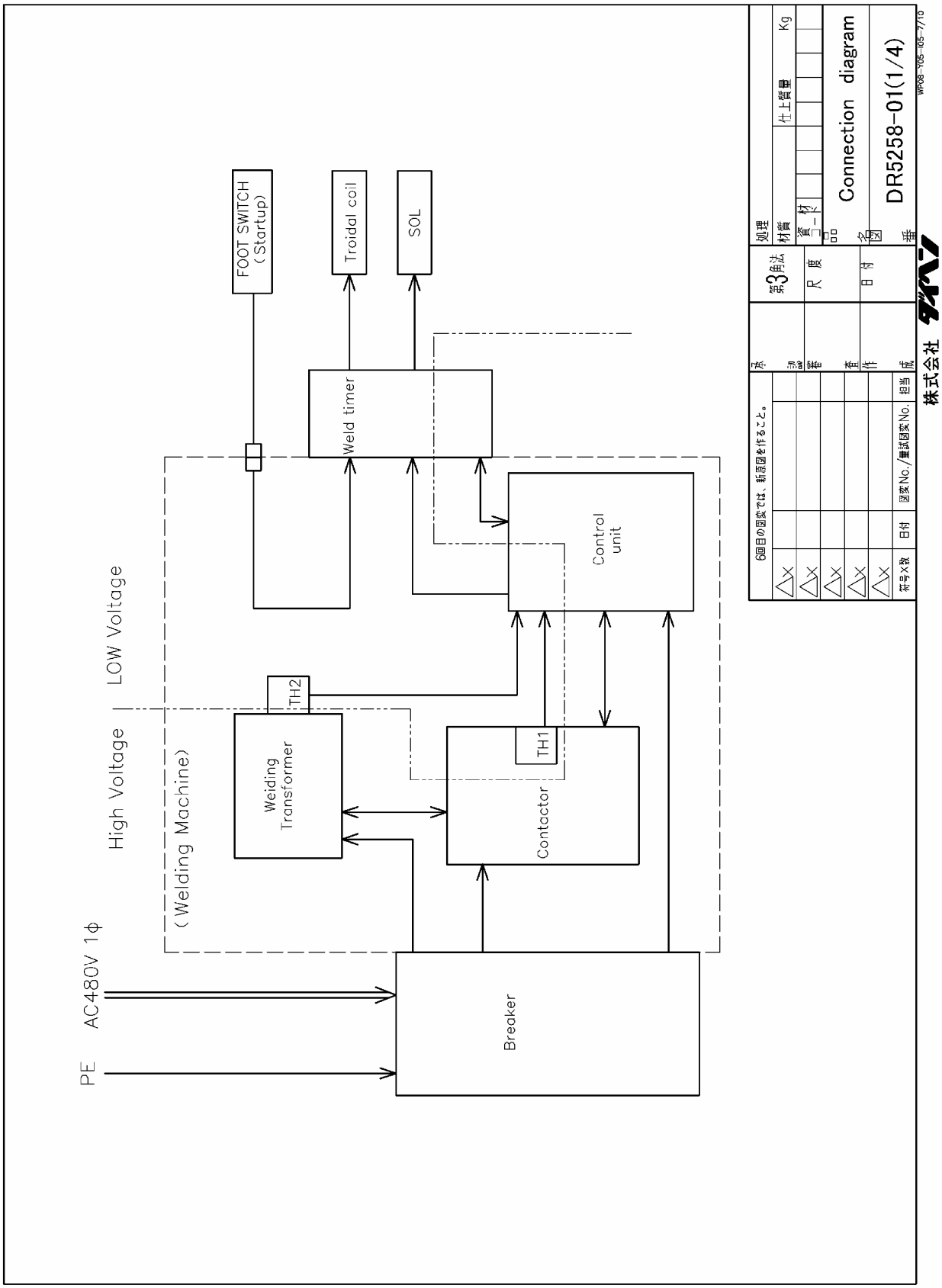
thickness over 3.2mm

＊4 Minimum lap

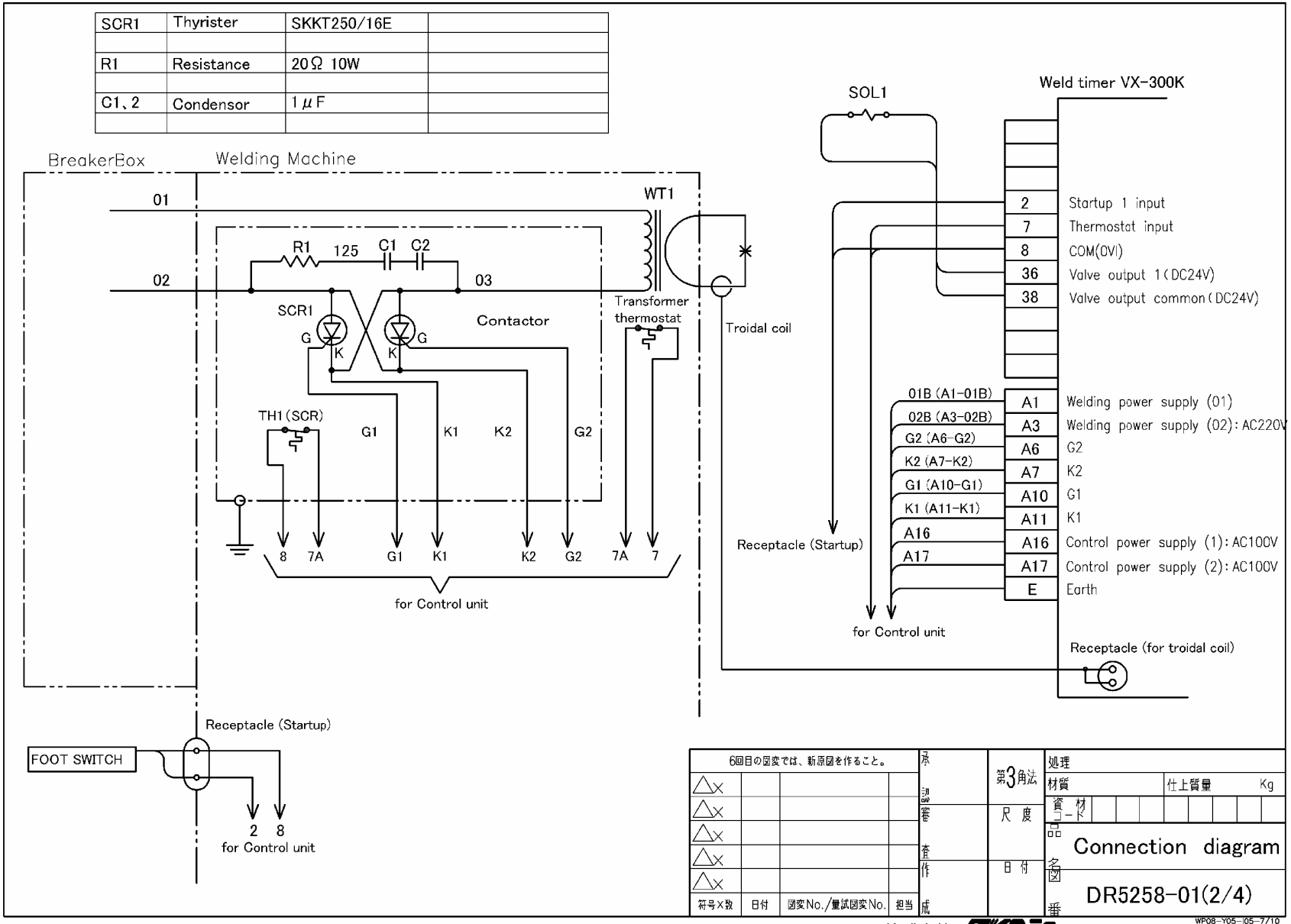




⑭ Electric Wiring Diagram



SCR1	Thyrister	SKKT250/16E	
R1	Resistance	20Ω 10W	
C1、2	Condensor	1μF	



6回目の図変では、新原図を作ること。				承認	第3角法	処理	
△X				審査	尺度	材質	仕上質量 Kg
△X				作成	日付	資材コード	
△X						品名	Connection diagram
△X						図番	DR5258-01(2/4)
符号×数	日付	図変No./量試図変No.	担当				

株式会社 ダイヘン

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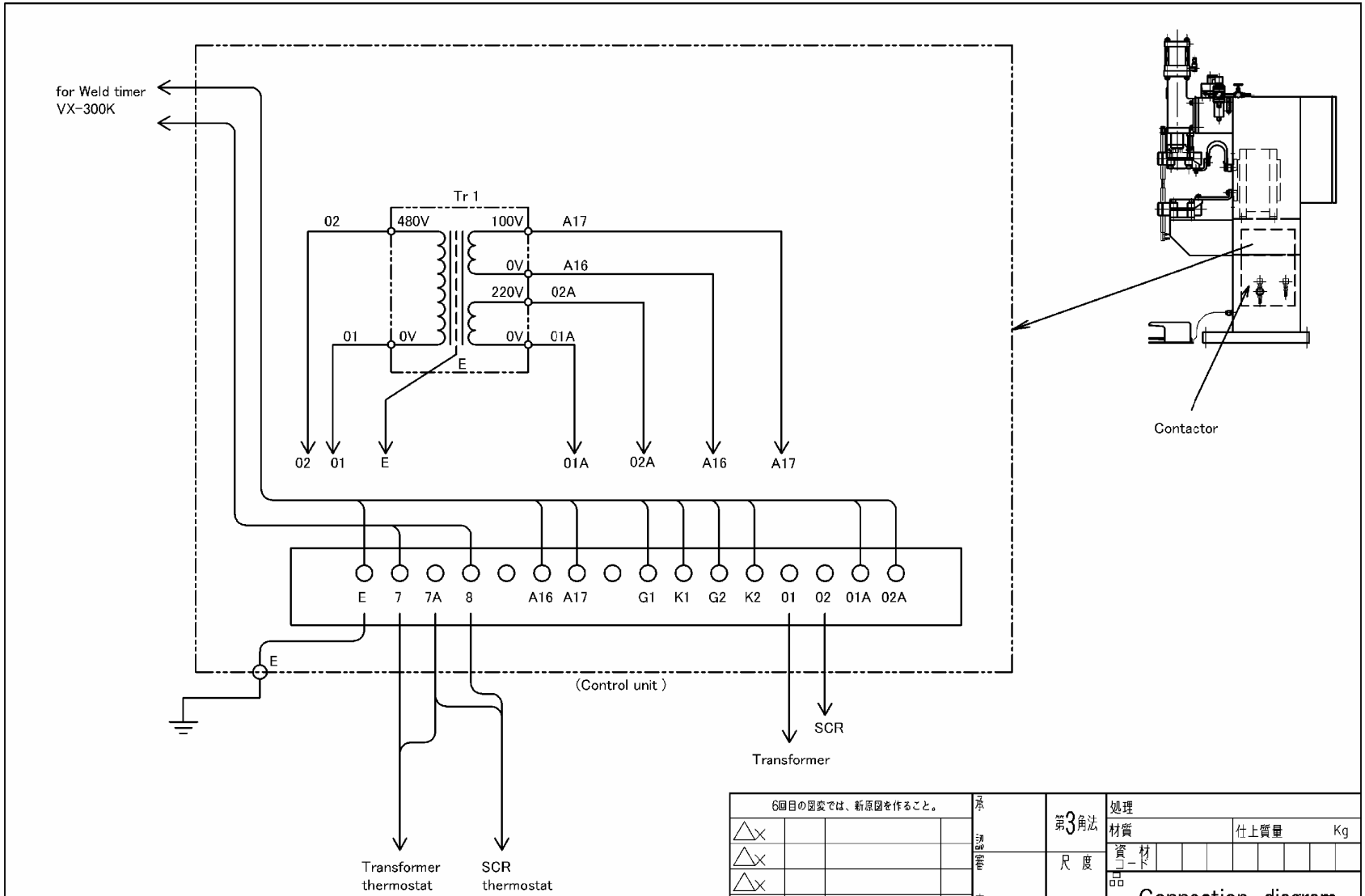

6回目の図変では、新原図を作ること。				承認	第3角法	処理	
△×				審査	尺度	材質	仕上質量 Kg
△×				作成	日付	資材コード	
△×						品名	Connection diagram
△×						図番	DR5258-01(3/4)
符号×数	日付	図変No./量試図変No.	担当				

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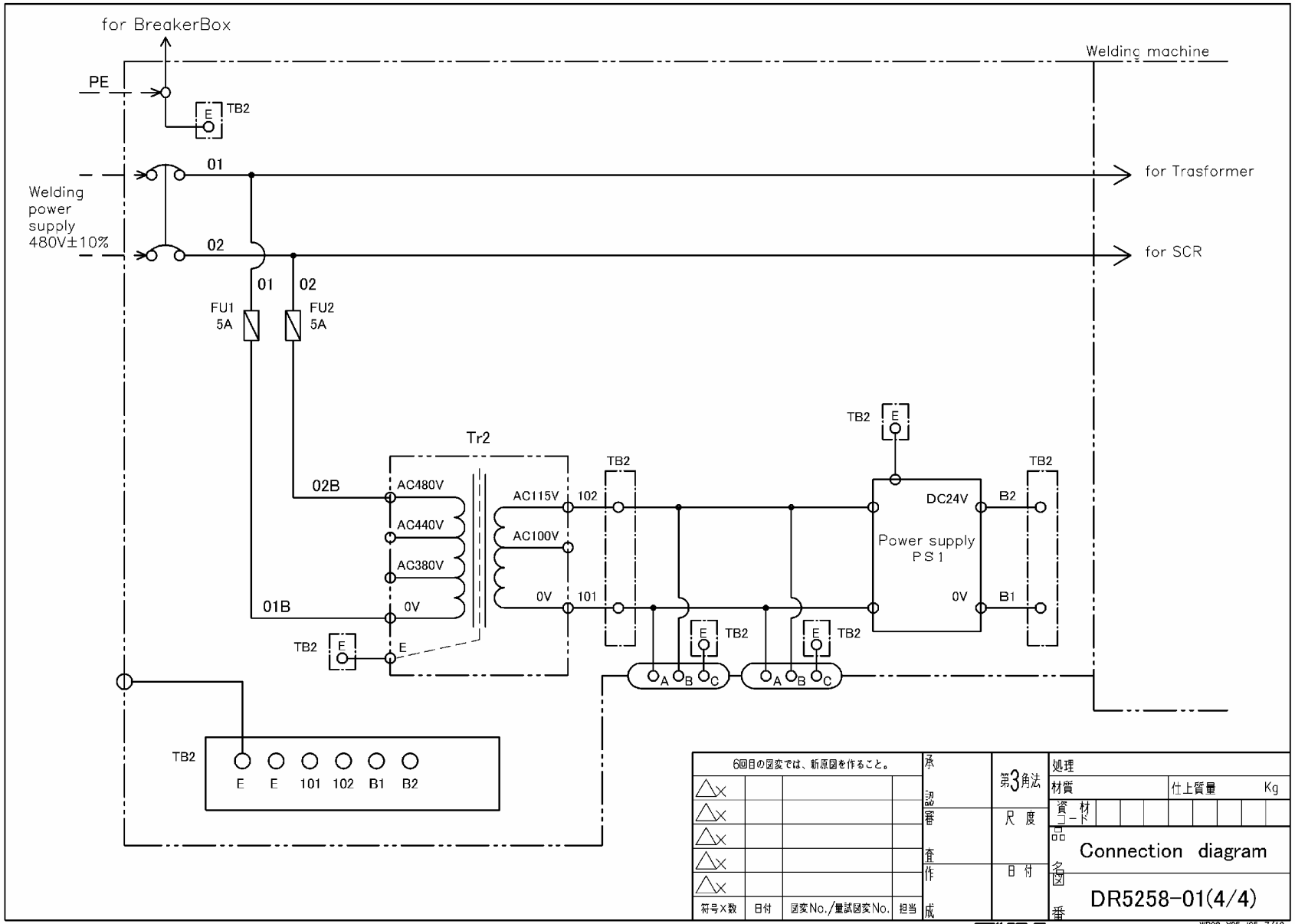

6回目の図変では、新原図を作ること。				承認	第3角法	処理	
△X				審査	尺度	材質	仕上質量 Kg
△X						資材コード	
△X				作成	日付	品名	Connection diagram
△X						図番	DR5258-01(4/4)
符号X数	日付	図変No./量試図変No.	担当				

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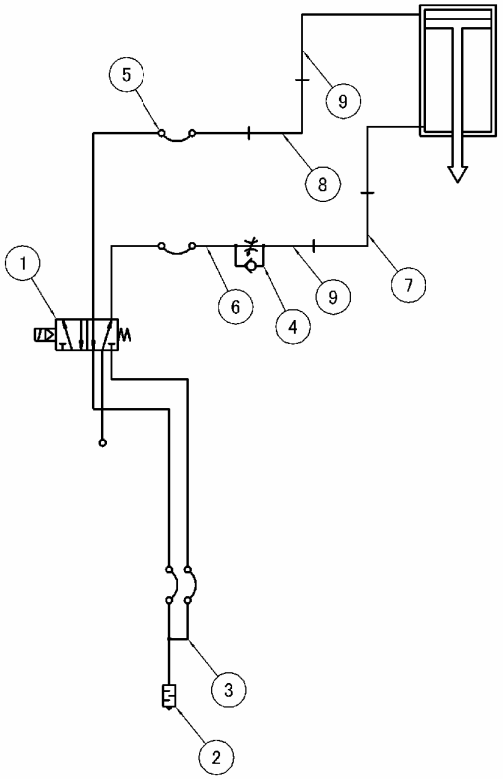

11	HOSE		12X17	3.8m	
10	HOSE BAND		Φ17	8	
9	NIPPLE		1/2	2	
8	REDUCING ELBOW		3/8 1/2	1	
7	STREET ELBOW		1/2	1	
6	BUSHING		3/8 1/2	1	
5	HOSE NIPPLE		Φ13XR3/8	9	
4	SPEED CONTROLLER	SMC	AS-4000-04	1	
3	TEE		3/8	1	
2	SILENCER	CKD	SLW-10L	1	
1	SOLENOID VALVE	SMC	VS7-6-FG-S-3ZA03	1	
SYMBOL	PARTS NAME	MAKER	TYPE & SPEC	QUANTITY	NOTE

6回目の図変では、新原図を作ること。			
△X			
△X			
△X			
△X			
△X			
符号X数	日付	図変No./量試図変No.	担当

承認 審査 作成

第3角法

尺度

日付

処理

材質 仕上質量 Kg

資材コード

品名 AIR PIPING LINE

図番 R5258L01

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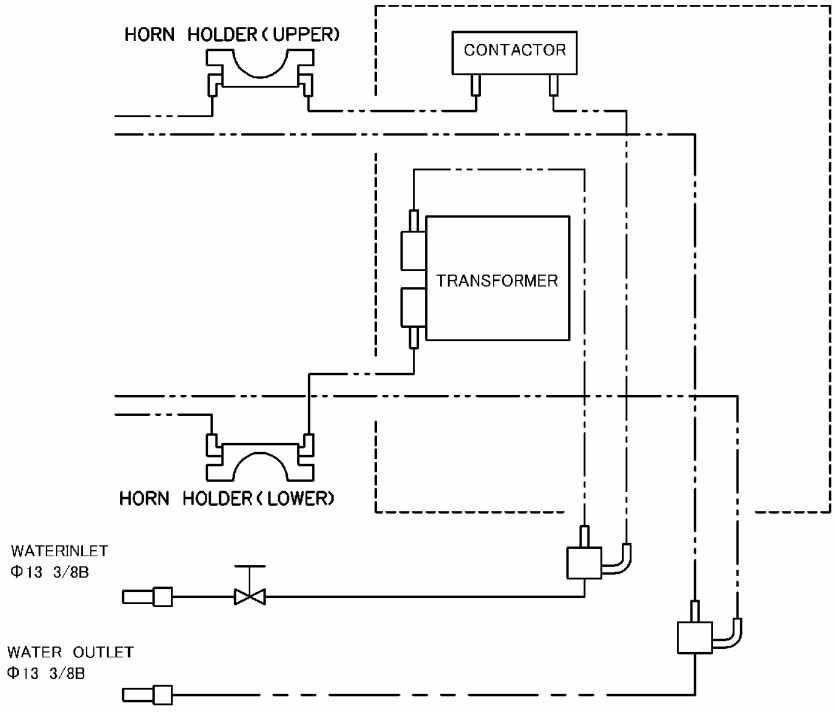

6回目の図変では、新原図を作ること。				承認	第3角法	処理	
△X						材質	仕上質量 Kg
△X				審査	尺度	資材コード	
△X						品名	WATER PIPING LINE
△X				作成	日付	図番	R5258G01
△X							
符号×数	日付	図変No./量試図変No.	担当				

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⑮ Attention of laminated shunt in SL-AJS35-600

As for SL-AJS35-600, bas bar is being inserted between the laminated shunt and the second ary terminal of transformer.

When the Laminated Shunt is removed, it is careful of bas bar.