WELDPROTM**system**

Operation and Installation Manual

Ver. 1 Date: March 2002

Welding Machine

Operator's Manual

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	Introduction

Introduction This manual provides instructions for operating, installation and maintaining the **WELDPROTM system W**elding Machine. There are a series of welding machine. And we have a kind of welding machine having Pre-pulse output and preheating before welding.

Purpose WELDPROTM system is a professional welding Machine for electronic and micro-electronic industries. It is specially designed for welding enameled and metal wires between 0.02mm - 0.45mm in diameter without any soldering.

It can also weld thin metal strips and thin metal slides. It has widely found application to micro-electronic industry with its characteristics of stabilization, small and light, facility and easy operation.

Contact us WELDPROTM system designed and produced by:

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2-1 System composition

WELDPROTM system, designed in the way of 'independent & alliance', is composed of three main parts: Control Unit, Weld Head and Optical Machine.

The machine has three settings, the weld force, the pulse amplitude (voltage) and the pulse width (duration), which can be digitally adjusted according to its different needs.

Control Unit

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Panel



This unit is composed of two parts installed in a box. They are transformer and Circuits. That is supporting precision output power to weld with the two digital switches.

There are two digital switches (dial), which the pulse width (duration) and the pulse amplitude (voltage) can be set.

There is counter on the box, which is easy to count weld times that operator has done.

There is especial dial to adjust Pre pulse amplitude. The setting is percentage of pulse amplitude setting. But when setting is zero, it is no Pre pulse.

Comment: The counter can save the weld times within one hour after turning off power, lost when more a hour.

2-2 System composition

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Automatic adjustment

The control unit has a special circuit board inside, which allows its automatic adjustment. Since there is dispersion of physical index of electrode and diversity of different weldment, this circuit provides an automatic adjustment in pulse amplitude and width by obtaining the physical parameter from the electrode. This is to ensure suitable power output. It also has a protective circuit board that restricts the pulse amplitude and width in order to obtain better performance and longer lifetime of the electrode.



Rear



A circuitry flow-chart of the Machine





The weld head operates the **MCL Electrode** to process welding.

It is also a weld force adjustable mechanical Machine. The linear weld force is shown on the LED display.

The head and pedal are both controlling the trigger on the weld head.

MCL Electrode

The MCL Electrode is the part that welds. Heat is produced at the tip of electrode during operation.

Optical Machine



The optical Machine is designed to visually aid the operator since the working area is minute.

This basically consists of the stereo microscope, held by a rectangular stand, which is attached to the front of the weld head. The angle of the microscope is adjustable.









Installing Weld Head

Fix the baseboard and the rectangular stand on to a strong work surface with the screws (the dimension of holes as shown above).

Thread the wire from the foot pedal, through the hole of the weld head stand. Press down the axis (located at the top of the weld head) so a metal rod protrudes at the bottom of the cylindrical stand. Connect the foot pedal wire to the metal rod using a small screw.

Fix the weld stand on to the strong work surface with the screws which locate in the metal piece.

Installing Power Cable and Control Cable

Using screws, attach the two power cables from the control unit to the power cable connector in the electrode clamp.

Connect the control cables from the control unit to the control connector of the weld head.

Caution: please check the input AC power(voltage)that Plug in the machine, there are a switch on the machine box back to be settings according to input AC power.

Safety Precautions

1) Do not open the control unit or the weld head.

2) Ensure that the axis and the weld head are kept clean and dry.

3) Do not use any lubricant.

3-3 Installation

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Installing MCL Electrode

To release the electrode clamp with the handle, put the electrode into the slot of the clamp and screw it firmly.



Note: The two sides of the clamp are positive and negative poles of the power, so the electrode centerline should be parallel with the slot of the clamp, otherwise it will short circuit and cannot weld.

The surface of the electrode must be kept clean and dry to avoid excessive resistance.

3-4 Installation

Electrode Options

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There are various electrode models (shown in below) designed for various dimension of wires and types of weldment. :

a. Flat tip (P1) - for welding on microcircuit.

b. Cylindrical tip (R1) - for welding on copper foil laminate and printed

circuit boards.

- c. Slanted edge tip (C1) cuts off the wire after welding.
- d. W shaped tip (W1) forces wires to be placed at the center of the weld spot (Up to 0.10mm in diameter).
- e. V shaped tip (V1) for welding thicker wires.

Note: All electrode models shown above are designed for common use. Do not hesitate to contact us if you need any new electrode models. We will especially for design and produce electrode by your request.

Electrode Maintenance

Make sure that the settings are correct or not before welding. Ensure that the tip of the electrode is positioned above the wire.

An electrode can weld between 5,000-10,000 times depending on the types

of wire and weldment. If the electrode is not working efficiently, special

sandpaper should be used to gently sand the tip a few times. Should the

electrode still perform inefficiently, a new electrode should be taken place.

Note: MCL electrode use is recommend.

Fluorescence Lamp

To release the three screws which in the middle of the lamp house.

Fix the lamp to the outside of the field lens of the stereo microscope directly, or fix to the lamp connector.

Check the AC power(voltage), plug in and switch on the lamp.

Note: that the connector should been selected to suit for different company's stereo -microscope.

4-1 Adjustment of Settings

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The correct setting of the weld force, pulse amplitude and the pulse duration are three essential factors for quality welding. Different dimension of wires and welding has various physical characters (For example, elimination of heat, conductive area and material density etc.). Therefore different settings are required. According to the law of energy $E=V^2 T/R$. For thicker wire, the stronger

the weld force and higher the energy required.

Diameter of wire	Weld Force	Voltage	Duration
(mm)	(±20 g)	(±0.15V)	(±1 ms)
0.02	200	0.50	5
0.06	300	0.70	7
0.10	500	0.85	10
0.13	700	1.20	14
0.15	800	1.30	14
0.19	1000	1.50	16
0.21	1200	1.60	16
0.23	1400	1.70	17
0.25	1800	1.80	17

This table is a reference to settings for different thickness of wires.

It is a reference guide; it is recommended that a trial weld should be conducted. Starting from 0.3V below the voltage parameters given in the table, graPrely adjust the three settings until an optimum weld quality is obtained.

Technical Specifications: a. 220V, 50Hz, (220V±25V)

115V, 60Hz, (115V±25V)

- NOTE: There is a switch to change input power on back of control box. When the input power changing, the switch should be changed according to the input power.
 - b. Maximum output pulse power: 540VA
 - c. Pulse amplitude (voltage): 0.01-1.99V
 - d. Pulse width (duration): 0.1-29.9ms
 - e. Welding frequency: reach up to 120 times per minute
 - f. Weld force: 30 3000 Kg
 - h. Dimension of wire: 0.02mm 0.40mm in diameter

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Certification of Calibration

Model: _____ Serial #: _____

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Calibration as below and refer to CP-5914

1.0 Main pulse duration:

- 1.1 Setting range:
 - 0.1ms-29.9ms (0.01V-1.00V)
 - 0.1ms-19.9ms (1.00V-1.99V)

Step: 0.1ms

- 1.2 Average duration at 1/2 height of amplitude:
 - Ts < Ta < Ts+0.5ms
- 1.3 Repeatability:
 - Tmax Tmin < 0.5ms
 - Measured at setting of 1.40V and 14.0ms with 10m0hm load and 100 pulses
- 1.4 Rise time: <1.0ms
 - From 10% to 90% of amplitude

2.0 Main pulse amplitude:

- 2.1 Main Pulse amplitude with setting 1.40V&14.0ms measured with 10mOhm load at 2ms is 1.40V±5%.
 Repeatability measured with setting 1.40V&14.0ms with 10mOhm load and 100 pulses: Vmax Vmin < 0.1V
- 2.2 Pulse top slope: <10% Erom 2.0ms to 12.0ms with the setting and loading of
 - From 2.0ms to 12.0ms with the setting and loading of 4.1
- 3.3 Setting Range: 0.01V to 1.99V Step: 0.01V
- 4.4 Open load amplitude increase 10%-25% in comparison to 4.1

3.0 Weld Force

3.1 Setting Range: 30g to 3000g step 10g 3.2 Tolerance: Fa = Fs \pm 10%

Fs	50g	100g	180g	260g	500g	800g	1000g	2000g	3000g
Fa									

Note: Fs stands for "Force Setting" Fa stands for "Force Actual"

This certifies that at the time of manufacture the above equipment has been tested and calibrated at SWH Industry Hong and complies fully with SWH Industry Hong product specifications.

Electrical Inspector: _____

Mechanical Inspector: _____

Calibration Date: _____

Month / day / year