

Instruction and programming/setup manual  
for the resistance welding

# ***"Masterweld 15"***

***welding control timer systems.***  
( 08C Seam welding control)  
(02E Spot / Proj with Highlift welding control).

***\*\*\*Important Note\*\*\****  
***Only use SCR units with single side cooling.***

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## **1. "Masterweld 15" features**

- For spot / projection welders and, if installed, optional seam welder function.
- Welding quality assured by maintaining weld current regardless of mains voltage fluctuations and/or variations of welding load. The "Masterweld 15" uses a close-loop feedback system back to the welding controller.
- Either constant current or phased heat control options.
- Up to 15 selectable welding schedules.
- Single weld or stitch / repeat welding.
- Three fully settable and adjustable welding pulses per schedule.
- Weld pulsation availability.
- Current upslope and down slope function.
- Spot weld count function.
- Visual readout of mains incoming supply voltage.
- Visual readout of welding current (in constant current mode).
- Primary side current feedback.
- Self-diagnostic functionality indicated by fault "Alarm" codes.
- Data memory retention for up to ten years after supply power failure.
- Membrane switch facia programming.

## **2. General technical data**

For the function parameters: refer to (Appendix 1)

Power Supply:	Single phase AC380V, 50/60 Hz, +10%~-20%
Ambient temperature:	0 - 50°C
Relative humidity:	≤90%
Cooling water:	inlet temperature≤30°C
Water flow:	6L/MIN
SCR:	500A/1200V

### 3. Basic set up instruction

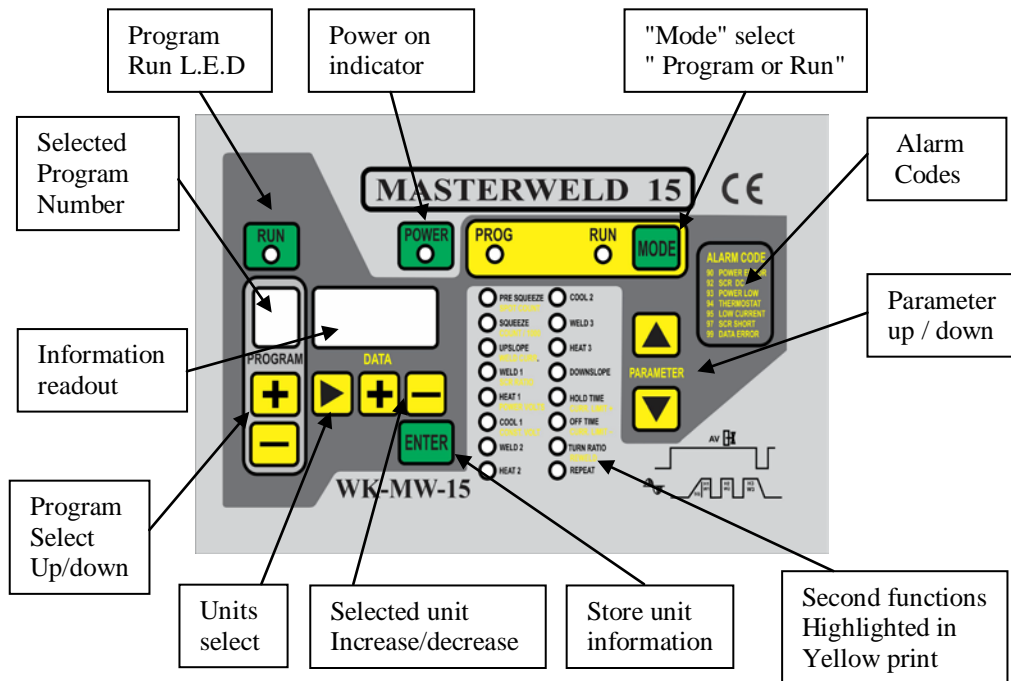
#### 3.1 Function selection

The setting of dip switches

ON position		OFF position
S1	Constant current "On"	Phase heat "On"
S2	Repeat On (stitch function)	Repeat Off (Stitch function)
S3	Pulse Starting initiation	Normal Start initiation
S4	Seam welding (optional 08C)	Spot welding
S5		
S6		
S7	15 program schedules	4 program schedules (dual gun mode)
S8	External "Stop" Welding alarm	External "Allow" Welding alarm

#### 3.2 The programmer uses

**3.2.1** There are two function "Modes" on the Masterweld 15. Either of the two modes can be selected by pressing the green "mode" button on the Programming Console.



1. Programming mode (Prog): Parameters can be programmed (see programming parameter list)
2. Welding mode (Run): Normal welding mode.

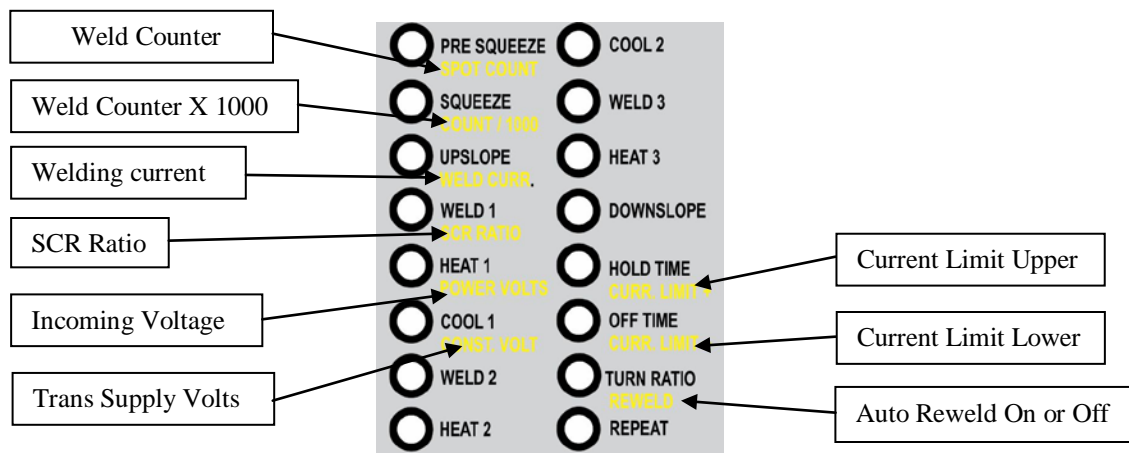
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3.2.2 The controller displays information in either the programming or welding mode.

While set up in programming mode the L.E.D,s will indicate information based on black print i.e. "pre-squeeze".

During run mode the L.E.D,s will indicate information based on yellow print i.e. "**SPOT COUNT**". please note that only a number of the L.E.D,s carry yellow print.

In run mode access is available to set up the constant current upper (CURR. LIMIT +), lower (CURR. LIMIT -) and reweld (REWELD) functions.



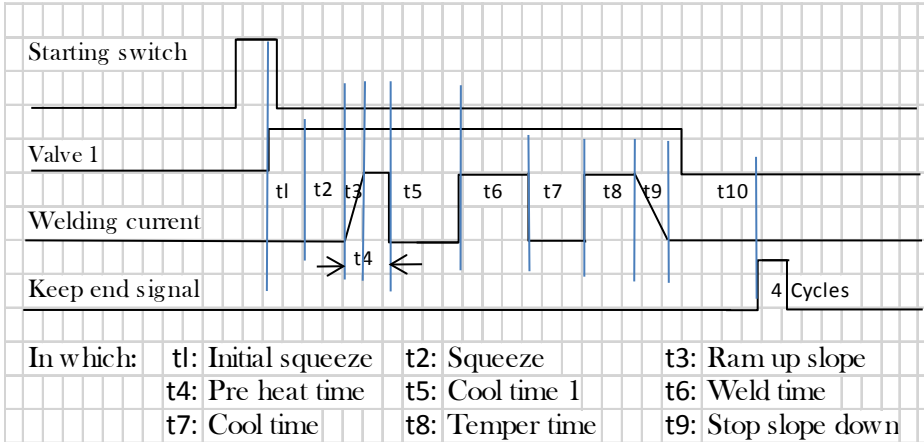
3.2.3 Set up to use the controller in Phase heat (Voltage compensation) mode.

- (1) At first power up i.e. first switch on, with controller set in phase heat (controller factory setup in phased heat on the dip switches).
- (2) The operator should weld once, then go to cool 1 (CONSTN. VOLT)
- (3) then press the green "ENTER" button.

Please note; it is important that the above setup is carried out in the "Run" mode as indicated on the yellow prog/run panel

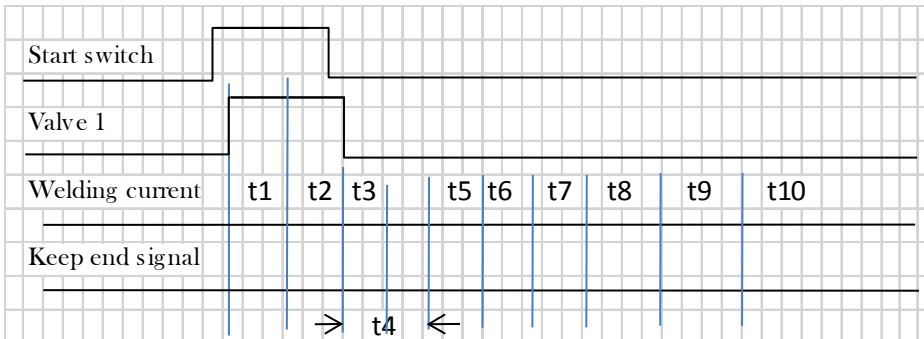
### **3.3 The welding process & functions**

3.3.1 Pulse start is available when dip switch S3 is in the "ON" position

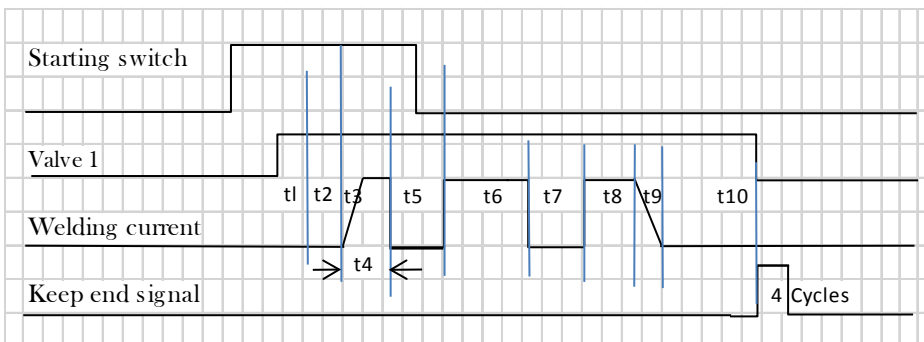


3.3.2 Pulse start is only available if S3 dip switch is "On"

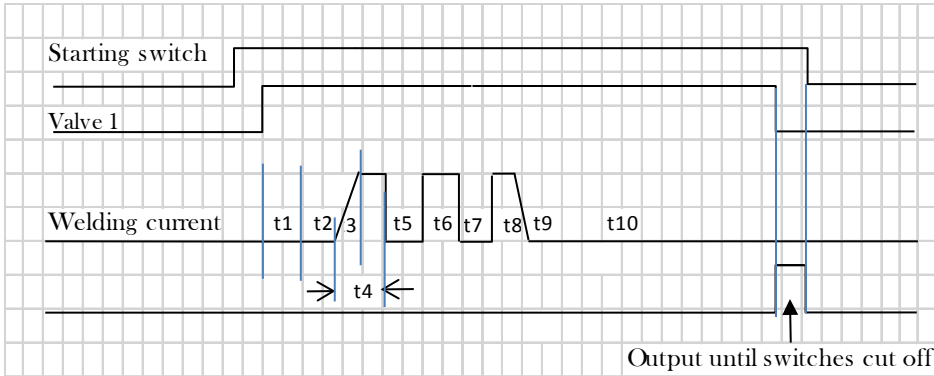
3.3.2.1 Abort welding after initiate (system only locks in first weld cycle)



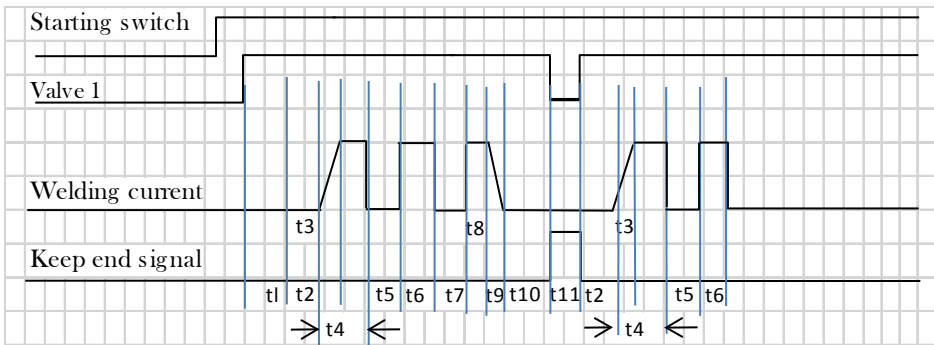
3.3.2.2 Continual welding after initiate (system locks in first weld cycle)



3.3.2.3 Single weld operation (start switch held "ON" )

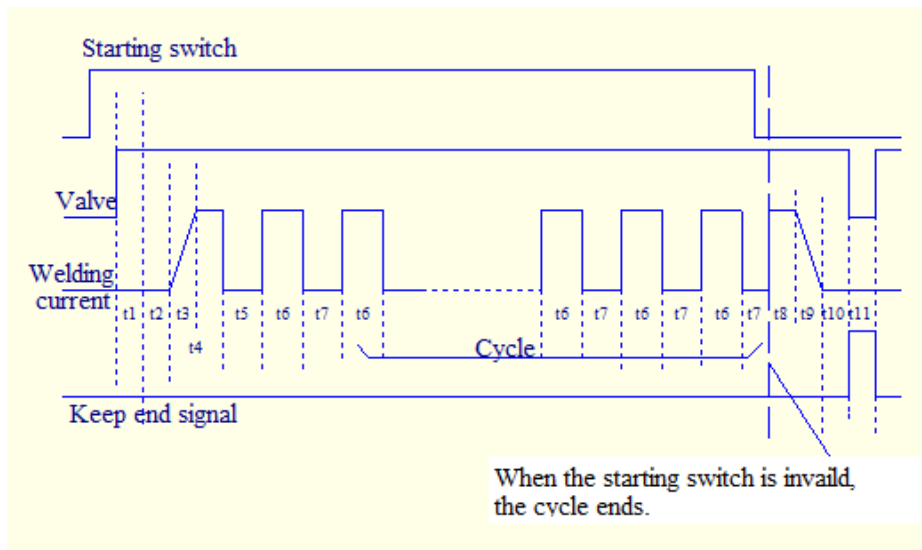


3.3.2.4 Repeat or stitch welding.



- |                 |             |               |
|-----------------|-------------|---------------|
| t1: Pre Squeeze | t2: Squeeze | t3: Upslope   |
| t4: Weld 1      | t5: Cool 1  | t6: Weld 2    |
| t7: Cool 2      | t8: Weld 3  | t9: Downslope |
| t10: Hold       | t11: OFF    |               |

### 3.3.2.5 Seam welding (optional software upgrade O8 Version)



## **3.4 Set up of program parameters**

The Masterweld can undertake three welding pulses during each weld schedule in which the second pulse can be setup to repeat from one to nine times.

If only single pulse welding is required then set cool1, cool2, weld1 & weld2 to "0" i.e. ZERO.

### **Enter welding parameters as follows:**

(1) timing on the initial Presqueeze , squeeze, welding time, cooling time, hold time, off time is based on the "cycle" with a scale of 0 - 99 cycles.

**Important note\*\***            At 50Hz,    one cycle is 1/50 second;  
   At 60Hz,    one cycle is 1/60 second.

(2) Welding current range scale of 20-199 where;  
      20 = approx 10% of available output current  
      199 = approx 100% available output current.

(3) TRF (Transformer) turns ratio is  $V_1/V_2$

$V_1$ —Primary voltage of welding transformer  
 $V_2$ —Second voltage of welding transformer  
Turns ratio range can be 1.0 turn to 199.9 turns.



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(4) Open.

(5) The over current limit (+) and the under current limit (-) is used to activate the alarm of out of range current. The setting of current is expressed by its percentage value between 5% (under current) and 20% (over current).

When the actual welding current value is out of the over current limit (+) an alarm will be indicated by flashing fault code "95".

When the actual value is out of the under current limit (-) and "re-weld" is set on, then the Masterweld will automatically reweld,

if the weld it's still out of the under current limit (-) and If "re-weld" is not set on, an alarm will be indicated by flashing fault code "95" and the machine will not allow further welding to be undertaken.

(6) Re-weld dip switch can be set either on/off in position 0 or 1 as follows;

Position 0, "re-weld" is not permitted.

Position 1, "re-weld" is permitted.

(7) Setting Upslope time.

If the time of weld1 is not set at 0 (Zero), then the total time of current upslope should not be more than the set time of weld 1;

if the time of weld1 is 0 (zero), then the total time of current upslope should not be more than the set time of weld2.

### **3.5 Wiring of initiation / program selection**

Refer to Figure 2 "The wiring diagram for user connection (CN2) terminal". As used on dual gun, multi welding head layouts.

(1) Please note;        3 programmes are available on Version 02  
                                  4 programmes are available on Version 08:

Valve 1		Valve 2		
program 1	program 3	program 2	program 4	
SW1	O	X	X	X
SW2	X	X	O	X
SW3	X	O	X	X
SW4	X	X	X	O

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(2) 15 schedule set up: using one air solenoid valve as used on single gun, pedestal and projection welding operations

Schedule

1	3	5	7	9	11	13	15	2	4	6	8	10	12	14
S W1	O	O	O	O	O	O	O	O	X	X	X	X	X	X
S W2	X	O	X	O	X	O	X	O	O	X	O	X	O	X
S W3	X	X	O	O	X	X	O	O	X	O	O	X	X	O
S W4	X	X	X	X	O	O	O	O	X	X	X	O	O	O

(3) weld on / off switching can be made using user connection 2-B5 / 2-B7.

When open; system operates without welding current being introduced into the weld area.

When closed; the system operates with welding current being introduced into the weld area.

### **3.6 Open section**

### **3.7 Trouble shooting**



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The "Masterweld 15" controller has self-diagnostic functions. Alarms codes are shown on the front L.E.D readout. These codes can be identified using the "Alarm codes" explanation block printed on the front of the controller.  
Reset alarm indication

You can press key "enter" to reset alarm indication.

**Power Error alarm code 90,**

If the alarm light goes on again after resetting, possible meaning the system is seeing a low voltage on the incoming side.

- (1) Check incoming power supply wiring.
- (2) Check incoming power supply quality.
- (3) Check fuses.
- (4) if a fault cannot be found with the above then replace main P.C.B.

**SCR D.C alarm code 92,**

- (1) Check the SCR gate and cathode leads are connected properly.
- (2) Check the thyristor firing circuits in the control panel.
- (3) Check for faults and/or problems with the SCR device.

**Power low alarm code 93,**

- (1) Check incoming voltage / supply voltage.

**SCR / Transformer Thermostat alarm code 94,**

- (1) Check SCR / Transformer cooling water's temperature and the water flows properly through the SCR device / Transformer cooling manifold.
- (2) That the duty cycle of the SCR device / Transformer is not being exceeded causing the SCR / Transformer to operate at a higher temperature that specified for the unit.
- (3) Whether the thermostat working properly. The thermostat is normally closed.

- (4) Check for faults in the main control panel.
- (5) Check if the main welding transformer is running hot.

If a alarm has been generated by over temperature in the above it will reset automatically on cool down. Once the system has reset it will be possible to re start the machine again.

### **Low Current alarm code 95,**

If pre set weld current output is not achieved with the likelihood of bad welds being produced then please check as follows:

- (1) the pre set current upper limit is too high for the transformer to achieve.
- (2) the transformer turn ratio was incorrectly programmed during initial setup.
- (3) please note\* upper limit factory set at + 20%.

When the incoming voltage/current is unstable and susceptible to large fluctuations and/or if set welding current is too low please check as follows:

- (1) possible unstable incoming supply voltage.
- (2) if system uses high flexibility supply cables, shunts, jumper cables or kick less cables these maybe worn or damaged.
- (3) failure of insulation in the secondary circuit causing a short circuit or current/voltage leakage.
- (4) the pre set current lower limit is too low for the transformer to achieve.
- (5) the transformer turn ratio was incorrectly programmed during initial setup.
- (6) please note\* lower limit factory set at - 10%.

### **SCR Short alarm code 97,**

- (1) The SCR is damaged and need to be replaced.
- (2) Measure the voltage on plug CN1, terminal 18 & 19, if voltage reading is Zero "0" the SCR is damaged, replace unit.
- (3) If the main P.C.B and/or the SCR interface card show damage then repair or replace the relevant damaged P.C.B.

## **Data Error alarm code 99,**

Data error covers faults due to Incorrect data input made during initial setup or programming or incorrect value inputs.

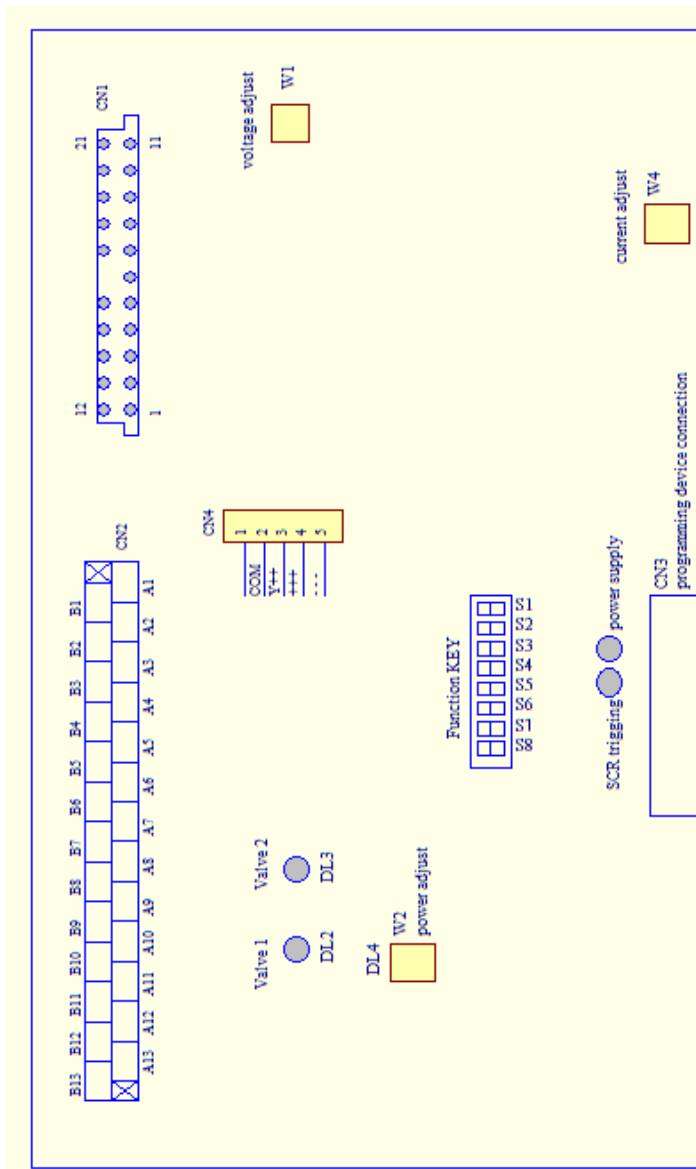
### **3.8 Safe use and general Precautions**

- (1) Always ensure that the controller / welder installation is properly connected to earth.
- (2) only qualified and trained personnel should be allowed access to the internal workings of this equipment. This system is electrically "live" and the possibility of electric shock is ever present.
- (3) always electrically isolate the system when work is being undertaken on the system.
- (4) handling of parts and components on the panel by hand is prohibited. Components and parts may be damaged and/or destroyed by static electricity.
- (5) Don't touch, adjust or change the potentiometer (pots). These items are factory preset.
- (6) The control panel should never be used without a proper connection to the cooling water system. Cooling water flow and pressure should be tested and assured. The cooling water system should be checked regularly at monthly intervals the following items to be checked:
  - A: Water is particle free,
  - B: water flows smoothly
  - C: water is at correct incoming temperature.
  - D: system check for water leaks.
- (7) Monthly inspection. *(After isolating the system)* Check all terminals for tightness, hot joints, loose connections. Further inspection of the general condition of the wiring and equipment should also be undertaken at this time.

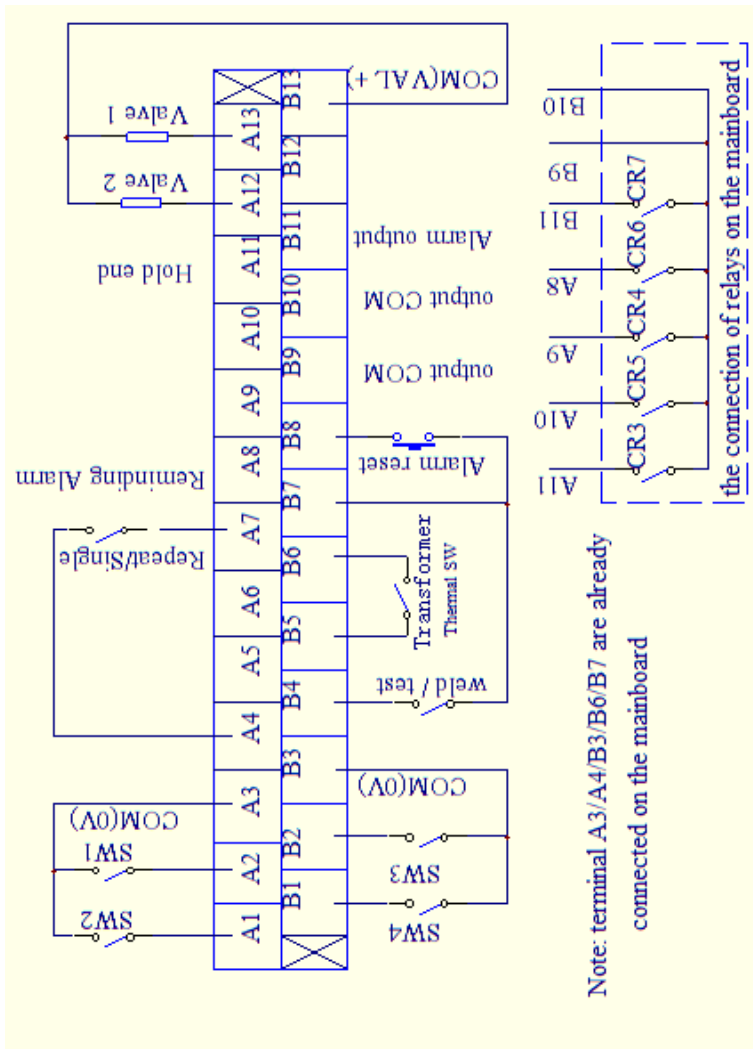
## Appendix 1 Program Function Parameters

Valve 1								Valve 2								Da ta ran ge
Sc he dul e	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Pre Squeeze								(cycle)								0~99
Squeeze								(cycle)								0~99
Upslope								(cycle)								1~99
Weld 1								(cycle)								1~99
Heat or Current 1								(×100A)								20~199
Cool 1								(cycle)								0~99
Weld 2								(cycle)								0~99
Heat or Current 2								(×100A)								20~199
Cool 2								(cycle)								0~99
Weld 3								(cycle)								0~99
Heat or Current 3								(×100A)								20~199
Down slope																0~99
Hold																1~99
Off																0~99
Transformer turns ratio																1~99
Welding Pulsations																1~4
Current limit + (upper)																5~99%
Current limit - (lower)																5~99%
Repeat on/off																0~1

## Appendix 2 Layout for connections on P.C.B

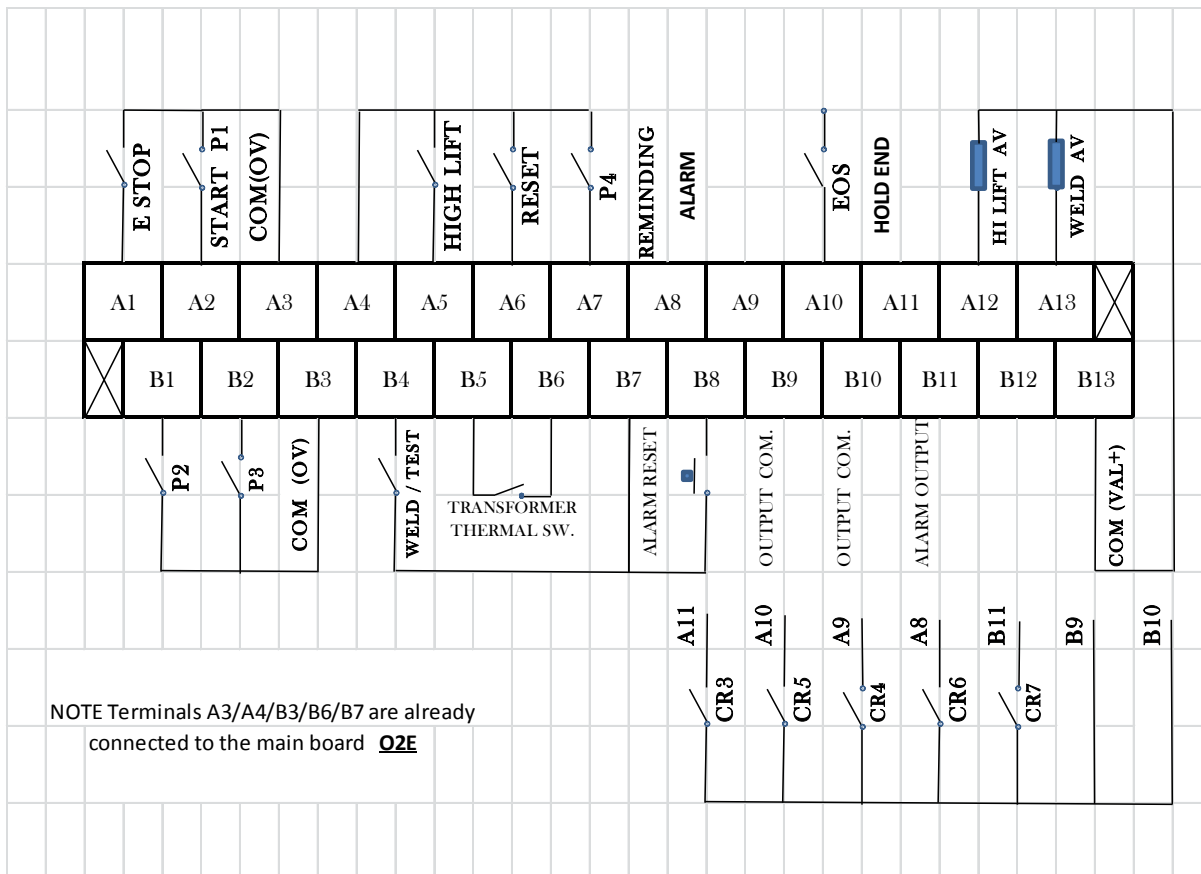


### Appendix 3 User connections (08C) I.O. wiring diagram

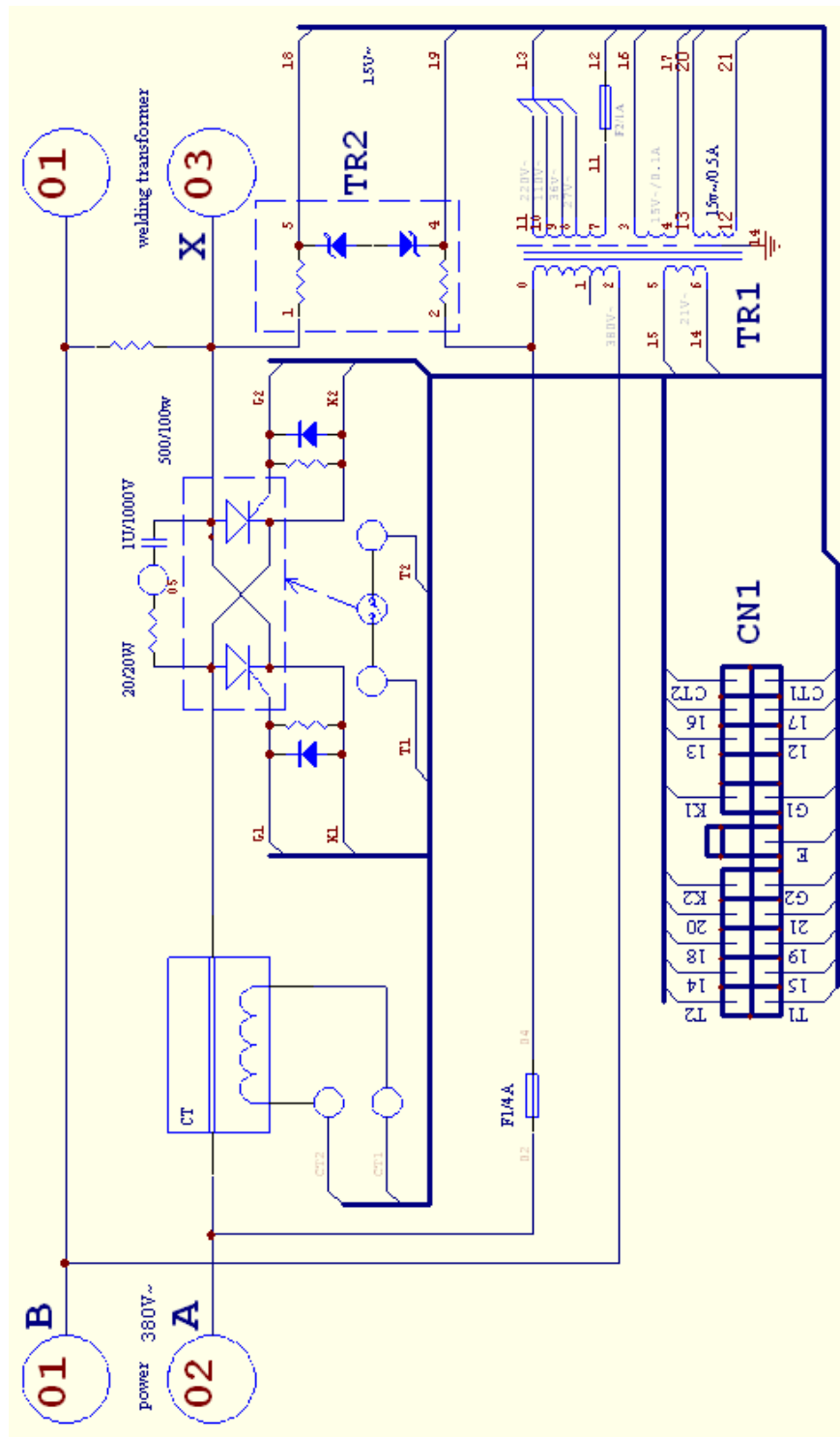




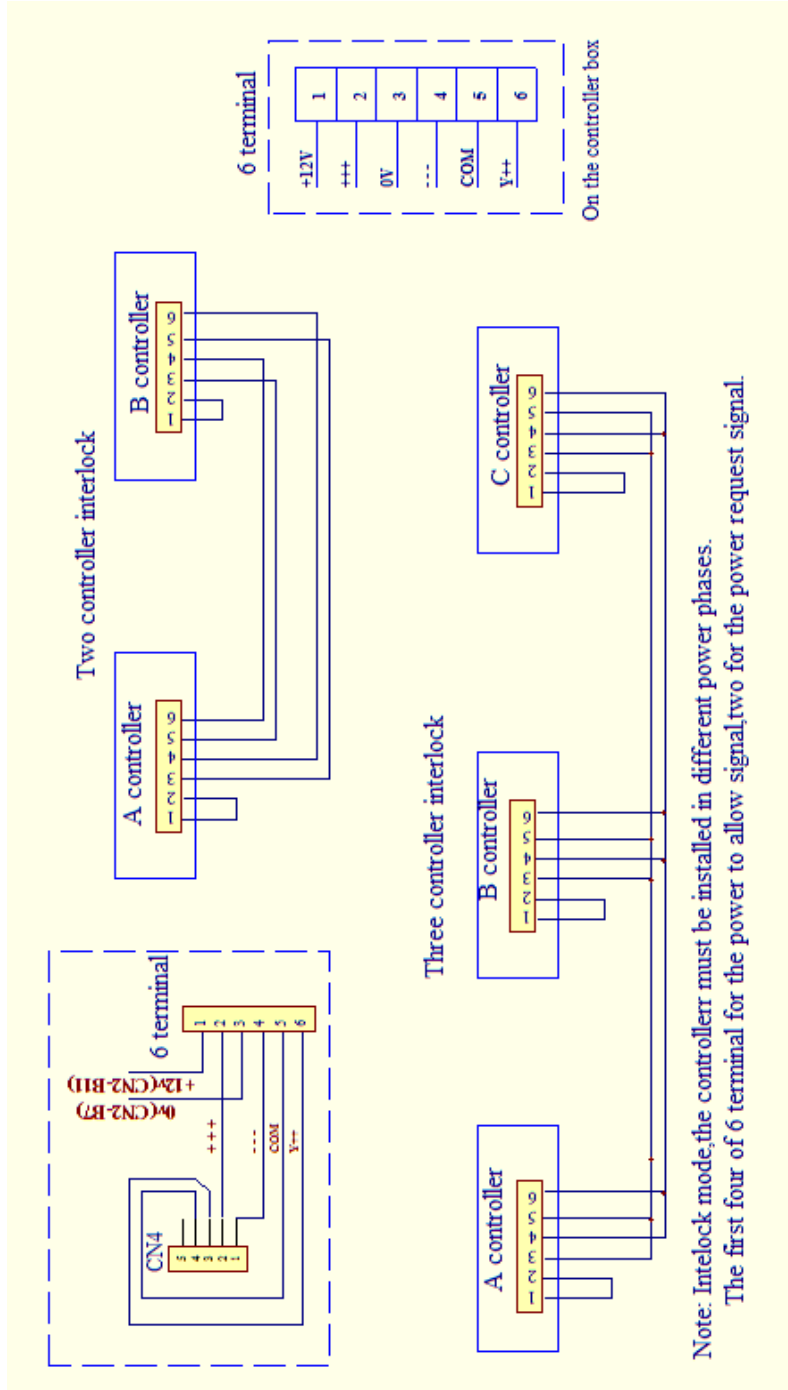
### Appendix 3A User connections (02E) I.O. wiring Diagram



## Appendix 4 Internal wiring diagram



## Appendix 6 Daisy Chain



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