

AC/DC Digital Pulse TIG
Maintenance Manual
For ATIG-P-AC Series
(ATIG630PAC & ATIG315PAC)

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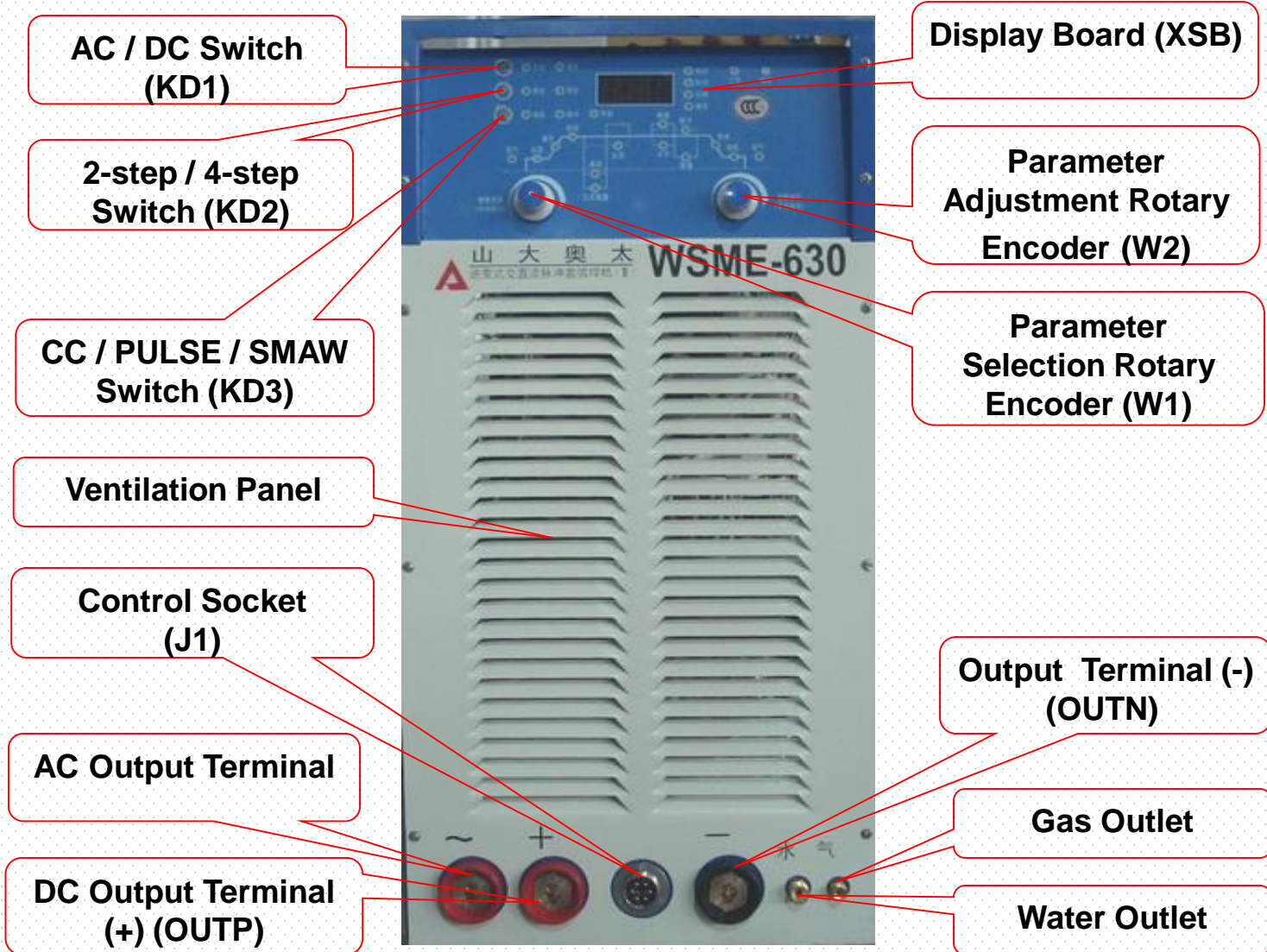
1. Structural Diagram

Note: This manual is based on WSME-630 II & WSME-315 II (ATIG630PAC & ATIG315PAC)

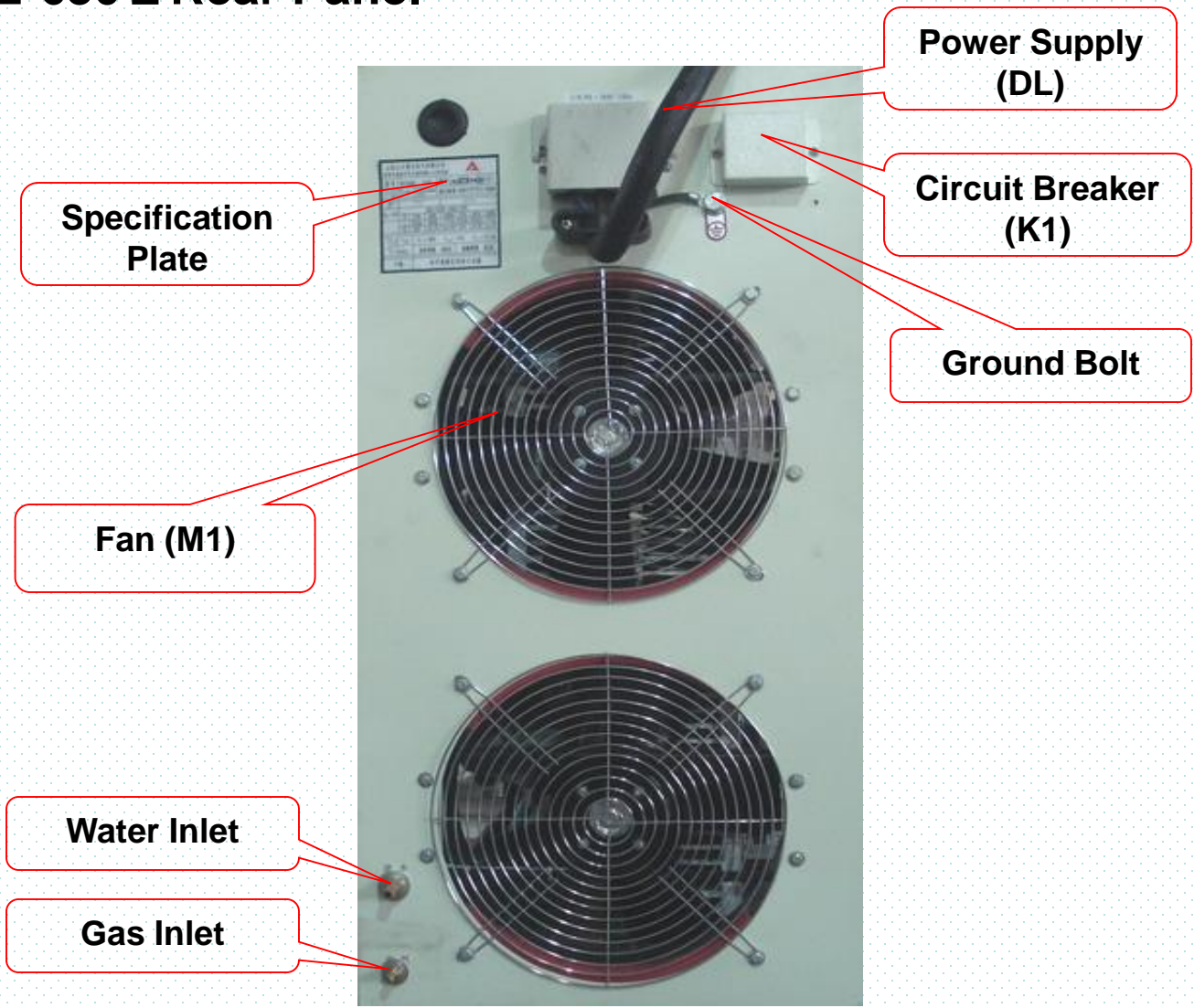
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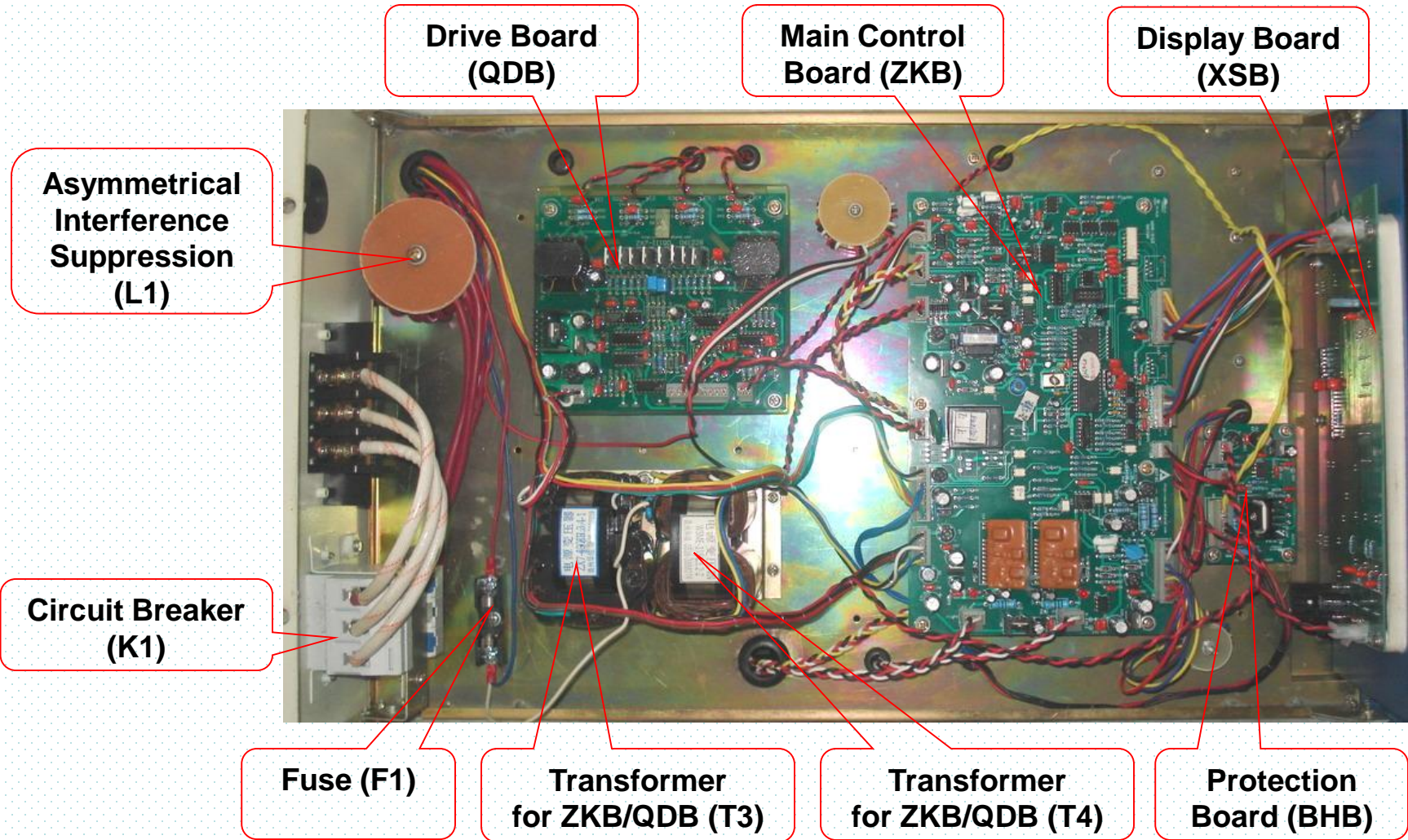
1.1 WSME-630 II Front Panel



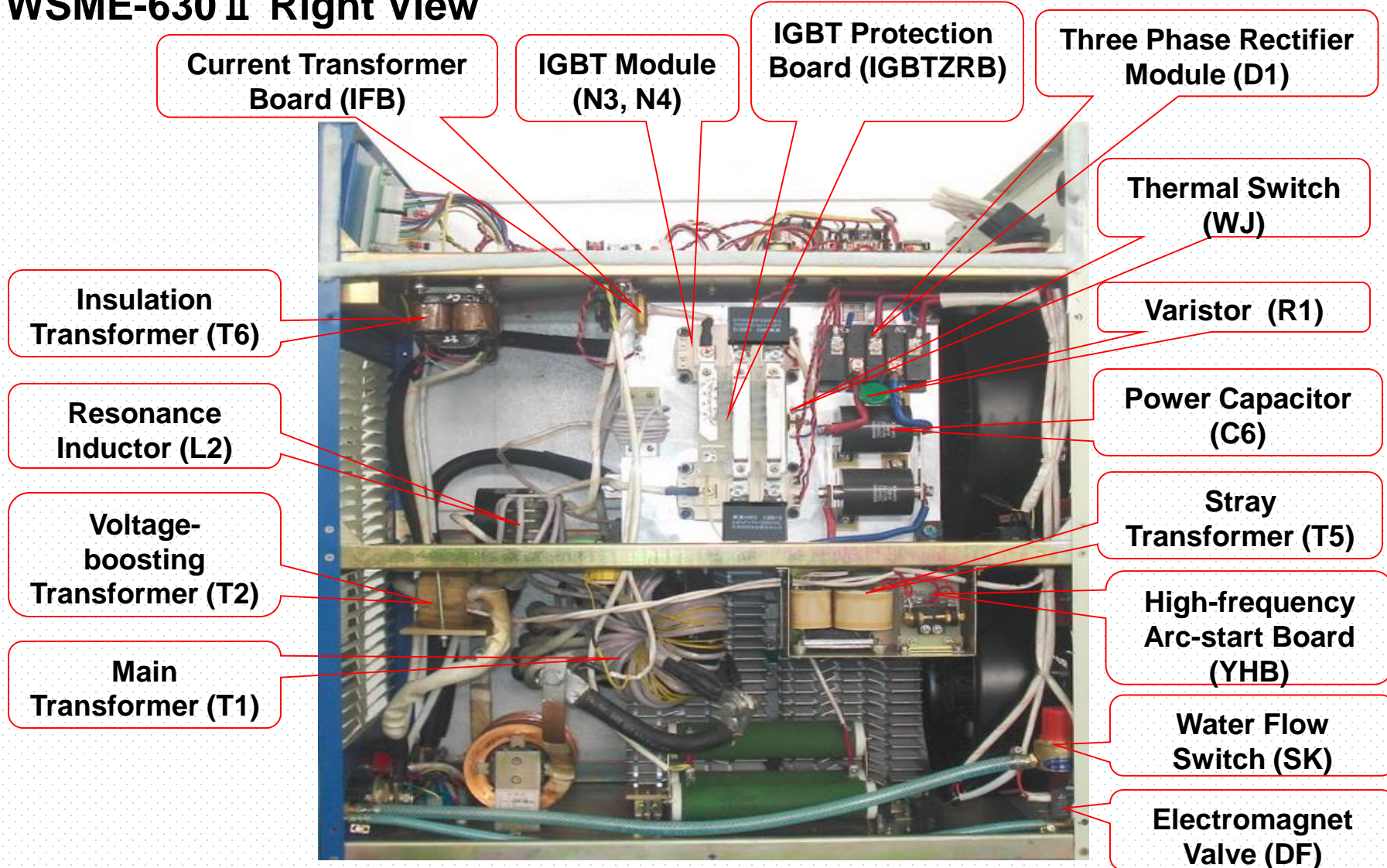
1.2 WSME-630 II Rear Panel



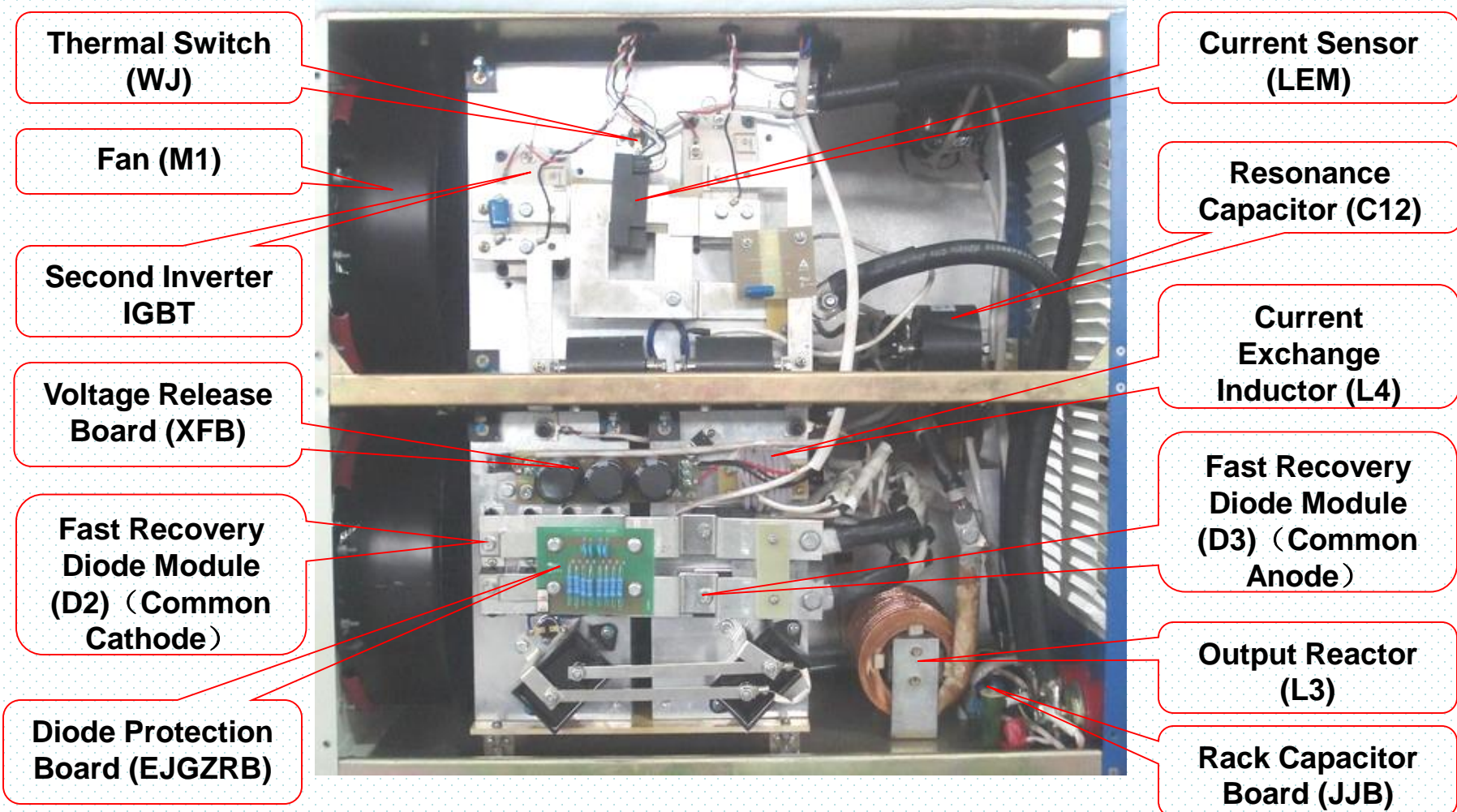
1.3 WSME-630 II Top View



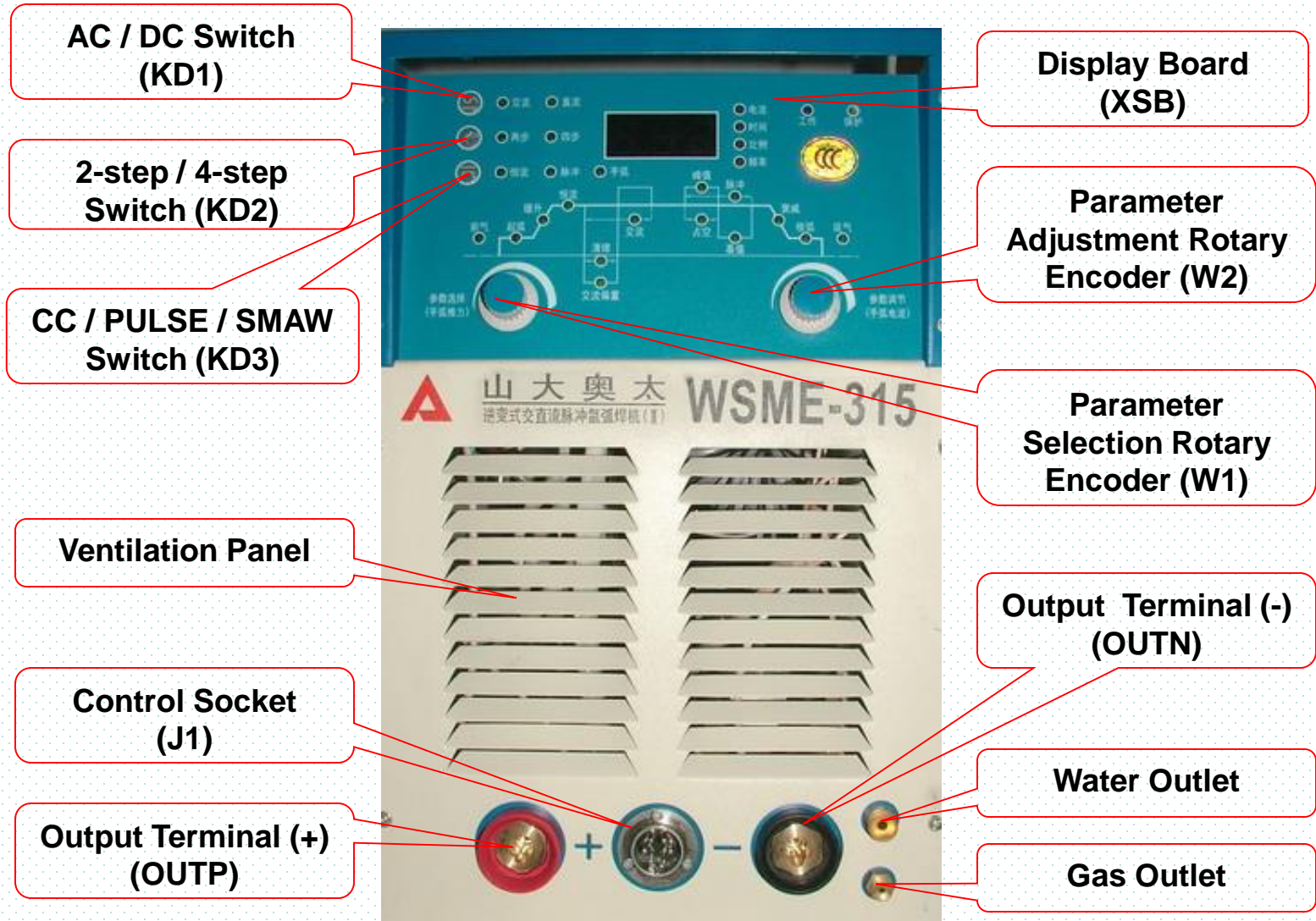
1.4 WSME-630 II Right View



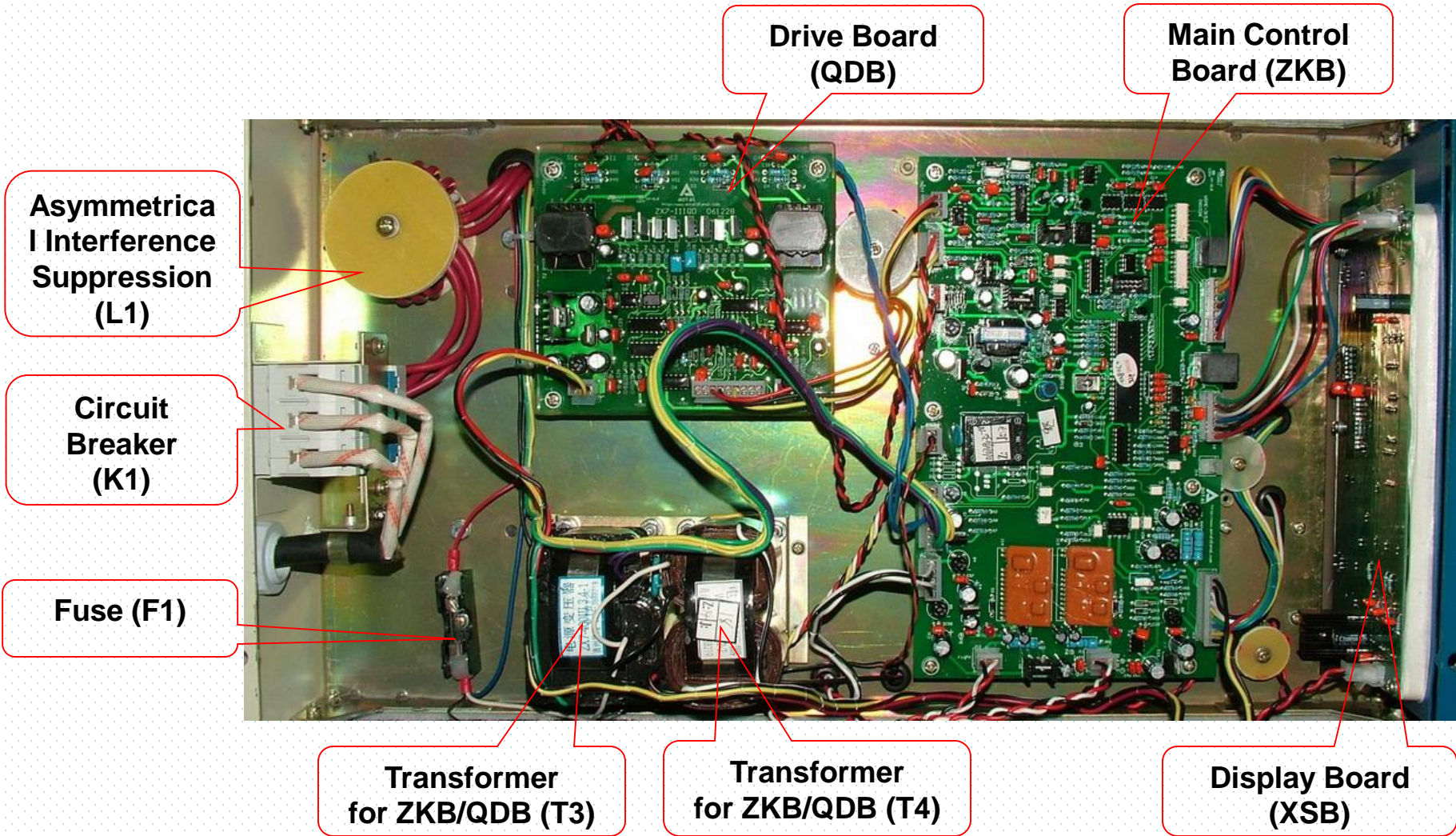
1.5 WSME-630 II Left View



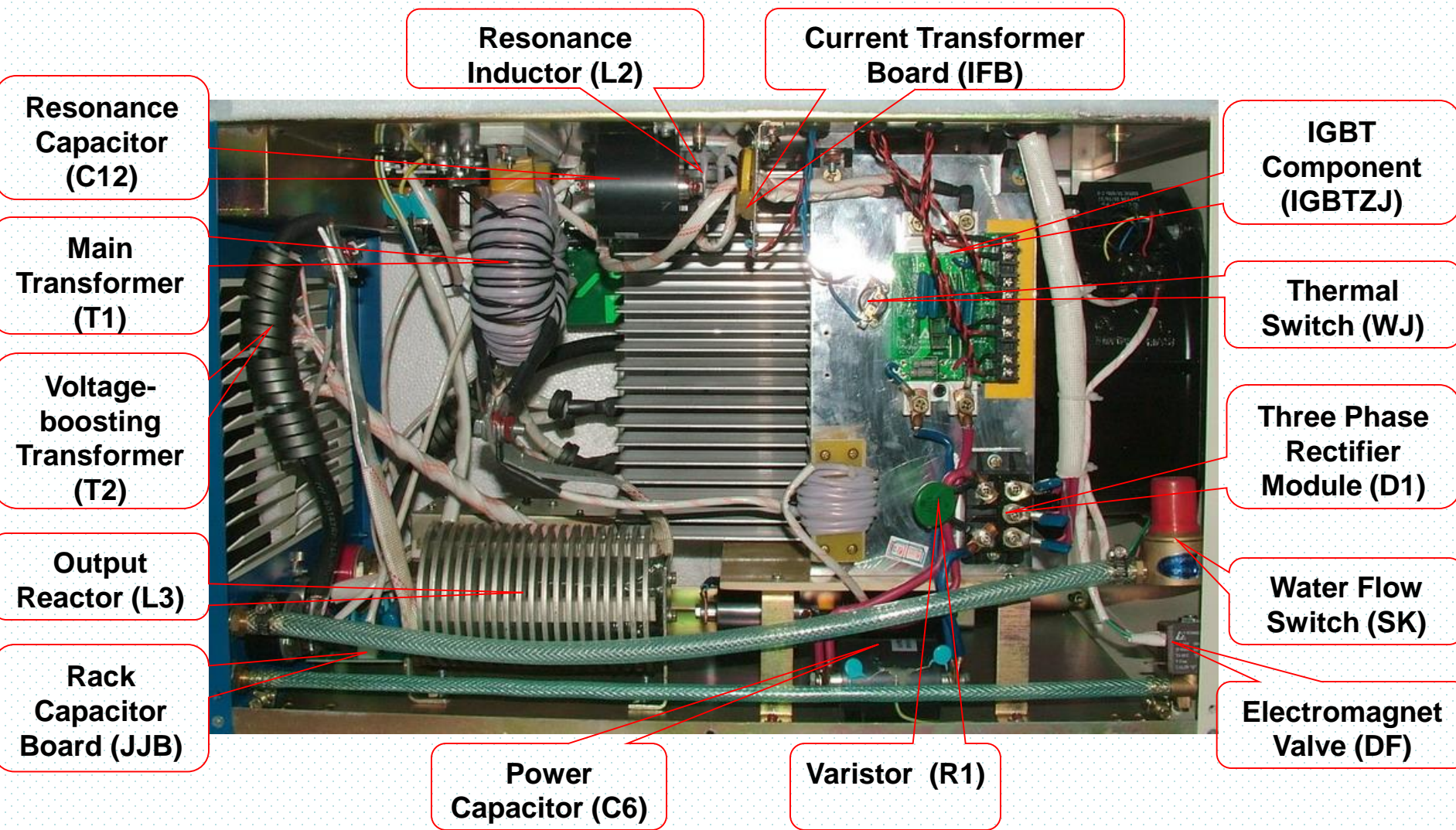
1.6 WSME-315 II Front Panel



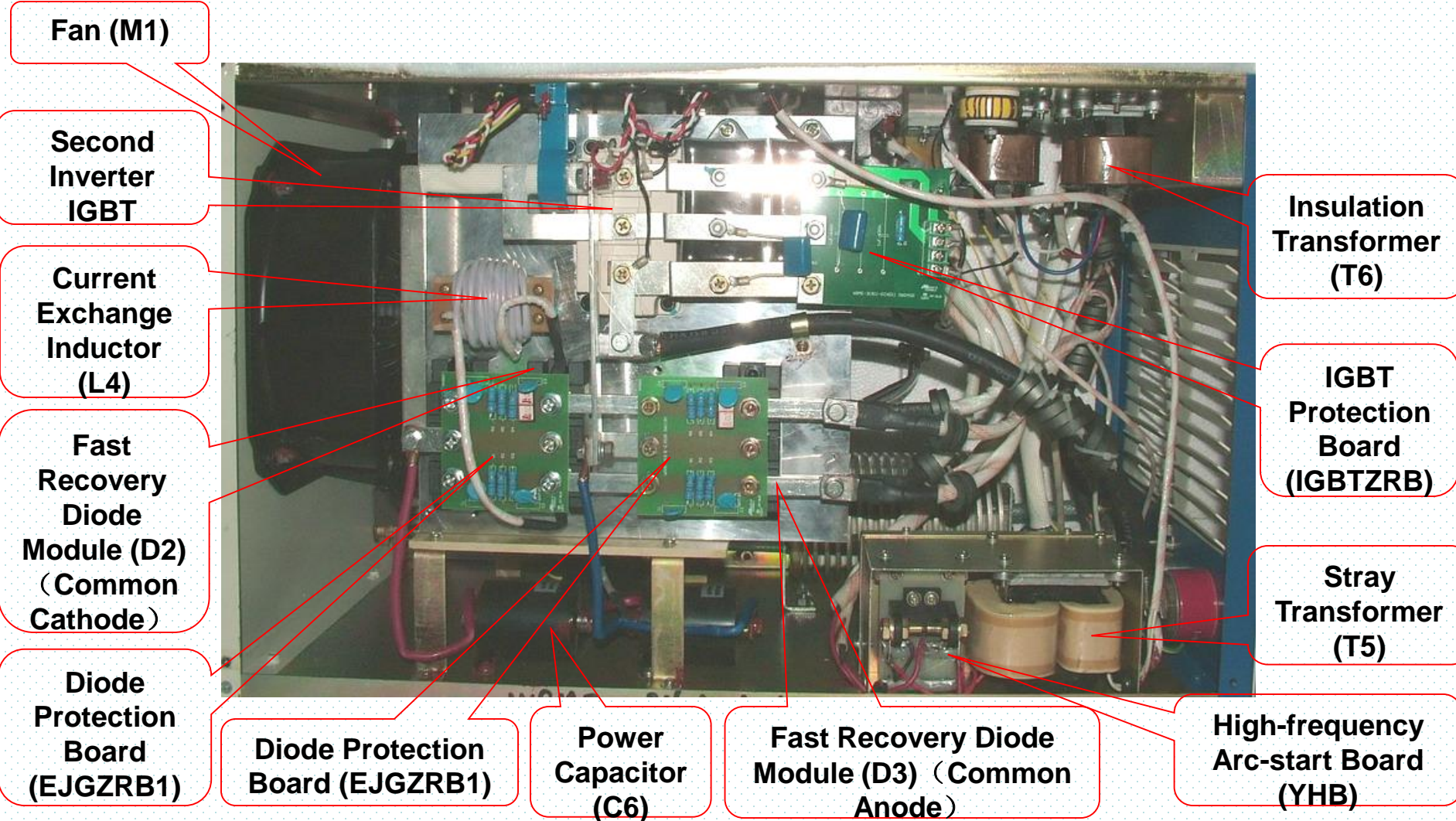
1.7 WSME-315 II Top View



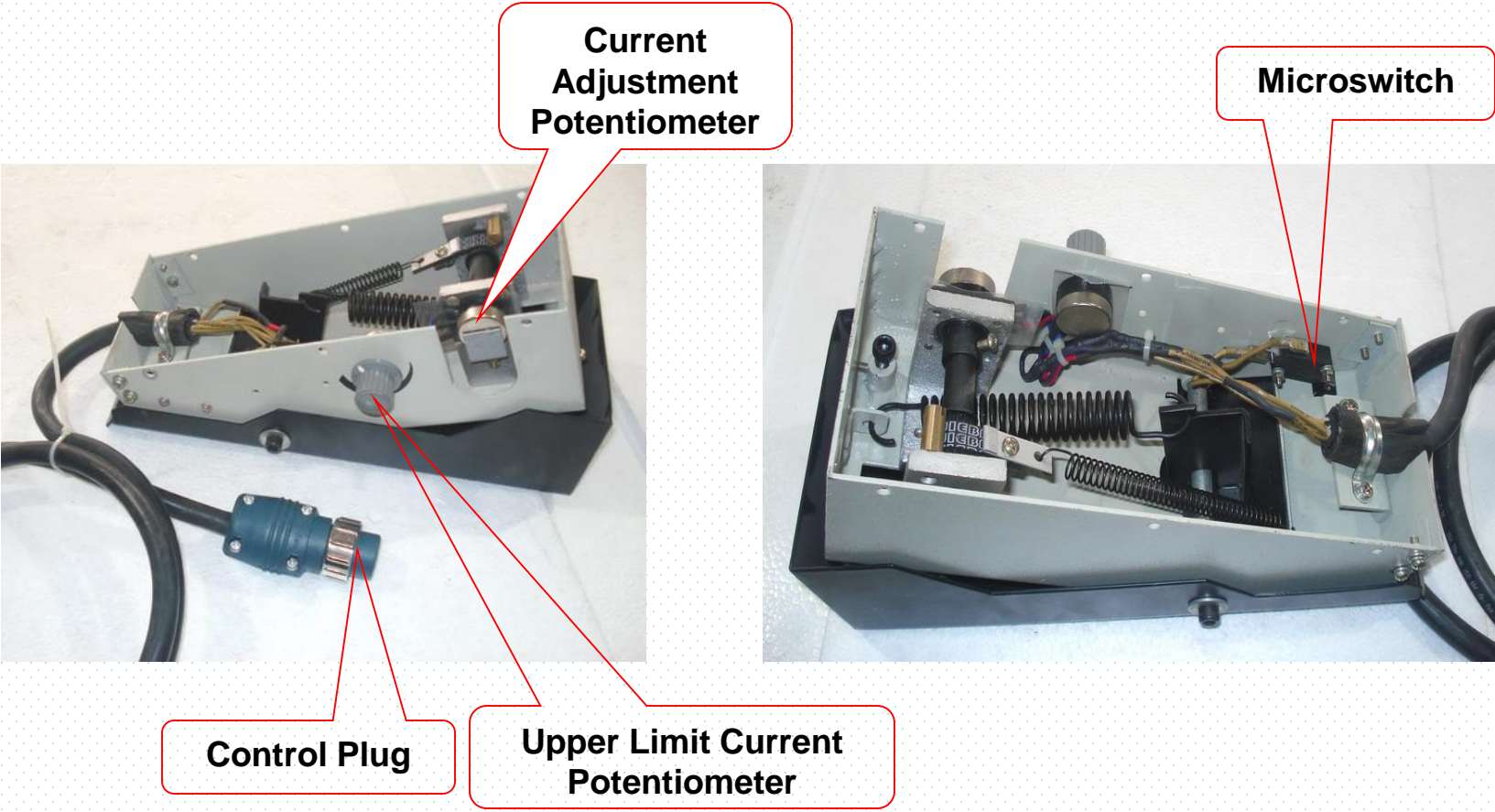
1.8 WSME-315 II Right View



1.9 WSME-315 II Left View



1.10 Foot Pedal Switch



1.11 Tools list



**Digital Multimeter
Fluke-17B**



**Torque Spanner
4.5nm**



**Analog
Multimeter
MF-47**



**Heat Conducting
Silicone Grease**



Oscilloscope TDS1002B

2. Wiring Diagram & Device



2.1 a. Main Devices List

Tab	Item	Available Machines	Item Code
BHB	Protection Board	500,630	201906470000
C4、 C5	Fan protection Capacitor	500	711161630090
		630	
C6、 C7	Polypropylene capacitor	500, 630	711155142030
C12	Polypropylene capacitor	500	711155500450
		630	711155500480
D1	Three Phase Rectifier Module	500, 630	716422100030
D2, D4	Fast Recovery Diode Module	500,630	716299000080
D3, D5	Fast Recovery Diode Module	500,630	716299000200
D6	Fast Recovery Diode	500,630	716299000100
E1	Electrolytic Capacitor	500,630	711429450120
F1	Fuse	General	717100002090
IFB	Current Transformer Board	500	201238221000
		630	201238223000
IGBTZRB	IGBT Protection Board	500	201305221000
		630	201305223000
K1	Circuit Breaker	500, 630	722300063060

2.1 b. Main Devices List

Tab	Item	Available Machines	Item Code
L2	Resonance Inductor	500	201275470000
		630	201275475000
L3	Output Reactor	500	732030470119
		630	732030475100
LEM	Current Sensor	500,630	714111000033
M1, M2	Fan	500	724111380150
		630	724111380300
N1-N4	IGBT Module	500	716122000080
		630	716122000120
N5—N6	IGBT Module	500	716122000400
		630	716122000440
QDB	Drive Board	500,630	201420122000-470
R1	Varistor	500, 630	712431102020
R2, R3	Metal-film Resistor	500, 630	712111550350
R6	Power Resistor	500	712399200020
		630	712399200030

2.1 c. Main Devices List

Tab	Item	Available Machines	Item Code
T1	Main Transformer	500	201291470000
		630	201291475000
T2	Voltage-boosting Transformer	500	201126470000
		630	201126475000
T3	Transformer for ZKB/QDB II	500,630	732010122100
T4	Transformer for ZKB/QDB I	500,630	732010465101
T5	Stray Transformer	500,630	732020122100
T6	Insulation Transformer	500,630	732020122200
WJ	Thermal Switch	500	724533085020
		500,630	724533070010
XFB	Voltage Release Board	500,630	201361470000
XSB	Display Board	500,630	201131465200
YHB	Arc-start Board	500,630	201531122000
ZKB	Main Control Board	500	201400470020
		630	201400475020

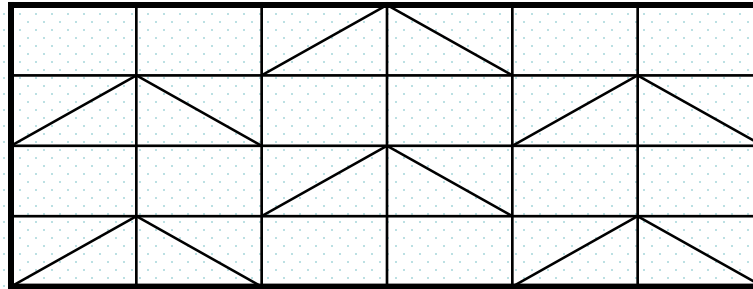
2.2 a. Phenomenon caused by the device fault

Device Fault	Phenomenon
Stray Transformer	No high-frequency
Welding Torch Switch	Open circuit: No change in display, no high-frequency and gas after pressing torch switch.
	Short circuit: There are high-frequency and gas flow before pressing torch switch, display 805 and Protection on LED lights up.
Electromagnet Valve	No gas flow or unceasing gas flow
Insulation Transformer	Open circuit: No change in display, no high-frequency and gas after pressing torch switch.
	Short circuit: There are high-frequency and gas flow before pressing torch switch, display 805 and Protection on LED lights up.
High-frequency Arc-start Board	No high-frequency or high-frequency instable
Display Board	Parameter Selection Rotary Encoder is damaged: Parameters can not be selected.
	Parameter Adjustment Rotary Encoder is damaged: Parameters can not be adjusted.
	CC / PULSE / SMAW Switch is damaged: CC / PULSE / SMAW can not transfer.
	2-step / 4-step Switch is damaged: 2-step / 4-step can not transfer.
	AC / DC Switch is damaged: AC / DC can not transfer.
	Others: No display, incorrect display, or all LEDS lights up.

2.2 b. Phenomenon caused by the device fault

Device Fault	Phenomenon
Water Flow Switch	Display 806 and Protection on LED lights up.
Thermal Switch	Display 804 and Protection on LED lights up.
Fan	Circuit Breaker tripps; Fan does not run; display 804.
Second Inverter IGBT	IGBT or Main Control Board is damaged; No AC output current (IGBT in open circuit)
Fast Recovery Diode Module	No AC & DC output current; with slight sparks; Low open-load voltage or no open-load voltage.
Protection Board	Second Inverter IGBT is damaged. Display 801. Arc breaks. Protection on LED lights up.
Voltage Release Board	Second Inverter IGBT is damaged. Display 801. Protection on LED lights up.
Current Sensor	Abnormal display. Welding current is unstable, and can not be adjuted. No output or instable output.

3. Trouble-shooting



Warning



The welders should be repaired by a qualified and trained technician only. Any wrong connections or improper settings will damage the PCB or devices. After switching off the machine, wait for a few minutes for the power capacitors to discharge completely before repairing to avoid electric shock. Ensure with a voltmeter that there is complete and total discharge before touching the bus bar connections.

General Notes

1. Please strictly comply with rules defined in this manual to avoid unexpected accidents.
2. Be sure that all maintenance and repair procedures are performed only by qualified individuals.
3. Please refer to General Maintenance Manual about the devices not concerned in this manual.
4. Before maintaining, check if the power supply is normal, the voltage and frequency are in accordance with the specification plate, and if the power supply capacity meets the need for welding machines' working requirement.
Avoid welding cable and control cable being worn out and broken, and the output of welders short circuit.

Summary

- 3.1 No display on Display Board when power on
- 3.2 Press welding torch switch, without any reaction
- 3.3 Press welding torch switch, there are no high-frequency but has gas outflow
- 3.4 Press welding torch switch, there are high-frequency, no gas outflow
- 3.5 Boot a high frequency
- 3.6 Parameters are not adjustable
- 3.7 2-step is normal, not 4-step
- 3.8 Press welding torch switch, there are high-frequency, normal gas, but fail starting arc in DC mode
- 3.9 Press welding torch switch, there are high-frequency, normal gas, but fail starting arc in AC mode
- 3.10 Long time to start arc
- 3.11 Protection on LED lights up, and display 804
- 3.12 Protection on LED lights up, and display 805
- 3.13 Protection on LED lights up, and display 806
- 3.14 Current is not adjustable
- 3.15 Difficult to start arc
- 3.16 Broken Arc in DC mode
- 3.17 Broken Arc in AC mode
- 3.18 Current is instable
- 3.19 Be able to weld in small current, but current can not be adjusted bigger
- 3.20 Bad weld formation

3.1 No display on Display Board when power on

Item	Fault cause	Trouble-shooting
1	Three phase missing	Check (see General Maintenance Manual)
2	Wire disconnection or bad contact between Main Control Board (ZKB) and Display Board (XSB)	Check and replace
3	Fuse (F1) is damaged	Replace (see General Maintenance Manual)
4	Transformer for ZKB/QDB (T4) is damaged	Replace (see #4.2, #5.2)
5	Display Board (XSB) is damaged	Check and replace (see #4.12)
6	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.2 Press welding torch switch, without any reaction

Item	Fault cause	Trouble-shooting
1	Torch Switch is damaged or control cable is broken	Check and replace (see #4.17 & General Maintenance Manual)
2	Insulation Transformer (T6) is damaged	Check and replace (see #4.5, #5.4)
3	Transformer for ZKB/QDB (T4) is damaged	Check and replace (see #4.2, #5.2)
4	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.3 Press welding torch switch, there are no high-frequency but has gas outflow

Item	Fault cause	Trouble-shooting
1	Pre-gas time is too long	Correct the parameter properly
2	Long clearance between Tungsten electrodes	Shorten the clearance (0.5-1mm)
3	Stray Transformer (T5) is damaged	Check and replace (see #4.4, #5.3)
4	High-frequency Arc-start Board (YHB) is damaged	Check and replace
5	Wire disconnection of high-frequency circuit	Check the circuit and reconnect the wire
6	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.4 Press welding torch switch, there are high-frequency, no gas outflow

Item	Fault cause	Trouble-shooting
1	Gas circuit is blocked	Check and clean up
2	Electromagnet Valve (DF) is damaged	Check and replace (see #4.3)
3	Transformer for ZKB/QDB (T4) is damaged	Check and replace (see General Maintenance Manual, #4.2, #5.2)
4	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.5 Boot a high frequency

Item	Fault cause	Trouble-shooting
1	Short circuit of torch switch or torch switch cable	Check and replace (see #4.17)
2	Insulation Transformer (T6) is damaged	Check and replace (see #4.5, #5.4)
3	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.6 Parameters are not adjustable

Item	Fault cause	Trouble-shooting
1	Wire disconnection or bad contact between Main Control Board (ZKB) and Display Board (XSB)	Check and replace
2	Parameter Adjustment Rotary Encoder (W1) on Display Board (XSB) is damaged	Check and replace (see General Maintenance Manual)
3	Display Board (XSB) is damaged	Check and replace (see #4.12)
4	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.7 2-step is normal, not 4-step

Item	Fault cause	Trouble-shooting
1	Main control board (ZKB) is damaged?	Check and replace (see General Maintenance Manual)

3.8 Press welding torch switch, there are high-frequency, normal gas, but fail starting arc in DC mode

Item	Fault cause	Trouble-shooting
1	Welding torch is damaged	Check and replace torch cable
2	Pre-gas time is too long	Correct the parameter properly
3	Bad contact of welding cable or short circuit	Check welding cable
4	Three phase missing	Check power supply (see General Maintenance Manual)
5	Current Sensor (LEM) is damaged	Check and replace (see #4.7, #5.8)
6	Current Exchange Inductor (L4) is damaged	Check and replace (see General Maintenance Manual)
7	Fast Recovery Diode Module (D2-D5) is damaged	Check and replace (see General Maintenance Manual; #4.10, #4.15)
8	Resonance Capacitor (C12) is damaged	Check and replace (see test for C12)
9	IGBT Module (N1-N4) is damaged	Check and replace (see General Maintenance Manual, #4.13)
10	Main Control Board (ZKB) or Drive Board (QDB) is damaged	Check and replace (see General Maintenance Manual)

3.9 Press welding torch switch, there are high-frequency, normal gas, but fail starting arc in AC mode

Item	Fault cause	Trouble-shooting
1	Fast Recovery Diode Module (D2-D5) is damaged	Check and replace (see General Maintenance Manual; #4.10, #4.15)
2	IGBT Module(N1-N6) is damaged	Check and replace (see General Maintenance Manual; #4.9, #4.13~4.14)
3	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.10 Long time to start arc

Item	Fault cause	Trouble-shooting
1	Pre-gas time or current up-slope time is too long	Adjust the parameters properly
2	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.11 Protection on LED lights up, and display 804

Item	Fault cause	Trouble-shooting
1	Over Duty Cycle	Adjust the current properly
2	Environmental temperature is too high	Put the machine in open-load mode and cool down
3	Thermal Switch (WJ) is damaged	Check and replace (see General Maintenance Manual)
4	Fan (M1) is damaged	Check and replace (see General Maintenance Manual)

3.12 Protection on LED lights up, and display 805

Item	Fault cause	Trouble-shooting
1	Torch switch is damaged	Check and replace (see General Maintenance Manual; #4.17)
2	Insulation Transformer (T6) is damaged	Check and replace (see #4.5, #5.4)
3	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.13 Protection on LED lights up, and display 806

Item	Fault cause	Trouble-shooting
1	Water Flow Switch (SK) is damaged	Check and replace (see General Maintenance Manual; #4.6, #5.7)
2	Water circuit is blocked	Check water circuit (such as water cooler, water tube, welding torch's water tube), and clean up
3	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.14 Current is not adjustable

Item	Fault cause	Trouble-shooting
1	Parameter Adjustment Rotary Encoder (W1) on Display Board (XSB) is damaged	Check and replace Display Board (XSB) (see General Maintenance Manual)
2	Display Board (XSB) is damaged	Check and replace (see #4.12)
3	Wire disconnection or bad contact between wires within the machine	Check and reconnect

3.15 Difficult to start arc

Item	Fault cause	Trouble-shooting
1	Bad contact of welding cable	Check every connetion of welding cable, and reconncet
2	Problem of High-frequency	Adjust the distance between Tungsten Electrodes
3	Current Sensor (LEM) is damaged	Check and replace (see General Maintenance Manual; #4.7, #5.8)
4	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.16 Broken Arc in DC mode

Item	Fault cause	Trouble-shooting
1	Three phase missing	Check (see General Maintenance Manual)
2	Circuit Breaker (K1) is damaged	Check and replace (see General Maintenance Manual)
3	Three Phase Rectifier Module (D1) is damaged	Check and replace (see General Maintenance Manual)
4	Power Capacitor (C6) is damaged	Check and replace (see General Maintenance Manual)
5	Current Sensor (LEM) is damaged	Check and replace (see #4.7, #5.8)
6	Resonance Capacitor (C12) damaged	Check and replace (see General Maintenance Manual)
7	Drive Board (QDB) is damaged	Check and replace (see General Maintenance Manual)
8	Main Control Board (ZKB) is damaged	Check and replace (see General Maintenance Manual)

3.17 Broken Arc in AC mode

Item	Fault cause	Trouble-shooting
1	Bad contact of welding cable	Check and repair
2	WSME-315 II (ATIG315PAC) IGBT Protection Board is damaged	Check and replace
3	WSME-500 II (ATIG500PAC) Voltage Release Board is damaged	Check and replace (see #4.11)
4	Main Control Board (ZKB) is damaged?	Check and replace (see General Maintenance Manual)

3.18 Current is instable

Item	Fault cause	Trouble-shooting
1	Three phase missing; Voltage is instable	Check (see General Maintenance Manual)
2	Bad contact of welding cable	Check and repair
3	Current Sensor (LEM) is damaged	Check and replace (see #4.7, #5.8)
4	Drive board (QDB) is damaged?	Check and replace (see General Maintenance Manual)
5	Main Control Board (ZKB) is damaged?	Check and replace (see General Maintenance Manual)

3.19 Be able to weld in small current, but current can not be adjusted bigger

Item	Fault cause	Trouble-shooting
1	Three phase missing	Check (see General Maintenance Manual)
2	Foot Pedal Switch Potentiometer is damaged	Check and replace (see General Maintenance Manual)
3	Bad contact of welding cable	Check and repair
4	Power Capacitor(C6) is damaged	Check (see General Maintenance Manual)
5	Resonance Capacitor(C12) is damaged	Check and replace (see test for C12)
6	Current Transformer board (IFB) is damaged	Check (see General Maintenance Manual)
7	IGBT Module (N1-N6) is damaged	Check (see General Maintenance Manual, #4.9, #4.13~4.14)
8	Drive Board (QDB) is damaged	Check (see General Maintenance Manual)
9	Current Sensor (LEM) is damaged	Check and replace (see #4.7, #5.8)
10	Main Control Board (ZKB) is damaged	Check (see General Maintenance Manual)

3.20 Bad weld formation

Item	Fault cause	Trouble-shooting
1	Parameters are not proper	Adjust properly

4. Switch Off Diagnostic Test



Warning



1. Before checking any devices, isolate machine from Power supply.
2. Remove welding cables from the output terminals.
3. Wait for a few minutes for power capacitors to discharge completely
(Ensure by voltmeter) to avoid electric shock.

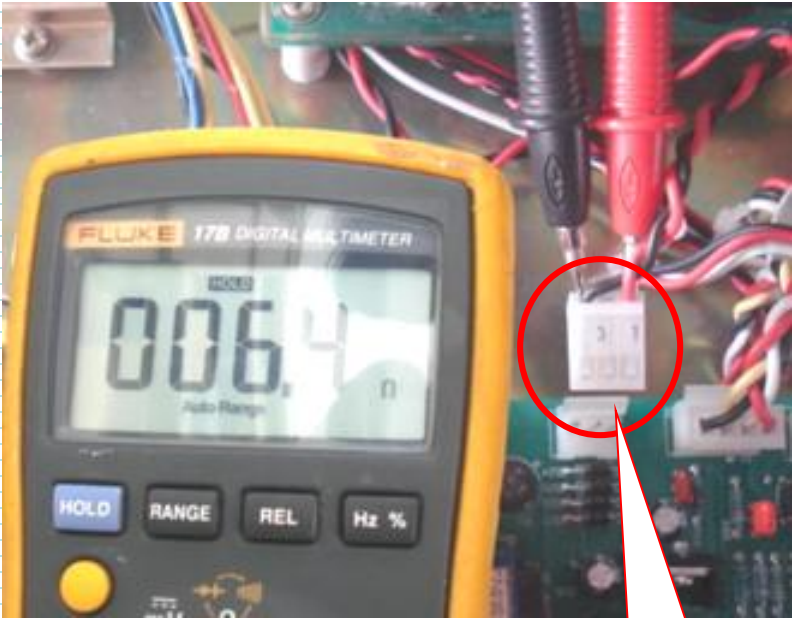
General notes

1. Set the mode of multimeter at 'DIODE', 'RESISTANCE' and 'CAPACITANCE' correspondingly.
2. The proper measure ranges are given. This may vary with different meters as per the accuracy of the meter used.
3. Wait for multimeter reading to stabilize before recording the data.
4. Ensure proper and tight contact between the multimeter probes and the test points.
5. Some components must be disconnected from Control board before taking the measurement.

Summary

- 4.1 a. Test for Transformer for ZKB/QDB (T3) I
- 4.1 b. Test for Transformer for ZKB/QDB (T3) II
- 4.2 a. Test for Transformer for ZKB/QDB (T4) I
- 4.2 b. Test for Transformer for ZKB/QDB (T4) II
- 4.3 Test for Electromagnet Valve (DF)
- 4.4 Test for Stray Transformer (T5)
- 4.5 Test for Insulation Transformer (T6)
- 4.6 Test for Water Flow Switch (SK)
- 4.7 Test for Current Sensor (LEM)
- 4.8 Test for second inverter drive cable
- 4.9 Test for second inverter IGBT (N5)
- 4.10 Test for Diode Module (D2, D3)
- 4.11 Test for Voltage Release Board (XFB)
Rectifier Module
- 4.12 Test for Display Board (XSB)
- 4.13 a. Test for first inverter IGBT Module (N)
(WSME-315 II / ATIG315PAC) I
- 4.13 b. Test for first inverter IGBT Module (N)
(WSME-315 II / ATIG315PAC) II
- 4.14 Test for second inverter IGBT Module
(N5) (WSME-315 II / ATIG315PAC)
- 4.15 Test for Diode Module (D2,D3) (WSME-315 II /
ATIG315PAC)
- 4.16 Test for Common Cathod Diode Module (D6)
(WSME-315 II / ATIG315PAC)
- 4.17 Test for TIG Torch Switch

4.1 a. Test for Transformer for ZKB/QDB (T3) I



Plug J1



Plug J7

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J1(1)	J1(3)	5~7Ω	
	J1(1)	J1(2)	1.5~2.5Ω	

Note: Unplug J1, J7 from Main Control Board before taking the measurement.

4.1 b. Test for Transformer for ZKB/QDB (T3) II



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J13(1)	J13(2)	4~5Ω	

Note: Unplug J13 from Main Control Board before taking the measurement.

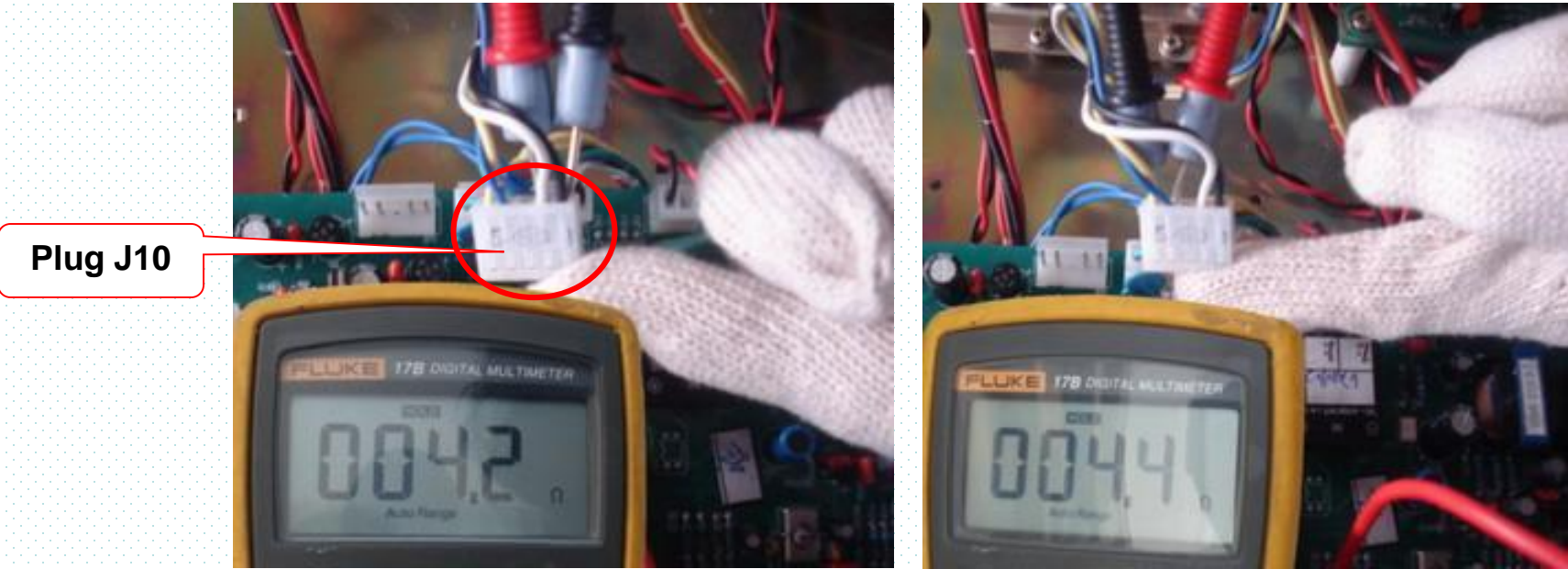
4.2 a. Test for Transformer for ZKB/QDB (T4) I



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	X1(1)	X1(3)	1.5~2.5Ω	
	A1(1)	A1(3)	2.8~4.5Ω	

Note: unplug Display Board Plug X1 and Protection Board A1 before taking the measurement.

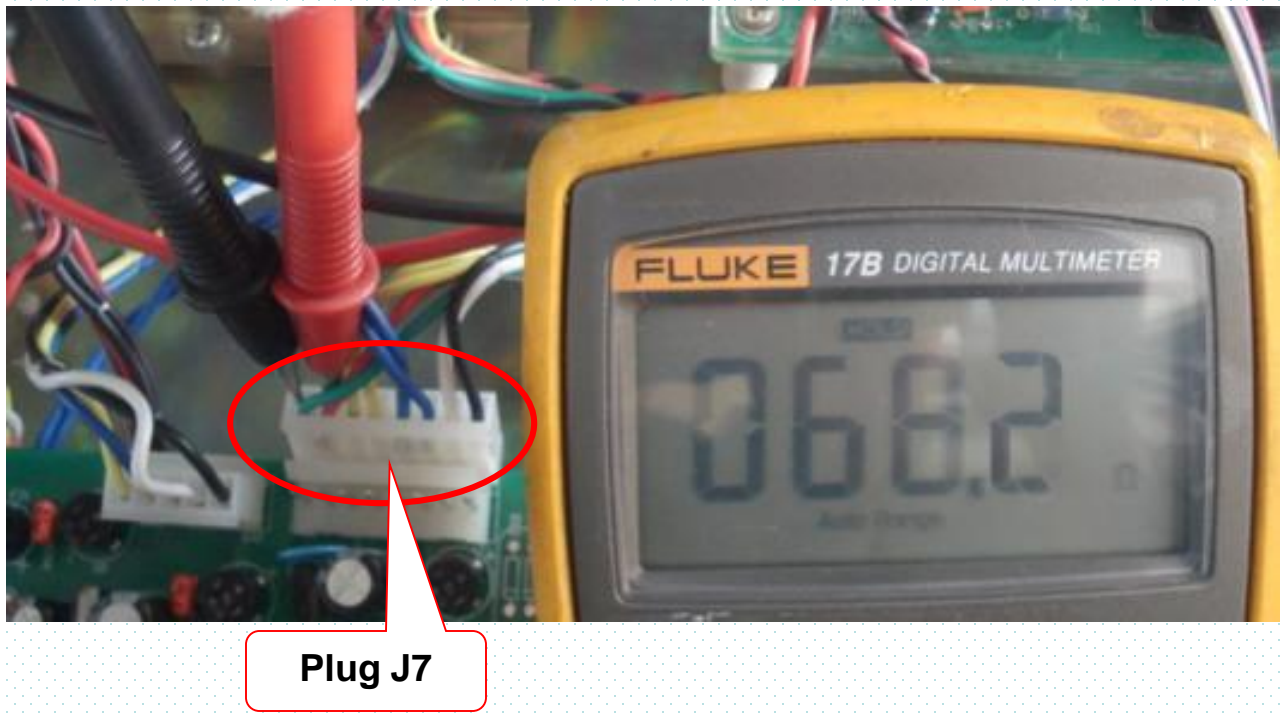
4.2 b. Test for Transformer for ZKB/QDB (T4) II



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J10(2)	J10(1)	3~6Ω	
	J10(3)	J10(4)		

Note: Unplug J10 from Main Control Board before taking the measurement.

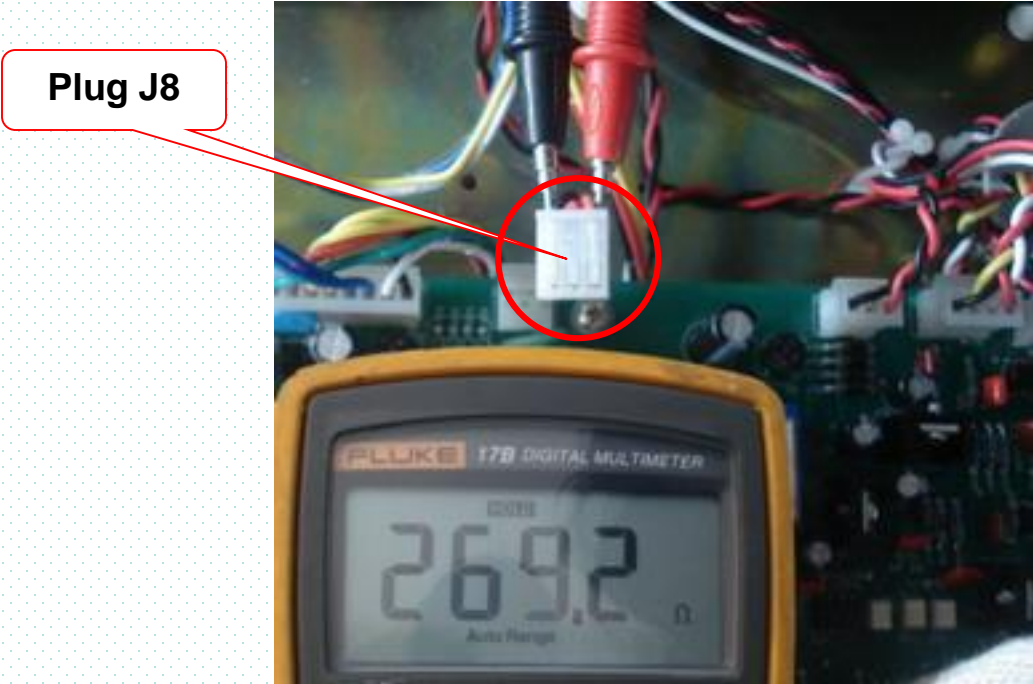
4.3 Test for Electromagnet Valve (DF)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J7(7)	J7(8)	50Ω~80Ω	

Note: Unplug J7 from Main Control Board before taking the measurement.

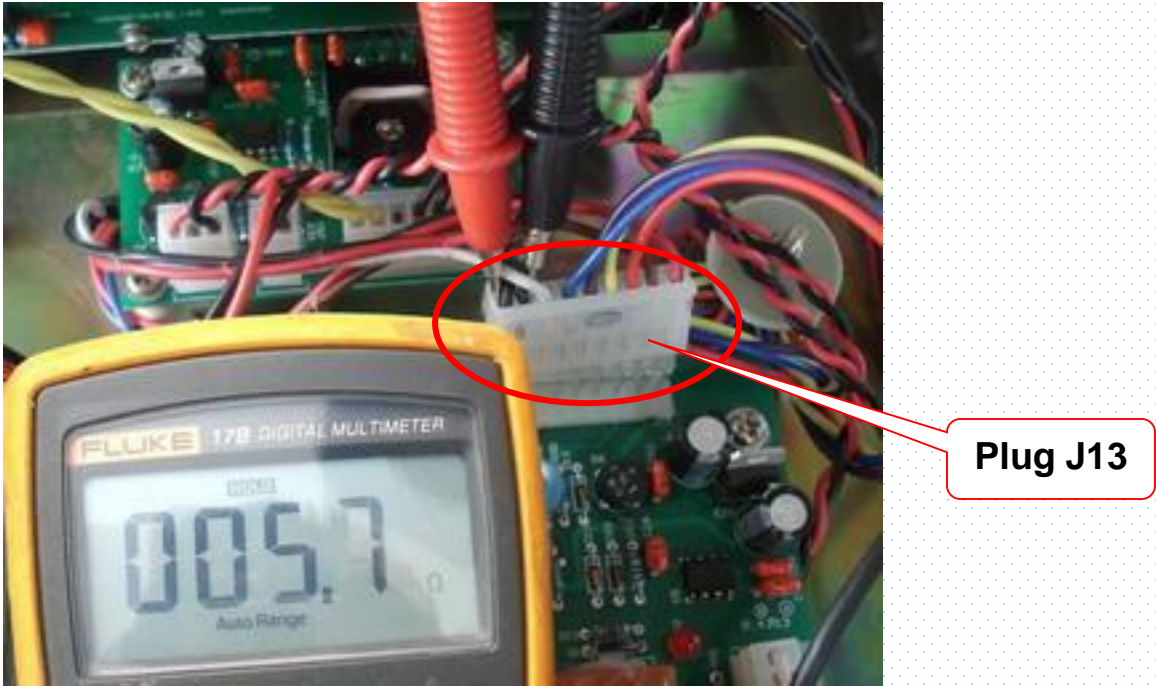
4.4 Test for Stray Transformer (T5)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J8(1)	J8(3)	250Ω~300Ω	

Note: Unplug J8 from Main Control Board before taking the measurement.

4.5 Test for Insulation Transformer (T6)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J13(9)	J13(8)	3~7Ω	

Note: Unplug J13 from Main Control Board before taking the measurement.

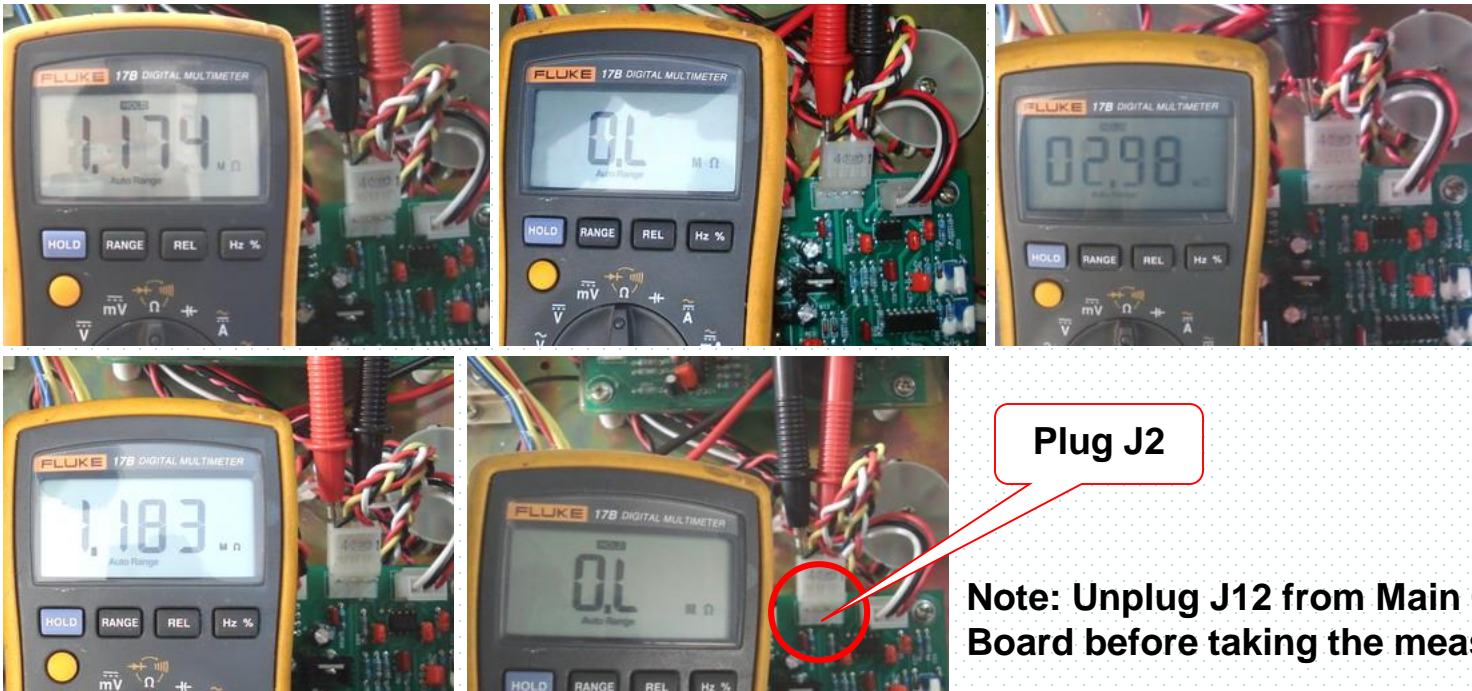
4.6 Test for Water Flow Switch (SK)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J7(5)	J7(6)	Over Limit	No water flow or small water flow
			0Ω	There is water flow

Note: Unplug J7 from Main Control Board before taking the measurement.

4.7 Test for Current Sensor (LEM)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	J2(1)	J2(4)	1~1.4 MΩ	
	J2(4)	J2(1)	Over Limit	
	J2(3)	J2(4)	2.5~3KΩ	
	J2(4)	J2(2)	1~1.4 MΩ	
	J2(2)	J2(4)	Over Limit	

4.8 Test for second inverter drive cable

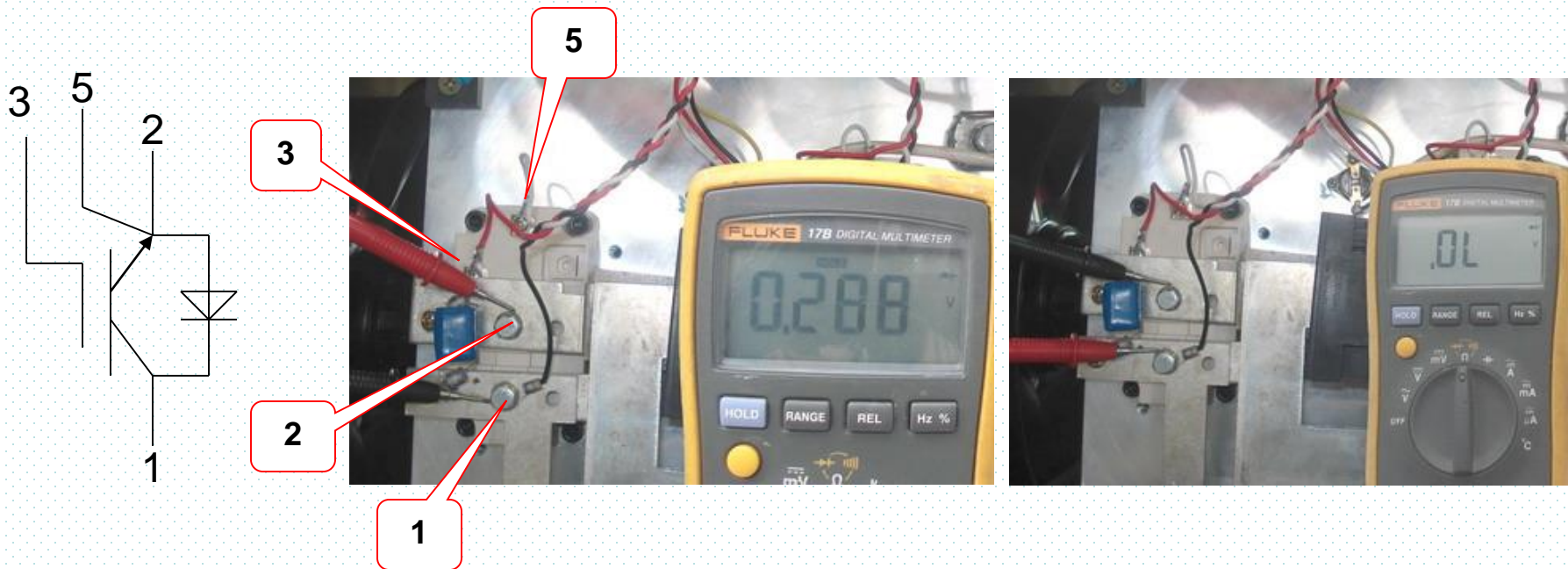


Plug J11

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	J11(1)	J11(3)	Over Limit	
	J11(3)	J11(1)	0.23~0.3V	

Note: Unplug J11, J12 from Main Control Board before taking the measurement.

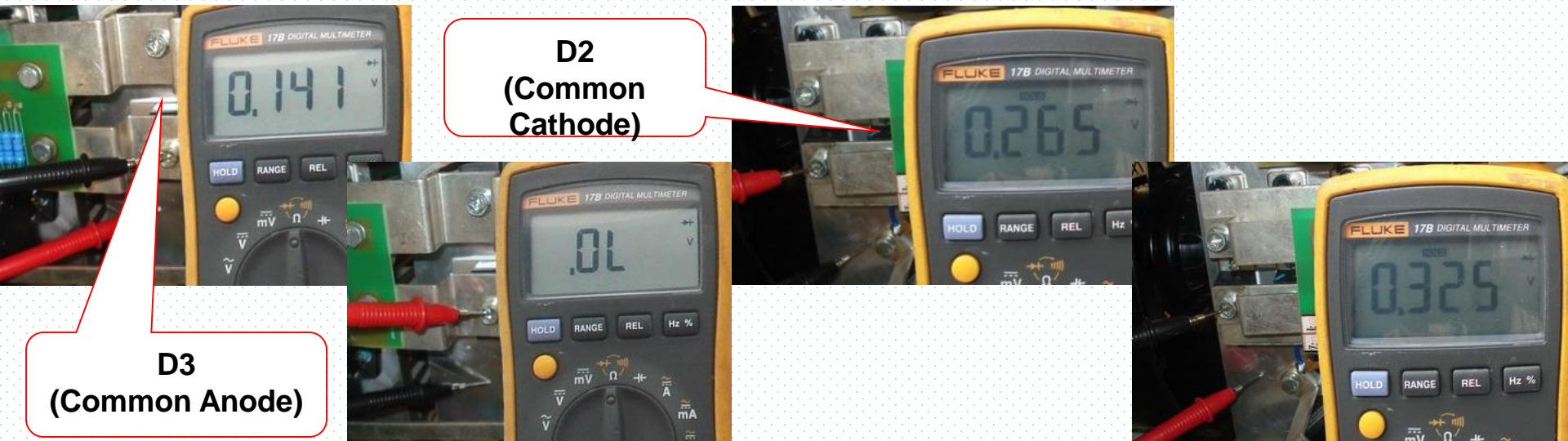
4.9 Test for second inverter IGBT (N5)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	N5-2 Terminal	N5-1 Terminal	0.23~0.3V	
	N5-2 Terminal	N5-2 Terminal	Over Limit	

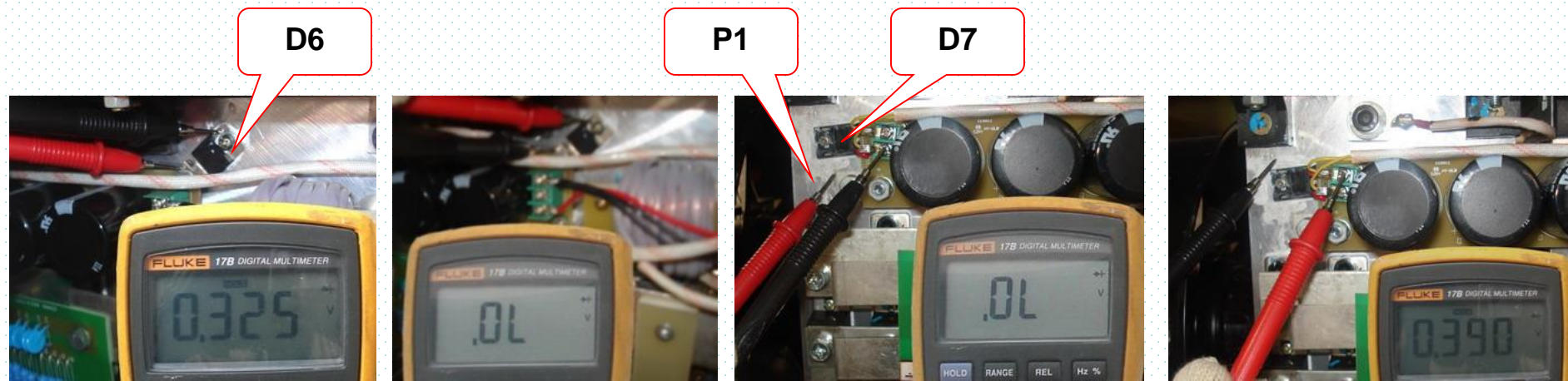
Note: Unplug J11, J12 from Main Control Board before taking the measurement.

4.10 Test for Diode Module (D2,D3)



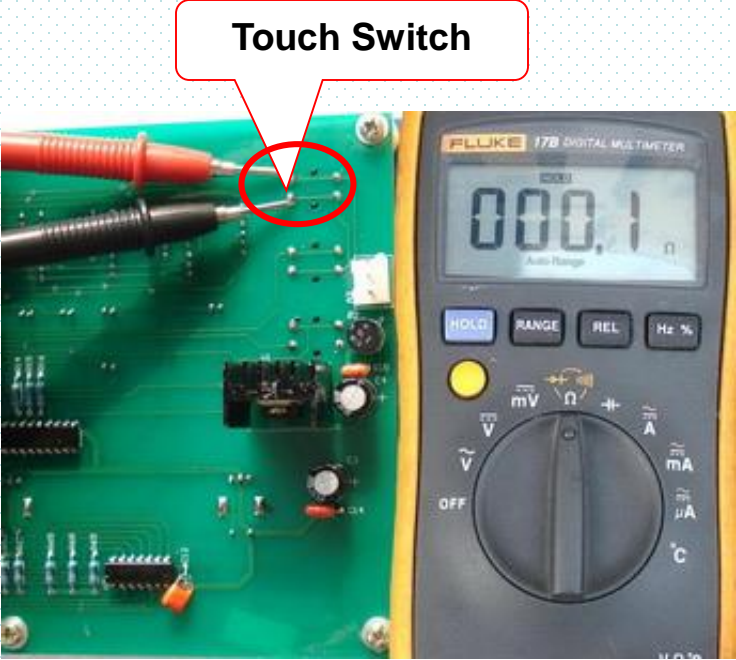
Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	D3 Anode	D3 Cathode	0.12~0.16V	
	D3 Cathode	D3 Anode	Over Limit	
	D3 Anode	D3 Cathode	0.25~0.29V	
	D3 Cathode	D3 Anode	0.25~0.3V	

4.11 Test for Voltage Release Board (XFB) Rectifier Module



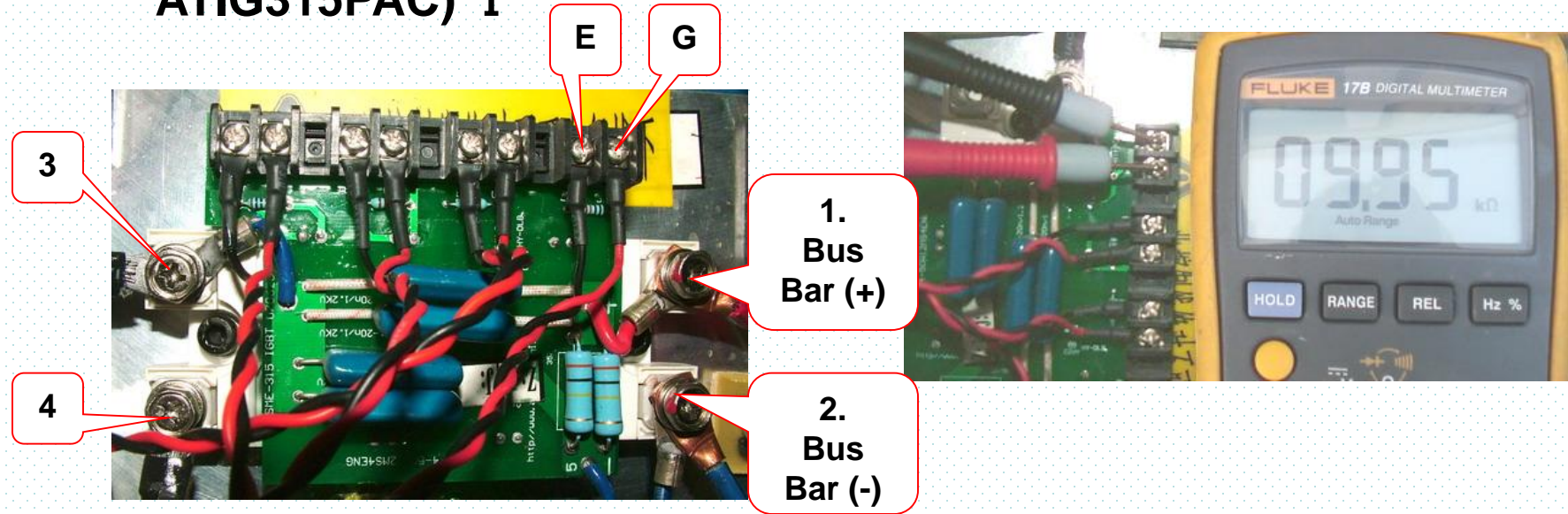
Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	D6 Anode	D6 Cathode	0.128~0.35V	
	D6 Cathode	D6 Anode	Over Limit	
	P1	D7 Anode		
	D7 Anode	P1	0.3~0.39V	

4.12 Test for Display Board (XSB)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	KD1(1)	KD1(2)	Over Limit	

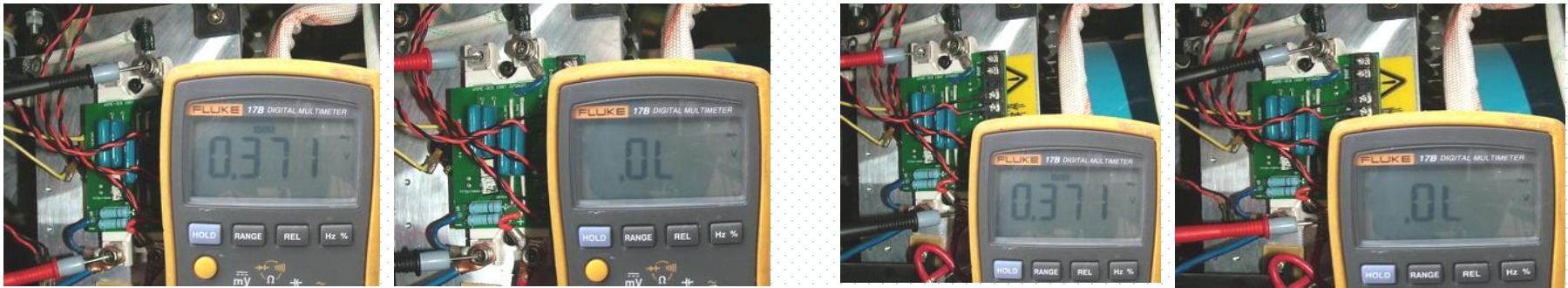
4.13 a. Test for first inverter IGBT Module (N) (WSME-315 II / ATIG315PAC) I



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	N(G)	N(E)	9~11KΩ	
	N(E)	N(G)		

Note: Release wire connection between Drive Board and IGBT module before taking the measurement.

4.13 b. Test for first inverter IGBT Module (N) (WSME-315 II / ATIG315PAC) II



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	N (1)	N (3)	Over Limit	Check IGBT component before taking the measurement. If the appearance is damaged, IGBT component will be damaged. Replace directly.
	N (1)	N (4)		
	N (3)	N (1)	0.360-0.380V	
	N (4)	N (1)		
	N (2)	N (3)		
	N (2)	N (4)		
	N (3)	N (2)	Over Limit	
	N (4)	N (2)		

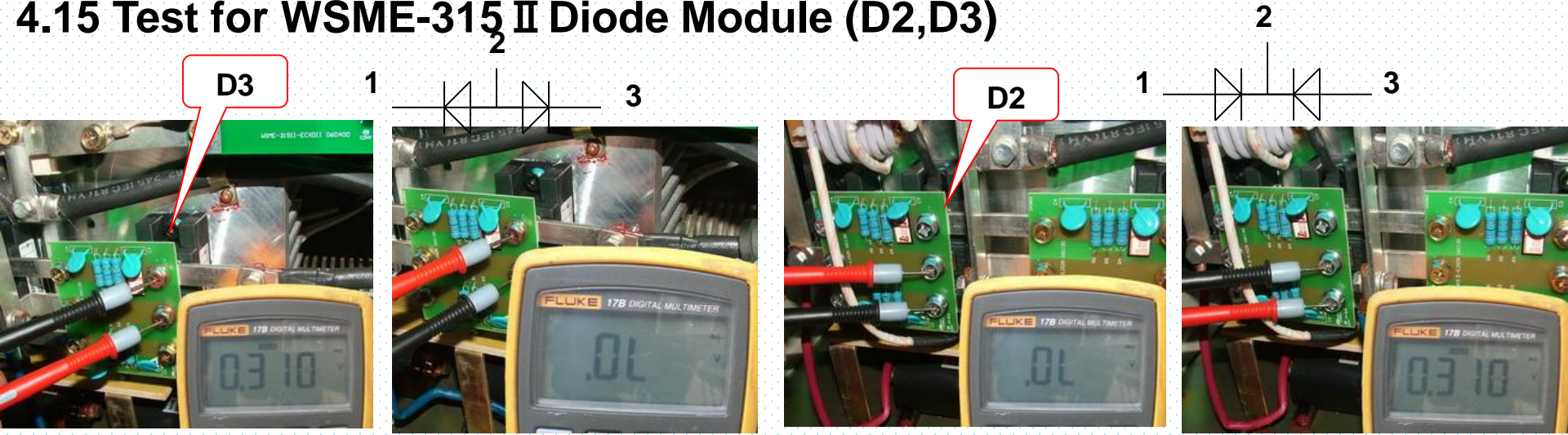
4.14 Test for second inverter IGBT Module (N5) (WSME-315 II / ATIG315PAC)

N5



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	N5 (2)	N5 (1)	0.338 ±5% V	
	N5 (1)	N5 (2)	Over Limit	
	N5 (1)	N5 (3)	0.338 ±5% V	
	N5 (3)	N5 (1)	Over Limit	

4.15 Test for WSME-315 II Diode Module (D2,D3)

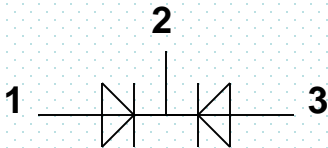


Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	D3 (2)	D3 (1)	0.310 ±5% V	
	D3 (1)	D3 (2)	Over Limit	
	D3 (2)	D3 (3)	0.310 ±5% V	
	D3 (3)	D3 (2)	Over Limit	
	D2 (2)	D2 (1)		
	D2 (1)	D2 (2)	0.310 ±5% V	
	D2 (2)	D2 (3)	Over Limit	
	D2 (3)	D2 (2)	0.310 ±5% V	

4.16 Test for Common Cathod Diode Module (D6)(WSME-315 II / ATIG315PAC)



D6



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Diode (Auto Range)	D6 (1)	D6 (2)	$0.325 \pm 5\% V$	
	D6 (2)	D6 (1)	Over Limit	
	D6 (2)	D6 (3)		
	D6 (3)	D6 (2)	$0.325 \pm 5\% V$	

4.17 Test for TIG Torch Switch



Panasonic
2 Pin Plug
(P1)



TIG Torch
Switch

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
Resistance (Auto Range)	P1 (1)	P1 (2)	<0.5Ω	Press torch switch
			Over limit	Release torch switch

5. Live Diagnostic Test



Warning



This live test can be carried out only when the Circuit Breaker does not trip.

Electric shock can kill:

1. The max voltage is up to 600V. Do not touch electrically “Hot” parts.
2. Insulate yourself from work and ground.
3. Wear dry, hole-free insulating gloves and body protection.

For Engine power equipment:

1. Running parts such as fan can injure fingers and catch loose clothing.
2. Ensure with a safety net when operating high above the ground.

General notes

1. Set the mode of multimeter is at “AC/DC Voltage” mode.
2. The proper measure ranges are given. This may vary with different meters as per the accuracy of the meter used.
3. Wait for multimeter reading to stabilize before recording the data.
4. Ensure proper and tight contact between the multimeter probes and the test points.
5. All the data tested in this manual are under 380V power supply voltage.

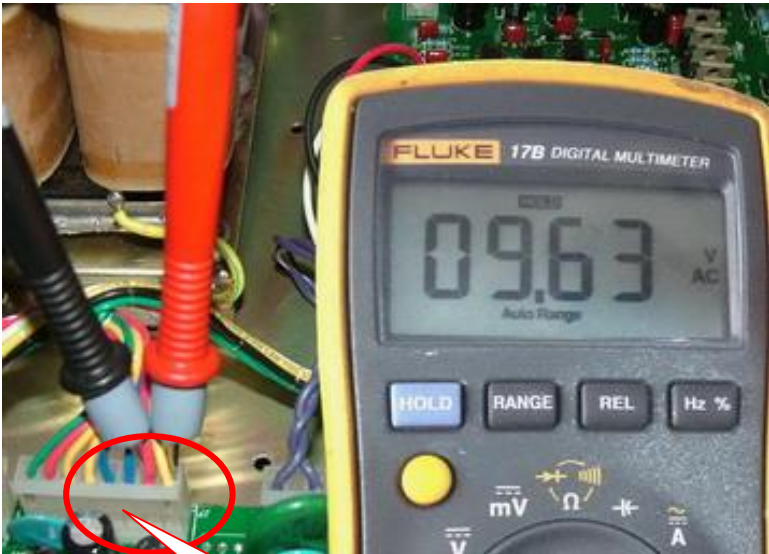
Summary

- 5.1 Test for Transformer for ZKB/QDB (T3) output voltage
- 5.2 a. Test for Transformer for ZKB/QDB (T4) output voltage I
- 5.2 b. Test for Transformer for ZKB/QDB (T4) output voltage II
- 5.3 Test for the voltage of Main Control Board (ZKB) that controls Stray Transformer (T5)
- 5.4 Test for Insulation Transformer (T6)
- 5.5 Test for the open-load voltage in SMAW mode
- 5.6 Test for the open-load voltage in SMAW mode (WSME-315 II / ATIG315PAC)
- 5.7 Test for Water Flow Switch (SK)
- 5.8 Test for Current Sensor (LEM)
- 5.9 Error Code Display
- 5.10 Key Combination Usage

5.1 Test for Transformer for ZKB/QDB (T3) output voltage



Plug J1



Plug J7

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
AC Voltage (Auto Range)	J1(3)	J1(1)	38VAC±10%	
	J7(1)	J7(2)	10VAC±10%	

5.2 a. Test for Transformer for ZKB/QDB (T4) output voltage I



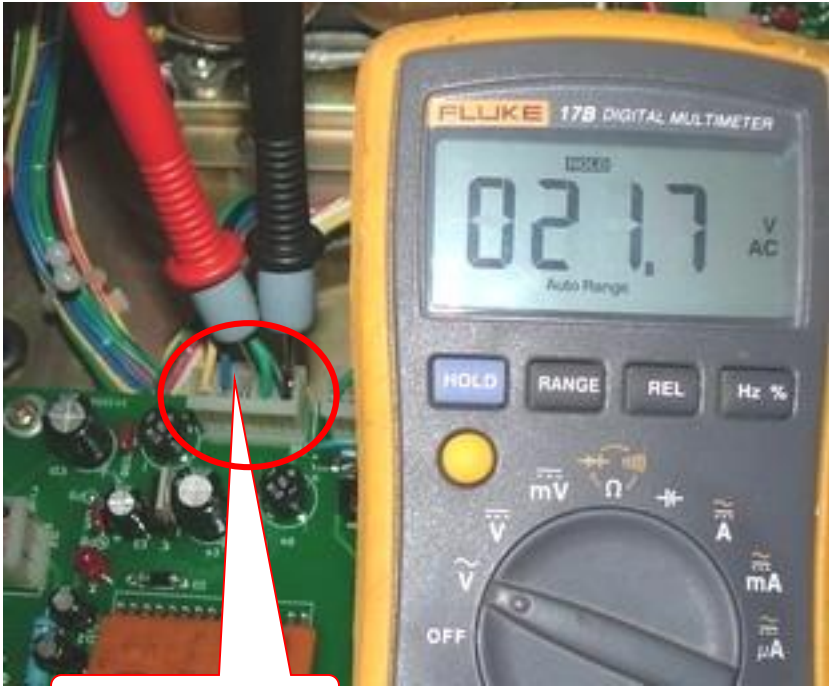
Plug X1



Plug A1

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
AC Voltage (Auto Range)	X1(1)	X1(3)	9VAC ± 10%	
	A1(1)	A1(3)	19VAC ± 10%	

5.2 b. Test for Transformer for ZKB/QDB (T4) output voltage II



Plug J10



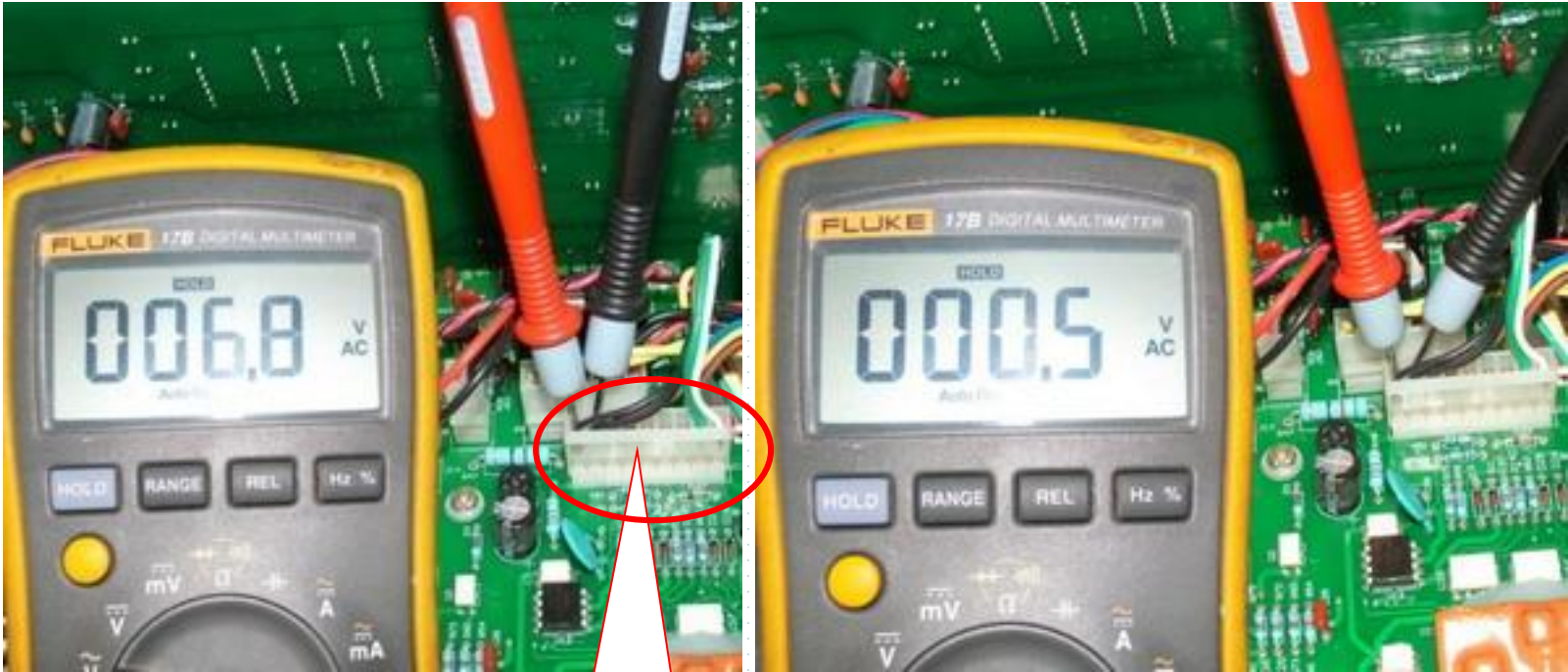
Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
AC Voltage (Auto Range)	J10(2)	J10(1)	22VAC ± 10%	
	J10(5)	J10(4)		

5.3 Test for the voltage of Main Control Board (ZKB) that controls Stray Transformer (T5)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
AC Voltage (Auto Range)	J8(1)	J8(3)	380VAC±10%	Release torch switch

5.4 Test for Insulation Transformer (T6)



Plug J13

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
AC Voltage (Auto Range)	J13(9)	J13(8)	9VAC±10%	Press torch switch
			<1VAC	Release torch switch

5.5 Test for the open-load voltage in SMAW mode



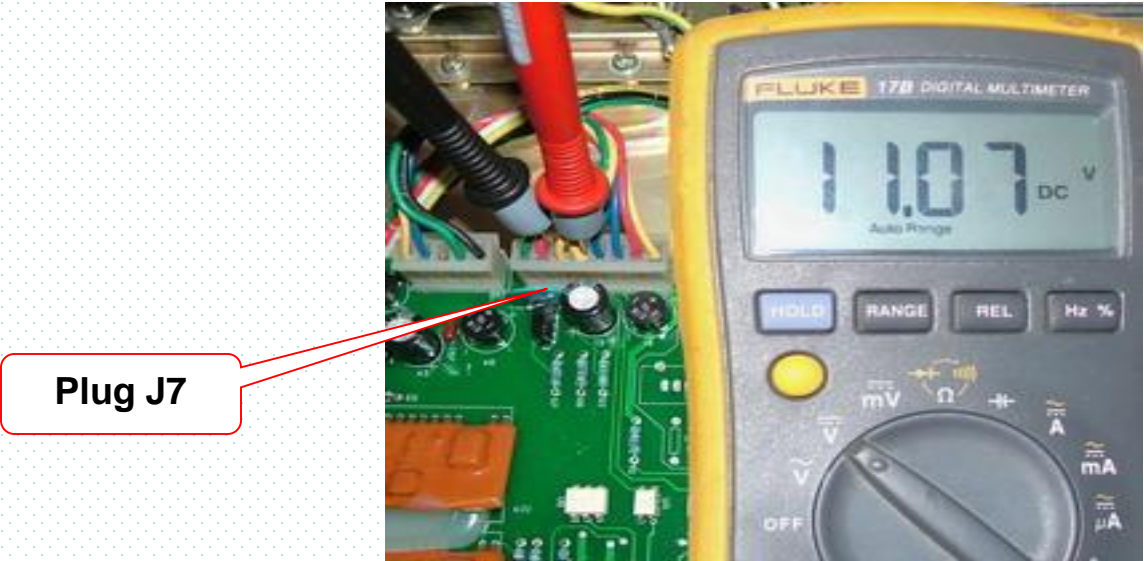
Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
DC Voltage (Auto Range)	OUTP	OUTN	80VDC±10%	

5.6 Test for the open-load voltage in SMAW mode (WSME-315 II / ATIG315PAC)



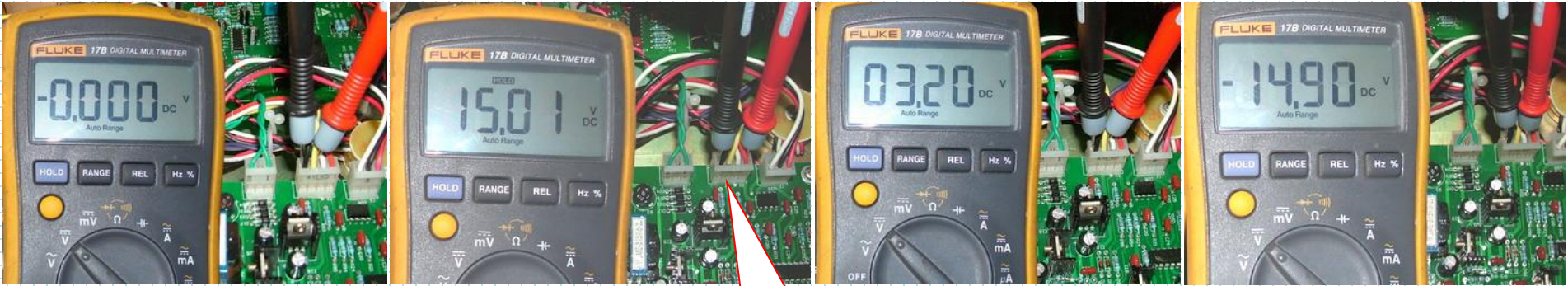
Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
DC Voltage (Auto Range)	OUTP	OUTN	80VDC±10%	

5.7 Test for Water Flow Switch (SK)



Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
DC Voltage (Auto Range)	J7(5)	J7(6)	<1V	There is water flow
			11V ±10%	No water flow

5.8 Test for Current Sensor (LEM)



Plug J2

Multimeter Operating Mode	Meter Probe (Red)	Meter Probe (Black)	Correct Value	Remark
DC Voltage (Auto Range)	J2(1)	J2(4)	15VDC ± 5%	
	J2(2)	J2(4)	-15VDC ± 5%	
	J2(3)	J2(4)	<1VDC	In open-load
	J2(3)	J2(4)	0.1-4VDC ± 5%	Adjust current when welding

5.9 Error Code Display



804: Over- heat protection



805: Torch switch is pressed for a long time or short circuit in TIG welding and open-load mode



806: Water shortage protection in TIG welding

5.10 Key Combination Usage



Press them over three seconds to restore factory defaults



Press these two encoders over three seconds at the same time to set / cancel water shortage protection

6. Maintenance

Warning



1. Be sure that all maintenance are performed only by qualified individuals.
2. Electric shock can be fatal. Before checking any devices, isolate machine from Input mains supply. Then wait for a few minutes, measure the voltage of capacitors on the bus bars. Ensure that there is complete and total discharge before replacing devices.
3. IGBT is a static-sensitive device, which will be damaged by electric caused by wire connection.
4. The screws of high-power modules should be fixed evenly and tightly. Apply a torque screw driver to tighten connection terminals, otherwise it will damage those modules.

6.1 Maintenance

1. Remove dust from welders with pressure-air by qualified individuals every 3-6 months. And check if the joints are loose. For poor environment, such performance should be conducted every month.
2. Check if the three phase supply voltage is within 340V-420V, and if there is phase missing.
3. Check if the protective ground and insulation is reliable.
4. Check regularly if cables are worn out, knobs are loose, and devices on the panels are damaged.
5. Check regularly if cables are tightly connected to cable connecting terminals in case of terminals being burnt out.
6. Check if TIG welding torch is broken and leaks gas before welding, torch switch, cables, and nozzle are damaged. Check and replace the tungsten electrode and clamp timely.
7. Ensure that there is good ventilation and dryness in welders.
8. Keep the devices being clean, and remove dust within the welder timely.