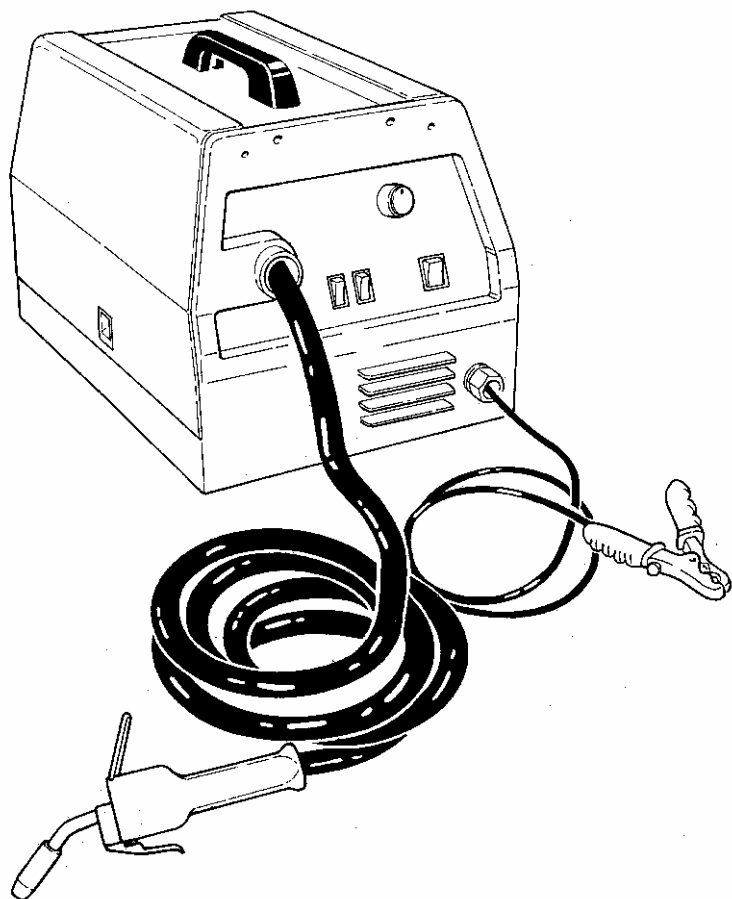


SERVICE MANUAL



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1 - GENERAL INFORMATION

1.1 - Introduction.

The purpose of this manual is to train personnel assigned to carry out maintenance on the power source art. 484 for MIG welding systems.

1.2 - General service policy.

It is the responsibility of the customer and/or operator to use the equipment appropriately, in accordance with the instructions in the Instruction Manual, as well as to maintain the equipment and related accessories in good working condition, in compliance with the instructions provided in the Service Manual.

Any internal inspection or repairs must be carried out by qualified personnel who are responsible for any intervention on the equipment.

It is forbidden to attempt to repair damaged electronic boards or modules; replace them with original Cebora spare parts.

1.3 - Safety information.

The safety notes provided in this manual are an integral part of those given in the Instruction Manual. Therefore, before working on the machine, please read the paragraph on safety instructions in the aforementioned manual.

Always disconnect the power cord from the mains before accessing the interior of the equipment.

Some internal parts, such as terminals and dissipaters, may be connected to mains or otherwise hazardous potentials. It is therefore forbidden to work with the safety guards removed from the machine unless strictly necessary. In this case, take special precautions such as wearing insulating gloves and footwear, and working in a perfectly dry environment with dry clothing.

2 - SYSTEM DESCRIPTION

2.1 - Introduction.

The BRAVO MIG110 is a system for MIG process welding of mild and stainless steel, and aluminum. It is made up of an electric power source, art. 484, with incorporated torch and wire feeder group.

2.2 - Technical specifications.

To verify the technical specifications, see the machine plate, Instruction Manual, and Sales Catalogue.

2.3 - Description of power source art. 484.

Art. 484 is an electro mechanic direct current power source, consisting of a single-phase transformer and a rectifier bridge.

Referring to the electrical diagram in par. 5.1, drawings 2.3.1, 4.1 and table 4.2, we can identify the main blocks that make up the power source.

The main switch (A) (14) powers the power transformer (46), through selectors (B) (15), which, commutating opportunely the primary winding sockets of the transformer (46), change the secondary winding voltage, and so the power source output voltage.

In this way they adapt the welding current to the welding requirement.

The rectifier bridge (38) connected at the transformer (46) secondary winding, rectifies the welding current, and at its output is connected the inductor (46), integrated in the same core of the power transformer, for the welding current leveling.

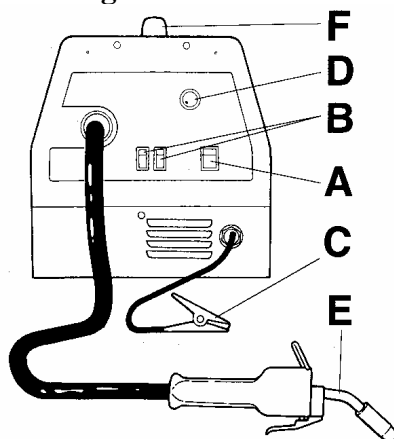
The control board (41), manages the power source output voltage by means the output contactor (50), which is activated by the relay on the control board (41), driven by the torch start button.

The wire feeder motor (40) supply voltage is picked-up from the rectifier (38) output, so that is subjected at the variations imposed by selectors (15) setup, and at the voltage difference due to loaded or no loaded transformer (46) working conditions. More exactly, at the increasing of the power source output voltage corresponds automatically an increase of motor (40) speed. The wire speed fine adjustment is performing by the control board (41) electronic regulator, through proper potentiometer (knob D).

Output welding current and wire speed must be adapted, to the welding requirements, manually by the operator.

The thermostat (47) is located on the power transformer (46) secondary winding, and its intervention interrupts the power source supply.

2.3.1 - Power source commands and signals.



3 - MAINTENANCE

WARNINGS

ANY INTERNAL INSPECTIONS OR REPAIRS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.

BEFORE BEGINNING MAINTENANCE OPERATIONS, UNPLUG THE MACHINE FROM THE MAINS.

3.1 - Periodic inspection, cleaning.

Periodically remove dirt and dust from the internal parts of the power source, using a jet of low-pressure dry compressed air or a brush.

Check the condition of the power supply and torch cables of the power source; replace if damaged.

Check the condition of the internal power connections and connectors on the electronic board; if you find “loose” connections, tighten or replace the connectors.

3.2 - Troubleshooting.

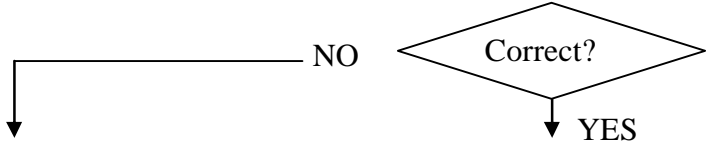
NOTE

- Items in **boldface** describe problems that may occur on the machine (symptoms).
- Operations preceded by this symbol refer to situations the operator must determine (causes).
 - ◆ Operations preceded by this symbol refer to actions the operator must perform in order to solve the problems (solutions).

3.2.1 - **The power source does not start, lamp in the switch (A) (14) off.**

MAINS SUITABILITY TEST.

- No voltage for mains protection.

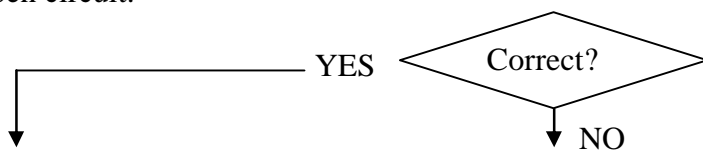


- ◆ Eliminate any short-circuits or insulation leakages toward ground on the connections between power cable, switch (14), selectors (15), transformer (46), control board (41) terminals B1 and B2, and output contactor (50).
- ◆ Check the condition of the windings of transformer (46), especially making sure that there are no signs of overheating or dents in the winding that may lead to partial short-circuits in the turns. If necessary, replace the transformer (46).
- ◆ Check the efficiency of the rectifier bridge (38), especially that there are no diodes in short-circuit.
- ◆ Mains not suitable to power the power source (ex.: insufficient installed power).
- ◆ Make sure there are no interruptions in the power supply cable.
- ◆ Check the efficiency of the switch (14) and thermostat (47).
- ◆ Replace switch (14) (lamp burned-out).

3.2.2 - Power source does not generate output voltage, lamp in the switch (A) (14) lit.

TRANSFORMER (46) SECONDARY VOLTAGE TEST.

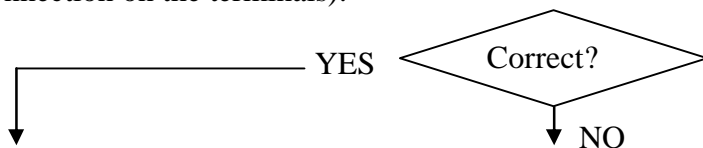
- Transformer (46) secondary terminals = voltages 22, 24, 26 or 29 Vac approximately, depending by selectors (15) positions, with nominal input voltage, and with power source open circuit.



- ◆ Check the wiring between supply cable, switch (14), thermostat (47), selectors (15) and transformer (46) primary winding.
- ◆ Make sure the efficiency of the switch (14) and selectors (15).
- ◆ Make sure the efficiency of the thermostat (47); with transformer (46) at ambient temperature the thermostat contact must be closed.
- ◆ Replace transformer (46).

RECTIFIER BRIDGE (38) OUTPUT VOLTAGE TEST.

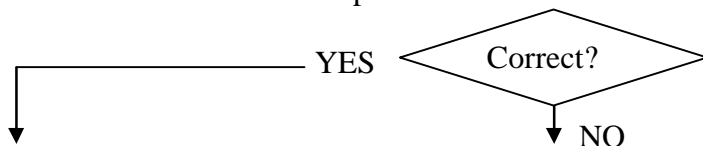
- Rectifier (38) terminals + and - = voltages 18, 20, 22 or 25 Vdc approximately, depending by selectors (15) positions, with nominal input voltage, and with power source open circuit (in case of difficulty in voltages measuring, insert a 1 Kohm, 10 Watts resistor in parallel connection on the terminals).



- ◆ Check the wiring between transformer (46) secondary winding and rectifier (38).
- ◆ Make sure the efficiency of the rectifier (38).
- ◆ Replace transformer (46).

START BUTTON TEST.

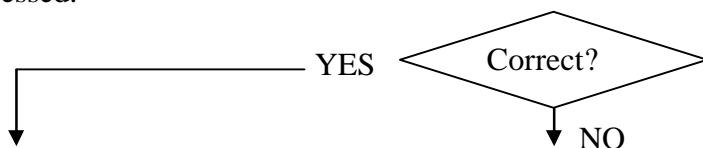
- Control board (41), terminals A1 – A3 = 18 - 25 Vdc (according with selectors (15) position) with start button on the torch pressed.



- ◆ Check connections of the torch cable conductors with power source internal elements.
- ◆ Check connections inside the torch handgrip, and make sure the torch pushbutton efficiency. If necessary replace the complete torch.

OUTPUT CONTACTOR (50) TEST.

- Output contactor (50) coil terminal = voltage equals to voltage line, with button on torch pressed.

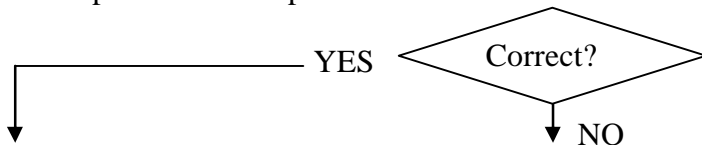


- ◆ Check the wiring between selectors (15), control board (41) B1 and B3 terminals, and contactor (50) coil terminals.
- ◆ With power source off, make sure the resistance of the contactor (50) coil. If 0 ohm (short-circuit) replace contactor (50) and control board (41).
- ◆ Replace the relay on the control board (41) with one of the same type, or replace the control board (41).
- ◆ With power source off, make sure the resistance of the contactor (50) coil. If >Mohm (coil interrupted) replace contactor (50).
- ◆ Check wiring between transformer (46) secondary winding, rectifier bridge (38), inductor (46), contactor (50) and work cable (13).
- ◆ With the power source off and disconnected from the mains, check the efficiency of the contacts of contactor (50), manually activating it, and make sure that the resistance on each contact is approximately 0 ohm. If you find burnt contacts or interference in moving the parts, replace the contactor (50).
- ◆ Check connections of the torch cable conductors with power source internal elements.
- ◆ Replace the complete torch (41).
- ◆ Replace inductor (46).

3.2.3 - Power source powered, regular output voltage, wire feeder motor (40) doesn't work.

WIRE FEEDER MOTOR (40) TEST.

- Wire feeder motor (40) terminals = voltages adjustable (with knob (D)) from maximum values 18, 20, 22 or 25 Vdc approximately, (depending by selectors (15) positions), up the minimum values equivalent to approximately 10% of such values, with start button pressed, and with power source open circuit.



- ◆ Check the wiring between wire feeder motor (40), control board (41) terminal A2, and rectifier bridge (38) negative terminal.
- ◆ Disconnect temporarily, with power source off, wire feeder motor (40) terminals from control board (41) and from rectifier (38), and make sure resistance between motor terminals left free. If 0 ohm (short-circuit) replace wire feeder motor (40) and control board (41). If > Mohm (winding interrupted) replace wire feeder motor (40).
- ◆ Replace control board (41).
- ◆ Make sure there are no mechanical impediments blocking the motor.
- ◆ Check the motor rotation direction; if wrong, reverse the wires on the motor (40) terminals.
- ◆ Make sure there are no partial occlusions in the wire sheath inside the torch cable, that jeopardize the wire and motor movement.
- ◆ Replace the wire feeder motor (40) and/or control board (41).

3.2.4 - In load operation, the welding quality is not satisfactory.

NOTE

During welding is possible to meet different type of difficulty, depending of the welding condition.

Due to the circuit simplicity, and the lack of automatism that bind power source functions between them, optimal welding condition must have sought manually and experimentally by the operator, operating on power source commands.

Following are listed some of the most frequently troubles, with some simple suggestion in order to find problems solutions.

Causes and solutions may have found also by power source adjustments optimization, or by performing the TESTS of the previous paragraphs, in order to verify power source single apparatus correct working conditions.

1. Welding current insufficient:
 - Selectors (15) wrong setup (output voltage too low);
 - Rectifier bridge (38) defective;
 - Torch or work cables connections defective.
2. Welding with a lot of metal spatter:
 - Selectors (15) wrong setup (output voltage too high);
 - Work cable connection defective.
3. Wire flowing difficult.
 - Roll spring wrong adjustment;
 - Wire roll wrong alignment;
 - Drive roll with too large a groove;
 - Contact tip with wrong diameter;
 - Wire sheath partially clogged;
 - Consider that wire speed is affected by the power source output voltage variations (by effect of the open circuit to load voltage drop of the transformer (46)), since the wire feeder motor supply voltage is picked-up from the rectifier bridge (38) output.
4. Excessive porosity in the welding seam.
 - Excess oxidation of the edges to be welded;
 - Gas nozzle partially or completely clogged.

4 - COMPONENTS LIST

4.1 - Power source art. 484 : see file ESP484.pdf enclosed at the end of the manual.

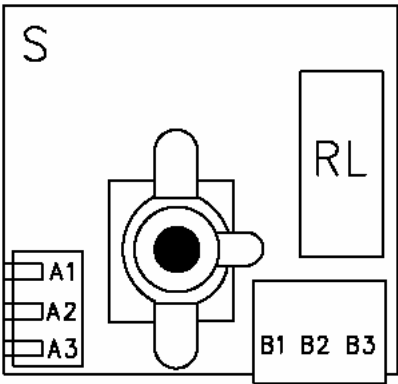
4.2 - Components table: see file ESP484.pdf enclosed at the end of the manual.

5 - ELECTRICAL DIAGRAMS

5.1 - Power source art. 484 : see file SCHE484.pdf enclosed at the end of the manual.

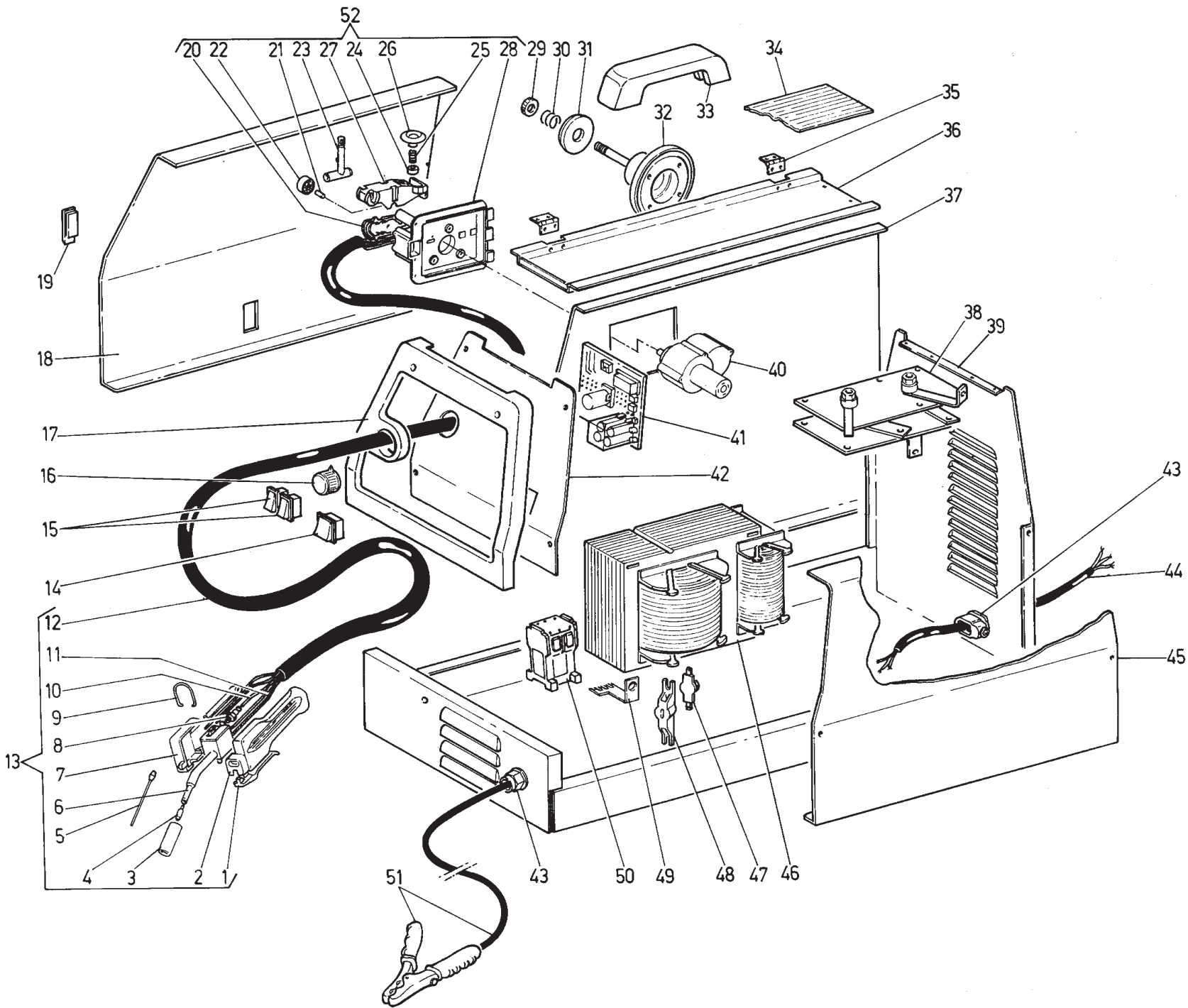
5.2 - Control board (41) code 5.600.817/A.

5.2.1 - Topographical drawing.



5.2.2 - Connector table.

Terminals	Function
A1	input start signal from torch button.
A2	wire feeder motor command output.
A3	control board (41) common supply input.
B1	NU
B2-B3	output contactor (50) command output.



M12179, MB120A, WFW12179, 117-092, 83-363 (same as Mig 110, WS1300)

Lincoln

Item	Stock #	Customer #	Description
1	S26399-23	B7037370	Torch Lever
2	S26399-24	B7038370	Handgrip, Left
3	334-500-400	M15598	Tapered Nozzle
	334-501-400	M15599	Spot Nozzle
4	334-159-400	M15522	Contact Tips .024"
	334-160-400	M15523	Contact Tips .030"
	334-161-400	M15524	Contact Tips .035"
5	S26400-7	B7041370	Conductor Tube Liner
6	246-533-000	B7042370	Gas Valve & Conductor Tube
7	S26399-25	B7043370	Handgrip, Right
8	S26399-26	B7044370	Quick Coupling
9	S26399-27	B7046370	Torch Hook
10	334-627-000	B7045370	Cable Liner
11	S26399-28	B7047370	Gas Hose
12	S26399-29	B7048370	Torch Sheath / Cover
13	334-633-000	M15591	Complete Torch Assy
14	246-537-666	B7069370	Switch
15	S26399-30	B7070370	Switch
16	S26399-22	B7033370	Knob
17	312-516-666	260470	Frame
18	S26399-12	260531	Hinged Left Side Panel
19	S26400-1	246948	Latch
20	See 52	B7001370	Cable holder
21	See 52	B7003370	Roller pin
22	See 52	B7002370	Bearing
23	See 52	B7004370	Roller presser pin
24	See 52	B7005370	Spring rest pin
25	See 52	B7006370	Spring rest pin
26	See 52	B7007370	Knob
27	See 52	B7008370	Roller holder arm

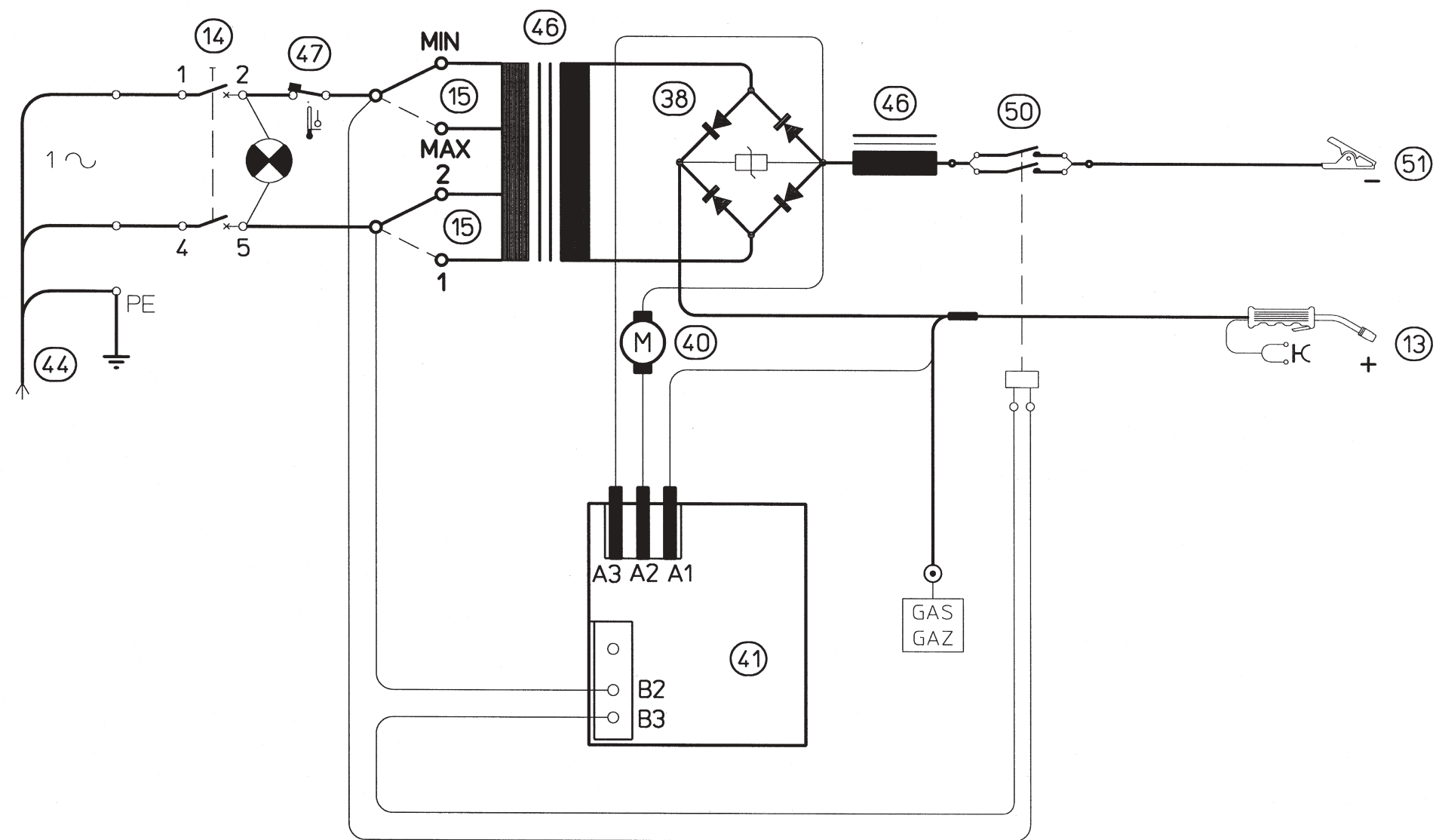
Lincoln

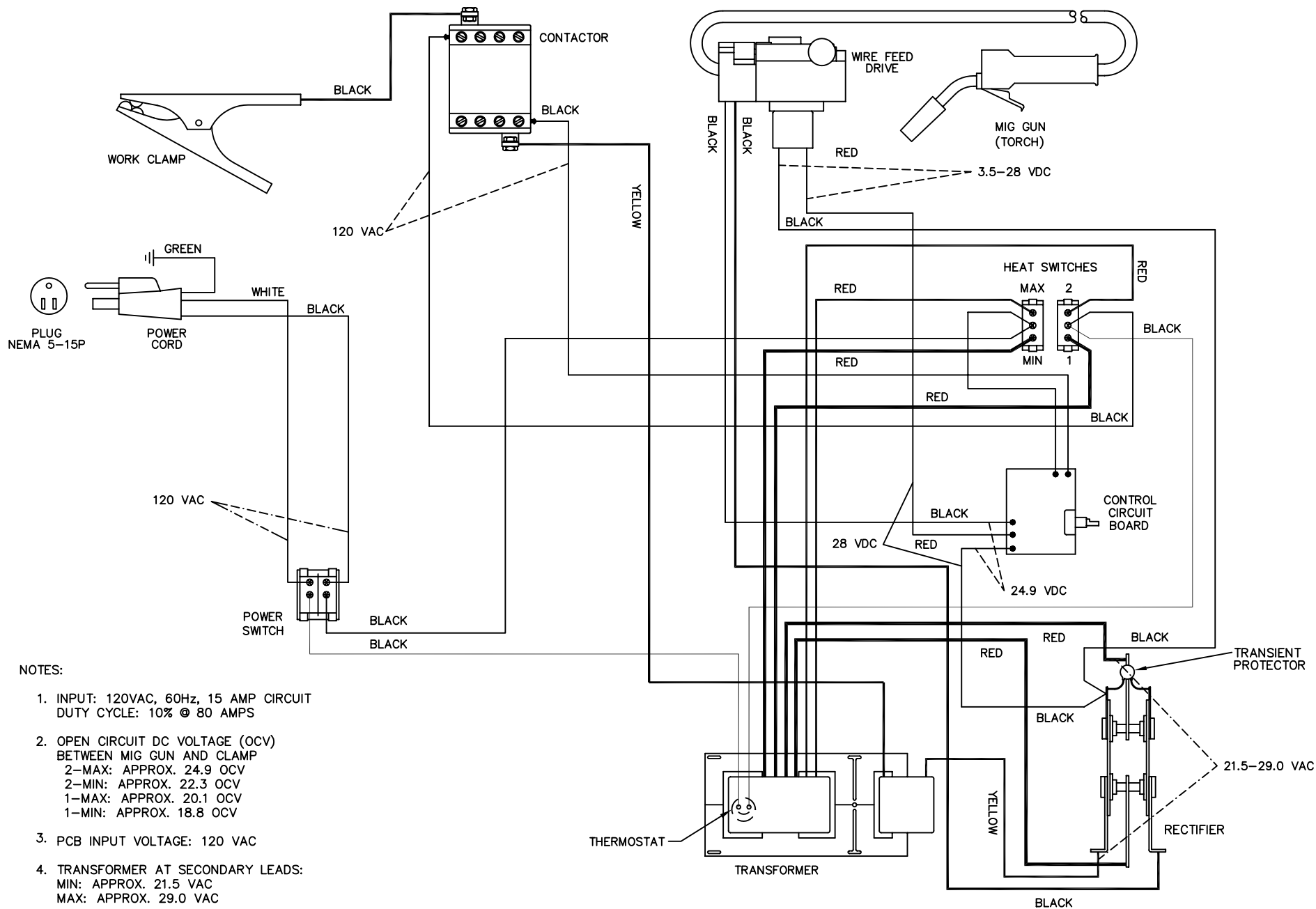
Item	Stock #	Customer #	Description
27	See 52	B7008370	Roller holder arm
28	See 52	B7009370	Drive motor support
29	S26399-8	251030	Washer
30	S26399-9	251031	Spring
31	S26399-7	251027	Spacer Coil Support
32	S26399-6	251022	Coil Support
33	312-515-666	250975	Handle
34	512-265-666	260467	Rubber Mat
35	S26399-2	246958	Hinge
36	S26399-13	260533	Cover
37	S26399-14	260534	Center Panel
38	S26400-2	260535	Rectifier
39	S26400-3	260539	Undercarriage
40	216-115-000	B7012370	Wire Feed Motor
41	880-591-000	B7029370	Circuit Board
42	S26400-4	260540	Front Panel
43	414-020-666	B7018380	Strain Relief
44	S26399-19	B7023370	Input Power Cord
45	411-110-026	260461	Fixed Right Side Panel
46	S26400-5	260544	Reactor Coil
47	S26399-21	B7096370	Thermostat
48	S26399-20	B7028370	Thermostat Support
49	S26399-15	260545	Contacto bracket
50	246-519-666	B7053370	Contacto
51	S26400-6	B7036370	Earth/Ground Cable
52	334-635-000	246229	Drive Deck Assy (Includes 20-28)
53	334-438-000		Preset Regulator w/o Gauges
	334-460-001	--	Gas Regulator w/ 2 Gauges
54		B7051370	Fan Blade (not on all verions)
55		B7052370	Fan Motor (not on all versions)

8/31/2006

Model	Primary Input	Input Plug	Duty Cycle at Rated Output
M12179	120V, 20 amp	15A	10%

Rated Output	Voltage Settings	Agency Listing	Max Output
80 amps	4	CSA	130 amps





NOTES:

1. INPUT: 120VAC, 60Hz, 15 AMP CIRCUIT
DUTY CYCLE: 10% @ 80 AMPS
2. OPEN CIRCUIT DC VOLTAGE (OCV)
BETWEEN MIG GUN AND CLAMP
2-MAX: APPROX. 24.9 OCV
2-MIN: APPROX. 22.3 OCV
1-MAX: APPROX. 20.1 OCV
1-MIN: APPROX. 18.8 OCV
3. PCB INPUT VOLTAGE: 120 VAC
4. TRANSFORMER AT SECONDARY LEADS:
MIN: APPROX. 21.5 VAC
MAX: APPROX. 29.0 VAC
5. ARC VOLTAGE AT 80 AMPS LOADED 18.0 VDC
6. SHOULD HAVE CONTINUITY BETWEEN GUN CABLE
AND TRIGGER LEAD WHEN TRIGGER IS PULLED.
7. ELECTRICAL PLUG: NEMA 5-15P (125V, 15A, GROUND)
8. ----- VOLTAGES ARE PRESENT ONLY WHEN TRIGGER IS PULLED.
9. ----- VOLTAGES ARE PRESENT WHEN MAIN POWER IS ON.

M12179 Wiring