



Multi-Process (Pulse)

POWER-MASTER® 500P



PROCESS	PULSE MIG	MIG	FLUX CORED	STICK	CAG	LIFT TIG	SUB-ARC
Part Number	Rated Output @ Duty Cycle		Output Range		Dimensions (H x W x D)		Net Weight
100054 (208/230/400/460V)	450 A / 38 V @ 100% 560 A / 42.4 V @ 60%		5 - 560 Amps 10 - 44 Volts		26.8" x 14.9" x 23.0" 681 x 379 x 585 (mm)		154 lbs. (70.0 kg)

The Power-Master® 500P delivers the multiple weld processes necessary for all manufacturing environments. This high amperage, energy efficient, 560 amp DC output power source will tackle most all of your present and future welding applications. It truly is the welder you won't outgrow.

With 24 factory installed pulse programs in the PULSED GMAW mode, you can easily match the appropriate size and type of wire for your pulse welding application. Whether it is mild steel, stainless steel, aluminum, nickel alloys or silicon bronze one of our pulse programs will get you welding. For those tougher jobs, the GUS software option will enable you to design or modify the ideal pulse waveform for your unique application.

Switch to GMAW mode to run your mild and stainless steel wires in the short circuit transfers. This is also the optimum mode for your flux-cored wires. For Stick welding and Arc Gouging switch to the SMAW mode. GTAW mode enables you to weld DC Lift-TIG.

From power generation to heavy equipment fabrication, from semi-automatic welding to automation, from mild steel to nickel, from stick to pulse welding, no matter how you weld it, the Power-Master 500P offers you the versatility and performance you demand for the future.

Machine Specifications

Maximum Output Current	600 Amps
Maximum OCV	70 Volts
Input Frequency	50/60Hz
Operating Temperature Range	32-104° F (0-40° C)
Input Line Variations	10%
Line Regulation	1%
Load Regulation	2%
Approvals	IP-23S, CSA C22.2

GOT POWER?™

Features

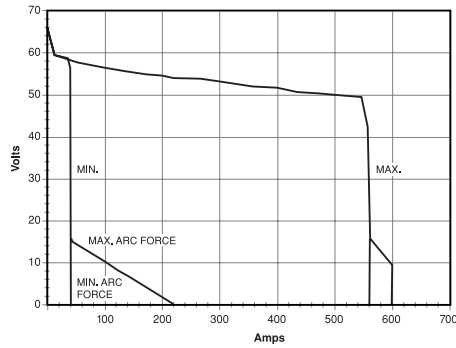
- Automation**
 - Interfaceable with ABB, Fanuc and Motoman Robots
 - Ideal for Both Robotic and Fixed Automation
- Multi-Process**
 - Pulse MIG / MIG / FCAW / STICK / Lift TIG / CAG
- Pulse MIG**
 - 24 Preset Programs
 - Waveform Design Capability
 - Adapts to Most Standard Wire Feeders
- Programmable**
 - Pulse Ref. / Amps / Volts - Min./Max. Limits, Wire Sharpening, Waveform Design, Lockouts, Data Monitoring, Filing, RS-232 Port, Can Port
- Powerful**
 - 450 Amps @ 100% Duty Cycle (Max. 600 Amps)
- Energy Efficient**
 - 90% Efficient (Draws Less Than 40 Amps on 460V / 3 Phase at Maximum Output)
- Simplicity**
 - Single Dial Amps / Volts / Pulse Ref. Control
 - Digital Meters
 - Other Controls Secured and Protected Behind Panel Door



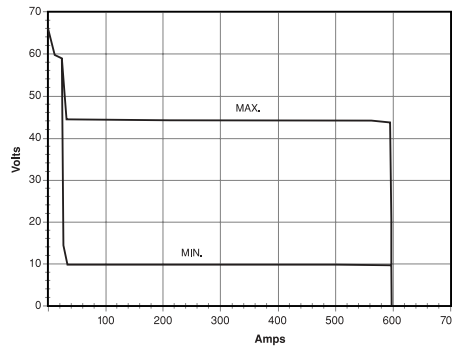
The Welder You Won't Outgrow!

Volt-Amp Characteristics

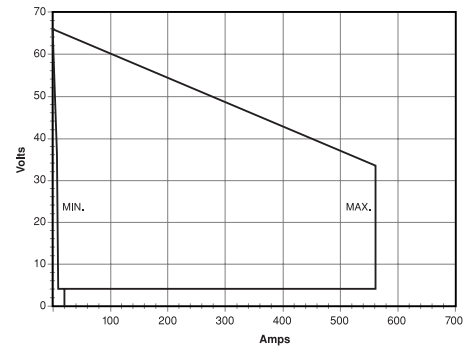
VOLT-AMP CURVE FOR CC-SMAW



VOLT-AMP CURVE FOR CV-GMAW



VOLT-AMP CURVE FOR CC-GTAW



Input Line Draw and Efficiencies

Line Voltage	Line Current	kVA	Eff.	PF	Output
208 VAC / 3 Phase	68 Amps	24.5	89%	0.83	450A / 38V / 100%
230 VAC / 3 Phase	62 Amps	24.7	90%	0.82	450A / 38V / 100%
400 VAC / 3 Phase	35 Amps	24.2	90%	0.84	450A / 38V / 100%
460 VAC / 3 Phase	30 Amps	23.9	91%	0.84	450A / 38V / 100%
208 VAC / 3 Phase	88 Amps	31.7	89%	0.88	560A / 42.4V / 60%
230 VAC / 3 Phase	82 Amps	32.7	89%	0.87	560A / 42.4V / 60%
400 VAC / 3 Phase	43 Amps	29.8	91%	0.86	560A / 42.4V / 60%
460 VAC / 3 Phase	39 Amps	31.1	90%	0.88	560A / 42.4V / 60%

When Power Consumption Counts!

Power-Master® 500P Comes with 24 Factory Set Pulse Programs

STANDARD MODE (Schedules 1-12)

Schedule	Wire Type	Wire Dia.	Shielding Gas
1	Mild Steel	.035"	90% Ar, 10% CO ₂
2	Mild Steel	.045"	90% Ar, 10% CO ₂
3	Mild Steel	1/16"	90% Ar, 10% CO ₂
4	Stainless Steel	.030"	81% Ar, 1% CO ₂ , 18% He
5	Stainless Steel	.035"	81% Ar, 1% CO ₂ , 18% He
6	Stainless Steel	.045"	81% Ar, 1% CO ₂ , 18% He
7	Aluminum	3/64"	100% Ar
8	Aluminum	1/16"	100% Ar
9	Silicon Bronze	.035"	100% Ar
10	Silicon Bronze	.045"	100% Ar
11	Metal Core	.045"	90% Ar, 10% CO ₂
12	Metal Core	1/16"	90% Ar, 10% CO ₂

AVC MODE (Schedules 13-24)

Schedule	Wire Type	Wire Dia.	Shielding Gas
13	Mild Steel	.035"	90% Ar, 10% CO ₂
14	Mild Steel	.045"	90% Ar, 10% CO ₂
15	Mild Steel	1/16"	90% Ar, 10% CO ₂
16	Stainless Steel	.030"	81% Ar, 1% CO ₂ , 18% He
17	Stainless Steel	.035"	81% Ar, 1% CO ₂ , 18% He
18	Stainless Steel	.045"	81% Ar, 1% CO ₂ , 18% He
19	Aluminum	3/64"	100% Ar
20	Aluminum	1/16"	100% Ar
21	Silicon Bronze	.035"	100% Ar
22	Silicon Bronze	.045"	100% Ar
23	Metal Core	.045"	90% Ar, 10% CO ₂
24	Metal Core	1/16"	90% Ar, 10% CO ₂

Pulse Made Easy!

Control Panels

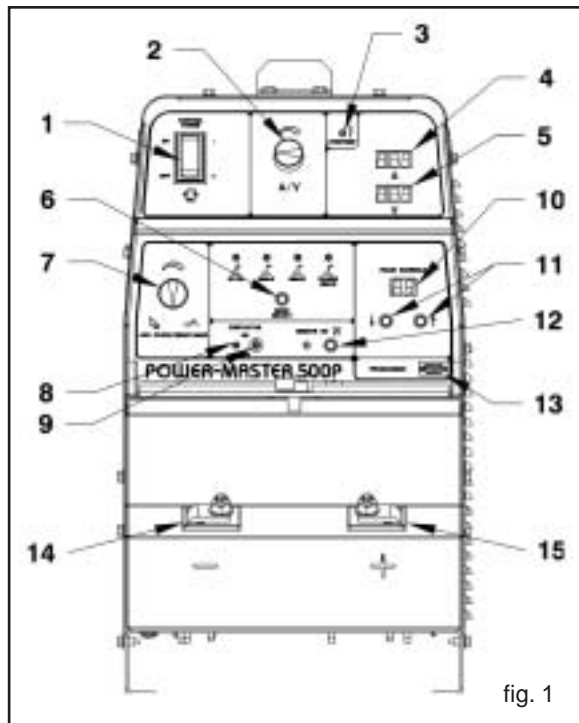


fig. 1

Front Panel (See Figure 1)

- 1. Control Power ON/OFF Switch:** This circuit breaker/switch activates the controls on the power source. When this switch is in the OFF position, the power source is in standby mode. Line voltage is still present internal to the machine, but the controls are not energized. In the ON position, power is applied to the control circuit of the power source. Whenever the switch is in the ON position, the digital meter displays are activated.

This circuit breaker also protects the auxiliary 24 VAC and 115 VAC power in case of an overload. If the circuit breaker trips, determine the cause of the overload before resetting.

- 2. Output Control:** This control is used to set the output voltage or amperage depending on the operating mode of the power source. For GTAW and SMAW modes, this control is used to preset the amperage. For GMAW this control presets the welding voltage. For Pulse GMAW this control sets the pulse reference, which is similar in function to a voltage control.

This control becomes inactive if REMOTE control is selected, except for GTAW mode. In GTAW mode this control is used to set the maximum welding current available to the remote control.
- 3. Overtemp Indicator:** This indicator light will be on if the power source has over heated. Whenever this light is on, the power source will be disabled from welding, but the fans will continue to run to cool the unit. Once the power source cools down, this light will automatically go off and the unit will be ready to weld. If this light comes on, the cause of the overheating condition should be investigated and resolved before continuing.
- 4. Amps Display:** The top display shows preset amperage for GTAW and SMAW modes when not welding. This display shows the actual welding current for all modes while welding. For GMAW and Pulsed-GMAW modes, the meter will hold the last value at the end of the weld for up to 5 seconds.
- 5. Volts Display:** The bottom display shows preset voltage for GMAW, and preset pulse reference for Pulsed-GMAW, when not welding.

The display will show actual welding voltage for all modes while welding. For GMAW and Pulsed-GMAW modes, the meter will hold the last value at the end of the weld for up to 5 seconds.

- 6. Mode Select Switch:** The mode select switch is used to select one of the four built in operating modes of the power source. One of the four indicator lights located above the switch should be on at all times, indicating the mode which is currently selected. The four modes are as follows:

GTAW mode: In this mode the power source operates in constant current mode. The front panel control can be used to preset the welding amperage. If a foot pedal or other remote control is used, then the front panel control is used to set the maximum welding current available to the foot pedal. For GTAW mode the arc force control is not active.

A lift arc circuit is automatically activated for GTAW mode, unless disabled internally by jumper selections on the control board. The lift arc circuit allows the arc to be initiated by momentarily touching the tungsten to the work and then lifting or rocking the tungsten off the work. The lift arc circuit limits the "touch" current to a low value and then switches to the preset current after the arc is struck.

SMAW mode: In this mode the power source operates in constant current mode. The front panel control can be used to preset the desired welding amperage. The arc force control is activated for SMAW mode allowing the amount of "dig" or arc force to be set by the arc force control. Maximum arc force is full clock wise, full counter clockwise is zero arc force.

GMAW mode: In this mode the power source operates in constant voltage mode. The front panel control can be used to preset the desired welding voltage. The inductance control is activated for GMAW mode. The inductance control allows the arc characteristics to be adjusted. Maximum inductance is full clockwise. Higher inductance settings make the arc "softer" with less spatter. Lower inductance settings give a stronger "driving" arc. Generally the inductance control can be set at mid range as a good starting point.

The GMAW mode also has a built in wire-sharpening circuit to help condition the end of the wire at the end of the weld. This feature reduces the size of the ball on the end of the wire to improve the next arc start. The wire sharp settings can be modified or disabled by using the programmer interface.

PULSED GMAW mode: In this mode the power source uses the built in pulse control for pulsed GMAW welding. The pulse control is factory programmed with 24 different pulse weld schedules. The active pulse schedule is shown on the pulse schedule display. The label on the inside of the control door shows the pulse schedules as shipped from the factory. Schedules 1 - 12 are programmed as standard (non AVC) and schedules 13-24 are programmed as AVC schedules. The AVC schedules provide for control of the arc length as the torch to work distance is varied. In the pulsed GMAW mode the front panel output control is used to preset a pulse reference for the pulse control circuit. The pulse schedules can be modified by using the programmer interface.

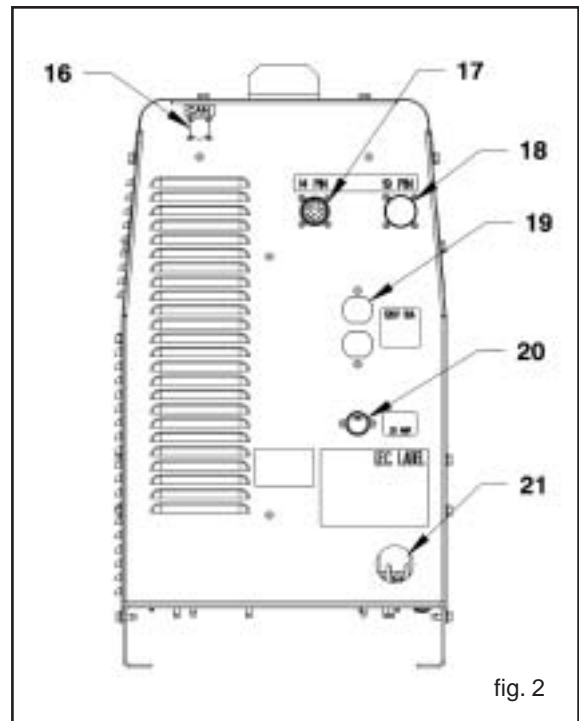
- 7. Arc Force/Inductance Control:** When the SMAW mode is selected this control is activated and allows adjustment of the amount of arc force or "dig". Maximum arc force is full clockwise, full counter clockwise is zero arc force. For GMAW mode this control can be used to adjust the amount of "inductance" in the circuit. Higher inductance settings make the arc "softer" with less spatter. Lower inductance settings give a stronger "driving" arc. Generally the inductance control can be set at mid range as a good starting point. For GTAW and PULSED-GMAW modes, this control is not active.
- 8. Contactor On Indicator:** This indicator light is on whenever the output of the power source is energized, either by the contactor switch on the front panel or by the remote gun switch signal.

Control Panels (cont.)

9. **Contactor Switch:** This switch can be used to energize the output of the power source, when a remote gun switch is not being used. This switch would primarily be used for SMAW welding or GTAW welding with out a remote pendant or foot pedal.
10. **Pulse Schedule Display:** This two digit display shows the current selected pulse GMAW welding schedule. The current schedule can be changed by using the schedule up and down select buttons.
11. **Pulse Schedule Select Buttons:** These two buttons can be used to select one of the built in pulse GMAW welding schedules. These buttons can only be used to change the pulse schedule when the output contactor is off, see description 8 above.
12. **Remote On Selector:** This button allows the selection of either remote control of the output or local (front panel) control of the output. The indicator light next to the switch will be on if remote control is selected, and off if local control is selected. Remote control is via either the 19 pin or 14 pin receptacle on the rear panel of the power source.
13. **Programmer Port:** This port allows the connection of the power source to a computer for accessing the programmable features of the power source. This port is configured for direct connection to a serial port on a computer.
14. **Output Negative Terminal:** Connection point for negative welding lead.
15. **Output Positive Terminal:** Connection point for positive welding lead.

Back Panel (See Figure 2)

16. **CAN Port:** This serial port is used for connection to a CAN compatible Thermal Arc wire feeder or other auxiliary device. All of the programmable features of the power source can be accessed via this port.
17. **14 Pin Receptacle:** This receptacle allows the power source to interface with wire feeders, and remote controls such as a foot pedal. This receptacle provides auxiliary power, contactor control for energizing the output of the power source, and remote output control. The pinout is as follows:
 - A) 24 VAC auxiliary power high side
 - B) 24 VAC Contactor circuit, (closure between pin A and pin B will energize output).
 - C) Remote control maximum (top side of remote pot.)
 - D) Control circuit common
 - E) Remote control in (wiper of remote pot., 0 to 10 Volts). CV mode: 0 to 10 Volts gives 10 – 44 Volts of output. CC mode: 0 to 10 Volts gives 5 – 560 Amps of output.
 - F) Scaled output current signal: $I_{fb} = 100 \text{ Amps/Volt}$
 - G) 24/115 VAC neutral
 - H) Output voltage signal: 10 Volts/Volt
 - I) 115 VAC auxiliary power high side
 - J) 115 VAC Contactor circuit, (closure between pin I and pin J will energize output).
 - K) Chassis ground
 - L) N/C
 - M) N/C
 - N) N/C
18. **19 Pin Receptacle:** This receptacle allows the power source to interface with wire feeders, and remote controls such as a foot pedal. This receptacle provides auxiliary power, contactor control for energizing the output of the power source, and remote output control. The pinout is as follows:



- A) Contactor circuit (+15 Volts)
- B) Contactor circuit in, (closure between pin A and pin B will energize output).
- C) Scaled output voltage signal: $V_{fb} = 10 \text{ Arc Volts/Volt}$
- D) 24 VAC auxiliary power high side
- E) 115 VAC auxiliary power high side
- F) 24/115 VAC neutral
- G) Chassis ground
- H) Remote control maximum (top side of remote pot.)
- J) Remote control in (wiper of remote pot., 0 to 10 Volts).
CV Mode: 0 to 10 Volts gives 0 – 44 Volts of output.
CC Mode: 0 to 10 Volts gives 0 – 560 Amps of output.
- K) Remote control minimum (bottom side of remote pot.)
- L) Control circuit common
- M) Arc Established = +12 Volts
- N) Control circuit common
- P) 24 VAC auxiliary power high side (same as pin D)
- R) 24/115 VAC neutral (same as pin E)
- S) N/C
- T) N/C
- U) Scaled output current signal: $I_{fb} = 100 \text{ Amps/Volt}$
- V) N/C

If a remote control is plugged into both the 14 pin and 19 pin receptacles the device plugged into the 19 pin receptacle will have control over the output current or voltage. Either device can control the output contactor circuit.

19. **Duplex Receptacle:** This receptacle can provide up to 10 amps of 120 VAC auxiliary power for powering wire feeders, water circulators, etc.
20. **Fuse:** This fuse protects the control transformer in the power source. If the fuse opens it should be replaced with a like amperage and voltage, (20 amps, 600VAC).
21. **Input Power Access:** This opening provides access to the input terminal block for the input cable. See installation chapter of the owner's manual for detailed instructions.

Description of Programmable Features

The following is a summary of the features which are programmable in the power source using GUS, the optional Graphical User Software (part no. 830970).

1. Lockout Features

Any or all of the following controls can be locked out on the Power-Master® 500P so they will have no affect on the operation of the machine. The machine will remain in whatever mode or condition it is in before the feature is locked out.

- 1.1 Mode Select Switch – Prevents changing of the mode of operation.
- 1.2 Remote On Switch – Prevents changing of the remote control feature.
- 1.3 Schedule Select Switches – Prevents changing of the pulse MIG schedule.

2. Restricted Output Adjustment

The range of adjustment of the output of the power source can be restricted for the various modes of operation.

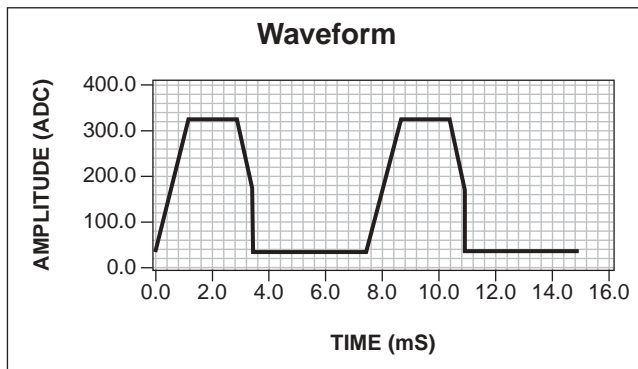
2.1 Amps Adjust Range Locked: A high and low amperage limit can be programmed which will limit the output amperage adjust range. This amperage adjust range is in effect for both GTAW and SMAW modes.

2.2 Volts Adjust Range Locked: A high and low voltage limit can be programmed for GMAW modes which will limit the voltage adjust range of the power source.

2.3 Pulse Reference Range Locked: A high and low pulse reference limit can be programmed which will limit the adjust range of the output of the machine for the Pulsed-GMAW mode.

3. Pulse Parameters

All 24 of the Pulsed GMAW schedules can be modified, to allow for a very flexible design of the optimum pulse waveform. In addition the arc starting conditions, and arc end conditions can be modified.



4. Wire Sharp

Both GMAW and Pulsed GMAW modes provide a wire sharpening sequence at the end of the weld to condition the end of the wire. The wire sharpening time and voltage can be modified.

5. Meter Functions

The meter hold feature and meter refresh rate can both be modified if desired.

6. Filing

All files can be downloaded or uploaded for complete weld parameter file management.

7. Arc Monitoring

Enables displaying or recording the values that are displayed on the power source.

8. Software Control

In addition to the programmable features of the Power-Master 500P, the power source can be controlled through either the programmer port or the CAN port. This includes complete control of the power source, such as mode, pulse schedule, pulse parameters, remote/local control, etc. Most of the features of the power source can be controlled in real time under live arc conditions. For further details please consult the factory.

Got Power..?

Ordering Information

	Part No.
POWER-MASTER® 500P 208/230/400/460 VAC, 3 Phase, 50/60Hz	100054
OPTIONS & ACCESSORIES	
GUS GRAPHICAL USER SOFTWARE (Required to design non-factory set pulse programs)	830970
RS-232 INTERFACE CABLE (6 ft. / 1.8m) (Interface cable from Power-Master 500P to Computer)	830969
PORTABLE MOUNTING WITH BOTTLE RACK	830457-001
REMOTE HAND CONTROLS (Output Control and Contactor Control)	
25 ft. (7.6m)	492330-009
50 ft. (15.2m)	492330-010
100 ft. (30.4m)	492330-011
FOOT CONTROL (25 ft. / 7.6m) (Output Control and Contactor Control)	200460-007

ACCESSORIES (cont.)

TORCH MOUNTED REMOTE CONTROL

(Output Control and Contactor Control)

For OD 5/8" – 7/8" (16mm – 22mm) / 25 ft. (7.6m)	203912-004
For OD 7/8" – 1-1/8" (22mm – 29mm) / 25 ft. (7.6m)	203912-005
For OD 1-1/8" – 1-3/8" (29mm – 35mm) / 25 ft. (7.6m)	203912-006

CD ARC STARTER

(Requires 374878-XXX Cable)

204288A

CABLES

(One required for CD Arc Starter)

6 ft. (1.8m)	374878-006
15 ft. (4.6m)	374878-015
25 ft. (7.6m)	374878-025

AM Pulser (For TIG Pulse Welding)

204297A-001

DUAL FEEDER INTERLOCK

(For connecting two wire feeders)

870008-001

Compatibility

Wire Feeders

Operates in GMAW/FCAW using all standard Thermal Arc® wire feeders.

Welding Guns

Operates with all Tweco MIG Guns.
(no adapters required)

Automatic Controls

HMC-410 Feeder, ABB and Fanuc Robot compatible.
(for compatibility of other Thermal Arc automatic controls, contact Thermal Arc Technical Service, Troy, Ohio)

Filler Metals

The high quality line of Thermal Arc filler metals meets a wide variety of application needs.

For Tweco equipment, please call Tweco Customer Service for more information at (316) 942-1421 or (800) 231-9353

Authorized Distributor

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Fax: (27) 11-917-8580

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