Forney

FORN-A-MATIC
VS SERIES
Operating and Service Instructions

FORNEY INDUSTRIES, INC.
Fort Collins, Colorado

THE FORN-A-MATIC VS SERIES OF ARC WELDERS FEATURES - - -

REMOTE AMPERAGE CONTROL

ELECTRONIC VARIABLE SHUNT

DIAL AMPERAGE SELECTOR

INTERCHANGEABLE BATTERY CHARGER

Combines the best features of TAP-PLUG machine and the crank machines. TAP-PLUG machines for years have been desired as the voltage is predetermined for each amperage output for best balance. The unlimited selection of output amperage of crank type machines has been a desirable feature. However, sacrificing the balance of bolts and amps as most crank machines give only one and in some cases two voltage ranges over the whole output. The Forn-A-Matic VS Series gives two basic voltage ranges with additional "Fine Adjustment" Voltage Tuning automatically changed with the Dial Amperage Selector.

REMOTE AMPERAGE CONTROL -

Units that have the Forn-A-Matic Remote Control allow the operator to adjust desired amperage in the range he has selected. This is accomplished by the convenient thumb control switch on the Electrode Holder. This is not just an "amp droppage" but a control allowing increase or decrease selection of any output within the range -- plus can be changed while welding -- can also be used for remote controlling, battery charging, soldering, etc.

ELECTRONIC VARIABLE SHUNT -

The "Electronic" Variable Shunt means that to change output of the welding transformer two shunts are incorporated which are "Electronically Energized" instead of "movable shunts - cores or windings." The Electronic Shunt allows continuous adjustment of amperage.

DIAL AMPERAGE SELECTOR -

The handy dial on the front of the machine shows amperage setting for welding, brazing, battery charging, and soldering. Gives unlimited amperage selection. Can be adjusted while operating. Knob can be turned by hand or with remote control switch on the Electrode Holder.

INTERCHANGEABLE BATTERY CHARGER -

The Battery Charger section is designed to be easily removable for service or to convert to a non-Battery Charger model.

BRAZING & SOLDERING - BATTERY CHARGING -

The Dial Amerage Selector that energizes the Electronic Variable Shunt also controls output for Brazing-Soldering and Battery Charging giving infinite adjustment for each. Allows "Electronic Tuning" of Arc Torch Flame to precise pattern for each size Brazing Carbon and job requirements. The same applies to Soldering giving exact solder heat required. When charging a battery, dial can be turned until indicator on the charge meter is set on desired charge rate.

OPERATION -

The Forn-A-Matic VS Series machines are wired for 230V Single Phase 60 Cycle Operation as they leave the Factory unless specifically noted on the machine. Standard Machines also have a 208V primary tap for those areas where only 208V power supply is available.

To change to 208 volt is as follows:

1) Disconnect power cord from electrical supply.

2) Remove right (facing unit) side panel.

3) Disconnect wire from flexible cable on lower right (facing unit) tab of the switch. Leave flexible cable attached to switch.

4) Tape this wire adequate for electrical insulation and position, so it does not touch any wire or components.

5) Locate 208 volt tap. It is recognized as a double solid wire looped at the end having a black vinyl safety sleeve, located in rear winding section of the main transformer. Attach this to the flexible cable (Sec. #3) on the lower right switch tab.

6) Check to see that all wires are clear from each other before replacing side panel.

230V-460V - Special ordered voltage models will have hook-up instructions with each machine.

WELDING -

Insert Ground Cable Plug into outlet jack marked "Ground." Notice color matched molded on Rubber insulator on cable plug and Green molded insulator on Welder output Ground jack. Insert Electrode Cable Plug (Black) into either High or Low range as desired. On Forn-A-Matic Remote units: Insert Remote Cable Plug into receptacle on Welder marked "Remote."

LO RANGE - 5 to 150 amps - Use this range where lower output is required. Since the open circuit voltage is higher use this range for "problem" rods.

HIGH RANGE - 40 - 300 amps - Use this range where high heat or cutting operations are needed.

Remote Operation. With Welder switch on, try out the remote control before welding until you become acquainted with the operation. To increase amperage depress the Forward part of the switch. To decrease, the Rearward part of the switch. A special "slip clutch" is provided between the actuating motor and the Potentiometer. If the switch is pressed down, causing the Potentiometer to reach the limits of the Dial, the clutch slips and prevents damage to the Potentiometer overload on the motor. When slight changes in amperage are desired, depress the switch in quick-momentary movements. This gives an "inching" effect to the dial movement.

This remote control can be operated while welding, allowing operator to select his welding heat before striking an arc and "fine tuning" the amperage desired while observing the weld. Also amperage can be increased at start of weld and decreased when parent metal heats or as you near the end of the weld.

BRAZING -

Insert the plugs of the Forney Arc Torch into the welding output "Ground" and "Lo Range." Note Green and Black color coding. Refer to Forney Welding Manual for use of Arc Torch.

Chart below shows Dial Settings for each size Brazing Carbons. Exact flame pattern can be set by adjusting dial while torch is lit.

Brazing Carbons Diameter	3/16	1/4	5/16	3/8	1/2
Recommended Amperage Range	5-30	30-50	50-75	75-90	90-150

SOLDERING -

Insert the 2 prong plug of the Forney Soldering Iron into the special output on front of machine marked "Soldering." The Dial Amperage Control gives a complete stepless range of Soldering heats for the lightest electronic work up to heavy-duty Soldering. Dial can be adjusted while Soldering.

BATTERY CHARGING:

On FORN-A-MATIC VS300's with the built-in Battery Charger and TRANSISTORIZED ALTERNATOR POLARITY PROTECTOR, you have the "FAIL-SAFE" Battery Charger for 6 volt, 8 volt, and 12 volt battery charging.

Insert the charging cables into the correct "color-coded" output plugs on the Battery Charger section located on the front at the top of the machine. Next connect the clamps of the correct polarity to the battery to be charged. When the battery has been connected properly (the transistorized alternator polarity protector will not allow the charger to operate unless all clamps and plugs have been connected properly) and before setting the time which turns the charger section on, turn the Dial to battery charge rate of "SLOW" and then set the TIMER to the charge time desired. After a charge to the battery has been allowed to operate on the "SLOW" rate for a few minutes to allow battery to warm up, turn the Dial to the desired charge rate. Refer to the CHARGER METER when adjusting this output.

When the TIMER has completed the time cycle that you have set, the TIMER automatically turns the battery charger section off. It is a good idea when setting the timer, at the start of the charger cycle, to remember the approximate time it will run out so that you can turn the welder off if it is not to be used further.

REMOVING THE BATTERY CHARGER SECTION FOR SERVICE OR TO CONVERT TO A NON-BATTERY CHARGING MODEL.

Before attempting to remove the Battery Charger section, DISCONNECT the welder plug from the wall receptacle. The Battery Charger assembly consists of the charge meter, timer, output plugs, and the internal parts; the rectifier, alternator protector components--these are all attached to the upper front panel section. To remove this section, remove the four side screws, two on each side and also the front screws, holding this section in place. Carefully slide the entire section out until you have access to the THREE main connector straps, TWO straps attach to the tabs of the

rectifier, the other strap to the SOLENOID. Remove ALL THREE straps which frees the battery charger section.

If the Battery Charger section is to be serviced and the welder needs to be used in the meantime, tape the ends of the three connector straps separately.

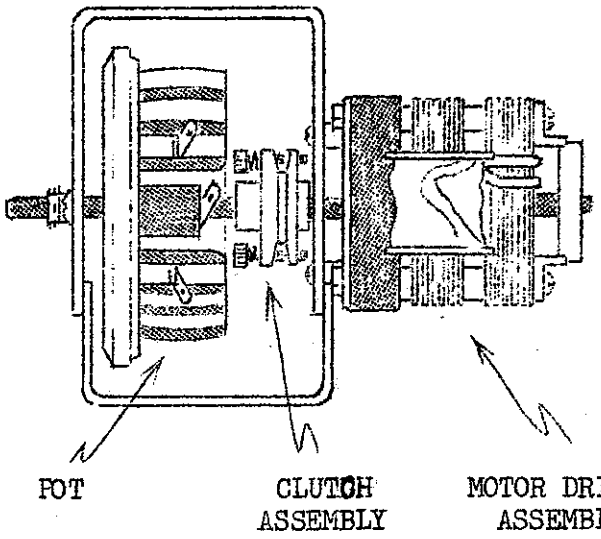
If you are making a conversion to the Non-Battery Charger Model, bolt the straps in the three separate holes provided on the rear of the blank panel provided from the Factory. This panel covers the area of the Battery Charger section that has been removed.

PIPE THAWING -

The FORN-A-Matic does an excellent job of thawing frozen water pipes. (Refer to this section in the Forney Welding Manual.) Connect your welding leads into the Ground and Electrode jacks. Then, connect the Ground Clamp and Electrode Holder to the frozen water pipe. Use High only. For steel or iron pipe 100 feet or less, set amperage at 140; pipe 150 feet, set amperage at 180; over 200 feet, set at 200-250 amps.

For additional service requirements for the internal parts of the machine, either the right or left side panels can be easily removed for access to all internal sections. The front, top, and back does not need to be removed for average service because all parts are accessible from either side.

REMOVAL OF REMOTE CONTROL ASSEMBLY
For Service or Conversion to Non-Remote Unit



(A) When mounted on one piece bracket.

1. Unplug welder from receptacle.
2. Remove right side panel (facing Welder).
3. Locate (2) wires connected from motor assembly to pins 3 & 4 of remote receptacle. Unsolder or clip these two wires at receptacle.
4. Locate (1) wire from motor assembly to diode assembly (heat sink connection). Clip wire at diode assembly.
5. Remove knob, then shaft nut and two screws which mount assembly to front panel, to allow easier access for disassembly.
6. Unscrew (3) clutch adjustment screws.
7. Loosen set screws on both clutch hubs. Remove (4) screws holding motor drive assembly to rear of bracket. Remove motor assembly and clutch assembly.

(B) When mounted to two piece bracket.

1. Unplug welder from receptacle.
2. Remove right side panel (facing welder).
3. Loosen set screw on clutch hub adjacent to potentiometer.
4. Locate (2) wires connected from motor assembly to pins 3 & 4 of remote receptacle. Unsolder or clip these wires at receptacle.
5. Locate (1) wire connected from motor assembly to diode assembly (heat sink connection). Clip wire at diode assembly.
6. Remove (4) screws which attach rear half of bracket assembly to front half.
7. Remove motor drive assembly, rear half of bracket and clutch assembly.

FORN-A-MATIC VS 300

Parts List

	Cat. No.	
1	6359000	Transformer Assembly
1	6347001	Front Panel
1	6307000	Case Back
1	6307001	Case Side (Facing Machine)
1	6307002	Case Side (Facing Machine)
1	6359001	Case Top
1	1025000	Rod indicator
1	6304002	Base Ass'y. (complete)
1	6334000	Leg Ass'y. (inc. wheels)
1	6334001	Leg Ass'y. (inc. wheels)
2	6368000	Wheels 6" (inc. Pin-Spacer & Washer)
3	6368001	Jack Ass'ys. inc. Plastic Ring & Washer (Specify Black or Green)
1	6304003	Solder Block Ass'y.
1	0406630	Outlet 115V
1	0401180	Breaker 115V
1	0407930	Main Switch
1	0407170	Potentiometer
1	6304004	Potentiometer Bracket
1	6307003	Clutch, Remote
1	0404757	Rheostat Knob
1	0406072	Outlet, Remote
1	0403710	Handle

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FORN-A-MATIC VS 300
Parts List

	Cat. No.	
1	6316000	Fan Assembly, inc. Blade & Shroud
1	6316001	Fan Shroud only
1	0405480	Fan Motor
1	0402820	Fan Blade
1	0501000	Lead-in Cable
2	0402515	Diode, Control Circuit
1	6376000	Heat sink
1	6308000	Battery Charger Section Assembly
1	6308100	BC Panel only
1	0400150	Ammeter
1	0408950	Timer
1	0404712	Knob, Timer
1	0406810	Rectifier
1	6301001	Alternator Protector Assembly
1	04048	Lamp Holder
1	0404771	Lamp
1	0401780	Capacitor
1	0401290	Heat probe
2	6328000	Jack Ass'ys. including Plastic Insulators (Specify Red or Black)
1	6347000	Panel, Upper Front Blank (Model 301)

(For Reference See Attached Schematic)

VS 300 AC/DC INSTRUCTIONS

NOTE: ADD THESE INSTRUCTIONS TO "FORN-A-MATIC VS SERIES OPERATING AND SERVICE INSTRUCTIONS."

With the advent of new and special welding electrodes more emphasis has been placed on utilizing both AC and DC for "all around" welding operations.

AC is generally better suited for high speed High Amperage Welding; To overcome "ARC Blow" encountered with DC; For most of the iron powder electrodes.

DC is generally better for stainless, some Hard Surfacing, sheet metal and non-ferrous welding; also for use with the electrodes sensitive to polarity such as "straight polarity" or "reverse polarity" welding rods.

The VS 300 AC/DC utilizes the basic components and controls as the Forn-A-Matic VS series except DC Welding Diodes and components are added in place of the Battery Charger section. For this reason the AC/DC cannot be equipped to charge batteries.

The DC section is made up of four large silicon diodes mounted on heavy aluminum heat sinks. Twin fans cool both the diodes and the welding transformers. An induction coil is added to "Smooth" the DC arc and give stability.

When the AC/DC unit leaves the factory, the DC section is connected to the Hi Range output giving a DC Range of 30 to 230 amps. If your operation requires amperage less than 30, an internal cable can be changed putting the DC output on the Lo Range giving excellent arc characteristics down to 5 amps.

TO WELD ON DC -

You will notice separate jacks on the front panel for DC welding. These jacks are color coded -- Black for "Positive", Green for "Negative". These colors match with the molded rubber jacket on the electrode and ground cable plugs. The Electrode has a "black" jacket, the Ground has a "green" jacket. When the "Black" electrode plug is inserted into the "Black" positive jack and the "Green" ground plug into the "Green" jack, you have straight polarity" (Electrode negative). For"reverse polarity" (Electrode positive) switch the plugs so that the colors are mismatched.

Generally Reverse Polarity (Electrode positive) gives deeper penetration; Straight Polarity (Electrode negative) gives higher melt off rate of electrode.

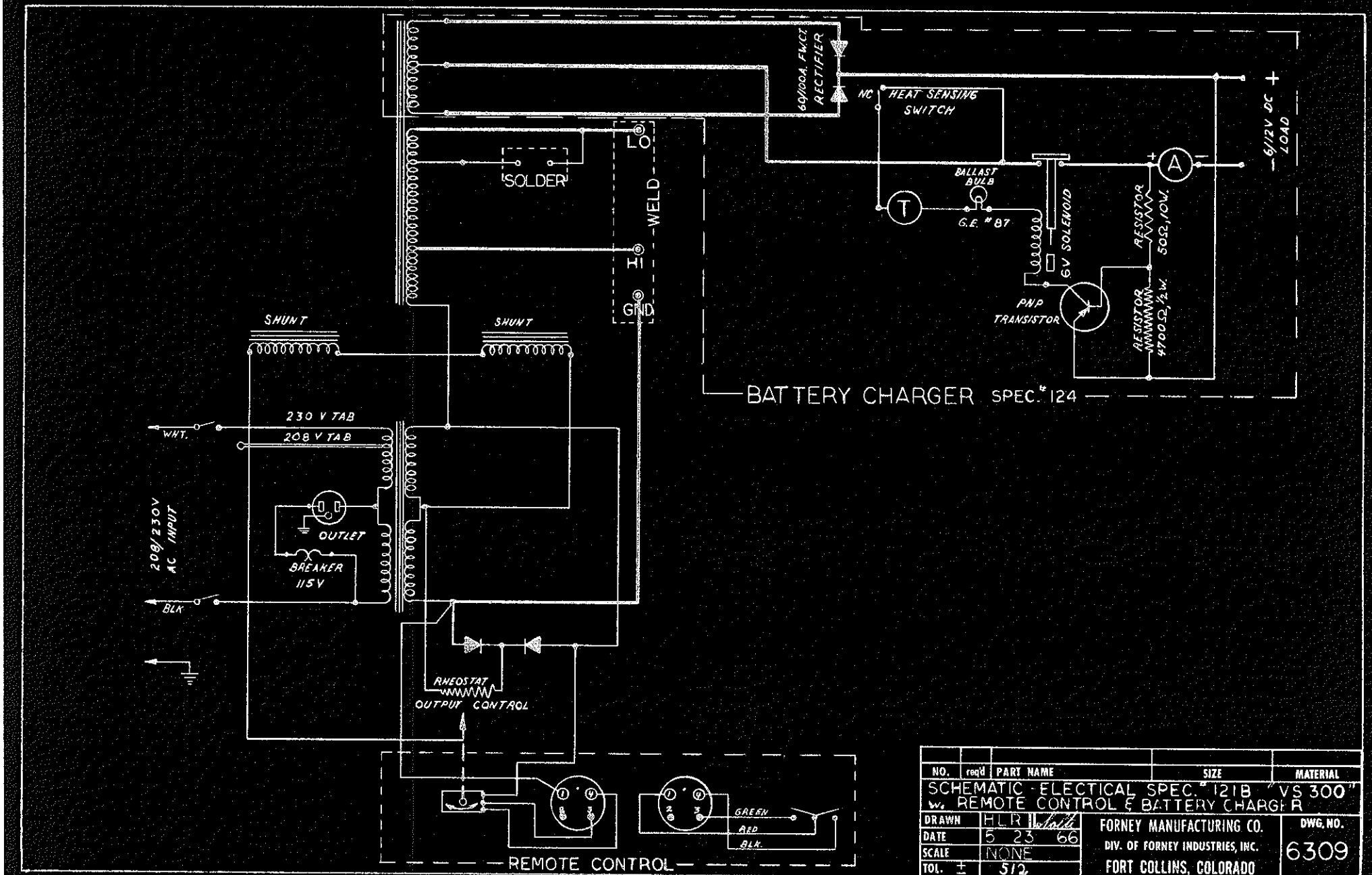
WARNING -- BE SURE BOTH CABLES ARE PLUGGED INTO THE DC SECTION FOR DC WELDING OR INTO AC SECTION FOR AC WELDING. DO NOT OPERATE WITH ONE CABLE IN DC AND ONE IN AC.

FORN-A-MATIC VS 300

DC SECTION

Parts List

Cat. No.	
4	Diodes
1	Heat Sink (Long)
2	Heat Sink (Short)
1	Induction Coil Assembly
1	Insulating Mounting Board
2	Support Straps
2	Angle Brackets
3	Connector Cables
1	Plastic Insulator (Green)



NO.	req'd	PART NAME	SIZE	MATERIAL
SCHEMATIC - ELECTICAL SPEC. "121B "VS 300" w. REMOTE CONTROL & BATTERY CHARGER				

DRAWN	H.L.R.	FORNEY MANUFACTURING CO.	DWG. NO.
DATE	5 23 66	DIV. OF FORNEY INDUSTRIES, INC.	6309
SCALE	NONE	FORT COLLINS, COLORADO	
TOL. ±	1/2		

Forney

FORN-A-MATIC

VS 300 AC-DC

This unit has been developed to utilize both AC and DC for "all around" welding operations. The AC-DC has the basic components and controls of the Forn-A-Matic VS series except DC Welding Diodes and components are added in place of the Battery Charger section. For this reason the AC-DC cannot be equipped to charge batteries. Equipped with Helmet, Electrode Holder, Ground Clamp and Cables.

SPECIFICATIONS

MODEL VS-300

Primary Volts	208/230
Phase	Single
Cycles	60
Power Factor	80%
Welding Range AC	5-300
Primary Amps	60/75
Maximum Open Circuit Volts	80
Duty Cycle at 200 Amps	50%
Duty Cycle at 300 Amps	30%

MODEL VS-300 AC DC

Specifications for the AC DC Model are the same as the VS-300 except this unit has an additional DC output range of 5-250 Amps.

The Forney Forn-A-Matic series combines the balance of predetermined voltage for each amperage found in the Tap-plug machine and the unlimited selection of output amperage found in the Crank type machine. The Forn-A-Matic VS Series gives three basic voltage ranges with additional "fine adjustment" Voltage Tuning automatically changed with the Dial Amperage Selector.

FEATURES

FAMOUS FORNEY 10-YEAR GUARANTEE

REMOTE AMPERAGE CONTROL—The Forn-A-Matic Remote Control allows the operator to increase or decrease the amperage in the range he has selected from a thumb control switch on the Electrode Holder. This may be done even while welding. The Remote Control can also be used with battery charging, soldering, etc.

RANGE SELECTOR—Three basic voltage range plugs allows the operator to quickly plug in the particular range of amperages his work requires. This assures perfect balance within each range.

AMPERAGE SELECTOR—A handy dial gives unlimited amperage selection for welding, brazing, battery charging, and soldering; and can be adjusted while operating. Knob can be turned by hand or with remote control switch.

BRAZING AND SOLDERING—The Dial Amperage Selector allows "Electronic Tuning" of Arc Torch Flame for brazing and gives exact solder heat for soldering.

CONVENIENCE OUTLET—The Forn-A-Matic is equipped with a 115-volt convenience outlet for trouble lights, power tools, and other electrical appliances. Outlet has an automatic breaker to protect fractional HP motors against overloading.

ACCESSORIES with the VS-300

FORNEY ARC WELDERS

DIVISION OF FORNEY INDUSTRIES, INC.

Fort Collins, Colorado, U.S.A. Regina, Sask., Canada

Forney

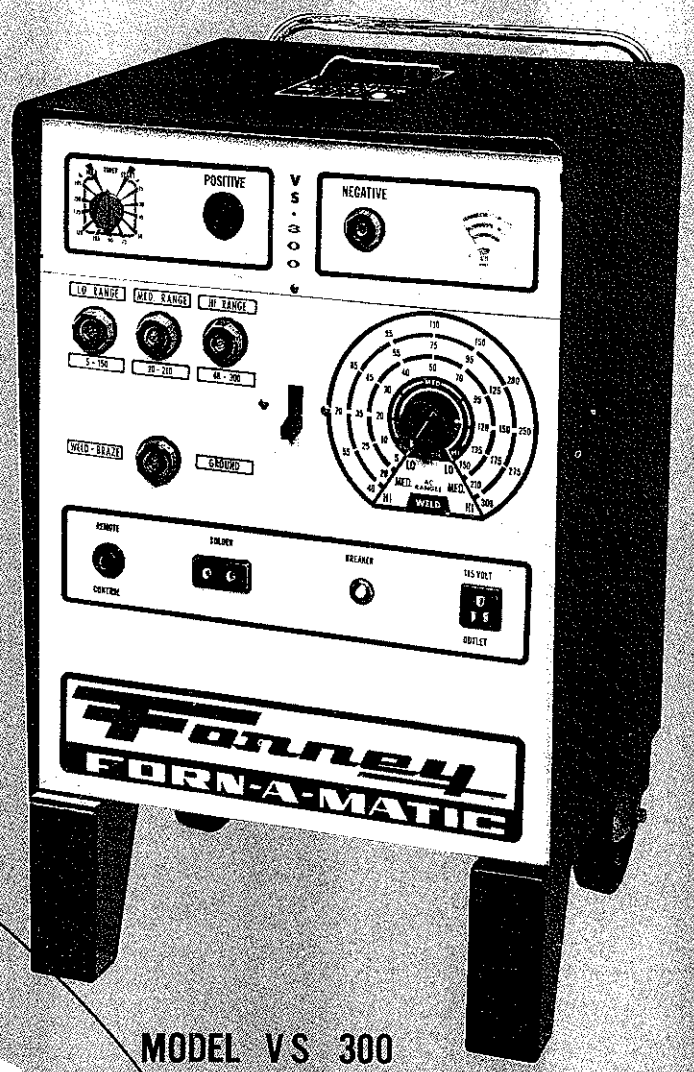
FORN-A-MATIC

ALL NEW COMBINATION REPAIR UNIT WITH BUILT-IN BATTERY CHARGER AND REMOTE CONTROL!

Now you can get on top of every welding job quickly and easily with finger tip* control!

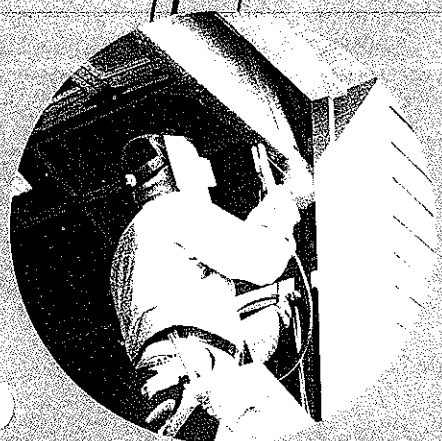
BUILD – REWORK – REPAIR anything made of metal

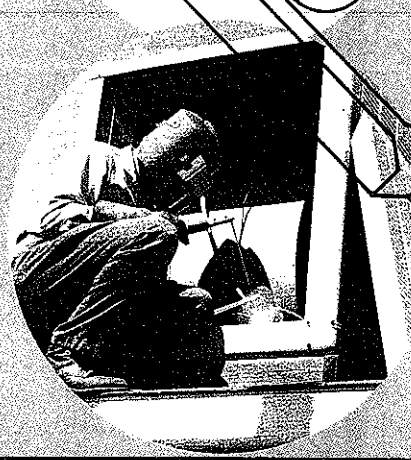
- WELD—any guage or weight metal from sheet to motor blocks. Also cut metal and bore holes.
- BRAZE—sheet metal, pipes, fenders, water tanks, etc. Heat metals for tempering or bending (forming), melt lead, heat water, and many other uses.
- SOLDER—delicate radio work to heavy copper. Also radiators, wiring, leaky fuel cans, milk cans, etc.
- HARDFACE—all parts of industrial and agricultural equipment subject to abrasion and wear.
- CHARGE BATTERIES—in or out of your car, truck, tractor, plane, or boat. Simply plug in cables to unit and clip clamps to battery.
- THAW PIPES—in a few minutes even underground. No flame or danger. Electric current flows through pipe.



MODEL VS 300

FINGERTIP CONTROL





FORNEY ARC WELDERS DIVISION OF FORNEY INDUSTRIES, INC. Fort Collins, Colorado, U.S.A. Regina, Sask., Canada

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