

TM 5-3431-227-14

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL
DS AND GS MAINTENANCE MANUAL

WELDING SET, ARC

INERT GAS SHIELDED, AIR COOLED

METAL LINED GUN FOR 3/64 IN. WIRE

(WESTINGHOUSE MODEL SA-136)

FSN 3431-121-5878

This copy is a reprint which includes current
pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

6 AUGUST 1969

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 6 August 1969

Operator, Organizational, Direct Support And General Support Maintenance

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INTRODUCTION

The Arc Welding Set, Model SA-136 is designed for consumable electrode inert-gas shielding welding. It incorporates a well-balanced handgun and a control with a built-in contactor. The system is designed for semi-automatic welding of aluminum with aluminum wire sizes from .030 to 3/64 inch diameters. It is rated 200 amperes continuous duty and is air-cooled. (Numbers in parentheses indicate item numbers on referenced drawings.)

DESCRIPTION

Control Monitor

The Control Monitor as shown on Figure 1. is light weight, fully insulated, and compact.

The Control Monitor operates from a 115 volt A.C. or D.C. power supply which is necessary for the operation of the control and inching circuits. The power for the gear-head drive motor during the welding operation is supplied by the welding machine. The motor armature is said to be "across the arc". This is accomplished by attaching the terminal of the ground cable (4) to the negative lug of the welder and the terminal of the current cable (12) to the positive lug of the welder.

A rheostat (1) in series with the motor armature is adjusted to control the wire feed speed and the arc length. The rheostat setting will vary with different welding machines and is dependent on the current setting of the welder. The fact that the wire feed drive operates from the arc voltage is important, because it insures good steady feeding consistent with constant arc length. It is based on the following principle of operation: If the arc length increases, the voltage across the arc becomes higher, and as a result the motor speed increases thereby feeding more wire and shortening the arc length. If the arc length shortens, the voltage across it is lower and the motor speed decreases thereby increasing the arc length. The rheostat type control will permit approximately a 2 to 1 speed adjustment.

An "On-Off" switch (2) energizes the control monitor while renewable fuses (6) protect the line. The power supply cord (3) is a 16 foot cable terminated in a three-prong plug with a three to two wire plug adaptor. A replaceable fuse (7) in series with the wire drive motor protects the armature from damage due to high current. This is a one ampere fuse and should not be replaced with a larger fuse. The use of a larger than recommended fuse automatically voids the warranty on this equipment. The line fuses (6) should be 2 ampere fuses.

The Control Monitor has a current relay which permits touch starts. The minimum current required to operate the relay is approximately 45 amperes. A 200 ampere D.C. contactor (9) is mounted in the control enclosure and is controlled from the control panel (8).

Type SP-4B Welding Gun

The Type SP-4B welding gun is shown on Figure 2. Good balance and ease of handling have been accomplished by careful distribution of weight and by directing the control cable, power cable, and gas hose downward from the body of the gun. The weight of the gun including a one-pound spool of welding wire is less than four pounds.

A spring return weld trigger (16) and recessed inch button (17) are located in the handle of the gun. All electrical connections from the gun to the control monitor, except for welding current connections are made through the control cable (12) which plugs into a matching socket on the control monitor. Figure 3, showing internal wiring of the gun, is included with this booklet.

Welding current is brought to the gun by a 50 foot insulated copper cable (25) that plugs into the control monitor by means of an insulated plug. A 60 foot gas hose (1) is used to carry the shielding gas from the gas regulator at the shielding gas supply. All cables and hoses to the gun are tied together into one assembly.

The gun is equipped with a gear head wire drive motor (11) mounted in the handle. Wire driving force is developed by squeezing the welding wire between a knurled feed roll (2) mounted on the end of the gear head motor shaft and an idler roll (19) mounted on the swing arm (15). Squeezing force on the wire is obtained by turning the wire pressure screw (18) which exerts pressure on the swing arm through a compression spring (20).

A four inch diameter spool of wire (13) is mounted on the wire spool shaft (23). An adjustable spool brake (26) provides a controlled amount of friction to prevent uncoiling of the wire. The wire spool is covered by a transparent high impact plastic shield (9) attached to the spool shaft by means of a captive thumb screw. This shield protects the wire from spatter, yet, because of its transparency, allows the operator to determine the amount of wire on the spool. The spool shaft is mounted on an electrically insulated aluminum protective shield (28).

The guide tube (5) is an expendable copper tube which conducts welding current to the welding wire as the wire slides through it. Position of the guide tube relative to the end of the gas nozzle (8) can be changed by releasing the insulated set screw knob (14). For 3/64 and .040 diameter welding wires, the end of the guide tube should be about 1/8 to 1/4 of an inch behind the front end of the nozzle. For smaller wires, the tip of the guide tube should be even with or slightly ahead of the nozzle. Always use the guide tube specified for the particular welding wire.

The gas nozzle (8) is specifically designed to completely exclude air from the weld zone by proper direction of the shielding gas. For optimum gas flow, the internal surface of the nozzle should be kept reasonably clear of weld spatter by periodic cleaning. This nozzle may require occasional replacement and is easily removable.