SULZER METCO

ValuArc™ ELECTRIC ARC SPRAY SYSTEM

Instructions

NOTICE

All personnel responsible for the proper and safe use of this equipment must read and understand this instruction manual.

In addition, the operator of this equipment must receive personal instructions in its use. A thorough understanding of the operation, maintenance, and safety requirements of this equipment is essential.

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MANUFACTURER'S DECLARATION EUROPEAN COMMUNITY COUNCIL DIRECTIVES 89/336/EEC

The Manufacturer: **Sulzer Metco**
1101 Prospect Avenue
Westbury, New York 11590-0201
United States of America

declares that the product:

Product Name: **ValuArc 100E & ValuArc 200E**
(for twin wire electric arc spraying)

Product Type: **Arc Welding Equipment**

conforms to the following applicable Standards:

EN 60204-1	Safety of Machines (Electrical Equipment)
pr EN 1050	Risk Assessment
EN 55 011	Group 1, Class A, Conducted Emissions, 150 kHz to 30 MHz
EN 55 011	Group 1, Class A, Radiated Emissions, 30 MHz to 1 GHz
EN 61000-4-2	Electrostatic Discharge
EN 50140	Radiated Immunity
EN 50204	Radiated Immunity, Pulsed
IEC 801-4	EFT/Burst, Power and I/O Leads
EN 61000-4-11	Voltage Dips and Interrupts, Power Leads

Sulzer Metco *hereby acknowledges compliance in accordance with the above listed standards in the design, manufacture and testing of the above listed equipment.*

Vice President, Equipment Operations
Westbury, New York
January, 2001

MANUFACTURER'S DECLARATION EUROPEAN COMMUNITY COUNCIL DIRECTIVES 89/336/EEC

The Manufacturer: **Sulzer Metco**
1101 Prospect Avenue
Westbury, New York 11590-0201
United States of America

declares that the product:

Product Name: **ValuArc 300E**
(for twin wire electric arc spraying)

Product Type: **Arc Welding Equipment**

conforms to the following applicable Standards:

EN 60204-1	Safety of Machines (Electrical Equipment)
pr EN 1050	Risk Assessment
EN 55 011	Group 1, Class A, Conducted Emissions, 150 kHz to 30 MHz
EN 55 011	Group 1, Class A, Radiated Emissions, 30 MHz to 1 GHz
EN 61000-4-2	Electrostatic Discharge
EN 50140	Radiated Immunity
EN 50204	Radiated Immunity, Pulsed
IEC 801-4	EFT/Burst, Power and I/O Leads
EN 61000-4-11	Voltage Dips and Interrupts, Power Leads

Sulzer Metco *hereby acknowledges compliance in accordance with the above listed standards in the design, manufacture and testing of the above listed equipment.*

Vice President, Equipment Operations
Westbury, New York
January, 2001

ValuArc™
ELECTRIC ARC
SPRAY SYSTEM

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NOTICE

It is imperative that all personnel responsible for the installation, operation and maintenance of this equipment read and understand the entire Safety Measures section of this instruction manual prior to working on or using the equipment.

The operator of this equipment must be aware of all safety precautions and procedures related to the operation and maintenance of the equipment.

SAFETY MEASURES

GRAPHIC SYMBOL DEFINITIONS

This manual uses a system of graphic symbols to alert the user to the presence of important operating instructions, safety considerations, and special instructions. These symbols (along with their definitions) are shown below.

Additional information of general importance is provided.

Additional information that must be acted upon.

Special instructions, safety instructions, etc. are being presented.

Information, instructions, and restrictions necessary to prevent personal injury or damage to equipment are being presented.

Explosive material is present.

Inflammable material or high temperature is present.

Respiratory equipment must be worn.

Danger: risk of electric shock.

Ear protection must be worn.

Eye protection must be worn.

Safety gloves must be worn.

Safety overalls must be worn.

Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support equipment (Pacemaker) should consult with their doctor before going near spray equipment.

GENERAL

Consult the Sulzer Metco Instruction Manual, Material Safety Data Sheet (supplied with materials), and applicable national and local jurisdiction safety and health regulations before using spray materials. Some individuals may show unusual sensitivity to exposure to these materials. Failure to observe proper practices may result in health hazards.

Arc thermal spraying can be hazardous, because it requires the use of high voltage electric current, hoses under high pressure, potentially irritating or toxic spray materials, noise, heat, and UV radiation. It may involve air contaminated by dust, fumes and mists. It is advisable to remove the operator from the process.

However, spraying can be a completely safe process when performed by an operator who follows the recommended precautionary measures, exercises care in operation, has a proper understanding of spraying practices, and possesses a knowledge of the equipment.

When safety becomes a habit, the equipment can be used with confidence.

USE OF EQUIPMENT

Follow the safety measures outlined below, when working with Sulzer Metco spraying equipment:

- Read, understand, and follow the safety and operation instructions provided in the instruction manuals.
- Do not operate equipment above recommended pressures and flows.
- Sulzer Metco thermal spray equipment has been expressly designed for thermal spraying. Never use it for any other purpose (such as welding, soldering or brazing).
- Keep hands and other parts of the body away from hot surfaces and objects. Sprayed metal and surfaces are hot.
- Sulzer Metco spray equipment is designed to use only Sulzer Metco spare parts. The use of other than Sulzer Metco parts may pose a safety hazard.

Equipment Handling

Maintain the equipment in first class condition. Follow the maintenance recommendations in the Sulzer Metco instruction manuals.

Remember that the stream of sprayed metal is hot. Point the gun away from yourself and away from materials that will burn. Carelessness in pointing the gun at paper, wood, or oily rags can result in fire.

Be especially careful not to spray on the hoses, when operating the gun. Hoses will burn. Keep them out of the way. All air lines, compressors, regulators, etc., should be inspected regularly for leaks and loose connections.

METAL DUST

All dust having considerable calorific value can be explosive. This dust includes: flour, starch, hard rubber dust, wood flour, aluminum dust, and dust of other metals. In addition, note the following safety considerations:

- Aluminum and magnesium dust are particularly hazardous. Exercise extreme care in handling them.

- To minimize the danger of dust explosion resulting from spraying, adequate ventilation must be provided for spray booths, and other confined spaces, to prevent the accumulation of fumes and dust.

- Inspect and clean regularly to ensure that there is no potentially dangerous accumulation of dust. Good housekeeping in the work area is essential.

- All closed collectors should be provided with blowout holes or relief panels. All fans, pipes, dust arrestors, and motors should be external to the duct system.

- Before cleaning booths, pipes, etc., purge area of any hazardous fumes using the ventilating exhaust system. Ensure that ventilating exhaust system is off while working on it and that an alternate means of ventilation is used. Also, keep hands, hair, clothing and tools away from moving parts.

- Non-sparking tools should be used in cleaning and repair operations.

- When cleaning, all sources of ignition in the area around the collector should be eliminated.

- When making repairs on the ventilating or dust collecting equipment, no welding or cutting should be done before the equipment is washed down and all metal dust removed.

VENTILATION AND EXHAUST SYSTEMS

A suitable spray booth and an adequate exhaust system are required to avoid the toxic or noxious effects of dust, fumes and mists, which may be generated by spraying.

For ordinary spray work, air at a velocity of 300 FPM (90 meters/min) should pass into the opening of the spray booth. With the gun at the booth opening, the exhaust system must be able to exhaust 300 CFM (9 cubic meters/min) of air for every square foot of booth opening. If the booth has an opening of four square feet (.37 square meters), a system that will exhaust 4 x 300 or 1200 CFM (33 cubic meters/min) should be provided.

If there is any question as to the effectiveness of the ventilation and exhaust system or as to the presence of airborne particles that the operator might inhale, consult a competent industrial hygienist.

Sulzer Metco has a complete line of spray booths, dust collectors, and exhaust units.

HAZARDOUS MATERIALS

All Sulzer Metco materials are supplied with a Material Safety Data Sheet. Never spray a material without reading and following the precautions contained in the Material Safety Data Sheet.

Some materials (beryllium, tellurium and their oxides, for example) are very dangerous to the respiratory system and should not be used at all, except under the supervision of a competent industrial safety engineer.

Blasting, spraying, and finishing all produce dust. Blasting, spraying, and finishing should be considered as hazardous as spraying such materials.

The following materials are specifically listed because they are commonly sprayed. There are many other hazardous materials that are not listed because they are not commonly sprayed. Because standards change and new information becomes

available from time to time, it is strongly recommended that the information contained in the Material Safety Data Sheet, which comes with the material being used, be consulted.

Complete and current information should be obtained from national and local agencies.

Lead, Lead Alloys, Cadmium and Chromium

The fumes of lead, lead alloys (such as solder and lead base babbits), cadmium alloys, and chromium alloys are extremely hazardous. Consult an industrial hygienist for the proper protection.

Zinc, Zinc Alloys, (Zinc, Bronzes and Brasses)

Fumes of these metals are toxic. Consult an industrial hygienist for the proper protection.

Nickel and Nickel Components

Fumes of nickel components are potentially hazardous. Consult an industrial hygienist for the proper protection. One known highly toxic compound is nickel carbonyl. Under certain conditions, nickel carbonyl can be formed by the combination of nickel and carbon monoxide.

PERSONAL PROTECTION

Reduction Of Respiratory Hazards

Consult the Sulzer Metco Instruction Manual, Material Safety Data Sheet, and applicable national and local jurisdiction safety and health regulations (or local standards), before using spray materials.

During the spray process, a respirator approved by applicable national and local regulations should be worn at all times, to protect the operator from exposure to dust and fumes. Respirators should also be worn when product handling generates dust. Consult an industrial hygienist for the proper protection.

Possible allergic reactions to dust, fumes and the like or other unknown causes of health impairment due to contact with the body cannot usually be predicted. To avoid such reaction, never allow spray dust to enter eyes, mouth, cuts, scratches, or open wounds. After spraying, and especially before eating or handling food, wash hands thoroughly. Wear fireproof or flame resistant protective clothing.

Any finely divided material may damage the respiratory system in varying degrees. Whenever fume concentration is high enough to cause operator discomfort (dizziness, nausea, etc.), stop spraying. Check the ventilating and exhaust systems and related equipment. If this equipment is not adequate and not operating properly, respirator equipment must be provided. If operator discomfort continues, even with the added protection, stop spraying and recheck all equipment. Do not resume spraying until all possibilities of discomfort have been eliminated.

In areas distant from spraying, where no respiratory protection seems needed, periodic air sampling is recommended.

Air samples should also be taken in the spray area after spraying has been stopped. Respiratory protection is not required when spraying is stopped and area is known to be free of harmful dust and fumes.

Reduction Of Noise Hazards

The operator and other personnel close to the spray operation must be protected from excessive noise. If possible, the spray operation should be in an approved spray cabinet. Hearing protection (that meets local standards) should be used. Do not rely on wads of cotton for hearing protection. They are ineffective against high-intensity noise.

Noise levels at any location depend on such factors as equipment operating parameters; background noise; room size; and wall, floor, and ceiling materials. To determine the exact noise level, it is necessary to measure the sound level.

The various spray guns can produce the following noise levels:

EQUIPMENT	NOISE LEVEL (DbA)
Plasma Guns	134
High Velocity Oxygen Fuel (HVOF) Guns	140
Thermal Powder Guns	111
Wire Combustion Guns	125
Arc Spray Guns	116

Eye Protection

The hardened green lens (in the eye protection supplied with the Sulzer Metco spray guns) is within the range recommended for most types of spraying. However, the choice of lens shade may be based on visual sensitivity and sharpness (acuity) and may vary widely from one individual to another. Check with national or local regulations for current and complete shade number recommendations.

Always wear proper eye protection when operating or watching the spray operation. Inspect the lens and cover plates frequently. Lenses and cover plates scratched, pitted, or damaged can impair vision and seriously reduce protection.

ELECTRIC POWER PRECAUTIONS

Ensure that adequate power line capacity is provided to avoid electrical hazards.

If a line cord with a ground lead is provided with the equipment for connection to a switchbox, connect the ground lead to the grounded switchbox. If a cable plug is added for connection to a grounded mating receptacle, the ground lead must be connected to a safety ground. If the line cord comes with a three pole plug, connect to a grounded mating receptacle. Never remove the ground from a plug or use a plug with a broken off ground prong.

The heat for spraying with an Arc spray Gun is produced by an electric arc of extremely high intensity. This relatively large amount of electric power can be dangerous if handled carelessly.

The metallizing wires of the Arc Spray Gun are electrically energized when the gun is in operation. Anyone touching both energized wires at the same time could receive a harmful or fatal electric shock or burn. When the spray is shut off, electrical charge is removed from both metallizing wires.

Cables

Frequently inspect cables for wear, cracks and damage. Immediately replace those with excessively worn or damaged insulation to avoid a possibly lethal shock from bare cable. Cables with damaged areas must be replaced.

Keep cables dry, free of oil and grease, and protected from hot metal and sparks. Do not walk on or drive vehicles over cables.Terminals, wire raceways, and other exposed parts of electrical units should have insulating covers secured before operation.

Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service of equipment, shut off all power and remove line fuse (or lock or red-tagged switches) to prevent accidental turning on of power.

Do not open power circuit or change polarity while spraying. If, in an emergency, it must be disconnected, guard against shock burns or flash switch arcing.

Before leaving equipment unattended, always shut off and disconnect all power from equipment.

A power disconnect switch must be available near the power source as required by code.

Protection For Wearers of Electronic Life Support Devices (Pacemakers)

Magnetic fields from high currents can affect Pacemaker operation. Persons wearing electronic life support equipment (Pacemaker) should consult with their doctor before going near spray equipment.

FLUOROCARBON MATERIAL (O-RINGS) PRECAUTIONS

Sulzer Metco specifies the use of O-rings made of fluorocarbon synthetic rubber, for use in most Sulzer Metco equipment. This material provides a wide range of desirable properties, including high flame and heat resistance, resistance to compression-set, and broad chemical compatibility.

At elevated temperatures above 316 degrees C (600 degrees F), fluorocarbon material may degrade, emitting hydrogen fluoride fumes that, in the presence of water, may react to form highly corrosive hydrofluoric acid. This can cause severe burns on bare skin with delayed symptoms.

In normal operation of Sulzer Metco gas guns, gun O-ring temperatures are well below the 316 degrees C (600 degrees F) level at which fluorocarbon O-rings start to degrade. However, the excess heat that occurs in gas guns during prolonged backfire, and in plasma guns when nozzle burnout occurs, may cause O-ring degradation.

Precautions

A heat-degraded fluorocarbon O-ring will look charred or gummy and sticky. To avoid corrosive skin burns, observe the precautions given below:

1. Put on neoprene or PVC gloves before handling any part contaminated with heat degraded fluorocarbon O-ring residue.

2. Wash the part thoroughly with soap and water. Fluorocarbon rubber manufactures advise further neutralizing the part with limewater (calcium hydroxide solution).

3. Discard the gloves when finished.

First Aid

If heat-degraded fluorocarbon rubber contacts bare skin, do the following immediately:

1. Wash skin thoroughly with soap and water.

2. Rub a 2.5% calcium gluconate gel into the skin until any existing irritation disappears. If irritation persists, consult a physician.

DISPOSAL OF MATERIALS AND EQUIPMENT

Disposal of all equipment material and collected overspray shall be in accordance with local regulations.

Some materials may be classified as hazardous. Follow local requirements and information on Material Safety Data Sheet.

Some guns may contain a small amount of oil. Drain oil and dispose of per local regulations.

SECTION 1

DESCRIPTION

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ValuArc™ ELECTRIC ARC SPRAY SYSTEM (Figures 1.1 and 1.2)

The ValuArc™ Electric Arc Spray System consists of components that supply, control, and deliver compressed air, electricity, and metallizing wire used during the arc spray process. The arc spray system offers high performance and advanced features for all applications used in the arc metallizing process.

The electric arc spray system is portable, and uses a push wire delivery technique. The system is reliable, easy-to-operate, and permits standard spraying operations up to 13 ft. (4m) away from the controller (with 1.6mm, 14 gauge wire).

The system is capable of producing accurately controlled coatings consisting of four different spray patterns: fine, fan, high-velocity, and high-profile. It also has the capability of spraying both hard and soft wires. By means of optional hardware packages, the controller and gun can be converted to spray all 2mm wire; all 14 gauge wire; and 11 gauge zinc, babbitt, and aluminum wire. The system is initially set up to spray 14 gauge soft wire.

The ValuArc™ Electric Arc Spray System is available in standard, unbundled, and tube mill configurations, as listed below:

STANDARD

ValuArc100	**ValuArc100E**
LCA Electric Arc Control Unit	LCAE Electric Arc Control Unit
LCAG Electric Arc Spray Gun (hand held)	LCAG Electric Arc Spray Gun (hand held)
LCARE Electric Arc Power Supply	LCARE Electric Arc Power Supply
LCAH Hose and Cable Package	LCAH Hose and Cable Package

UNBUNDLED

ValuArc200	**ValuArc200E**
LCA Electric Arc Control Unit	LCAE Electric Arc Control Unit
LCAG Electric Arc Spray Gun	LCAG Electric Arc Spray Gun
LCARE Electric Arc Power Supply	LCARE Electric Arc Power Supply
LCAH200 Hose and Cable Package	LCAH200 Hose and Cable Package

TUBE MILL

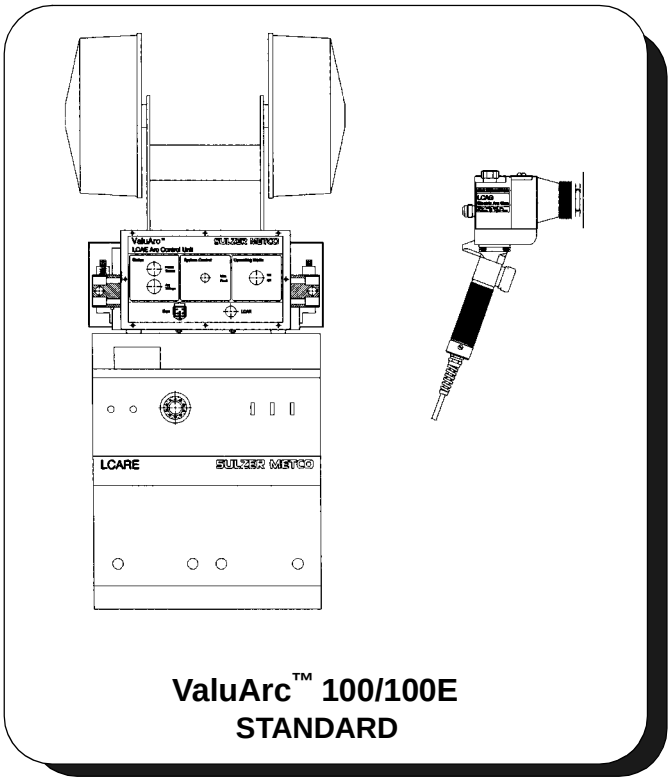
ValuArc 300E

LCACE Electric Arc Control Unit
LCAGM Electric Arc Machine Mount Gun
LCARE Electric Arc Power Supply
LCAH300 Hose and Cable
LCAD Electric Arc Drive Unit
LCAT Tower Assembly

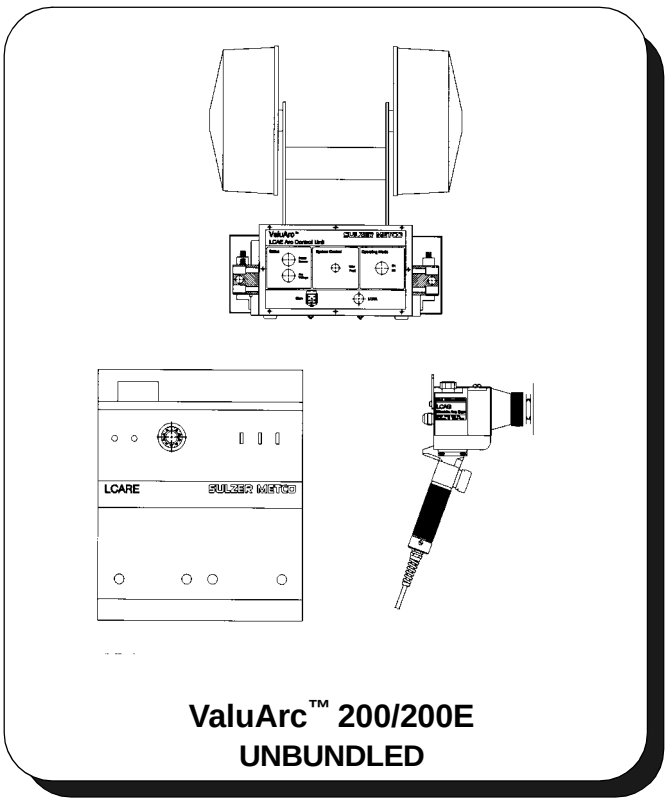
NOTE

In the above table and throughout this manual, the letter E appended to part designations (LCARE, for example) indicates CE conformity.

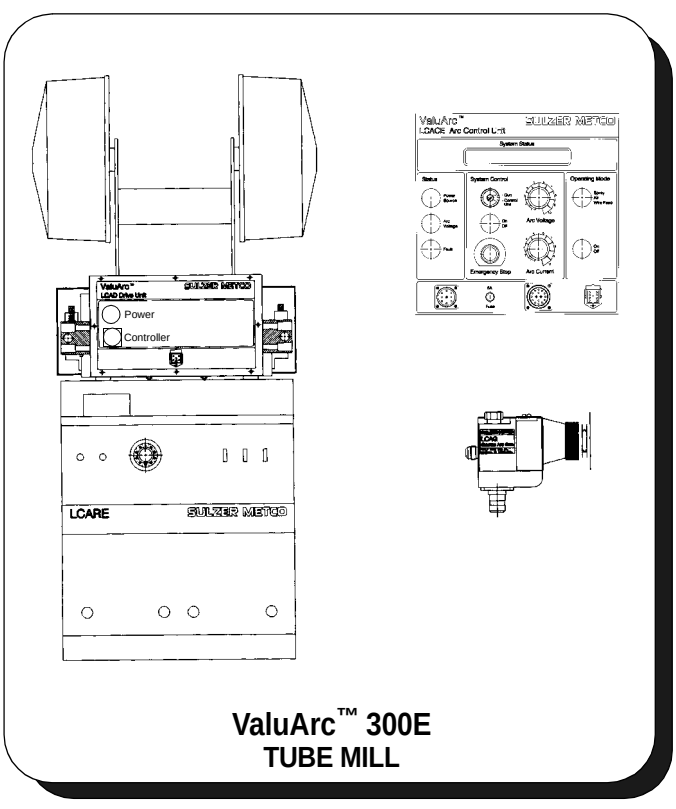
For personal protection, the Sulzer Metco MS Safety Unit is recommended.



ValuArc™ 100/100E
STANDARD



ValuArc™ 200/200E
UNBUNDLED



ValuArc™ 300E
TUBE MILL

FIGURE 1.1 ValuArc™ ELECTRIC ARC SPRAY SYSTEM CONFIGURATIONS

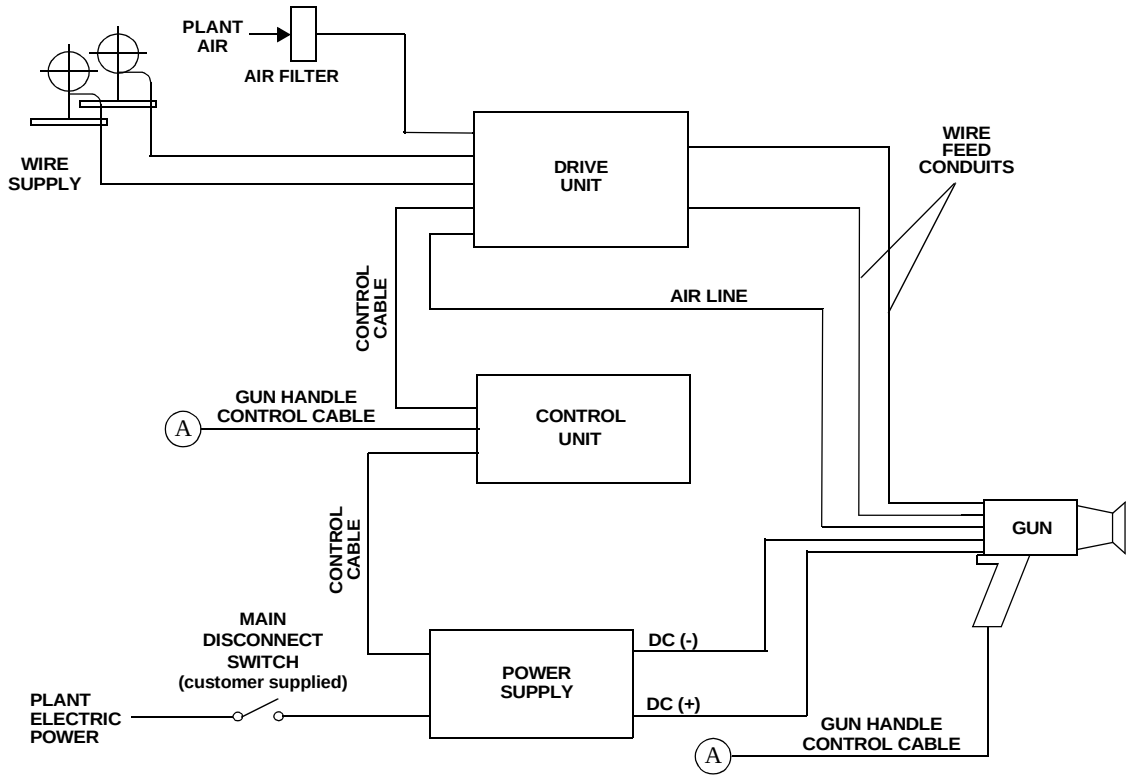


FIGURE 1.2 ValuArc™ ELECTRIC ARC SPRAY SYSTEM

LCAE Electric Arc Control Unit

The LCAE electric arc control unit controls air, electricity, and metallizing wire used by the arc spray gun. The control unit consists primarily of three distinct assemblies: an electrical control cabinet, wire feed chassis, and a wire spool tower. The electrical control cabinet is secured to the wire feed chassis. The wire spool tower is secured to the wire feed chassis and holds two spools of metallizing wire. Specifications Specifications of the control unit are provided below.

Height: 9" (22.86cm)
Width: 19.5" (49.53cm)
Length: 26" (66cm)
Weight: 70 lb (32kg)

The front panel of the control unit contains clearly identified switches and indicator lights. The indicator lights provide for immediate identification of system status. See “Controls and Indicators” paragraph, later in this section.

The wire feed chassis contains a wire drive mechanism with rollers and guides and a wire drive motor that supplies the push force required to feed the metallizing wire through the gun.

An air pressure gauge, used to monitor primary air, and an air regulator are mounted on the rear panel of the control unit. Should air pressure fall below a preset value, a safety switch in the primary air circuit will open and automatically shut off the unit.

LCAG Electric Arc Spray Gun

The gun is made up of two sections: gun head and rear gun body. The gun head houses the contact tips, contact tubes, electrode posts, air cap, arc shield, and DC power cable connections. The gun is supplied with a handle for hand-held operation.

LCARE Electric Arc Power Supply

The power supply is a solid state, constant voltage, SCR controlled power supply rated for maximum continuous duty of 200 amps at 32 volts DC. The power supply requires three-phase, AC electrical input of 200/380/440 Volts, 50/60 Hertz. For more detailed information, refer to Section 8.

LCAH Arc Hose And Cable Package

This package includes two DC power cables, air hoses, and a set of wire feed cables. The DC power cables are connected to the gun to deliver the electric power needed to spray coatings. The air hoses are used to supply primary air to the controller and from the controller to the gun. The wire feed cables are used to route metallizing wire from the wire spools to the gun.

LCA Electric Arc Control Unit

The front panel of the control unit contains clearly identified switches and indicator lights. The indicator lights provide for immediate identification of system status. See “Controls and Indicators” paragraph, later in this section.

The wire feed chassis contains a wire drive mechanism with rollers and guides and a wire drive motor that supplies the push force required to feed the metallizing wire through the gun.

An air pressure gauge, used to monitor primary air, and an air regulator are mounted on the rear panel of the control unit. Should air pressure fall below a preset value, a safety switch in the primary air circuit will open and automatically shut off the arc voltage.

LCACE Electric Arc Control Unit

The control unit is powered by the LCARE power supply, and is a separate remote cabinet that controls the LCAD drive unit. The LCACE control unit is used to remotely operate the LCAGM gun, control voltage and wire speed. The control unit also displays amps, volts, air pressure, wire feed mode, air mode, spray mode, and fault messages. See “Controls and Indicators” paragraph, later in this section.

LCAGM Electric Arc Spray Gun

The gun is made up of two sections: gun head and rear gun body. The gun head houses the contact tips, contact tubes, electrode posts, air cap, arc shield, and DC power cable connections. The rear gun body consists of the air connection and wire feed connections. The gun is supplied with a tool post mount for machine mount operations.

LCAD Electric Arc Drive Unit

The drive unit houses a motor drive with wire feeder assembly. A rear air control panel supplies all the air needed for the LCAGM gun.

LCAH200 Arc Hose And Cable Package

This cable package consists of two DC power cables, two arc hoses, one extension control cable (connects power supply to controller), and two wire feed cables.

LCAH300 Arc Hose And Cable Package

This cable package consists of two DC power cables, two air hoses, two wire feed cables, and two control cables. One control cable is used to connect the LCAD electric arc drive unit to the LCAC/ LCACE electric arc control unit, the other connects the LCAC/LCACE electric arc control unit to the LCARE electric arc power supply.

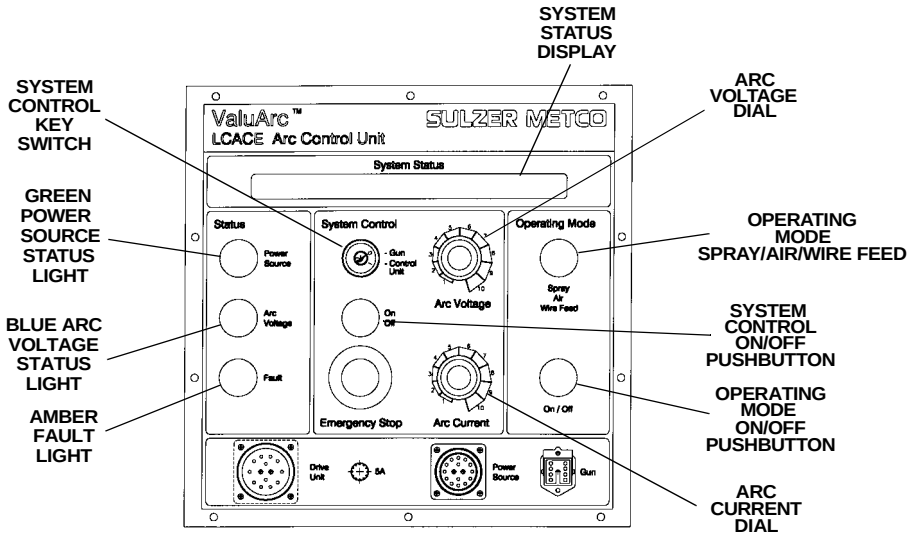
LCAT Tower Assembly

The tower assembly supports two 12" (300mm) diameter wire spools.

CONTROLS AND INDICATORS

LCACE Electric Arc Control Unit (Figure 1.3)

The functions of the controls and indicators, located on the front panel of the LCACE electric arc control unit, are described below.



ARC VOLTAGE DIAL Sets "Volts" spray table operating parameter

ARC CURRENT DIAL Sets "Amps" spray table operating parameter

SYSTEM STATUS DISPLAY Provides system status messages on a 20-character vacuum fluorescent display

AMBER FAULT LIGHT Lights anytime a fault occurs

OPERATING MODE SPRAY/AIR/ WIRE FEED Enables spray, wire feed, and air operating modes

BLUE ARC VOLTAGE STATUS LIGHT Lights when spray sequence has begun and arc voltage is present at gun

SYSTEM CONTROL ON/OFF PUSHBUTTON Enables the control unit. If pressed during operation, normal shutdown will occur

GREEN POWER SOURCE STATUS LIGHT Lights when power supply is turned on and 115vac is present in unit

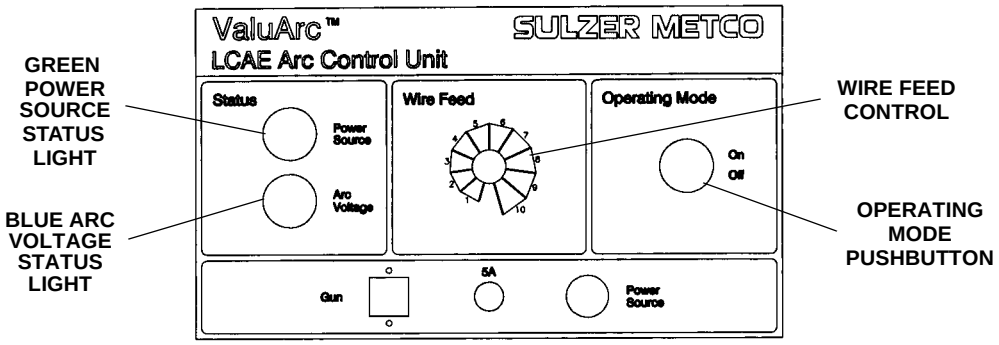
OPERATING MODE ON/OFF PUSHBUTTON Initiates spray sequence. Also used to enable calibration mode

SYSTEM CONTROL KEY SWITCH Used to select between gun and control unit operation

FIGURE 1.3 LCACE CONTROLS AND INDICATORS

LCA/LCAE Arc Control Unit (Figure 1.4)

The function of the controls and indicators, located on the front panel of the LCA/LCAE electric arc control unit, are described below.



WIRE FEED CONTROL Sets "Amps" spray table operating parameter

OPERATING MODE PUSHBUTTON Enables the control unit

BLUE ARC VOLTAGE STATUS LIGHT Lights when spray sequence has begun and arc voltage is present at gun

GREEN POWER SOURCE STATUS LIGHT Lights when power supply is on

FIGURE 1.4 LCA/LCAE CONTROLS AND INDICATORS

SECTION 2

OPTIONAL EQUIPMENT

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LCAG/LCAGM GUN

PPGFA Complete Unit Cat. No. PPGFA56844* — The PPGFA complete unit includes the focused arc air cap assembly, reseal kit, and air hoses. The focused arc air cap produces a harder, denser, and smoother surface finish than other air caps.The focused arc air cap requires a source of secondary air, which may be supplied by the 6A Air Control unit, which is available for purchase separately.

Fan Air Cap Kit Cat. No. LCAG/LCAGM55864 — This kit includes the fan air cap assembly, 20 foot (6.1m) air hose, and a 6A Air Control unit. The fan air cap is used when a wider spray pattern is desired. The width of the pattern is dependent upon the wire being sprayed, spray distance, and air pressure settings. The 6A Air Control unit connects to plant air (3/4" pipe, shut-off valve, and reducer required for hook-up by customer), and regulates and filters the compressed air, which is needed for the fan air cap. Two regulators and filters are supplied with the unit. The larger of the two regulators is used for the fan air cap.

Fan Air Cap Assembly Cat. No. LCAG/LCAGM51732 — The fan air cap includes fan retainer, fan insert, fan air adapter, retaining ring, and o-ring.

High Velocity Air Cap Assembly Cat. No. LCAG51777 (standard on LCAGM) **—** This assembly includes air cap body and hardened insert with o-ring. The high velocity air cap is used when a narrower spray pattern or high density coating is desired.

High Profile Air Cap Hardware Kit Cat. No. LCAG/LCAGM51735 — This assembly includes a centering post and an arc shield. The high profile air cap is used when a rougher surface finish is desired for aluminum and steels.

14 ga Hard Wire Kit Cat. No. LCAG/LCAGM55831 — This kit includes 14 ga contact tips (qty 10), wire feed cable hardened wire guides (qty 2), control unit hardened wire guides (qty 2), and left side and right side fixed wire straighteners.

Fine Air Cap Assembly Cat. No. LCAG51416 — This assembly includes an air cap body and hardened insert with O-ring. The fine air cap is used when a larger spray pattern is needed than is possible with the high velocity air cap.

2mm Soft Wire and Zinc Kit Cat. No. LCAG/LCAGM56321 — This kit includes 2mm contact tips (qty 10) and 2mm lower grooved drive rolls (qty 2).

11 ga Soft Wire Kit Cat. No. LCAG/LCAGM55833 — This kit includes 11 ga contact tips (qty 10), 11 ga contact tubes (qty 2), left side and right side adjustable wire straighteners, and 11 ga lower grooved drive rollers (qty 2).

14 ga Long Life Contact Tip Kit Cat. No. LCAG/LCAGM51920 — This kit includes 14 ga long life contact tips (qty 2). These tips are recommended when performing high volume spraying of hard wires.

2mm Long Life Contact Tip Kit Cat. No. LCAG/LCAGM51921 — This kit includes 2mm long life contact tips (qty 2). These tips are recommended when performing high volume spraying of hard wires.

14 ga Hard Wire Contact Tip Kit Cat. No. LCAG/LCAGM51351 — This kit includes 14 ga wire contact tips (qty 10).

14 ga Soft Wire Contact Tip Kit Cat. No. LCAG/LCAGM51496 — This kit includes 14 ga contact tips (qty 10).

2mm Contact Tip Kit Cat. No. LCAG/LCAGM51523 — This kit includes 2mm contact tips (qty 10).

11 ga Contact Tip Kit Cat. No. LCAG/LCAGM51524 — This kit includes 11 ga contact tips (qty 10).

11 ga. Contact Tube Cat. No. LCAG/LCAGM55095 — Includes 11 ga contact tubes (qty 2) for use in spraying 11 ga. wire.

2mm Hard Wire and Aluminum Hardware Kit Cat. No. LCAG51946 — This kit includes contact tips (qty 10), adjustable wire straighteners (qty 2), wire straightener spacers (qty 2), lower grooved rollers (qty 2), and screws (qty 4). This kit is recommended when spraying aluminum and hard wires.

Gun Handle Cat. No. LCAG51843 — Allows for hand-held operation of the gun.

Tool Post Gun Mount Cat. No. LCAG54967 (standard on LCAGM) **—** The tool post gun mount allows the LCAG gun to be machine mounted, after the handle is removed.

Tool Post Fixture Assembly Cat. No. LCAG/LCAGM13132 — This fixture can be mounted to work handling equipment; the tool post gun mount LCAG54967 can mount to it.

Tool Kit Cat. No. LCAG55362 (not applicable to LCAGM) **—** Includes tools required for the assembly and disassembly of the gun.

Hardware Kit Cat. No. LCAG/LCAGM55326 — Includes all screws, washers, lockwashers and retaining rings needed for gun.

***** The PPGFA56844 is not part of the LCAG/LCAGM gun.

LCA/LCAE CONTROL UNIT

Air Adapter (Nitrogen Supply) Cat. No. LCA/LCAE1882 — The air adapter is used to connect the air supply hose to the nitrogen supply regulator, when nitrogen is used instead of air.

Fixed Wire Straightener (Right and Left Sides) Cat. Nos. LCA/LCAE55847 and LCA/LCAE55846 — Consists of three hardened steel rollers, contained within the straightener housing, that are used to straighten 14 ga hard wires and 14 ga and 2mm soft wires. Also includes spacer. Provides increase in gun contact tip life, when spraying 14 ga hard wires.

Adjustable Wire Straightener Cat. No. LCA/LCAE40648 — Consists of three hardened steel rollers (with middle roller adjustable), contained within the straightener housing, that are used to straighten 14 ga and 2mm hard wires and 14 ga, 2mm and 11 ga soft wires. Also includes spacer. This wire straightener is of benefit when spraying 14 ga and 2mm hard wires and 11 ga aluminum, because of the increase in gun contact tip life it provides. Two straighteners are required per control unit.

2mm Lower Grooved Drive Roller Cat. No. LCA/LCAE51472 — Required when spraying 2mm wire (two required per control unit).

1.6mm Lower Grooved Roller Cat No. LCA/LCAE56092 — Reduces scuffing when spraying 14 ga zinc wire.

1.6mm Upper Grooved Roller Cat No. LCA/LCAE56093 — Reduces scuffing when spraying 14 ga zinc wire.

11 ga Lower Grooved Drive Roller Cat. No. LCA/LCAE51473 — Required when spraying 11 ga. wire (two required per control unit).

Hardware Kit Cat. No. LCA/LCAE55861 — Includes all screws, o-rings, washers, lockwashers and spacers for wire straighteners.

Bulb Kit Cat. No. LCA/LCAE55862 — Includes ten, 130 volt bulbs.

Fuse Kit Cat. No. LCA/LCAE55859 — Includes ten, 5 Amp fuses.

Switch Kit Cat. No. LCA/LCAE55860 — Includes parts for status indicators and operating mode switch.

Filter Assembly Cat. No. LCA/LCAE50843 — Filter assembly used to remove oil or water in the air line.

Control Unit Wire Guide Cat. No. LCA/LCAE51878 — A hardened wire guide (qty 1) used for spraying 14 ga and 2mm hard wires (two required per system).

Mounting Bracket Cat. No. LCA/LCAE55853 — Used to secure the control unit to the power supply.

LCAD CONTROL UNIT

Fixed Wire Straightener (Right and Left Sides) Cat. Nos. LCAD55847 and LCAE55846 — Consists of three hardened steel rollers (contained within the straightener housing) that are used to straighten 14 ga hard wires and 14 ga and 2mm soft wires. Also includes spacer. Provides increase in gun contact tip life, when spraying 14 ga hard wires.

Adjustable Wire Straightener Cat. No. LCAD40648 — Consists of three hardened steel rollers (with middle roller adjustable), contained within the straightener housing, that are used to straighten 14 ga and 2mm hard wires and 14 ga, 2mm and 11 ga soft wires. Also includes spacer. This wire straightener is of benefit when spraying 14 ga and 2mm hard wires and 11 ga aluminum, because of the increase in gun contact tip life it provides (two required per control unit).

2mm Lower Grooved Drive Roller Cat. No. LCAD51472 — Required when spraying 2mm wire (two required per control unit).

1.6mm Lower Grooved Roller Cat No. LCAD56092 — Reduces scuffing when spraying 14 ga zinc wire.

1.6mm Upper Grooved Roller Cat No. LCAD56093 — Reduces scuffing when spraying 14 ga zinc wire.

11 ga Lower Grooved Drive Roller Cat. No. LCAD51473 — Required when spraying 11 ga. wire (two required per control unit).

Filter Assembly Cat. No. LCAD50843 — Filter assembly used to remove oil or water in the air line.

Control Unit Wire Guide Cat. No. LCAD51878 — A hardened wire guide (qty 1) used for spraying 14 ga and 2mm hard wires (two required per system).

Hose Fitting Cat. No. LCAD1882 — Required when nitrogen is used as primary air.

LCADAP Alignment Package Cat. No. LCADAP — Provides the instructions and parts necessary to align the wire guides and drive rollers.

LCARE POWER SUPPLY

Power Supply Truck Cat. No. LCART — Includes handle, 2-fixed wheels, and 2 swivel front wheels on one frame with a storage area in back.

LCACE CONTROL UNIT

Bulb Kit Cat. No. LCACE55862 — Includes ten, 130 volt bulbs.

Fuse Kit Cat. No. LCACE56332 — Includes ten, 5-Amp slow acting fuses.

Switch Kit Cat. No. LCACE56282 — Includes parts for status indicators and operating mode switch.

LCAH100 HOSE AND CABLE PACKAGE

DC Power Cables To Gun, 25 Feet (7.62m) Cat. No. LCAH55886 — I/O DC power cable that connects to power supply with twistmate connectors and to gun with 1-hole cable lugs.

DC Power Cables To Gun, 50 Feet (15.25m) Cat. No. LCAH55887 — I/O DC power cable that connects to power supply with twistmate connectors and to gun with 1-hole cable lugs.

Tubing Assembly, 120 Feet (36.5m) Cat. No. LCAH55812 — This is the liner used in the wire feed cables.

Wire Feed Cable Wire Guide Cat. No. LCAH51364 — This hardened wire guide (qty 1) is used when spraying 14 ga and 2mm hard wires (two required per system).

LCAH200 HOSE AND CABLE PACKAGE

Wire Feed Cable Wire Guide Cat. No. LCAH51364 — This hardened wire guide (qty 1) is for spraying 14 ga and 2mm hard wires (two required per system).

Tubing Assembly, 120 Feet (36.5m) Cat. No. LCAH55812 — This is the liner used in the wire feed cables.

LCAH300 HOSE AND CABLE PACKAGE

Wire Feed Cable Wire Guide Cat. No. LCAH51364 — This hardened wire guide (qty 1) is for spraying 14 ga and 2mm hard wires (two required per system).

Tubing Assembly, 120 Feet (36.5m) Cat. No. LCAH55812 — This is the liner used in the wire feed cables.

MISCELLANEOUS

LCAWAK Adapter Kit Cat. No. LCAWAK — Adapts the ValuArc System for use with production packs.

Ms Safety Unit Cat. No. MS — The MS safety unit includes a helmet with lens plate, an aluminized body protector, aluminum gloves, and hearing protectors. These safety items protect the operator against the visible light, ultraviolet rays, heat and noise generated by the system.

SECTION 3

REQUIRED FACILITIES

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LOCATION REQUIREMENTS

Proper location is necessary for the power supply unit to operate satisfactorily. The back and sides of the unit must be located at least 18" (31.8cm) away from walls and obstructions, so that air flow into the unit and exhaust air out of the unit will not be blocked. Air flow into the unit should not exceed 105°F (41° C).

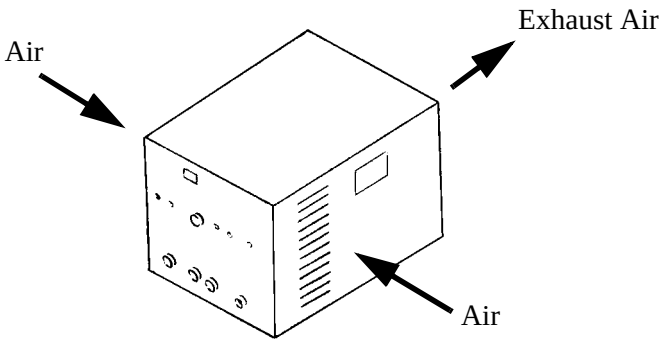
NOTE

Failure to observe the precautions described above can result in excessive operating temperatures and nuisance shut-downs.

CAUTION

Do Not Allow Dirt, Metal Dust, Or Any Foreign Material To Be Drawn Into The Power Supply.

To permit proper maintenance, locate the unit so that the side panels can be opened. To meet this requirement, it may be necessary to provide ducts for cooling air intake. If duct work is used, an intake air fan should be installed. The fan in the unit cannot pull air from a distance.



POWER SUPPLY

NOTE

Maintain 18" clearance on sides with louvers, to ensure proper air flow.

EXHAUST SYSTEM REQUIREMENTS

An effective exhaust and dust collection system is required to avoid the toxic or noxious effects of dust, fumes and mists that may be generated by spraying. On production setups, if the spraying station is enclosed, make sure that there is sufficient inlet air so that the exhaust system is adequately supplied, Under some conditions, metal dust can be hazardous. For this reason, the exhaust system should be laid out by an experienced engineer.

Dust collectors, especially designed for metallizing dust, are recommended. Dust collectors designed primarily for other kinds of dust are apt to be ineffective and, in some cases, dangerous if used for metal dust.

ELECTRIC POWER REQUIREMENTS

The only unit to require external electric power is the power supply. It requires a three-phase, AC input of 200/380/440 Volts, 50/60 Hz (see table). Note that input voltage can vary +/-10%, except for an input voltage of 200 that can range between 200 - 230 volts.

Input Volts (50/60 Hz)	**Line Current** (amps)
200-230	42
380	28
440	24

Electrical Fuse and Wiring Requirements

WARNING

IF THE POWER SUPPLY UNIT IS LOCATED IN AN INACCESSIBLE LOCATION, THEN THE INSTALLATION OF AN ON/OFF MAIN DISCONNECT SWITCH IS A SAFETY REQUIREMENT.

It is important that the electric power supply lines within the plant and the utility company service lines be adequate for the load. If there is any question of power line capacity, check with the utility company before installing equipment. The equipment will not operate correctly, and electrical hazards may result, if service lines or plant supply lines to the equipment are not large enough.

A three-phase line disconnect switch, separately fused, must be installed ahead of the power supply unit. This provides a safe, convenient means to completely remove all electrical power from the entire system.

WARNING

ALL WIRING MUST BE DONE BY A QUALIFIED ELECTRICAN IN ACCORDANCE WITH LOCAL ELECTRICAL CODES.

COMPRESSED AIR REQUIREMENTS

Air Compressor

For primary air flow, the system may require a maximum of 4500 SCFH at 60 psi (4.1 bar), when using a fine air cap.

The size of the air compressor will be determined by the number of arc guns to be operated, and whether or not the compressor is to supply air for grit blasting or other uses.

When calculating air requirements, allow for a pressure drop of about 10 psi (0.7 bar) across the supply line air regulator, in order to get good regulation. In addition, allowance should be made for pressure losses in piping, connections and valves. Therefore, the line pressure at the regulator should be at least 75 psi (5.2 bar) with the gun spraying. The compressor unloader should be set so that the difference between the “cut-out” and “cut-in” pressure is not more than 10 to 15 psi (0.7 to 1.0 bar). An unloading range which is too wide, or line pressure which is too low, will cause fluctuating air pressure at the gun.

Air Compressor After-cooler

Compressed air usually contains enough oil and moisture to weaken bond and coating strength of sprayed coatings. To prevent weakening of the sprayed material, an air compressor after-cooler must be used. An after-cooler incorporates an expeller to remove the water and an automatic drain trap. This unit will remove most of the oil, dirt and water from the air supply, even under adverse conditions. However, further cleaning of the air may be necessary, to obtain top quality spray results. For this purpose, the Type 4AC Air Cleaner unit is available.

SECTION 4

INSTALLATION

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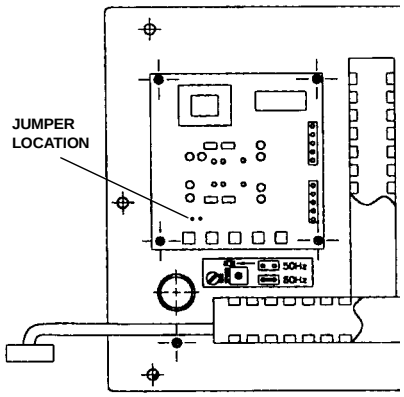
GENERAL

Installation of the ValuArc™ Electric Arc System (100/100E, 200/200E, 300E) consists primarily of installing the power supply, changing the hardware in the gun and control unit, if necessary, to accommodate the wire being sprayed, and connecting the electric cables and air hoses.The components are packaged in several cartons. Before setting up, check that the following system components are provided:

Control Unit/Drive Unit
Wire Spool Tower
Arc Spray Gun
Arc Power Supply Unit
Hose and Cable Package

50Hz/60Hz OPERATION

The LCA electric arc control unit is factory set for 60Hz operation (jumper installed). The LCAE electric arc control unit is factory set for 50Hz operation (jumper not installed). To change the factory default settings requires either the installation or removal of these jumpers. Refer to Figure 4.1 and accompanying table.

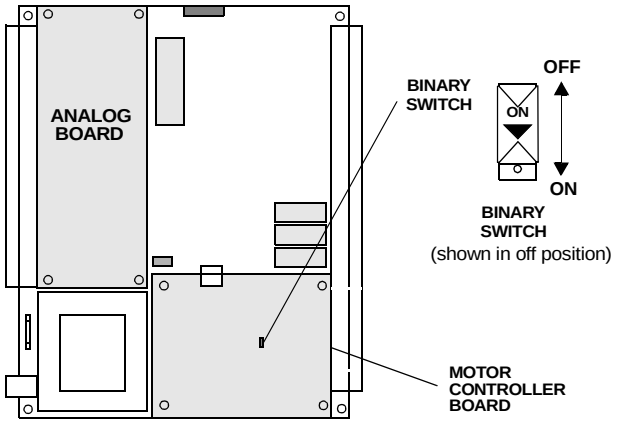


COMPONENT PANEL ASSEMBLY
(LCA/LCAE CONTROL UNIT)

LCA	To change to 50Hz operation, remove jumper
LCAE	To change to 60Hz operation, install jumper

FIGURE 4.1 LCA/LCAE 50HZ/60HZ OPERATION

The LCACE electric arc control unit is factory configured for 50Hz operation. To change the factory default setting refer to the Figure 4.2 and accompanying table shown below, and set the binary switch accordingly.



INTELLIGENT BOARD
(LCACE CONTROL UNIIT)

50Hz	OFF
60Hz	ON

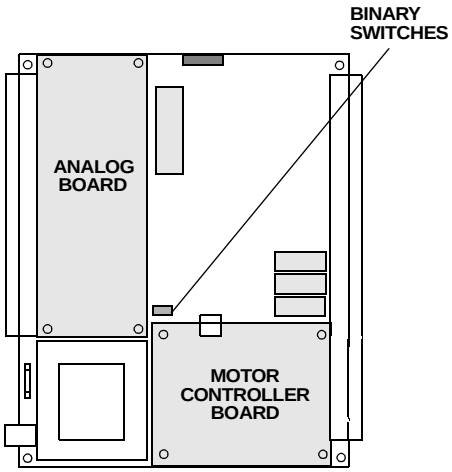
BINARY SWITCH SETTINGS

FIGURE 4.2 LCACE 50HZ/60HZ OPERATION

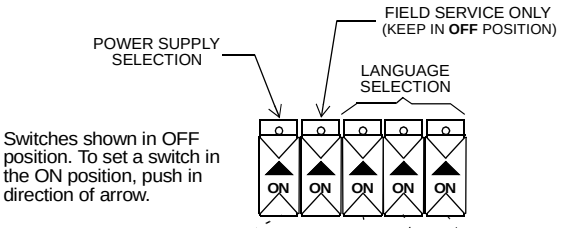
LCACE LANGUAGE/POWER SUPPLY SELECTION

Language Selection The LCACE control unit status display is factory configured to display English characters. Other languages (German, French, Italian, and Spanish) are also available and can be selected via three binary switches located on the intelligent board. To select a language, refer to Figure 4.3 and the Language Selection table, and set each binary switch accordingly.

Power Supply Selection To select a power supply for use with the LCACE control unit, refer to Figure 4.3 and set the appropriate binary switch according to the Power Supply Selection table. The factory default setting is OFF.



INTELLIGENT BOARD
(LCACE CONTROL UNIT)



350RU	ON
LCARE	OFF

POWER SUPPLY SELECTION TABLE

ENGLISH	OFF	OFF	OFF
GERMAN	OFF	OFF	ON
FRENCH	OFF	ON	OFF
ITALIAN	OFF	ON	ON
SPANISH	ON	OFF	OFF
ENGLISH*	ON	OFF	ON
ENGLISH*	ON	ON	OFF
ENGLISH*	ON	ON	ON

*Reserved for future language. Currently set to English.

LANGUAGE SELECTION TABLE

FIGURE 4.3 LCACE LANGUAGE/POWER SUPPLY SELECTION

POWER SUPPLY INSTALLATION

WARNING

ELECTRIC SHOCK CAN KILL. ONLY QUALIFIED PERSONNEL SHOULD PERFORM THIS INSTALLATION.

WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LOCAL CODES.

ENSURE THAT ALL POWER TO THE POWER SUPPLY IS OFF BEFORE WORKING ON THIS EQUIPMENT.

SET POWER SUPPLY POWER SWITCH TO THE OFF (0) POSITION, BEFORE CONNECTING OR DISCONNECTING CABLES AND EQUIPMENT.

350RU SmartArc™ Electric Arc Power Supply

CAUTION

An LCACE56738 Control Cable (200 amps max.) Must Be Used When Using A 350RU Power Supply.

Refer to *350RU SmartArc™ Electric Arc Power Supply* instructions for further information.

LCARE Power Supply

The LCARE electric arc power supply has the following specifications and ratings:

Duty Cycle: 100%
Output Amps (DC): 200
Output Volts (DC): 32

Input Volts (50/60 Hz)	Line Current (amps)
200-230	42
380	28
440	24

NOTE

Input voltage can vary by +/-10%, except for 200 input volts that can range between 200-230 volts.

Input KVA:	18.4
Output Range:	min: 30A, 7 VDC max: 200A, 32 VDC
Dimensions:	19-½ in. (495mm) wide, 27 in. (686mm) long, 21-½ in. (546mm) high
Operating Temperature Range:	-40°F to +104°F (-40°C to +40°C)
Weight:	300 lb (136 kg)

Suitable Location Locate the power supply where clean cooling air can freely circulate in through the side louvers and out through the rear louvers. Do not allow dirt, dust or any foreign material to be drawn into the power supply.

NOTE

Failure to observe the precautions described above can result in excessive operating temperatures and nuisance shut-downs.

Portable Installation The power supply unit can be connected to a line cord and plug (customer supplied) if it is to be moved from place to place within the plant. It may also be connected into the plant power lines, if portability is not required. Ensure that the correct conductor size is used and that the plug is rated for the load.

Input Power Connections The power supply is factory wired to supply its maximum rated input of 440 volts.

NOTE

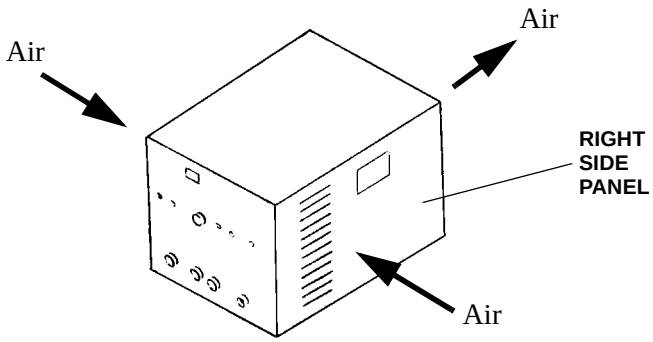
To use the power supply at 380 or 200 volts, the jumper links on the terminal board must be relocated.

Electric power lines from the plant source should be brought in through the opening in the back of the unit. This opening will accommodate standard conduit fittings. Connect supply lines to terminals L1, L2, and L3 located on the terminal board. To gain access to the terminal board, unscrew and remove the power supply right side panel. Follow the directions provided on the input connection diagram located on the inside of the right side panel.

To gain access to the terminal board, unscrew and remove the power supply right side panel. Follow the directions provided on the input connection diagram located on the inside of the right side panel (see figure below).

NOTE

Maintain 18" clearance on sides with louvers, to ensure proper ventilation.



Permanent Installation A three-phase, line disconnect switch that is separately fused must be installed ahead of the power supply unit. This provides a safe, convenient means to completely remove all electrical power from the entire system. No other apparatus should be connected to the load side of this switch.

Connect a ground wire from the plant electrical ground to the terminal marked ⏚. If a plant electrical ground is not available, connect to an earth ground.

WARNING

THE GROUND CONNECTION MUST NOT BE FUSED OR BROKEN BY A SWITCH.

ORDERING PARTS

The part numbers provided in this section are for reference only. When ordering parts, refer to the replacement parts list and the spare parts list in Sections 10 and 9, respectively, and to the spray kit/hardware tables in Section 11.

GUN/CONTROL UNIT SETUP

The gun is set up to spray 14 gauge soft wire. When using different gauge wires, or when converting to high volume spraying, certain gun and control unit components must be changed. The information provided below specifies which gun parts are to be used.

NOTE

Contact tips may be identified by the number of grooves on the contact body. See “Contact Tip Identification” this section.

Optional spray kits are available to allow spraying of different wires and wire sizes. Refer to the spray kit/ hardware tables in Section 11, to determine which kit(s) to use.

Contact Tip Selection

To convert the gun from 14 gauge soft wire to 2mm or 11 gauge wire, or to 14 gauge hard wire, refer to the following table and install contents of applicable hardware kit. To determine the appropriate kits(s) to use, refer to Spray Kit/Hardware table in Section 11 of this manual.

CONVERT TO	**CONTACT TIP KITS**		
	2.0mm Contact Tip Kit (Cat. No. LCAG51523) or 2.0mm Long Life Contact Tip Kit (Cat. No. LCAG51921) (for hard wire only)	11ga Contact Tip Kit (Cat. No. LCAG 51524) 11ga Contact Tube Kit (Cat. No. LCAG 51923)	14ga Contact Tip Kit (Cat. No. LCAG 51351) or 14ga Long Life Contact Tip Kit (Cat. No. LCAG51920)
All 2mm Wire	✓		
11gauge Wire (Zinc, Babbit, Aluminum Wire)		✓	
14 Gauge Hard Wire			✓

Contact Tip Identification

The various contact tips can be easily identified according to the number of grooves located on each tip, as shown in Figure 4.4.

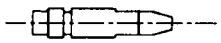
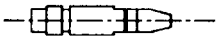
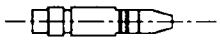
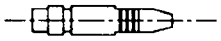
Contact Tips – Number of Grooves	Description
 no grooves	14 ga (1.6mm) Hard Wire
 one groove	14 ga (1.6mm) Soft Wire (aluminum, zinc, babbitt)
 two grooves	2mm All Wires, Hard And Soft
 three grooves	11 ga (2.3mm) Soft Wire

FIGURE 4.4

Air Cap Identification

The various air caps are shown in Figure 4.5 for easy identification.

FIGURE 4.5

Wire Guide Installation (Figures 4.6 and 4.7)

The control unit and wire feed cables come from the factory with plastic wire guides already installed. When spraying hard wires, however, metal guides must be installed. Refer to the following table to determine the correct wire guides to use when spraying hard wires.

HARD WIRE GUIDES

ITEM	WIRE GUIDE PART No.
Wire Feed Cables	LCAH51364
Control Unit	LCAE51878

NOTE

Rear wire guide not used for hard wire, 2mm, or 11ga wire spraying.

To change the wire guides in the control unit, refer to Figure 4.6 and perform the following steps:

1. Remove side covers by releasing quick-release fasteners.
2. Remove metallizing wire if it has been loaded. Refer to "Unloading Metallizing Wire," in Section 5 of this manual.
3. Remove nut that secures each wire guide to each wire feeder. Remove wire guides.
4. Install applicable wire guides and secure each wire guide with nut.
5. Load metallizing wire. Refer to "Loading Metallizing Wire," in Section 5 of this manual.
6. Using quick-release fasteners, secure side covers to control unit.

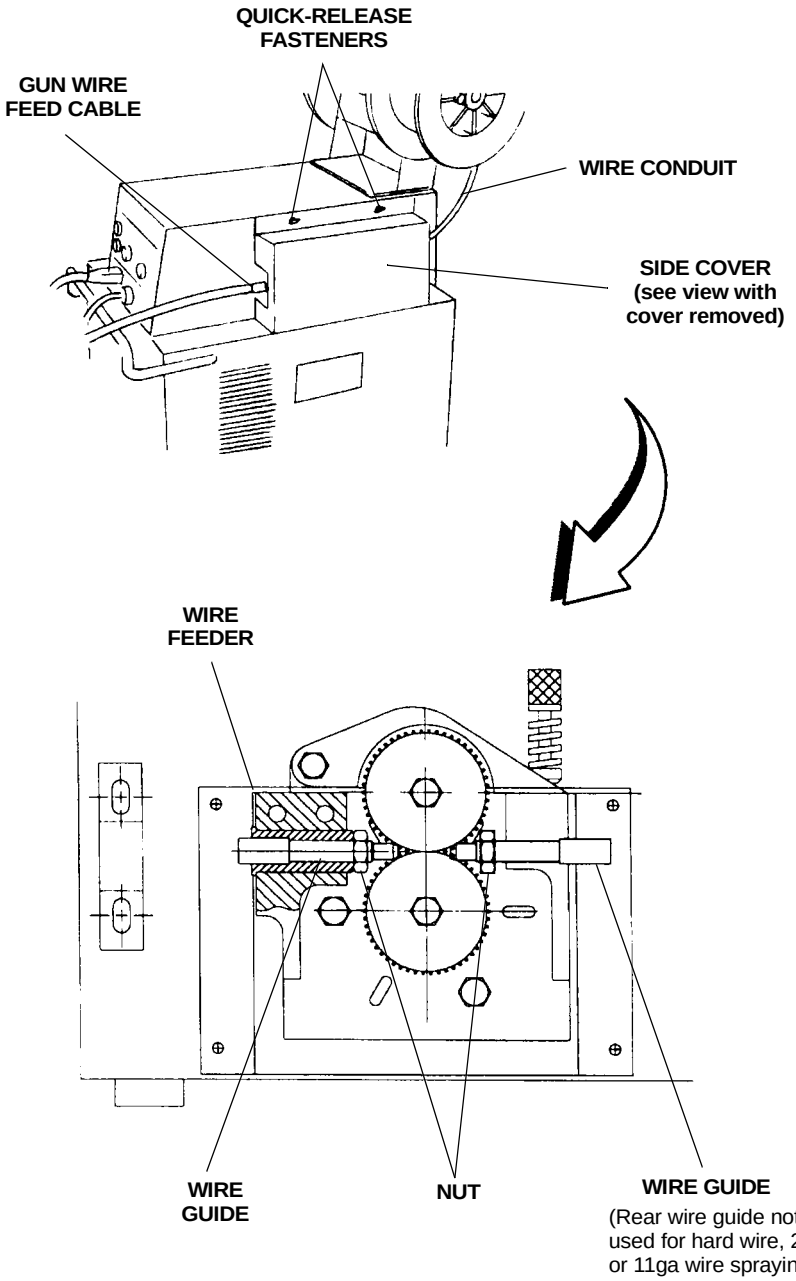


FIGURE 4.6 WIRE GUIDE INSTALLATION – CONTROL UNIT

To change the wire guide in the wire feed conduits, refer to Figure 4.7 and perform the following steps:

For each wire feed conduit –

1. Unscrew insulator from tube adapter.
2. Using pliers, unscrew tube adapter from wire feed cable.

3. Remove wire guide from the adapter.
4. Insert new wire guide into tube adapter.
5. Using pliers, secure tube adapter to wire feed cable.

NOTE

Guide will not move if tightened sufficiently. Wire guide must be bottomed.

6. Secure insulator to tube adapter.

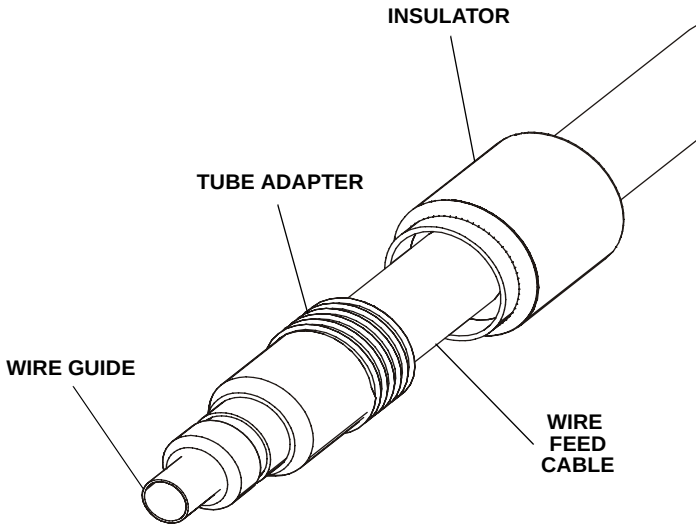


FIGURE 4.7 WIRE GUIDE INSTALLATION – WIRE FEED CONDUITS

Wire Straighteners

Refer to the following table, for the proper wire straighteners to use.

NOTE

Wire straighteners are not required when using 14 gauge soft wire, 2mm zinc wire, or 2mm SPRABABATT.

WIRE	FIXED		ADJUSTABLE	
	RIGHT SIDE Cat. No. LCAE55847	LEFT SIDE Cat. No. LCAE55846	RIGHT SIDE Cat. No. LCAE40648	LEFT SIDE Cat. No. LCAE40648
14ga Hard Wire	✓	✓		
2mm Soft Wire (aluminum)			✓	✓
2mm Hard Wire			✓	✓
11ga Soft Wire			✓	✓

To install the wire straighteners, secure wire straighteners to sides of control unit using the hardware provided. Note that spacers are included. Refer to Figure 4.8 for mounting location.

Using 2mm or 11 Gauge Wire (Figures 4.6 and 4.8)

When using 2mm or 11 gauge metallizing wire, the lower grooved drive rollers in the drive housing must be changed. Refer to the following table, for the correct drive rolls to use.

WIRE	LOWER DRIVE ROLLS Cat. No.
14ga	LCAE51471
2mm	LCAE51472
11ga	LCAE51473

To change drive rolls in each of the wire feeders (left and right sides), proceed as follows:

1. Remove side cover by releasing quick-release fasteners, and lift upper drive housing.
2. Remove lower drive roll from the motor shaft by unscrewing retaining nut. **Be careful not to misplace key.**
3. When replacing the lower drive roll on the push motor shaft, be sure that the drive roll is centered on the wire path through the wire feeder to avoid poor spray performance.

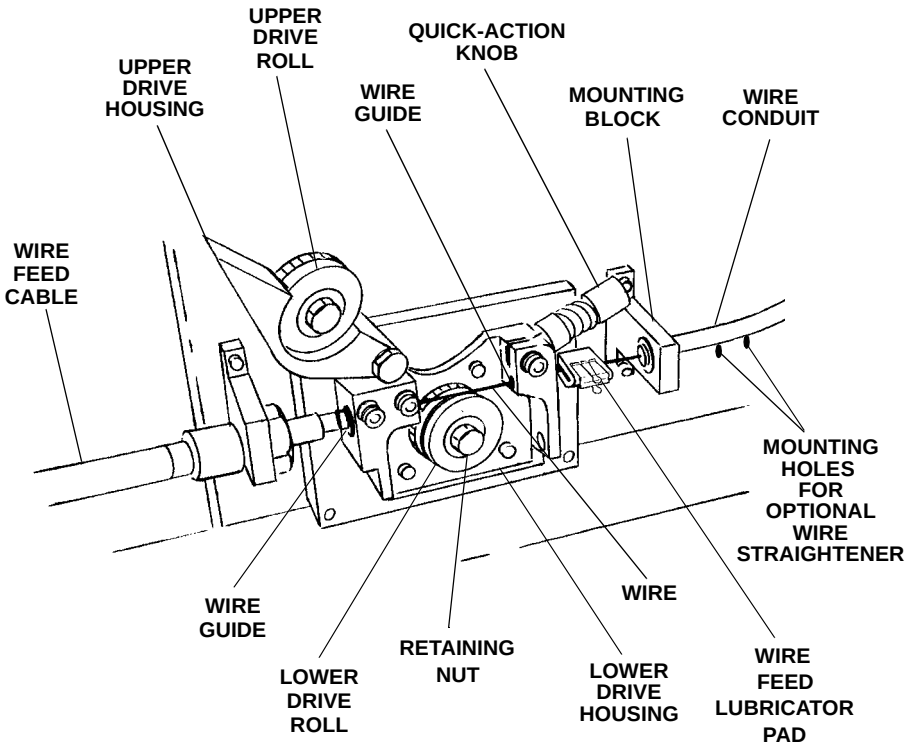


FIGURE 4.8 CHANGING DRIVE ROLLS

COMPONENT ASSEMBLY AND PRIMARY AIR HOSE CONNECTIONS (Figures 4.9, 4.10, and 4.11)

NOTE

Some components of the control unit may come disassembled. If so, proceed as follows.

To assemble the control unit with wire spool tower, proceed as follows:

1. Position tower on control unit so that mounting holes line up. Attach together using the supplied hardware.
2. Connect supplied air hose between air filter (located on rear panel of control unit) and plant air supply. To avoid pressure drops when spraying, do not install other apparatus in the line. To extend the plant air supply line, use 3/4-inch (19mm) or larger pipe. Use the adapter provided to connect the air hose to the air line.

POWER SUPPLY CABLE AND AIR HOSE CONNECTIONS (Figures 4.9, 4.10, and 4.11)

Make power supply and air hose connections as follows:

1. Connect one end of a DC power cable to the positive output connection (marked “+”) on the power supply.
2. Connect one end of the other DC power cable to the high inductance neg. connection (marked “l”) on the power supply. The NO inductance neg. connection (marked “0”) is for spraying below 50 amps only.
3. Remove the gun lower cover by unscrewing the four screws holding it in place. The right and left electrode posts will be exposed.
4. Unscrew the bolts from the right and left electrode posts.
5. Attach the free end of one DC power cable to the right electrode post using the bolts provided. Make sure cable lugs are oriented as shown in Figure 4.10.
6. Attach the free end of the other DC power cable to the left electrode post, using the bolt provided.
7. Tighten the right and left DC electrode post connections, using a suitable wrench.

WARNING

FAILURE TO TIGHTEN THE RIGHT AND LEFT ELECTRODE POST CONNECTIONS MAY RESULT IN DAMAGE TO THE GUN AND INJURY TO PERSONNEL.

8. Replace the lower cover, allowing the cable recesses in the lower cover to align the cables.

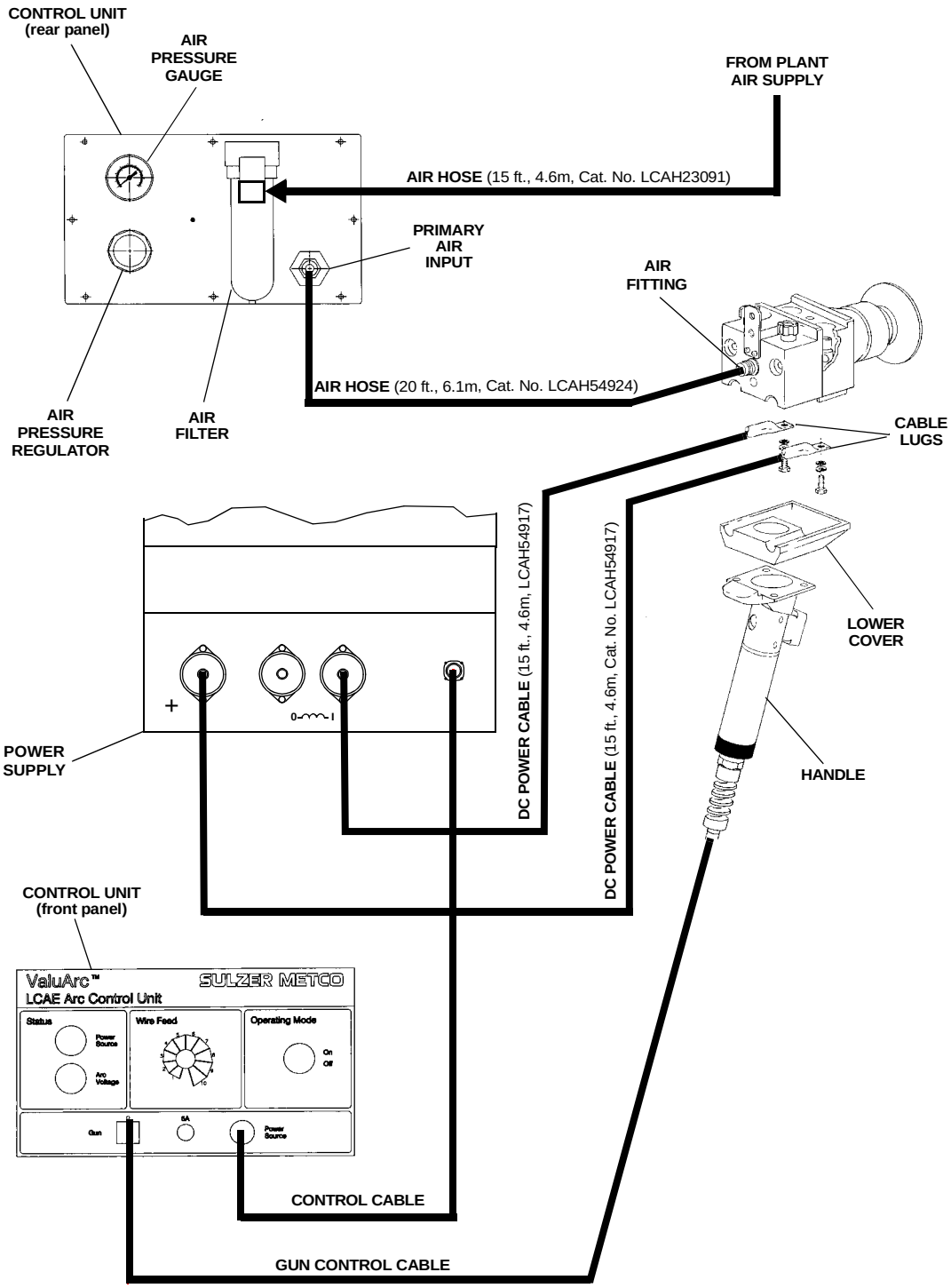


FIGURE 4.9 ValuArc 100/100E

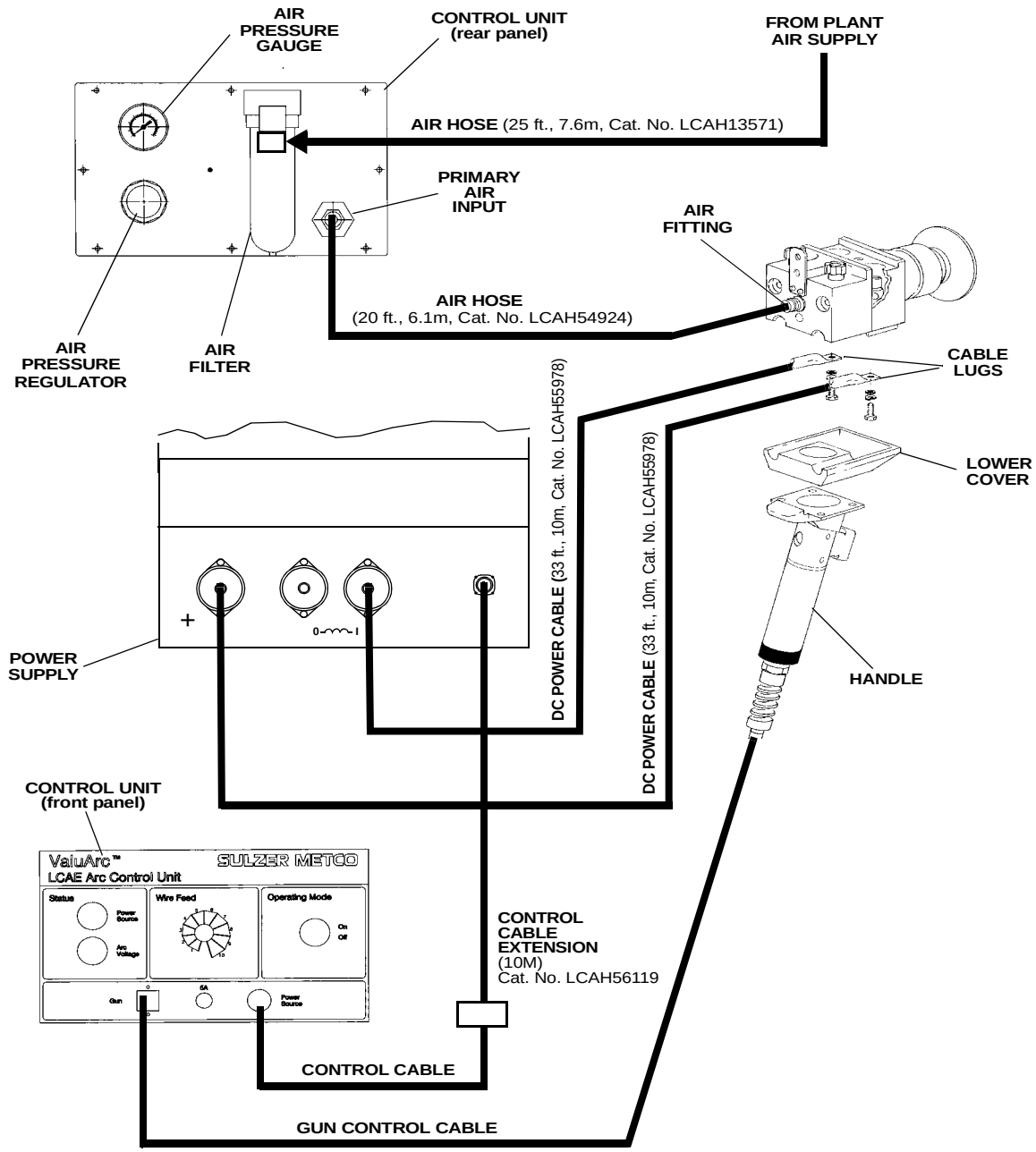


FIGURE 4.10 ValuArc 200/200E

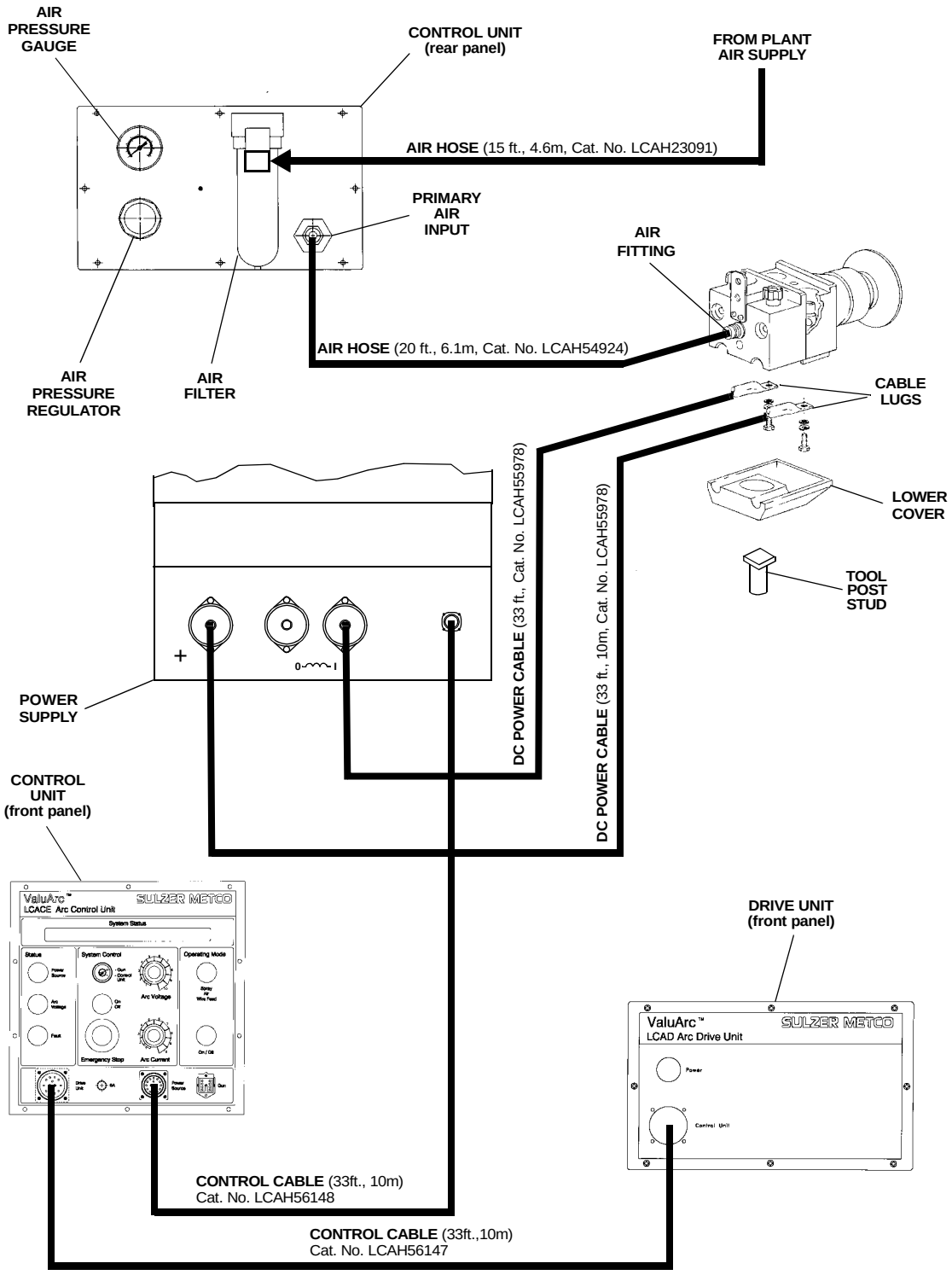


FIGURE 4.11 ValuArc 300E

INSTALLATION OF GUN WIRE FEED CABLES

To install the gun wire feed cables, refer to Figure 4.12 and perform the following steps:

NOTE

Install gun wire feed cables prior to loading metallizing wire.

1. Remove side covers (not shown) from controller by releasing quick-release fasteners.
2. Insert one end of each gun wire feed cable into mounting blocks and secure using nuts (only right side installation show as typical). The other ends of the gun wire feed cables are connected to the gun at the time metallizing wire is loaded. Refer to instructions for the loading of metallizing wire in Section 5 of this manual.
3. Using quick-release fasteners, secure side covers to control unit.

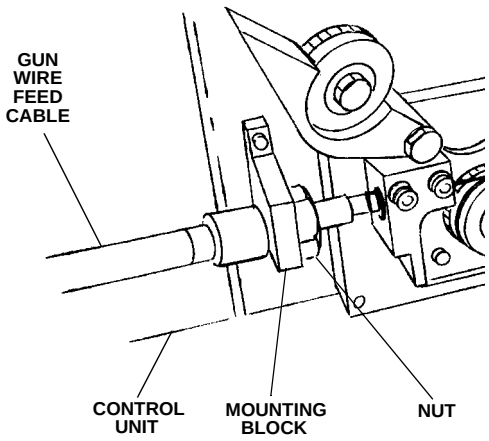


FIGURE 4.12

INSTALLATION OF FOCUSED ARC AIR CAP (PPGFA)

To install the focused arc air cap assembly, refer to Figure 4.13 and perform the following steps:

1. Install the focused arc air cap on the gun.
2. Connect one end of air hose to focused arc air cap and the other end to the 6A Air Control Unit.
3. Connect one end of air hose to air fitting on gun and the other end to primary air connection on the LCAD, LCA, or LCAE.

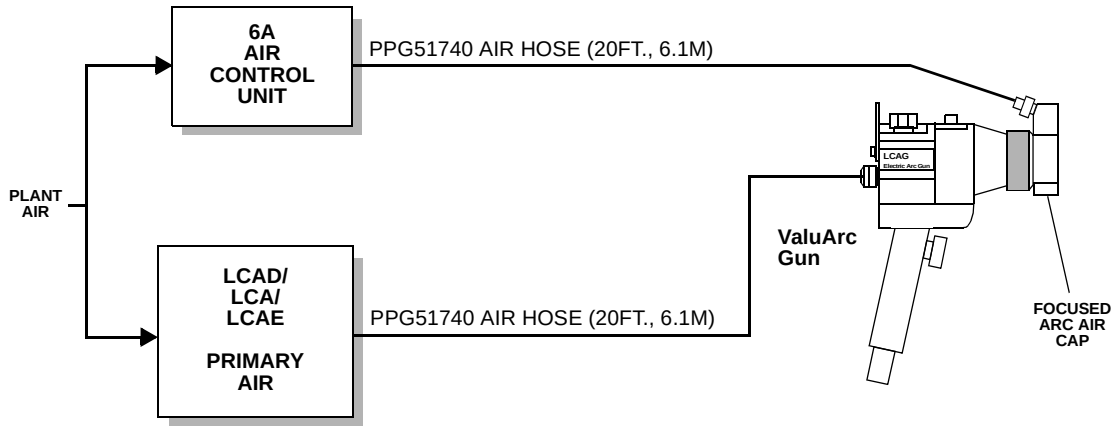


Figure 4.13 FOCUSED ARC AIR CAP INSTALLATION

INSTALLATION OF POWER SUPPLY HANDLE/BRACKET ASSEMBLY (100/100E and 200/200E Units Only)

To install the optional handle/bracket assembly, refer to Figure 4.13 and perform the following steps:

1. Remove four screws that secure handle assembly to power supply.
2. Remove front two feet from control unit.
3. Using front two feet, secure bracket assembly to control unit.
4. Secure handle and bracket assembly to power supply using four screws.

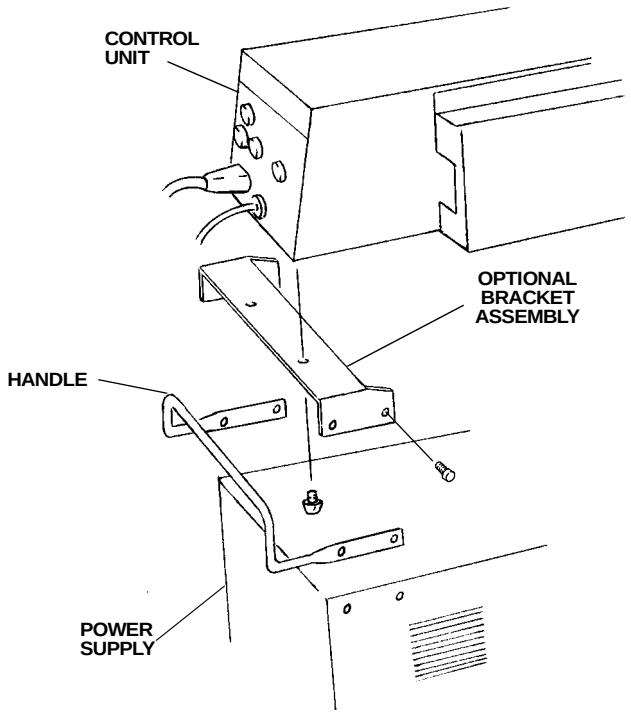


FIGURE 4.13 HANDLE/BRACKET INSTALLATION

MOUNTING THE GUN (Optional)

Optionally, the gun handle can be removed and used as a pendent. Use gun mounting stud, Cat. No. 54967, to mount the gun onto spray booth mounting fixture.

SECTION 5

OPERATION

Table of Contents

GENERAL

Operation of the ValuArc™ Electric Arc Spray System includes the loading of metallizing wire, equipment setup prior to spraying, spraying, shutdown, and the unloading of metallizing wire.

WARNING

BEFORE OPERATING THE SYSTEM, THE OPERATOR MUST BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE SAFETY MEASURES PRESENTED IN THE SAFETY MEASURES SECTION OF THIS MANUAL.

NEVER LEAVE RUNNING EQUIPMENT UNATTENDED.

LOADING METALLIZING WIRE (100/100E, 200/200E, 300E)

WARNING

TO PREVENT ELECTRICAL SHOCK — SET ALL BUTTONS AND SWITCHES ON CONTROL UNIT AND POWER SUPPLY UNIT TO THE OFF POSITION — BEFORE LOADING METALLIZING WIRE.

NOTE

Before loading metallizing wire, be sure gun and control unit components are set up for the gauge wire being used. See Section 4, “Installation,” for gun and control unit components setup.

To Load Metallizing Wire (Figure 5.1)

1. Unclip quick-release clamps on wire spool covers; remove right and left wire spool covers from tower assembly.

2. Turn quick-release fasteners on side covers and remove side covers from control unit.

3. Remove spool knob from spool shaft.

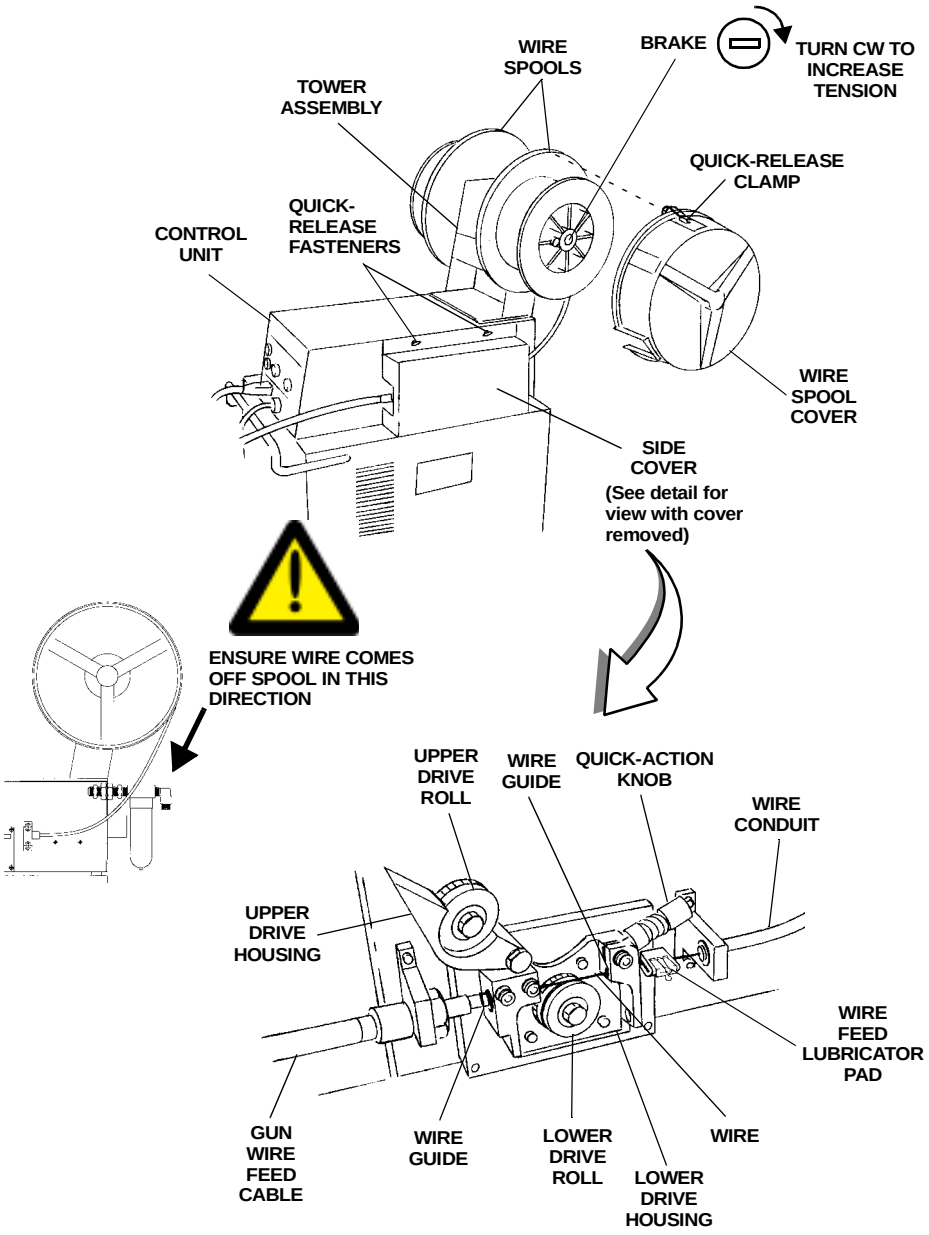


FIGURE 5.1 LOADING METALLIZING WIRE

NOTE

The following steps apply to the loading of one wire spool. Repeat steps 4 -10 to install the other spool of wire.

4. Flip quick-action knob to unlatch upper drive housing. Lift upper drive housing from lower drive housing.

5. Place spool of wire on shaft so that the pin on spool shaft flange engages hole in wire spool. Replace spool knob.

WARNING

TO AVOID PERSONAL INJURY, PREVENT END OF WIRE FROM SPRINGING FREE.

6. Release starting end of wire from spool. Straighten approximately 6" to 10" of wire. To ensure wire end is cut clean, cut a piece off end of wire using the cutting tool provided.

CAUTION

Do Not Permit Wire To Uncoil. Be Sure There Are No Burrs At End Of Cut Wire And That Wire Is Not Kinked.

7. Manually feed wire through wire conduit that protrudes from rear of wire feed chassis, and continue feeding through wire feeder rollers. Make sure wire comes off of spool smoothly and feeds directly into gun wire feed cables. Use the brake on each wire spool, to adjust spool tension as needed.

8. Check that wire is in groove of lower drive roll. Latch upper drive housing and flip quick-action knob back in place.

9. Hand tighten quick-action knob until light resistance is felt.

10. Place wire feed lubricator pad on wire (see Figure 5.1).

11. Replace wire spool cover and side cover.

SECONDARY AIR SUPPLY REQUIREMENTS

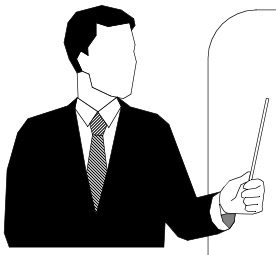
WARNING

TO PREVENT MELTING OF THE GUN HEAD — THE FAN AND FOCUSED ARC AIR CAPS REQUIRE A SOURCE (USER SUPPLIED) OF SECONDARY AIR DURING SPRAYING.

SETUP PROCEDURES (100/100E and 200/200E)

Operation of the gun is via the gun trigger, which is located on the gun handle. The following table gives the gun trigger sequences and resulting actions.

TRIGGER SEQUENCE	ACTION
Press Once And Hold	Gun will start spraying
Press Twice And Hold	Air only will flow from gun
Press Three Times And Hold	Wire feeding only will start



When initiating a gun trigger sequence, pull the gun trigger in a moderately quick, uniform manner. Otherwise, the trigger sequence may have to be repeated.

If the trigger sequence is performed correctly, as described above, the operating mode pushbutton light will remain lit and gun action will occur. If performed incorrectly, the operating mode pushbutton light will turn off and no gun action will occur. The gun trigger sequence must then be reinitiated. To do this —

1. Release the gun trigger. The operating mode pushbutton light will go on.
2. Repeat gun trigger sequence, only if operating mode pushbutton light is on.

Why Gun Trigger Sequence Fails

-Not waiting until operating mode pushbutton is lit, until repeating gun trigger sequence

-Too many or too few trigger pulses issued

-Timing of pulses not uniform

There are three setup procedures: one for wire feed, one for air, and one for spraying. The wire feed setup procedure is described first.

Wire Feed Setup (Figures 5.2, 5.3, and 5.4)

1. Mount the gun so that it points into the spray hood.

2. Turn on the LCARE Electric Arc Power Supply (power supply) by setting the power switch to the ON (1) position. The power source status light, located on the front panel of the LCAE Arc Control Unit (control unit), will light.

3. Press operating mode pushbutton, located on the front panel of the control unit. The pushbutton will lock in place and the operating mode pushbutton will light.

4. Remove the arc shield, air cap, and locating ring.

5. With the wire feed cables removed from the gun, press gun trigger three times and hold (if gun does not react when trigger is pressed, wait for three seconds for controller to reset. Then, try again). Wire will begin to feed through wire feed cables. Let wire feed about 12" past end of cables.

6. Release gun trigger, wire will stop feeding.

WARNING

If Air Comes On Or Blue Arc Voltage Status Light Comes On, Release Gun Trigger Immediately – Gun Is Not In Wire Feed Mode.

7. Loosen quick release knobs on gun. Manually feed wire through contact tubes and tips; shoulder wire feed cables to rear gun body. Tighten quick release knobs.

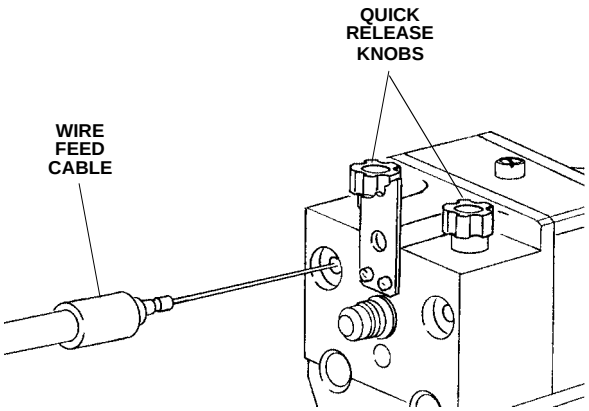


FIGURE 5.2

CAUTION

Do Not Feed Wire Automatically, After Wire Has Been Installed In Gun.

NOTE

Make sure both wires protrude slightly from contact tips but do not touch each other.

8. Make sure the contact tips are securely screwed into the contact tubes, the locating ring is in position, and the contact tubes are securely fastened in the gun head. Make sure the contact tips are seated at the front of the gun and that they are in alignment.

9. Replace the air cap and arc shield securely.

Air Setup (Figures 5.3 and 5.4)

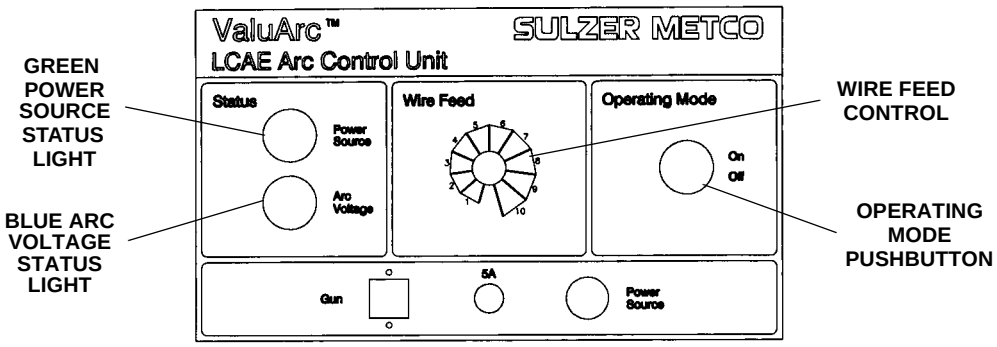


FIGURE 5.3 LCAE ARC CONTROL UNIT – FRONT PANEL

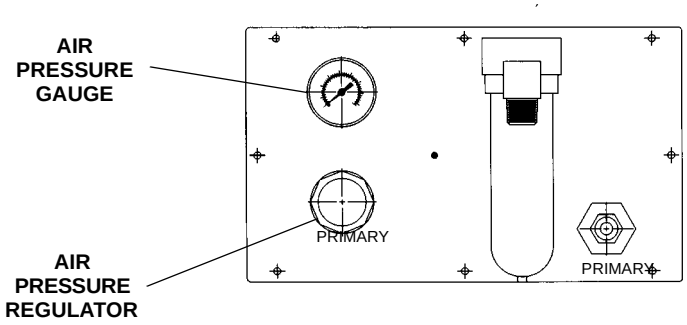


FIGURE 5.4 LCAE ARC CONTROL UNIT – REAR PANEL

1. Check that power supply is on.

2. Check that the operating mode pushbutton, located on the front panel of the control unit, is set to the ON position.

3. Ensure that plant air is on.

4. Press gun trigger twice and hold. Only air will flow from the gun. No arc voltage or wire feed will occur.

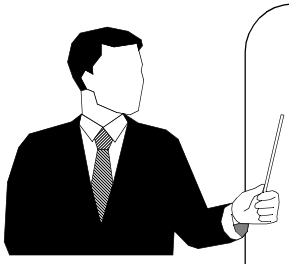
WARNING

IF MOTOR TURNS ON OR BLUE ARC VOLTAGE STATUS LIGHT COMES ON, RELEASE GUN TRIGGER IMMEDIATELY – GUN IS NOT IN AIR MODE.

5. Check air pressure gauge on rear panel of control unit, and adjust air pressure in accordance with parameters supplied in Section 11.

Spraying Setup (Figures 5.3 and 5.5)

The gun should be positioned four to six inches (10.16cm to 15.24cm) away from the surface to be sprayed. When spraying small parts, the Sulzer Metco Type 2AJ Air Blast Cooler is recommended.



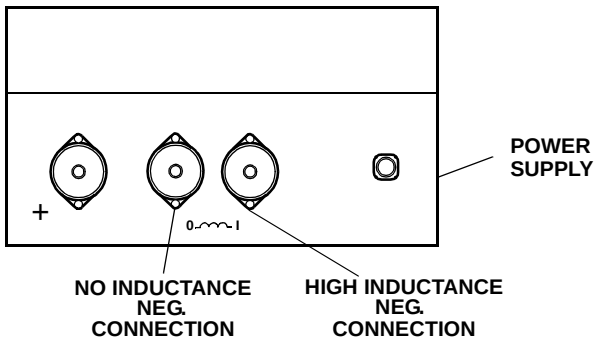
POWER SUPPLY DC CABLE CONNECTION

•Spraying above 80 Amps

-Connect power supply DC cable to HIGH INDUCTANCE NEG connection

•Spraying below 80 Amps

-Connect power supply DC cable to NO INDUCTANCE NEG connection



1. Turn on the power supply by setting the power switch to the ON (1) position. The power source status light, located on the status panel of the control unit, will light.

2. At the power supply, use voltage adjustment potentiometer to set voltage level according to the spray parameters provided in Section 11.

3. On the wire feed panel of the control unit, set wire feed potentiometer to position **6**.

4. On the operating mode panel of the control unit, press operating mode pushbutton to the ON position.

SPRAYING (100/100E and 200/200E) (Figures 5.3 and 5.5)

WARNING

ENSURE VENTAILATING SYSTEM IS ON AND IS OPERATING PROPERLY, BEFORE SPRAYING IS BEGUN.

EAR PROTECTION MUST BE WORN.

EYE PROTECTION MUST BE WORN.

RESPIRATORY EQUIPMENT MUST BE WORN.

FOLLOW ALL RELEVANT SAFETY MEASURES AS DESCRIBED IN THE SAFETY MEASURES SECTION OF THIS MANUAL.

NEVER LEAVE RUNNING EQUIPMENT UNATTENDED.

1. Perform steps 1 - 4 given in “Spraying Setup” above.

NOTE

Refer to trigger sequence table on page 5-5, before spraying.

Starting and stopping the spray stream produces spatter. Always move the gun well away from the work piece at these times.

2. Set power supply volts/amps switch to Volts and adjust to parameters given in Section 11.

3. Be sure power supply output control toggle switch is set to the ON (spray) position.

4. To start spraying, press and hold gun trigger. Air will turn on, then the blue arc voltage status light, located on the status panel of the control panel, will light; then the motor will feed wire and the gun will begin spraying.

5. Set power supply volts/amps switch to AMPS and adjust to parameters given in Section 11 by using the wire feed control on the control unit (see Figure 5.3).

SHUTDOWN (100/100E and 200/200E) (Figures 5.3 and 5.5)

Normal Shutdown

1. Release the gun trigger. Wire feed will stop. One second later arc voltage will stop (blue arc voltage status light, located on the front panel of the LCAE Arc Control Unit, control unit, goes off), then one second later atomizing air goes off. This produces a gap between the two wires which reduces the amount of spatter at the next start.

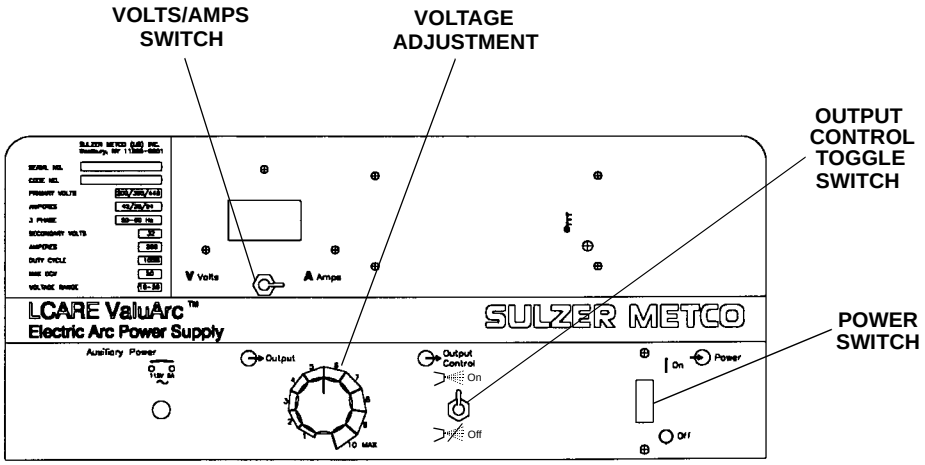


FIGURE 5.5 LCARE ELECTRIC ARC POWER SUPPLY - FRONT PANEL

2. On the operating mode panel of the control unit, press the operating mode pushbutton (light goes off).

3. On the LCARE Electric Arc Power Supply (power supply), turn power switch to the OFF position. Turn off plant electric power to the system. The power source status light, located on the status panel of the control unit, will go off.

4. Turn off plant air supply to system. It is recommended that the air pressure regulator knob on the control unit be backed out.

CAUTION

The Air Line From The Plant Air Supply To The Control Unit Filter Will Remain Pressurized, Even Though The control Unit Is Shutdown And The Plant Air Supply Is Off. Before Performing Maintenance On The Filter Or Before Relocating The control unit, Unscrew The Filter Drain Valve To Bleed Off Air.

Emergency Shutdown

If the operating mode pushbutton is used to stop the operation, electric power to the gun is shut off immediately. At the next start, initial spatter will be greater.

NOTE

Should a plant power failure occur, the system will shut off. If possible, shut off all equipment before plant power is restored.

UNLOADING METALLIZING WIRE (100/100E, 200/200E, 300E) (Figure 5.1)

WARNING

BE SURE ALL ELECTRIC POWER TO THE SYSTEM IS OFF.

1. Remove both left and right control unit side covers. Unlatch upper drive housing from lower drive housing, at both left and right drive housings.

2. At gun, remove arc shield and air cap; cut metallizing wires back to contact tips, to remove any melted portions.

3. Loosen quick release knobs on gun and pull each wire feed conduit from gun.

4. Remove both left and right wire spool covers. Recoil metallizing wire by turning wire spools by hand.

WARNING

TO AVOID PERSONAL INJURY, PREVENT END OF WIRE FROM SPRINGING FREE.

5. For each spool of wire, insert free end of wire in hole on spool to prevent wire from uncoiling.

6. Unscrew each spool knob from spool adapters and remove wire spools.

7. Replace each spool knob.

LCACE (300E) CONTROL UNIT OPERATION

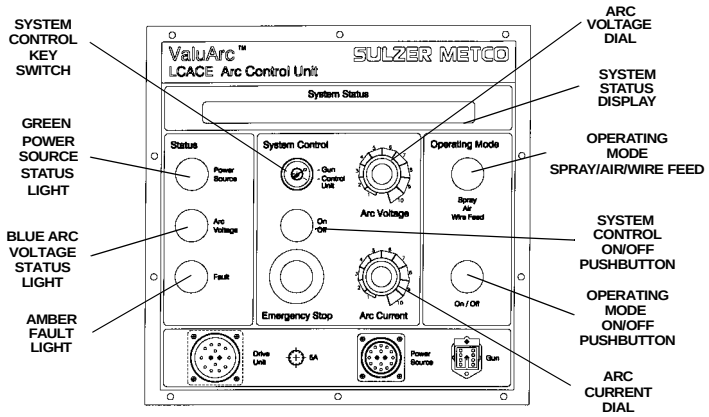
The LCACE (300E) Control Unit (control unit) provides two modes of operation: Control Unit Mode and Gun Mode. In the Control Unit Mode of operation, air and wire feed are controlled from the control unit, while in the Gun Mode of operation, these functions are controlled at the gun, via the gun trigger. The control Unit Mode of operation is described first.

Control Unit Mode

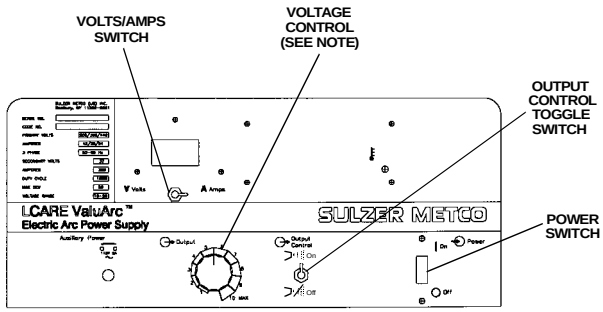
The following describes the Control Unit Mode of operation. Procedures for wire feed setup, air calibration, air setup, spraying setup, and spraying, are given. The wire feed setup procedure is described first.

NOTE

When output control on/off toggle switch is in OFF position, voltage is controlled by LCACE - Voltage control on power supply has no effect.



LCACE ARC CONTROL UNIT - FRONT PANEL

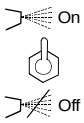


LCARE ELECTRIC ARC POWER SUPPLY - FRONT PANEL

FIGURE 5.6 LCACE (300E) CONTROL UNIT OPERATION

Wire Feed Setup (Figure 5.6)

NOTE



When using the LCARE Electric Arc Power Supply (power supply) with the control unit, make sure the output control toggle switch (see figure at left and Figure 5.6) is set to the OFF (no spray) position. As a reminder, the **CK LCARE SW NO SPRAY** message will be displayed on the control unit's system status display (display) at start-up.

1. Mount the gun so that it points into the spray hood.

2. Turn on the power supply by setting the power switch to the ON (1) position. Ensure output control toggle switch is set to the OFF position. The green power source status light, located

on the front panel of the control unit, will light. The display will read:

SELF TEST IN PROGRESS

If a problem arises during self test, the following message is displayed:

A/D FAILED SELF TEST

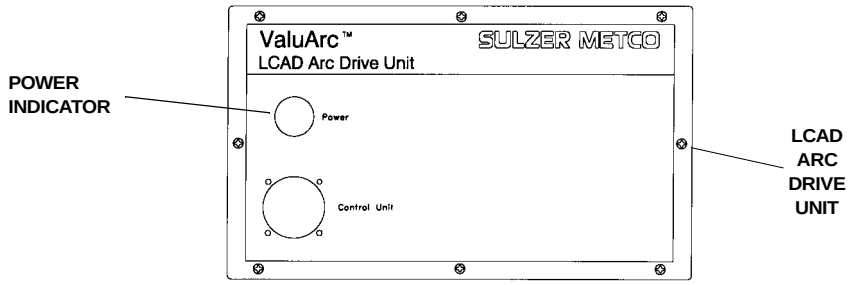
NOTE

If the above message is displayed, contact Sulzer Metco field service.

Otherwise, the display will read:

LAMP TEST

All lamps on the control unit and LCAD Arc Drive Unit (drive unit), shown below, will blink for three seconds.



FRONT PANEL

Then, the display shows the software version for this equipment:

SULZER METCO V1.18

Next, the display will indicate one of five languages selected by a switch on the intelligent board. See Section 4, “LCACE Language Selection,” on how to select a language.

If “English” is selected, for example, the display will read:

ENGLISH LANGUAGE

Then, the display will read:

CK LCARE SW NO SPRAY

This is a reminder that the power supply Output Control toggle switch is in the OFF position.

Next, the display reads:

POWER SOURCE ON

3. Turn control unit system control key Switch to the CONTROL UNIT position.

4. Press control unit system control on/off pushbutton to ON. The display will read:

CONTROL UNIT READY

5. Remove the arc shield, air cap, and locating ring.

6. With the wire feed cables removed from the gun, press operating mode spray/air/wire feed button, located on the front panel of the control unit, until display reads:

WIRE FEED MODE READY

7. Press operating mode on/off pushbutton, located on the front panel of the control unit. The drive unit Power Indicator will light. The display reads:

WIRE FEED MODE IS ON

Wire will begin to feed through wire feed cables. Let wire feed about 6" past end of cables.

WARNING

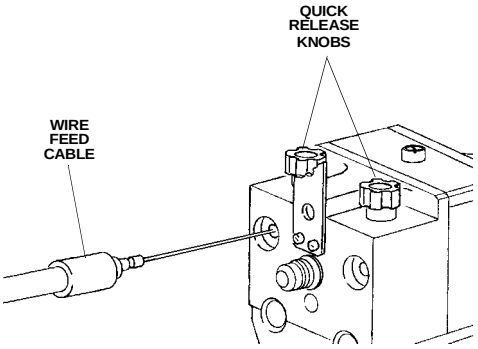
GUN IS NOT IN WIRE FEED MODE IF AIR COMES ON OR BLUE ARC VOLTAGE STATUS LIGHT COMES ON. PRESS OPERATING MODE PUSHBUTTON.

8. Press operating mode on/off pushbutton. Wire will stop feeding.

The display will read:

WIRE FEED MODE READY

9. Loosen quick release knobs on gun. Manually feed wire through contact tubes and tips; shoulder wire feed cables to rear gun body. Tighten quick release knobs.



NOTE: ONLY ONE WIRE FEED CABLE SHOWN FOR CLARITY.

NOTE

Make sure both wires protrude slightly from contact tips but do not touch each other.

10. Make sure the contact tips are securely screwed into the contact tubes, the locating ring is in position, and the contact tubes are securely fastened in the gun head. Make sure the contact tips are seated at the front of the gun and that they are in alignment.

11. Replace the air cap and arc shield securely.

Calibration Procedure for Air (300E) (Figure 5.7)

This calibration procedure is provide to ensure that the transducer in the LCAD and the intelligent board in the LCACE are properly matched.

NOTE

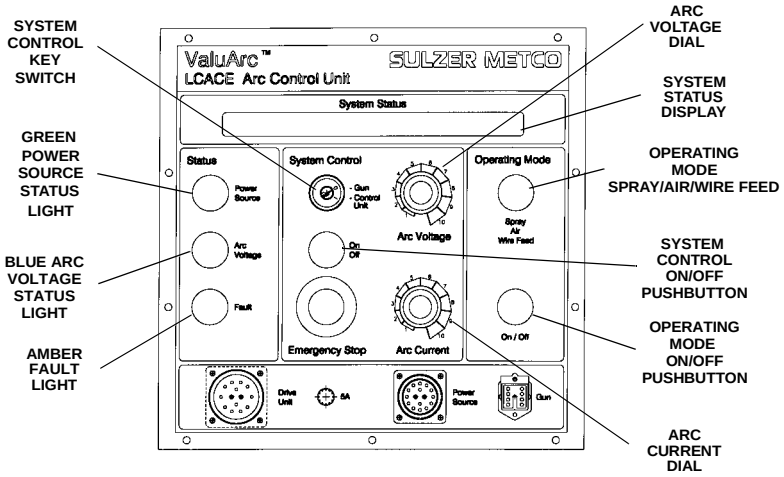
Replacement of the intelligent board or transducer necessitates recalibration of the LCACE Arc Control Unit.

To avoid calibration errors due to drift in electronic component operating parameters, allow equipment to warmup for 15 minutes before performing procedure.

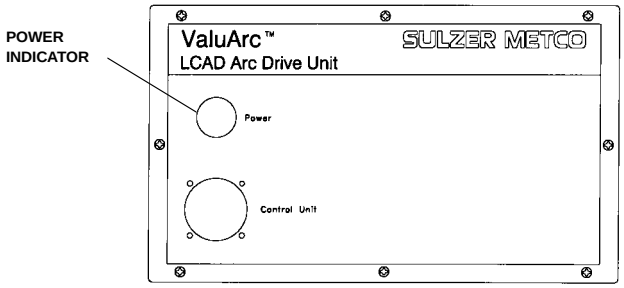
WARNING

ENSURE VENTAILATING SYSTEM IS ON AND IS OPERATING PROPERLY, BEFORE SPRAYING IS BEGUN.

FOLLOW ALL RELEVANT SAFETY MEASURES AS DESCRIBED IN THE SAFETY MEASURES SECTION OF THIS MANUAL.



LCACE ARC CONTROL UNIT - FRONT PANEL



LCAD ARC DRIVE UNIT

FIGURE 5.7 CALIBRATION

1. Press system control on/off pushbutton, located on the front panel of the LCACE ARC Control Unit (control unit), to ON. The system status display (display) will read:

CONTROL UNIT READY

2. Press and hold operating mode on/off pushbutton, located on the front panel of the control unit, for 5 seconds. The display will read:

CALIBRATION MODE

3. Press operating mode on/off pushbutton. The display will read:

SET AIR TO 0 PSI

4. Set air pressure by turning regulator on LCAD ARC Drive Unit (drive unit) to 0 psi. Air pressure can be read on air pressure gauge located on rear panel of drive unit.

5. Press operating mode on/off pushbutton. The display will read:

SET AIR TO 40 PSI

6. Set air pressure by turning regulator on drive unit to 40 psi. Air pressure can be read on air pressure gauge located on rear panel of drive unit.

7. Press operating mode on/off pushbutton. The display will read:

CALIBRATION COMPLETE

The calibration procedure is now completed. If **CALIBRATION ERROR** was displayed in any step, redo calibration.

To reset the control unit:

1. Press system control on/off pushbutton, located on the front panel of the control unit. The display will read:

POWER SOURCE ON

2. Press system control on/off pushbutton. The system control on/off pushbutton should light. The display will read:

CONTROL UNIT READY

Air Setup (Figures 5.6 and 5.8)

1. Turn on the power supply by setting the power switch to the ON (1) position. The power source status light, located on the front panel of the control unit, will light. The display will read:

SELF TEST IN PROGRESS

Then the display will read:

LAMP TEST

All lamps on the control unit and drive unit will blink for three seconds.

Then, the display shows the software version for this equipment:

SULZER METCO V1.18

Next, the display will indicate one of five languages selected by a switch on the intelligent board. See Section 4, “LCACE Language Selection,” on how to select a language.

If “English” was selected, for example, the display will read:

ENGLISH LANGUAGE

The display will then read:

CK LCARE SW NO SPRAY

This is a reminder that the power supply output control toggle switch is in the OFF position.

Next, the display reads:

POWER SOURCE ON

2. Turn system control key switch, located on the front panel of the control unit, to the CONTROL UNIT position.

3. Press control unit system control on/off pushbutton to ON. The display will read:

CONTROL UNIT READY

4. Ensure that plant air is on.

5. Press operating mode spray/air/wire feed pushbutton, located on the front of the control panel, until display reads:

AIR MODE READY

6. Press the operating mode on/off pushbutton, located on the front panel of the control unit. The drive unit Power Indicator will light. The display will read:

AIR MODE IS ON

Only air will flow from the gun. No arc voltage or wire feed will occur.

WARNING

IF MOTOR TURNS ON OR BLUE ARC VOLTAGE STATUS LIGHT COMES ON, GUN IS NOT IN AIR MODE. IMMEDIATELY PRESS OPERATING MODE PUSHBUTTON. THE BLUE ARC VOLTAGE STATUS LIGHT SHOULD GO OUT.

7. After a one second delay, the display will appear similar to the one shown below. Set the air pressure to 40 psi by turning regulator knob on back panel of the drive unit, while monitoring the air pressure gauge.

AIR MODE ON, 40PSI

8. Check display for correct pressure reading. If reading is not in accordance with parameters supplied in Section 11, adjust regulator on rear panel of drive unit.

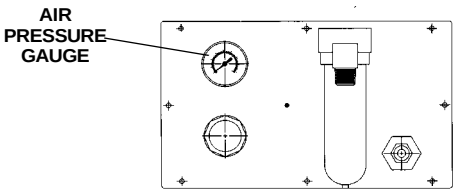


FIGURE 5.8 DRIVE UNIT – REAR PANEL

9. Press control unit operating mode on/off pushbutton. Air will stop flowing and the display will read:

AIR MODE READY

Spraying Setup (Figures 5.6 and 5.8)

The gun should be positioned four to six inches (10.16cm to 15.24cm) away from the surface to be sprayed. When spraying small parts, the Sulzer Metco Type 2AJ Air Blast Cooler is recommended.

NOTE

Ensure that wire is cut back to gun contact tips. Also, check that all wire clamping mechanisms are engaged.

1. Turn on the power supply by setting the power switch to the ON (1) position. The Power source status light, located on the front panel of the control unit, will light. The display will read:

SELF TEST IN PROGRESS

Then the display will read:

LAMP TEST

All lamps on control unit and drive unit will blink for three seconds.

Then, the display shows the software version for this equipment:

SULZER METCO V1.18

Next, the display will indicate one of five languages selected by a switch on the intelligent board. See Section 4, “LCACE Language Selection,” on how to select a language.

If “English” is selected, for example, the display will read:

ENGLISH LANGUAGE

The display will then read:

CK LCARE SW NO SPRAY

This is a reminder that the power supply output control toggle switch is in the OFF position. Next, the display reads:

POWER SOURCE ON

2. Turn system control key switch, located on the front panel of the control unit, to the CONTROL UNIT position.

3. Press system control on/off pushbutton, located on the front panel of the control unit, to ON. The display will read:

CONTROL UNIT READY

4. At the control unit, set arc voltage according to the spray parameters provided in Section 11.

5. At the control unit, set arc current to position **6**.

Spraying (Figures 5.6 and 5.8)

WARNING

ENSURE VENTAILATING SYSTEM IS ON AND IS OPERATING PROPERLY, BEFORE SPRAYING IS BEGUN.

EAR PROTECTION MUST BE WORN.

EYE PROTECTION MUST BE WORN.

RESPIRATORY EQUIPMENT MUST BE WORN.

FOLLOW ALL RELEVANT SAFETY MEASURES AS DESCRIBED IN THE SAFETY MEASURES SECTION OF THIS MANUAL.

1. Perform “Spraying Setup” procedure, above.

NOTE

Starting and stopping the spray stream produces spatter. Always move the gun well away from the work piece at these times.

2. Be sure power supply output control toggle switch is set to the OFF position, for remote operation.

3. Press operating mode spray/air/wire feed button, located on the front panel of the control unit, until display reads:

SPRAY MODE READY

NOTE

If operating mode on/off pushbutton is held when **SPRAY MODE READY** is displayed, unit will not spray and display will read **000 AMP 30V 40PSI**, for example. The voltage displayed is open circuit voltage (no load) that can be adjusted 3 to 6 volts higher than voltage required by parameters. Unit will spray, when operating mode on/off pushbutton is released.

4. Press the operating mode on/off pushbutton, located on the front panel of the control unit. The drive unit power indicator will light. The spray sequence will start after a one second delay. Air will turn on, then the blue arc voltage status light, located on the status panel of the control unit, will light. One second later, the motor will feed wire and the gun will begin spraying. The display will cycle through the following messages:

SPRAY MODE AIR ON

SPRAY MODE ARC ON

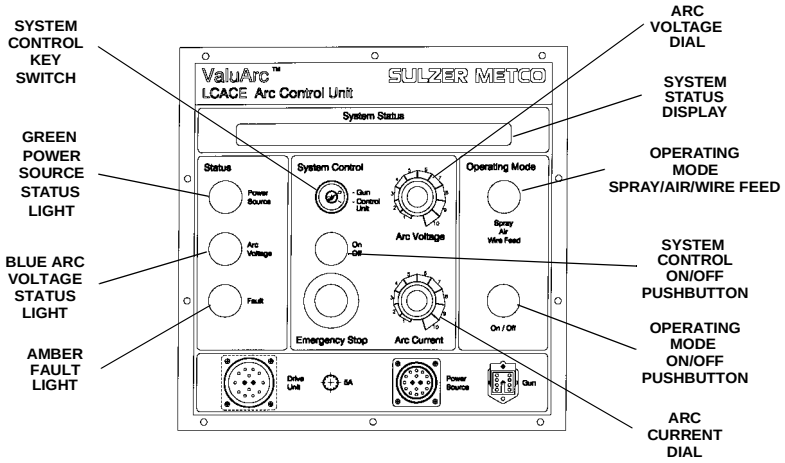
SPRAY MODE WIRE ON

After a one second delay, the display will indicate values of amperes, volts, and air pressure like the sample display shown below (actual values will be those set by the operator):

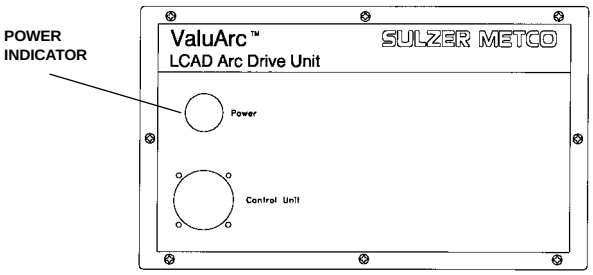
200AMPS 30V 40PSI

Gun Mode

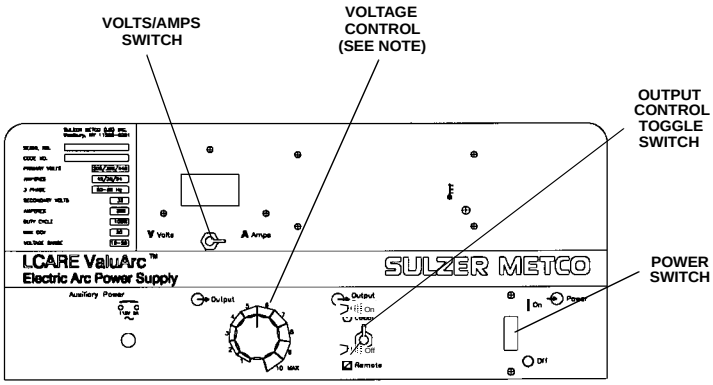
The following describes the gun mode of operation. Procedures for wire feed setup, air setup, and spraying are provided. The air setup procedure is described first.



LCACE ARC CONTROL UNIT – FRONT PANEL



LCAD ARC DRIVE UNIT – FRONT PANEL



LCARE ELECTRIC ARC POWER SUPPLY

FIGURE 5.9 GUN MODE OPERATION

Air Setup (Figure 5.9)

1. Press gun handle trigger twice and hold. Air will flow from front of gun. The Power Indicator, located on the front panel of the LCAD ARC Drive Unit (drive unit) will light. The system status display (display) will read:

AIR MODE IS ON

2. Release gun handle trigger. Air stops. Drive unit power indicator goes off. Display will read:

GUN READY

Wire Feed Setup (Figure 5.9)

1. Press gun handle trigger three times and hold. Wire will feed from front of gun. Drive unit power indicator goes on. Display will read:

WIRE MODE IS ON

2. Release gun handle trigger. Wire will stop feeding. Drive unit power indicator goes off. Display will read:

WAIT

Then display will read:

GUN READY

3. Press system control on/off pushbutton. Light goes out. Display will read:

POWER SOURCE ON

4. Turn off power supply. Power source status light goes off. Display goes off.

NOTE

When using the LCARE Electric Arc Power Supply (power supply) with the control unit, make sure the output control toggle switch is set to the OFF position. The message **CK LCARE SW NO SPRAY** will be displayed at start-up, as a reminder.

Spraying (Figure 5.9)

WARNING

ENSURE VENTAILATING SYSTEM IS ON AND IS OPERATING PROPERLY, BEFORE SPRAYING IS BEGUN.

EAR PROTECTION MUST BE WORN.

EYE PROTECTION MUST BE WORN.

RESPIRATORY EQUIPMENT MUST BE WORN.

FOLLOW ALL RELEVANT SAFETY MEASURES AS DESCRIBED IN THE SAFETY MEASURES SECTION OF THIS MANUAL.

NEVER LEAVE RUNNING EQUIPMENT UNATTENDED.

1. Mount the gun so that it points into the spray hood.

2. Turn on the power supply by setting the power switch to the ON (1) position. Ensure output control toggle switch, located on the front panel of the power supply, is set to the Off position. The green power source status light, located on the front panel of the control unit, will light. The display will read:

SELF TEST IN PROGRESS

If a problem arises during self test, the following message is displayed:

A/D FAILED SELF TEST

NOTE

If the above message is displayed, contact Sulzer Metco field service.

Otherwise, the display will read:

LAMP TEST

All lamps on the control unit and drive unit will blink for three seconds. Then, the display shows the software version for this equipment:

SULZER METCO V1.18

Next, the display will indicate one of five languages selected by a switch on the intelligent board. See Section 4, “LCACE Language Selection,” on how to select a language.

If “English” is selected, for example, the display will read:

ENGLISH LANGUAGE

Then the display will read:

CK LCARE SW NO SPRAY

This is a reminder that the output control toggle switch is in the OFF (no spray) position. This message is displayed for approximately 5 seconds.

Next, the display reads:

POWER SOURCE ON

3. Set system control key switch, located on the front panel of the control unit, to GUN.

4. Press system control on/off pushbutton, which should then light. The display will read:

GUN READY

5. Check that Arc Current is set to **6**.

6. Check that Arc Voltage is set to **8**.

7. Press gun handle trigger once and hold. The drive unit power indicator will light. The message display will read:

SPRAY MODE AIR ON

After approximately one second, the display will read:

SPRAY MODE ARC ON

The blue arc voltage status light, located on the front panel of the control unit, should light. The display will read:

SPRAY MODE WIRE ON

After approximately one second, the display will read:

SPRAY MODE IS ON

NOTE

The sequence will start after a one second delay. Air will turn on, then the blue arc voltage status light will light. One second later, the motor will feed wire and the gun will begin spraying.

After a one second delay, the display will read:

200AMPS 30V 40PSI

8. Adjust amperage to 200, if needed.

9. Adjust air pressure to 40, if needed.

Display should read:

200AMPS 30V 40PSI

10. Release gun handle trigger. Spray stops. The display reads:

SPRAY MODE WIRE OFF

11. Adjust voltage to 30, if needed. The drive unit power indicator will go off. After a one second delay, the display will read:

SPRAY MODE ARC OFF

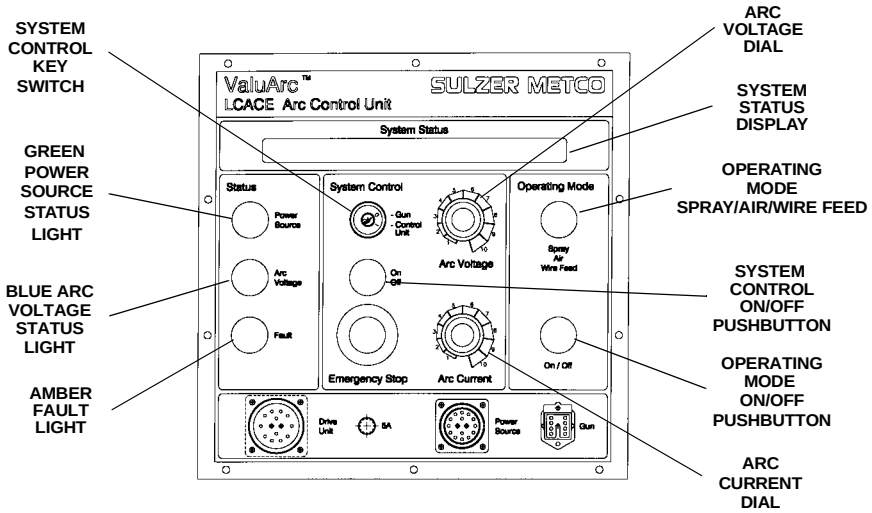
The blue arc voltage status light should go off. After a one second delay, the display will read:

SPRAY MODE AIR OFF

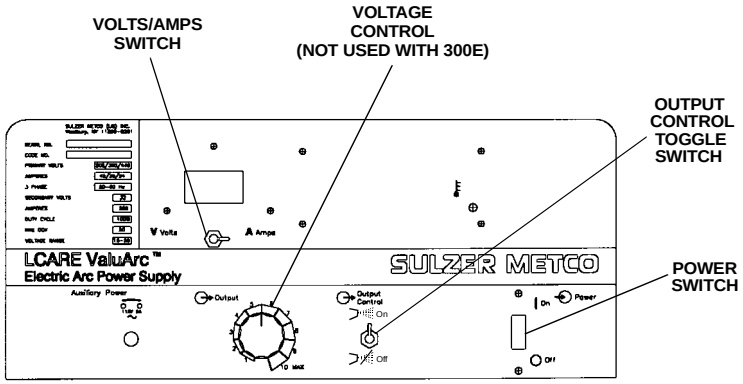
After a one second delay, the display will read:

GUN READY

SHUTDOWN (300E) (Figure 5.10)



LCACE ARC CONTROL UNIT



LCARE ELECTRIC ARC POWER SUPPLY

FIGURE 5.10 SHUTDOWN (300E)

There are four ways to stop spraying from the controller. They are as follows:

First Method (Normal Shutdown)

1. Press operating mode on/off pushbutton, located on the front panel of the LCACE Arc Control Unit (control unit). The display will cycle through the following messages:

SPRAY MODE FEED OFF
SPRAY MODE ARC OFF
SPRAY MODE AIR OFF
SPRAY MODE READY

   Wire feed will stop. One second later, arc voltage will stop (blue arc voltage status light, located on the front panel of the control unit, goes off). Then one second later, atomizing air goes off. This produces a gap between the two wires which reduces the amount of spatter at the next start.

2. On the LCARE Electric Arc Power Supply (power supply), set power switch to the OFF position. Turn off plant electric power to the system. The green power source status light, located on the front panel of the control unit, and LCAD ARC Drive Unit (drive unit) power indicator will go off.

3. Turn off plant air supply to system. It is recommended that the air pressure regulator knob on the control unit be backed out.

CAUTION

The Air Line From The Plant Air Supply To The Control Unit Filter Will Remain Pressurized Even Though The Control Unit Is Shutdown And The Plant Air Supply Is Off. Before Performing Maintenance On The Filter Or Before Relocating The Control Unit, Unscrew The Filter Drain Valve To Bleed Off Air.

Second Method (Normal Shutdown)

1. Press operating mode spray/air/wire feed pushbutton, located on the front panel of the control unit. The display will cycle through the following messages:

SPRAY MODE WIRE OFF
SPRAY MODE ARC OFF
SPRAY MODE AIR OFF
SPRAY MODE READY

Wire feed will stop. One second later, arc voltage will stop (blue arc voltage status light, located on the front panel of the control unit, goes off). Then, one second later, atomizing air goes off. This produces a gap between the two wires which reduces the amount of spatter at the next start.

2. On the power supply, set power switch to the OFF position. Turn off plant electric power to the system. The green power source status light, located on the front panel of the control unit, and drive unit power indicator will go off.

3. Turn off plant air supply to system. It is recommended that the air pressure regulator knob on the control unit be backed out.

CAUTION

The Air Line From The Plant Air Supply To The Control Unit Filter Will Remain Pressurized Even Though The control Unit Is Shutdown And The Plant Air Supply Is Off. Before Performing Maintenance On The Filter Or Before Relocating The control unit, Unscrew The Filter Drain Valve To Bleed Off Air.

Third Method (Normal Shutdown)

1. Press system control on/off pushbutton, located on the front panel of the control unit. The display will read:

POWER SOURCE ON

Electric power to the gun is shut off immediately. At the next start, initial spatter will be greater.

Fourth Method (Emergency Shutdown)

If the emergency stop pushbutton is used to stop the operation, electric power to the gun is shut off immediately. At the next start, initial spatter will be greater.

NOTE

Should a plant power failure occur, the system will shut off. If possible, shut off all equipment before plant power is restored.

UNLOADING METALLIZING WIRE (300E)

Refer to the procedure given on page 5-11.

FAULT INDICATION (300E)

The following table provides the fault indications (and their meaning) that may be displayed by the 300E during operation.

Fault Indication	Meaning
PRIMARY PRESSURE LOW	No air pressure, or lower than 15 psi
EMERGENCY STOP	E-Stop pressed
ARC FAILURE	No arc at gun, zero voltage, Zero Amps, over-amperage
SYSTEM SWITCH STUCK	Key switch damaged
A/D FAILED SELF TEST	Analog-to-digital converter IC on intelligent board has failed
CALIBRATION ERROR	When in calibration mode, incorrect value for 0 or 40 psi set. Redo calibration.
MOTOR OVERLOADED	Push motor over-amperage. Check wire feed system for restrictions.

REMOTE OPERATION (300E)

The 300E provides for remote spraying, through the use of a remote switching device (relay, momentary switch, etc.) connected to the intelligent board.

WARNING

WHEN UNIT IS REMOTELY OPERATED, EMERGENCY STOP CIRCUIT MUST BE CONNECTED.

NOTE

The remote switching device, connection wire, and jumper wire are customer supplied items.

To prepare the 300E for remote operation, refer to Figure 5.11 and proceed as follows:

1. Add jumper wire between terminals TB4-10 and TB4-9.

2. Connect leads of momentary switching device (separate pulse on, separate pulse off) to terminals TB4-5 and TB4-8.

3. Connect leads of momentary switching device to terminals TB4-5 and TB4-8.

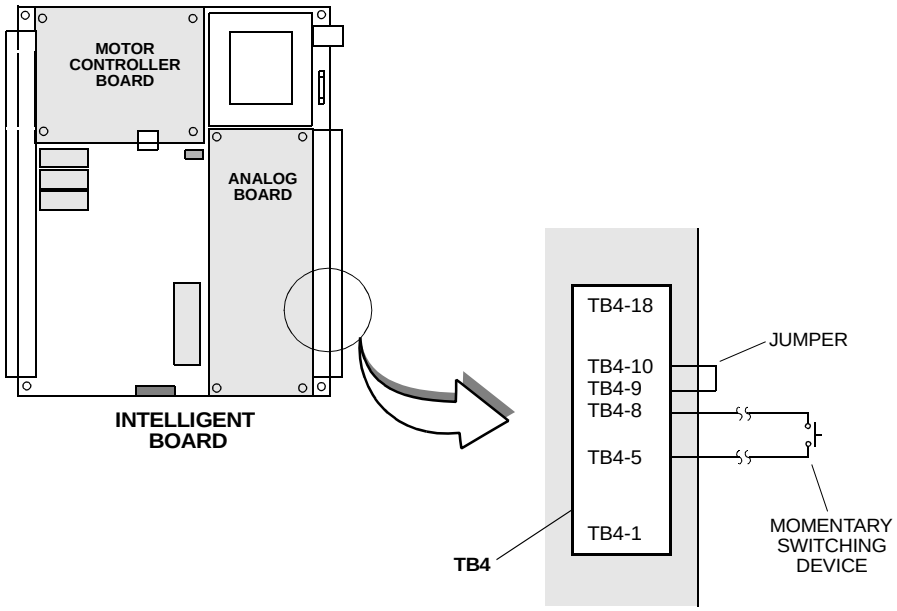


FIGURE 5.11 REMOTE OPERATION – SETUP

To set parameters:

Using the operating mode spray/air/wirefeed pushbutton, set 300E to Remote Mode Ready. The control unit's system status display (display) will read:

REMOTE MODE READY

NOTE

The remote switching device can only turn on or off spraying (normal sequence) when 300E is in Remote Ready Mode and **REMOTE MODE READY** is displayed.

Remote Mode Start-up

Press control unit operating mode on/off pushbutton. The display will read:

REMOTE READY

At this time, no other activity should occur. The remote switching device can now be used to start/ stop spraying.

Remote Shutdown

There are four ways to stop spraying during remote operation. They are as follows:

Remote Switching Device Activated

1. When the remote switching device is activated, the display will cycle through the following messages:

   SPRAY MODE WIRE OFF

   SPRAY MODE ARC OFF

   SPRAY MODE AIR OFF

   REMOTE READY

   Wire feed will stop. One second later, arc voltage will stop (blue arc voltage status light, located on the front panel of the control unit, goes off). Then one second later, atomizing air goes off. This produces a gap between the two wires which reduces the amount of spatter at the next start.

2. On the LCARE Electric Arc Power Supply (power supply), set power switch to the OFF position. Turn off plant electric power to the system. The green power source status light, located on the front panel of the control unit, and LCAD ARC drive unit power indicator will go off.

3. Turn off plant air supply to system. It is recommended that the air pressure regulator knob on the control unit be backed out.

CAUTION

The Air Line From The Plant Air Supply To The Control Unit Filter Will Remain Pressurized Even Though The control Unit Is Shutdown And The Plant Air Supply Is Off. Before Performing Maintenance On The Filter Or Before Relocating The Control Unit, Unscrew The Filter Drain Valve To Bleed Off Air.

Operating Mode Spray/Air/Wire Feed or On/Off Pushbutton Pressed

1. When either the operating mode spray/air/wire feed or on/off pushbutton is pressed, the display will cycle through the following messages:

SPRAY MODE WIRE OFF

SPRAY MODE ARC OFF

SPRAY MODE AIR OFF

REMOTE READY

Wire feed will stop. One second later, arc voltage will stop (blue arc voltage status light, located on the front panel of the control unit, goes off). Then one second later, atomizing air goes off. This produces a gap between the two wires which reduces the amount of spatter at the next start.

2. On the power supply, set power switch to the OFF position. Turn off plant electric power to the system. The green power source status light, located on the front panel of the control unit, and drive unit power indicator will go off.

3. Turn off plant air supply to system. It is recommended that the air pressure regulator knob on the control unit be backed out.

CAUTION

The Air Line From The Plant Air Supply To The Control Unit Filter Will Remain Pressurized Even Though The control Unit Is Shutdown And The Plant Air Supply Is Off. Before Performing Maintenance On The Filter Or Before Relocating The control unit, Unscrew The Filter Drain Valve To Bleed Off Air.

System Control On/Off Pushbutton Pressed

1. Press system control on/off pushbutton, located on the front panel of the control unit. The display will read:

POWER SOURCE ON

Electric power to the gun is shut off immediately. At the next start, initial spatter will be greater.

E-Stop Pushbutton Pressed

If the emergency stop pushbutton is used to stop the operation, electric power to the gun is shut off immediately. At the next start, initial spatter will be greater.

NOTE

Should a plant power failure occur, the system will shut off. If possible, shut off all equipment before plant power is restored.

Remote E-Stop Connection

A remote E-Stop may be added to the 300E. To prepare the 300E for remote E-Stop operation, refer to Figure 5.12 and proceed as follows:

1. Remove jumper from between terminals TB6-10 and TB6-9.

2. Connect leads of remote E-Stop switch to terminals TB2-1 and TB6-10.

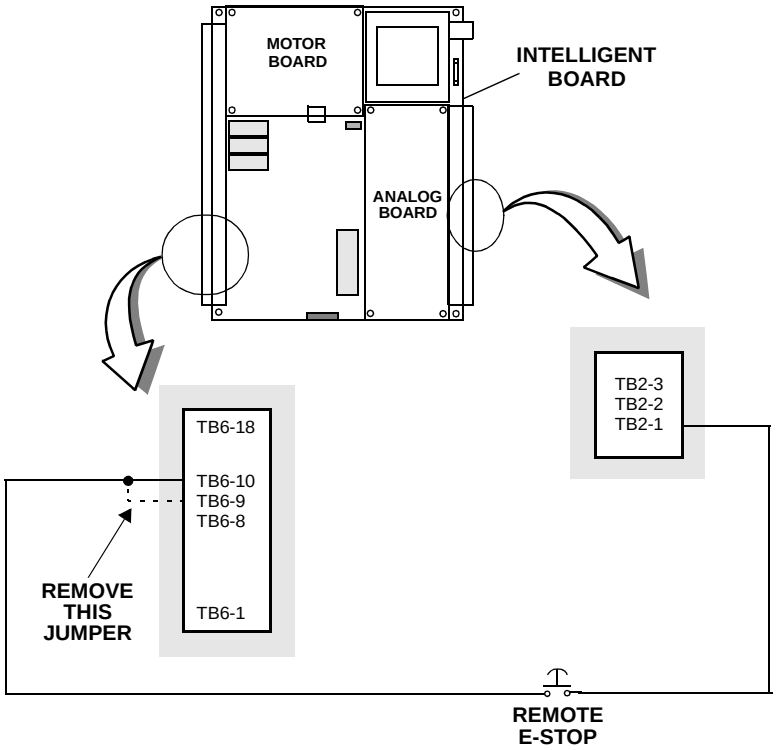


FIGURE 5.12 REMOTE E-STOP – SETUP

GUN PERFORMANCE (100/100E, 200/200E, 300E)

To maintain the good spray performance of the gun, note the following:

Contact Tips Life of the tips vary with the amperage level, wire type, how straight the wire is (if wire straighteners are used for hard wires), and whether standard or long life tips are used. In heavy production spraying of hard wires, long life tips are recommended. Check the condition of the tips periodically, depending on usage. Tips which show signs of wear should be replaced (fluctuations in arc current is an indication of excessive tip wear).

NOTE

Use of incorrect tips will adversely affect the performance of the gun. Always check that the correct tips for wire size and type of wire are used.

Contact Tubes Depending on the type of wire, surface condition of the wire, and amperage levels, periodic cleaning of the contact tubes is required. Usually soft and/or dirty wire will require a more frequent cleaning interval. Establish guidelines for your own cleaning schedule.

NOTE

Dirty wire will adversely affect the performance of the gun. Avoid using such wire or be prepared for frequent maintenance.

Wire Drive Rollers Control unit lower groved drive rollers should be checked regularly for metal chip "caking." This is particularly true for soft wires, such as aluminum, than for the harder wires. It may be necessary to remove this caked material once a day or every 4-6 hours of spray time.

NOTE

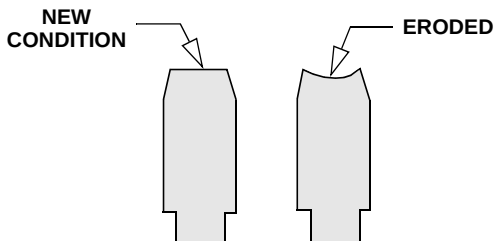
Incorrect size of grooved rollers will adversely affect the performance of the gun. Always check that the correct rollers are used when the wire size is changed.

Air Caps The orifice of air caps should be kept free of any accumulations of spray material. Accumulations may be the result of severe deviations from spray parameters. They may also indicate a malfunction in the arc system.

NOTE

The orifice edges of air caps will erode with time even though they are of a hardened material. The rate of erosion depends on the type of wire being sprayed and the amperage level. To ensure consistency of coating quality, periodically check the condition of the air cap orifice.

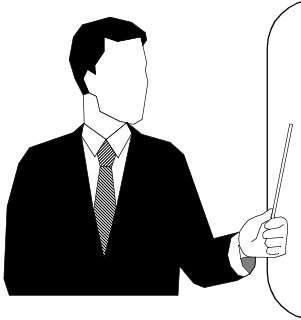
Centering Post The front of the centering post (see below) can erode over time under high production operating conditions. Check regularly and replace centering post if necessary. A worn centering post can adversely affect coatings.



Wire Lubrication Due to the nature of soft arc wire (zinc, aluminum, babbitt), lubrication of this type of wire is required. For this purpose, wire feed lubricator pads are available. Use of these pads accomplishes the following:

- Cleans wire of dust and other contaminants, thus allowing better contact at contact tips and tubes.

- Lubricates wire, lowering coefficient of friction. Less force is thus required by wire drive motor to push wire through wire feed cables.



Wire feed lubricator pads should be changed when they become dirty.

Depending on the quality of wire and gun parameters, lubricator pads should be repositioned to expose a clean area of pad. For example, with 14ga zinc arc wire, they should be repositioned every twenty minutes when wire becomes very dirty.

SECTION 6

DISASSEMBLY AND ASSEMBLY

Table of Contents

GENERAL

Normal operation of the LCAG and LCAGM Electric Arc Spray Guns will eventually require their disassembly and reassembly to allow for the replacement of various parts and assemblies. The necessary disassembly and assembly procedures are provided in this section.

NOTE

The information provided in this section applies to both the LCAG and LCAGM Electric Arc Spray Guns, unless otherwise noted.

The gun is made up of the following main assemblies:

Gun Head – consists of the arc shield, air cap body, air cap insert, contact tubes, contact tips, locating ring, centering post, and electrode posts.

Rear Gun Body – consists mainly of air and wire feed connections.

PRELIMINARY PROCEDURES (FIGURE 6.1)

Before performing the removal procedures presented in this section:

a. Loosen quick release knobs and remove both wire feed cables (only one shown) form rear gun body.

b. Remove air hose (not shown) from air hose fitting.

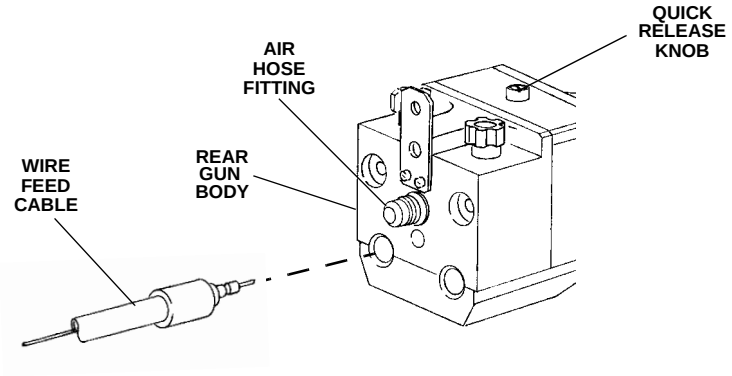


FIGURE 6.1

To complete the installation procedures given below, prior to gun use do the following:

a. Install wire feed cables. Secure by tightening quick release knobs.

b. Install air hose on air hose fitting.

AIR CAP BODY, LOCATING RING, AND CONTACT TIPS REMOVAL/ INSTALLATION (FIGURE 6.2)

To remove air cap body, locating ring, and contact tips:

1. Unscrew and pull the arc shield and air cap body (with air cap insert) forward and off the gun head, exposing the locating ring and the contact tips.
2. Using the finger groove, pull the locating ring forward, off the gun head.

3. Using the wrench provided, unscrew the contact tips from the contact tubes.

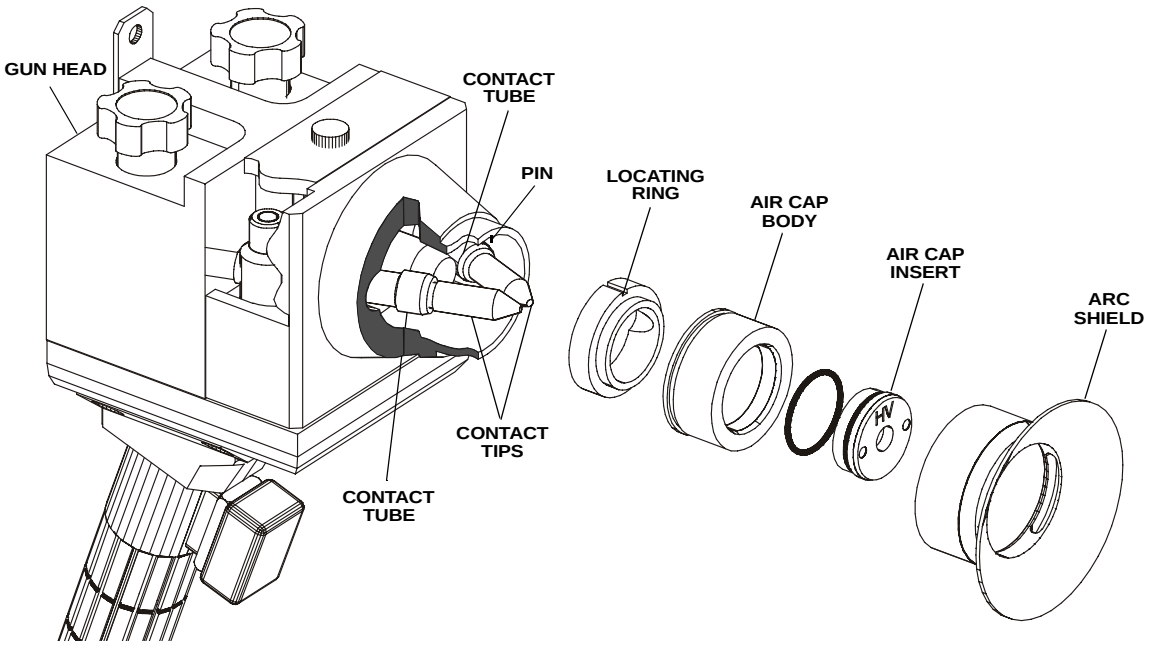


FIGURE 6.2

To install air cap body, locating ring, contact tips:

1. Screw contact tips on contact tubes; use wrench (provided) to tighten.
2. Align notch in locating ring with pin on gun head and press locating ring onto gun head.
3. Install air cap body (with air cap insert) on gun head.
4. Screw arc shield to gun head.

CONTACT TUBES REMOVAL/INSTALLATION (FIGURES 6.2 AND 6.3)

To remove the contact tubes:

1. Unscrew and pull the arc shield and air cap body (with air cap insert) forward and off the gun head, exposing the locating ring and the contact tips.
2. Using the finger groove, pull the locating ring forward, off the gun head.
3. Loosen captive screw that secures gun cover; remove gun cover.
4. Using a hex key, loosen set screw on each electrode post (only one electrode post shown).

5. Pull each contact tube by the contact tip from the gun head.

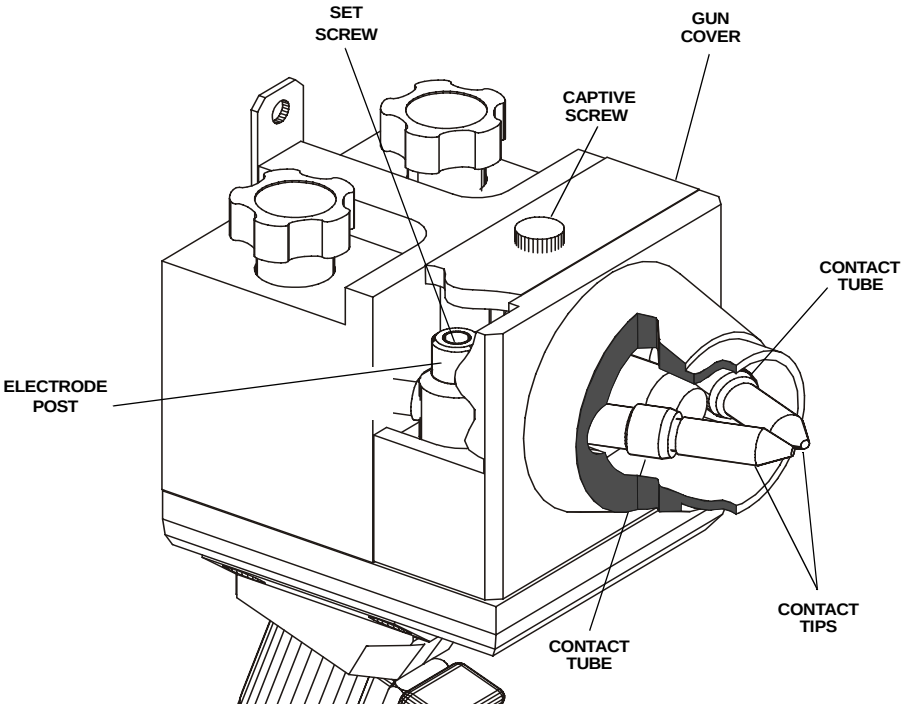


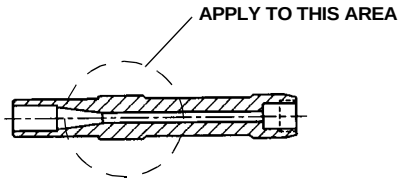
FIGURE 6.3

To install contact tubes:

NOTE

Before installing contact tubes, contact tips should be installed on contact tubes.

1. Apply Ringlube to each contact tube, as shown below.



2. Ensure hole in each electrode post is aligned with corresponding hole in gun head.
3. From front of gun head, push contact tubes, one at a time, toward rear of gun head through holes in gun head and electrode posts, until each contact tube shoulders in the electrode post.
4. Using a hex key, tighten set screw on each electrode post.
5. Replace gun cover; secure using captive screw.

6. Align notch in locating ring with pin on gun head, and press locating ring onto gun head.
7. Install air cap body (with air cap insert) on gun head.
8. Screw arc shield to gun head.

AIR CAP INSERT REMOVAL/INSTALLATION (FIGURE 6.2)

To remove the air cap insert:

1. Unscrew the arc shield and pull the air cap body forward and off the gun head.
2. Using a spanner wrench, remove air cap insert from air cap body.

To install the air cap insert:

1. Using a spanner wrench, install air cap insert (with o-ring) on air cap body.
2. Place air cap body on gun head over locating ring.
3. Screw arc shield onto gun head.

CENTERING POST REMOVAL/INSTALLATION (FIGURE 6.4)

To remove the centering post:

1. Remove contact tubes. Refer to applicable removal procedure.
2. Remove four screws that secure handle to lower cover; remove handle.
3. Remove four screws that secure lower cover to gun; remove lower cover.
4. Remove two screws that secures rear gun body to gun head assembly; separate rear gun body from gun head assembly.
5. Remove centering post mounting screw that secures centering post to gun head assembly; remove centering post.

To install the centering post:

1. Insert centering post into gun head assembly. Secure centering post using centering post mounting screw.
2. Secure rear gun body to gun head assembly, using two screws.
3. Secure lower cover to gun using four screws.
4. Secure handle to lower cover using four screws.
5. Install contact tubes. Refer to applicable installation procedure.

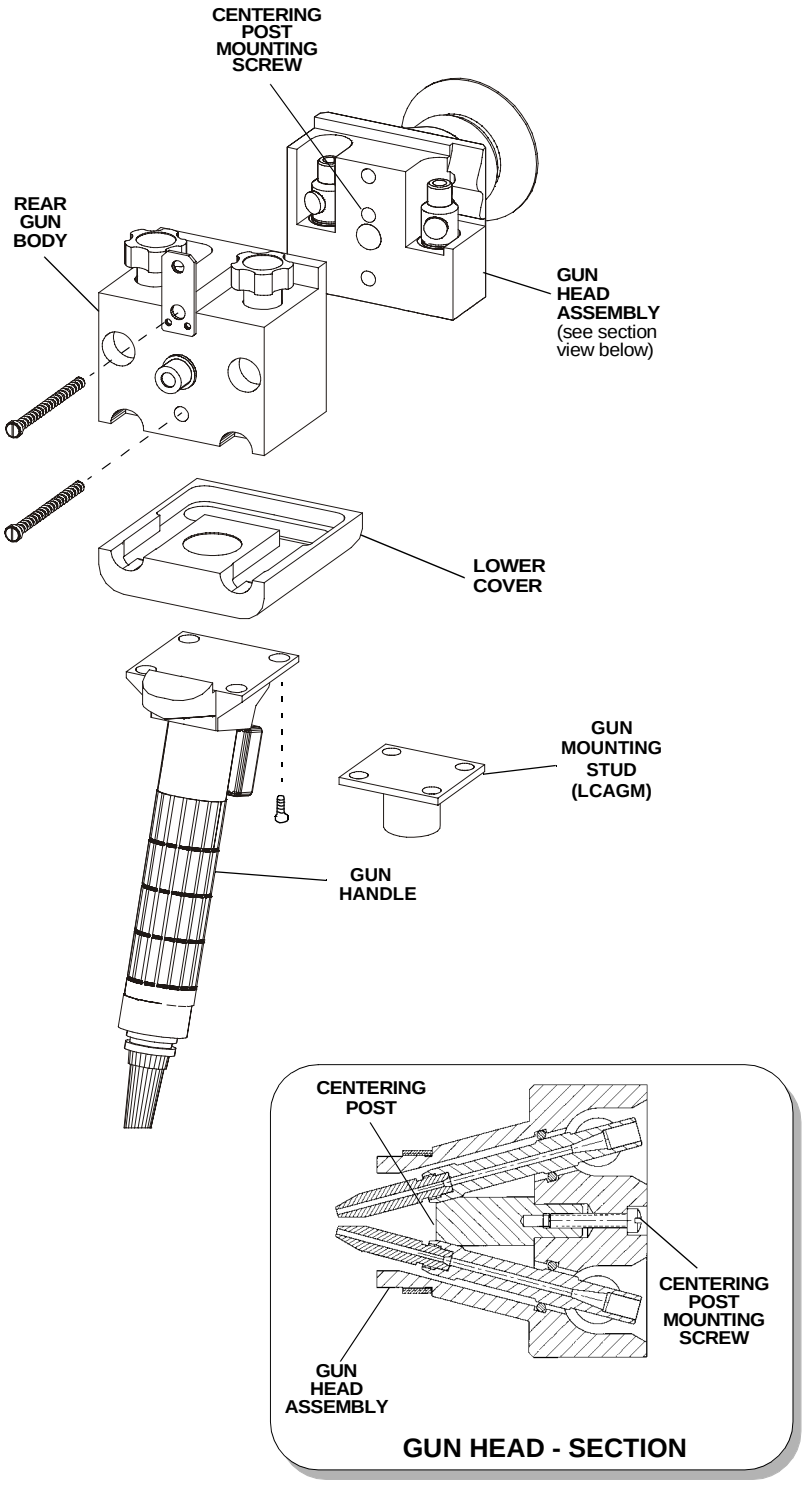

CENTERING POST MOUNTING SCREW
REAR GUN BODY
GUN HEAD ASSEMBLY (see section view below)
LOWER COVER
GUN MOUNTING STUD (LCAGM)
GUN HANDLE
CENTERING POST
CENTERING POST MOUNTING SCREW
GUN HEAD ASSEMBLY
GUN HEAD - SECTION

FIGURE 6.4

ELECTRODE POSTS REMOVAL/INSTALLATION (FIGURE 6.5)

To remove the electrode posts:

1. Remove contact tubes. Refer to applicable removal procedure.
2. Remove four screws that secure handle to lower cover; remove handle.
3. Remove four screws that secure lower cover; remove lower cover.
4. Remove two screws that secure rear gun body to gun head assembly. Separate rear gun body from gun head assembly.
5. Remove DC cables from electrode posts by removing attaching hardware.
6. Remove retaining ring from each electrode post.
7. Push down (toward bottom of gun head) on each electrode post – one at a time – and remove each electrode post from gun head assembly.

To install electrode posts:

1. Apply Ringlube to the two o-rings on each electrode post.
2. Insert electrode posts into corresponding holes in gun head assembly.
3. Secure each electrode post with a retaining ring.
4. Install contact tubes. Refer to applicable installation procedure.
5. Install DC cables on electrode posts. Secure DC cables using attaching hardware.
6. Secure rear gun body to gun head assembly using two screws.
7. Install lower cover with DC cables routed through holes in lower cover. Secure using four screws.

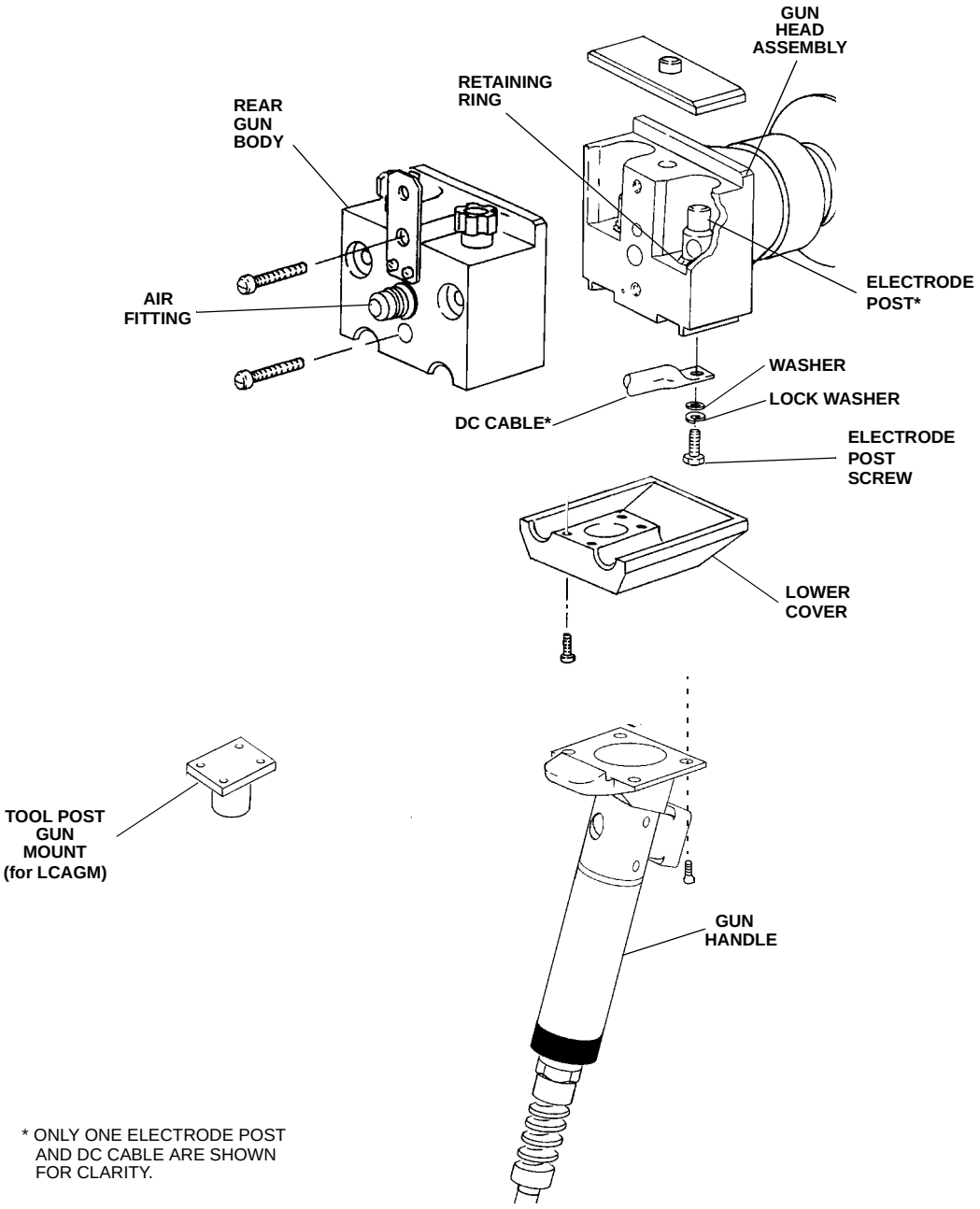

GUN
HEAD
ASSEMBLY
RETAINING
RING
REAR
GUN
BODY
AIR
FITTING
ELECTRODE
POST*
WASHER
LOCK WASHER
DC CABLE*
ELECTRODE
POST
SCREW
LOWER
COVER
TOOL POST
GUN
MOUNT
(for LCAGM)
GUN
HANDLE
* ONLY ONE ELECTRODE POST
AND DC CABLE ARE SHOWN
FOR CLARITY.

FIGURE 6.5

WIRE FEED LINER REPLACEMENT (Figure 6.6)

NOTE

Use LCAH55812 wire feed liner package. Includes tubing (120 ft., 36.4m) and ten ferrules/sleeves.

1. Ensure that no wire is in the wire feed liner.
2. Remove cable assembly from gun.
3. Remove nut from cable assembly at control unit mounting block.
4. Lay wire feed cable assembly out in a straight line on a flat surface and remove liner ferrule nut.
5. Pull liner out from cable assembly.
6. Cut a piece of cable to the length specified in the table below:

CABLE LENGTH	CUT LINER TO LENGTH
13.1 ft (4m)	13.5 ft (4.1m)

7. Push liner through cable until it bottoms in far side wire guide.
8. Push in required additional length of liner (see table below) before securing.

CABLE	LINER LENGTH	ADDITIONAL LINER LENGTH
13.1 ft (4m)	13.5 ft (4.1m)	3/4" - 1¼" (1.9cm - 3.2cm)

CAUTION

Take Care Not To Overtighten Nut Or Distort Liner.

9. Put ferrule on liner, and tighten ferrule nut to assemble liner to conduit assembly.
10. Trim liner to dimension shown in Figure 6.6.

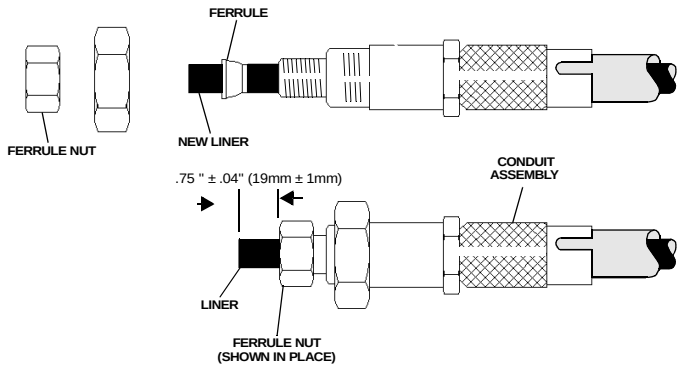


FIGURE 6.6

INTELLIGENT BOARD REMOVAL AND REPLACEMENT

Required Tools

Small, Screwdriver
Phillips Screwdriver
Wire Cutter/Stripper
Socket Wrench (5/16”)

Refer to Figure 6.7 and perform the following steps:

CAUTION

The Intelligent Board And Its Components Can Be Damaged By Static Discharge. Always Wear A Grounding Wrist Strap When Handling The Intelligent Board.

WARNING

DISCONNECT ALL ELECTRIC POWER TO THE CONTROL UNIT, BEFORE PERFORMING REMOVAL, INSTALLATION, AND REWIRING PROCEDURES.

1. Remove LCACE Electric Arc Control Unit front panel.
2. Disconnect ribbon cable from intelligent board.
3. Remove plug (with attached wires) from mating plug on motor controller board.
4. Remove connectors (with attached wires) from intelligent board.
5. Remove two hex nuts from bracket.
6. Remove four mounting screws.
7. Remove intelligent board from control unit.
8. Secure new intelligent board to control unit chassis using four mounting screws and two hex nuts.
9. Install connectors (with attached wires) on new intelligent board.

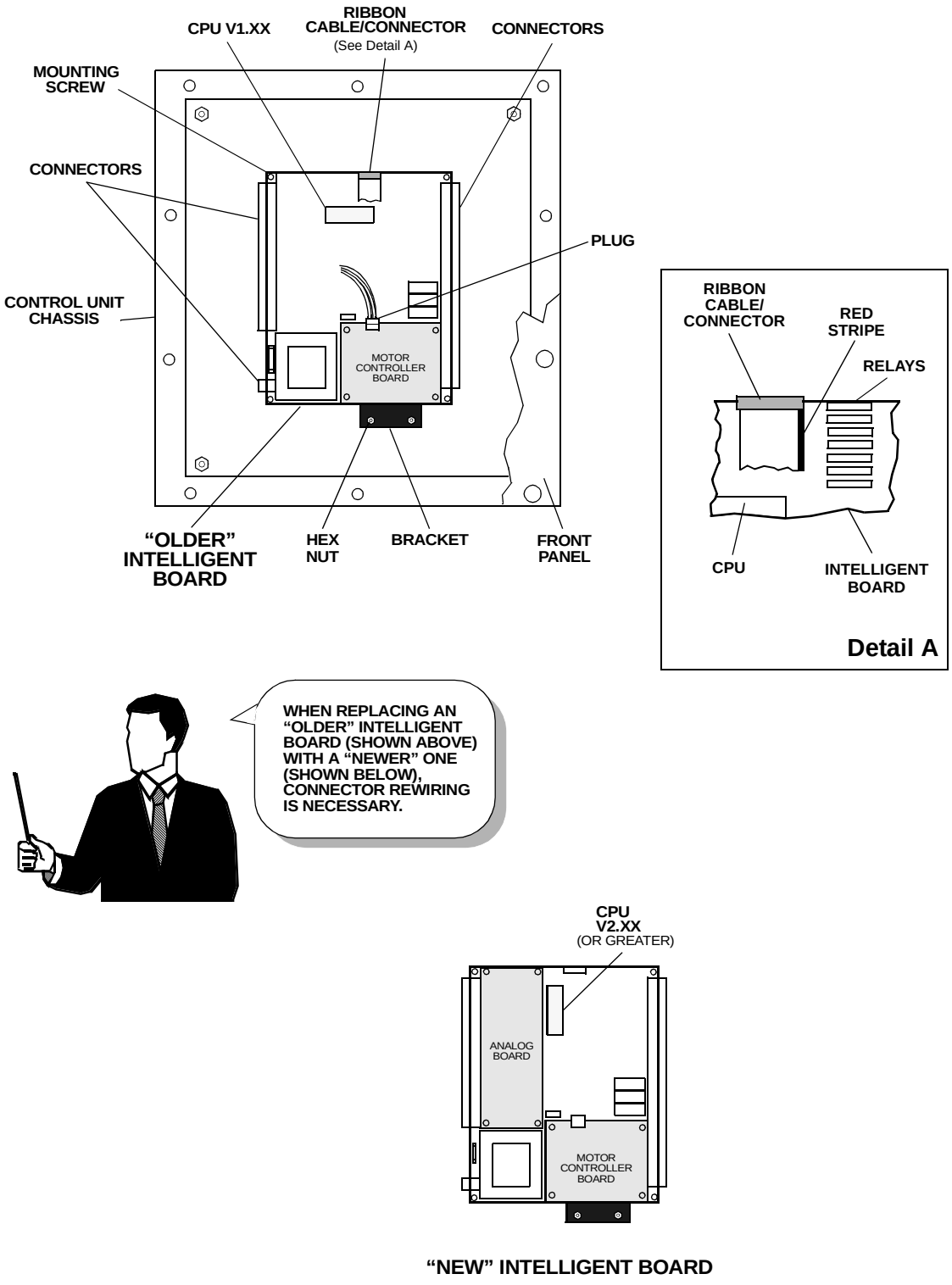

CPU V1.XX
RIBBON CABLE/CONNECTOR
(See Detail A)
CONNECTORS
MOUNTING SCREW
CONNECTORS
PLUG
CONTROL UNIT CHASSIS
MOTOR CONTROLLER BOARD
"OLDER" INTELLIGENT BOARD
HEX NUT
BRACKET
FRONT PANEL
RIBBON CABLE/ CONNECTOR
RED STRIPE
RELAYS
CPU
INTELLIGENT BOARD
Detail A
WHEN REPLACING AN "OLDER" INTELLIGENT BOARD (SHOWN ABOVE) WITH A "NEWER" ONE (SHOWN BELOW), CONNECTOR REWIRING IS NECESSARY.
CPU V2.XX
(OR GREATER)
ANALOG BOARD
MOTOR CONTROLLER BOARD
"NEW" INTELLIGENT BOARD

FIGURE 6.7

CAUTION

Ribbon Cable Connectors Are Not Keyed On Older Intelligent Boards. When Re-installing This Type Of Connector – Make Sure Connector Is Oriented So That Red Stripe On Ribbon Cable Is Closest To Relay Side Of Intelligent Board. See Figure 6.7, Detail A.

10. Install ribbon cable/connector on new intelligent board.
11. Install plug (with attached wires) to mating plug on motor controller board.
12. If an older intelligent board (CPU serial no. V1.XX) is being replaced by a newer one (CPU serial no. V2.XX or greater), perform rewiring procedures; otherwise, proceed to step 13.
13. Replace front panel.

Rewiring

To rewire, refer to Figure 6.8 and proceed as follows.

1. Remove jumper (wire no. 145, red) from between terminals TB5-15 and TB6-12.
2. Disconnect the wire (wire no. 145, red) attached to terminal TB5-15. Cut wire to size, strip end, and reconnect it to terminal TB6-12.

NOTE

After completing step 2, there should be no wires connected to terminal TB5-15 and two wires connected to terminal TB6-12.

3. Switch the wires that are connected to terminals TB7-7 and TB7-8 so that the wire from LCAD MOTOR is connected to terminal TB7-7 and the wire from terminal TB5-4 is connected to terminal TB7-8.
4. Replace front panel.

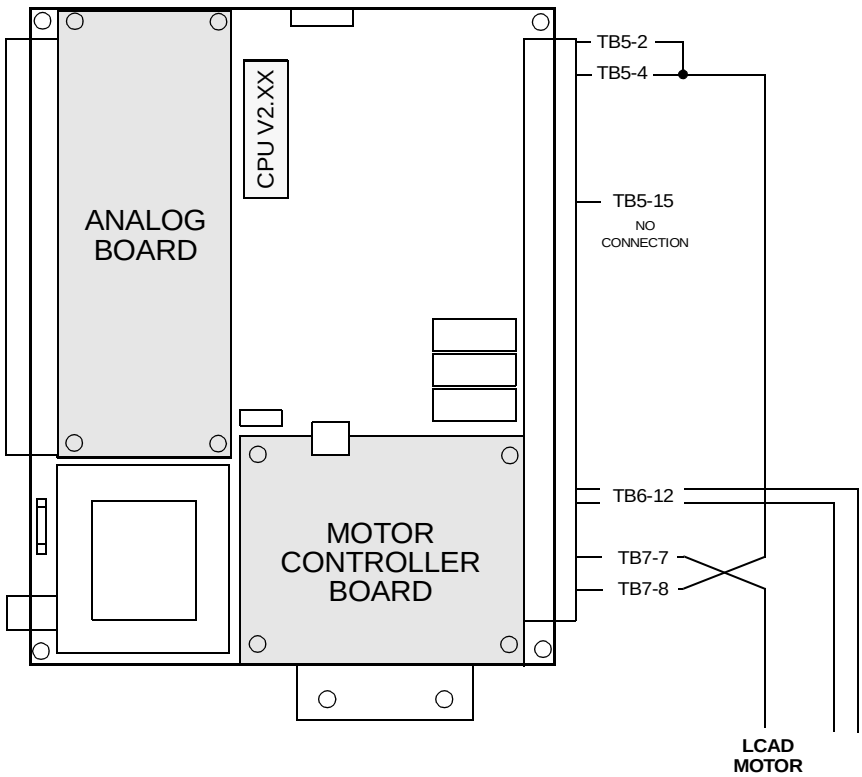


FIGURE 6.8

NOTE

Replacement of the intelligent board necessitates recalibration of the LCACE Arc Control Unit. Recalibration is required to ensure that the transducer in the LCAD and the intelligent board in the LCACE are properly matched.

Refer to Section 5, *OPERATION*, for calibration procedure.

SECTION 7

TROUBLESHOOTING

Table of Contents

List of Tables

Troubleshooting – ValuArc ™ 100/100E and 200/200E		
PROBLEMS (SYMPTONS)	**POSSIBLE CAUSE**	**REMEDY**
Power supply problems	—	See power supply troubleshooting, Section 8
Turn on power supply. LCAE green power source status light does not go on.	1. Bad 5A fuse-LCAE 2. Bad bulb	1. Replace fuse 2. Replace bulb
Operating mode on/off on LCAE depressed, light does not go on.	1. Bad bulb	1. Change bulb
Press gun handle trigger once and hold, gun does not spray.	1. Power supply trouble 2. Air pressure switch not satisfied (20 psi min) 3. Gun handle cable not connected to LCAE 4. Defective gun handle cable 5. Defective gun handle switch 6. Defective relay board	1. See power supply troubleshooting, Section 8. 2. Turn on air and raise pressure to correct setting. 3. Connect cable to LCAE 4. Replace gun handle cable 5. Replace switch 6. Replace relay board
Press gun handle trigger once and hold. Arc voltage light not on, wire feeds, air on, gun does not spray.	1. Power supply trouble 2. Defective relay board 3. Toggle switch on power supply set to OFF (no spray)	1. See power supply troubleshooting, Section 8 (toggle switch to spray). 2. Replace relay board. 3. Set toggle switch on power supply to ON (spray)
Press gun handle trigger once and hold. Arc voltage light not on, gun spraying, wire feeds, air on.	1. Check arc voltage bulb	1. Replace bulb

Troubleshooting – ValuArc ™ 100/100E and 200/200E (continued)		
PROBLEMS (SYMPTONS)	**POSSIBLE CAUSE**	**REMEDY**
Press gun handle trigger once and hold. Arc voltage light on, gun not spraying. wire feeds, air on.	1. Check voltage setting	1. Turn voltage dial on power source clockwise.
Press gun handle trigger once and hold. Arc voltage light on, air on. Wire not feeding, gun sprays.	1. Check that wire feed pot is not at 0 2. Defective pot 3. Defective motor 4. Defective motor control board 5. Defective relay board 6. Wire coil locked 7. Controller wire feed mechanism not fully clamped	1. Turn wire feed pot clockwise 2. Replace potentiometer 3. Replace motor 4. Replace motor control board 5. Replace relay board 6. Untangle wire on coil or replace wire coil 7. Clamp both mechanisms. Also check that correct lower grooved roller is being used for wire size being sprayed.
Press gun handle trigger once and hold. Gun sprays, but amperage erratic.	1. Worn tips 2. Uneven wire feeding	1. Change tips, check that correct tips are being used for wire being sprayed. 2. One wire spool locked, or brake on wire spool to tight or too loose, wrong grooved rollers on wire feeder for size of wire being sprayed, wire feed cable severely bent. wire feed cable liner worn and needs to be changed.
Press gun handle trigger once and hold. Gun sprays, but severe popping sound from front of gun.	1. Low voltage 2. Dirty contact tubes	1. Raise voltage until popping stops; then increase 2 volts for smooth spraying. 2. Clean or replace contact tubes.

Troubleshooting – ValuArc ™ 100/100E and 200/200E (continued)		
PROBLEMS (SYMPTONS)	**POSSIBLE CAUSE**	**REMEDY**
Press gun handle trigger once and hold. Gun sprays at 200 amps, but has a different sound from front of gun (not smooth).	1. Check power supply choke setting	1. Should be set on high choke on power supply for spraying of 100 amps and above. No choke setting is for 80 amps and below
Press gun handle trigger twice and hold, air not on.	1. Power supply trouble 2. Air pressure switch not satisfied (20 psi min) 3. Gun handle cable not connected to LCAE 4. Defective gun handle cable 5. Defective gun handle switch 6. Defective relay board	1. See power supply trouble-shooting, Section 8. 2. Turn on air and raise pressure to correct setting. 3. Connect cable to LCAE 4. Replace gun handle cable 5. Replace switch 6. Replace relay board
Press gun handle trigger three times and hold, wire does not feed.	1. Power supply trouble 2. Controller wire feed mechanism not fully clamped 3. Gun handle cable not connected to LCAE 4. Defective gun handle cable 5. Defective gun handle switch 6. Defective relay board 7. Trigger sequence too fast/slow	1. See power supply trouble-shooting, Section 8. 2. Clamp both mechanisms. Also check that correct lower grooved roller is being used for wire size being sprayed. 3. Connect cable to LCAE 4. Replace gun handle cable 5. Replace switch 6. Replace relay board 7. Wait 3 seconds - then retry

Troubleshooting – ValuArc ™ 100/100E and 200/200E (continued)		
PROBLEMS (SYMPTONS)	**POSSIBLE CAUSE**	**REMEDY**
Press gun handle trigger once and hold. Unit shuts down.	1. Blown 5A fuse	1. Check solenoid suppressor cable; replace if necessary.

Troubleshooting – ValuArc ™ 300E		
FAULT MESSAGE	**FAULT MESSAGE INDICATION**	**REMEDY**
PRIMARY PRESSURE LOW	Low air pressure to gun	Raise air pressure to 20 psi min. (See parameters for correct air pressure for spraying.)
SOURCE SELECT MOVED	Warning, when in operating mode, not to move source selection from control unit to gun, or vice-versa	Do not move source selection from control unit to gun, or vice-versa, when in operating mode.
SYSTEM SWITCH STUCK	Bad select switch	Repair or replace switch
ARC FAILURE	Inadequate voltage to melt arc wire	Raise voltage NOTE Power supply voltage adjustment dial is disabled. Use Arc Voltage dial on controller to increase voltage. Check that arc voltage contact in power supply is being activated. Set power supply Output Control to OFF (no spray).
	No wire feed (no current)	Check that Arc Current is set to 6 (min.). Check that motor rollers are turning and that Arc Current dial does not change roller speed.
	Unit operated above 240 amps for 3 or more seconds.	Lower current
	Unit operated at or below 10 amps.	Raise current

Troubleshooting – ValuArc ™ 300E (continued)		
FAULT MESSAGE	**FAULT MESSAGE INDICATION**	**REMEDY**
WAIT	Gun Mode:	Release gun ON/OFF trigger. Replace or repair gun ON/OFF switch.
	Control Unit Mode:	Repair or replace operating mode switches

TEST AND INFORMATION MESSAGES

The following test and information messages may be displayed at appropriate times during the operation of the equipment.

LAMP TEST Checks all lamps on control unit and drive unit.

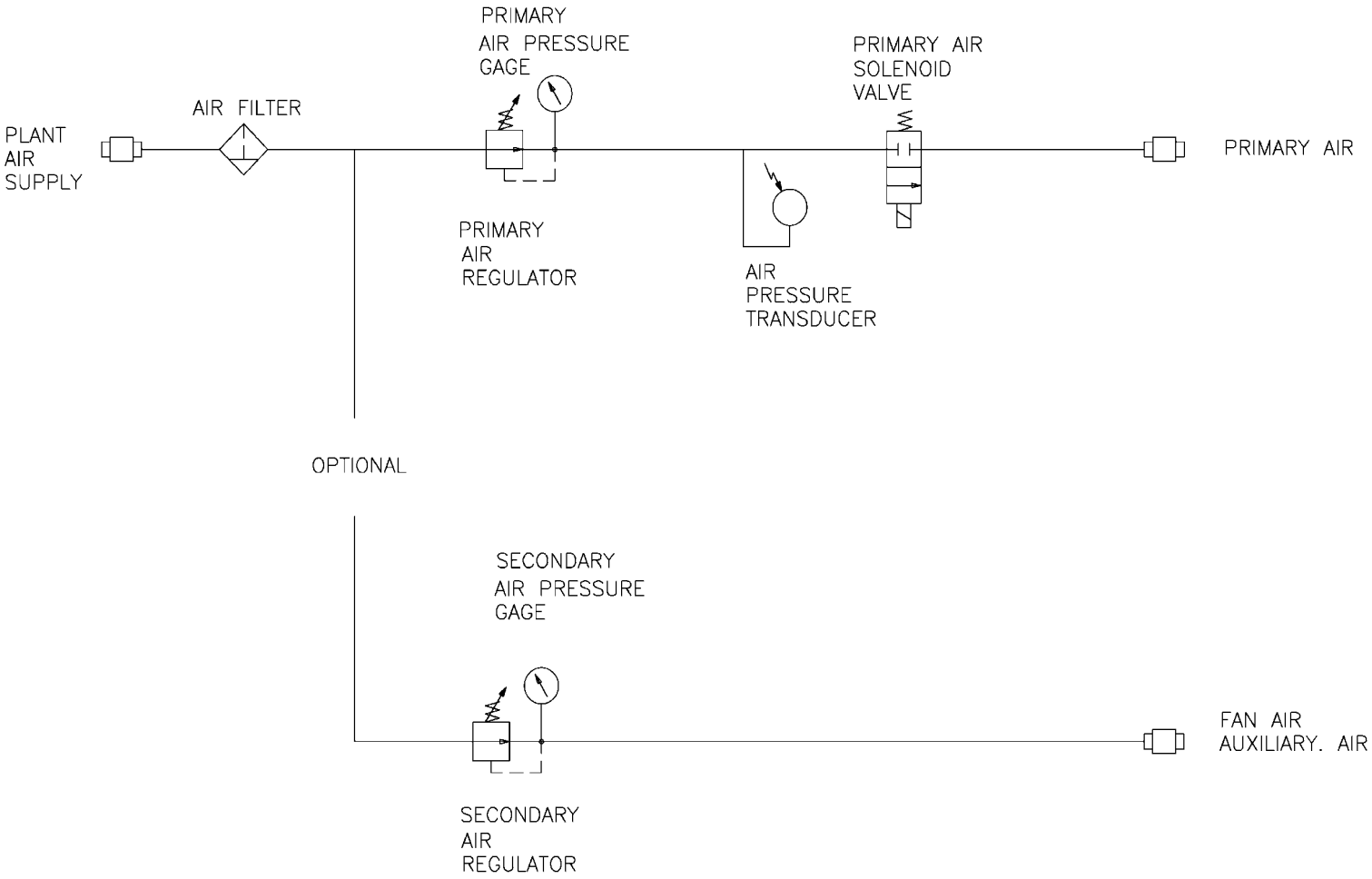
SELF TEST IN PROGRESS Indicates that the intelligent board components are being tested.

CK LCARE SW NO SPRAY Indicates that the LCARE Power Supply Output Control switch is set to OFF (no spray).

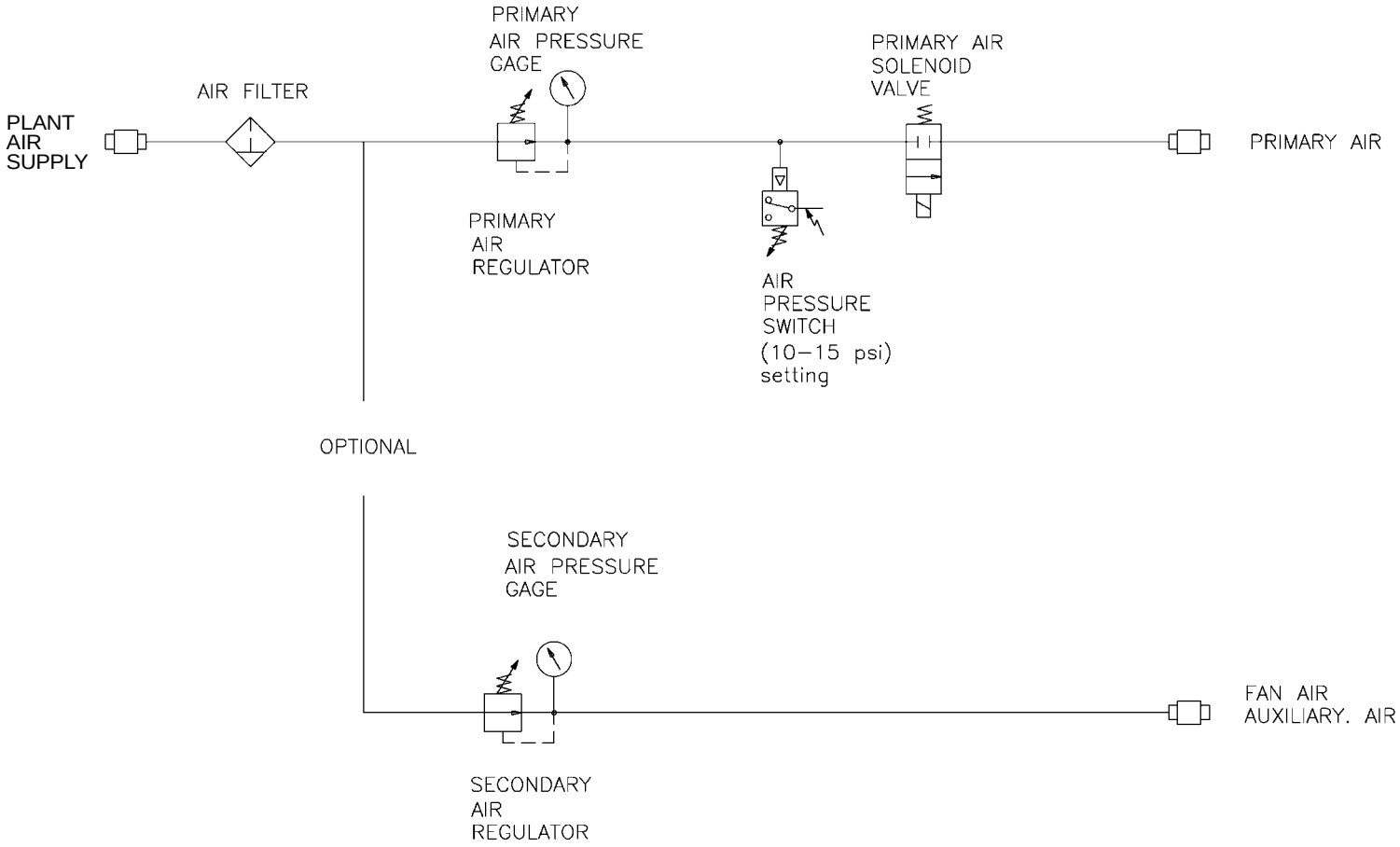
EMERGENCY STOP Indicates that the E-STOP was activated (either remotely or by the controller).

FLOW DIAGRAMS

Flow diagrams of the unit are provided on the following pages.



FLOW DIAGRAM (Sheet 1 of 2)



FLOW DIAGRAM (Sheet 2 of 2)

SECTION 8

LCARE ELECTRIC ARC POWER SUPPLY

Table of Contents

GENERAL

The LCARE electric arc power supply is a solid state, constant voltage SCR controlled power supply, rated for maximum continuous duty of 200 amps at 32 volts DC. The unit requires three-phase, AC electrical input of 200/380/440 Volts, 50/60 Hz.

The power supply has the following specifications and ratings:

Duty Cycle: 100%
Output Amps (DC): 200
Output Volts (DC): 32

Input Volts (50/60 Hz)	Line Current (amps)
200	42
380	28
440	24

NOTE

Input voltage can vary by +/-10%, except for 200 input volts that can range between 200-230 volts.

Input KVA: 18.4

Output Range:

min.: 30A, 7 VDC
max.: 200A, 32 VDC

Operating temperature range: -40°F to +104°F (-40°C to +40°C)

Weight: 300 lb (136 kg)

Dimensions: 19-½ in. (495mm) wide, 27 in. (686mm) long, 21-½ in. (546mm) high

RESETING THE POWER SUPPLY

The power supply is electrically protected against overloads and accidental short circuits. An overload condition will limit current output. If a short circuit occurs, the unit will shut down.

To reset the power supply:

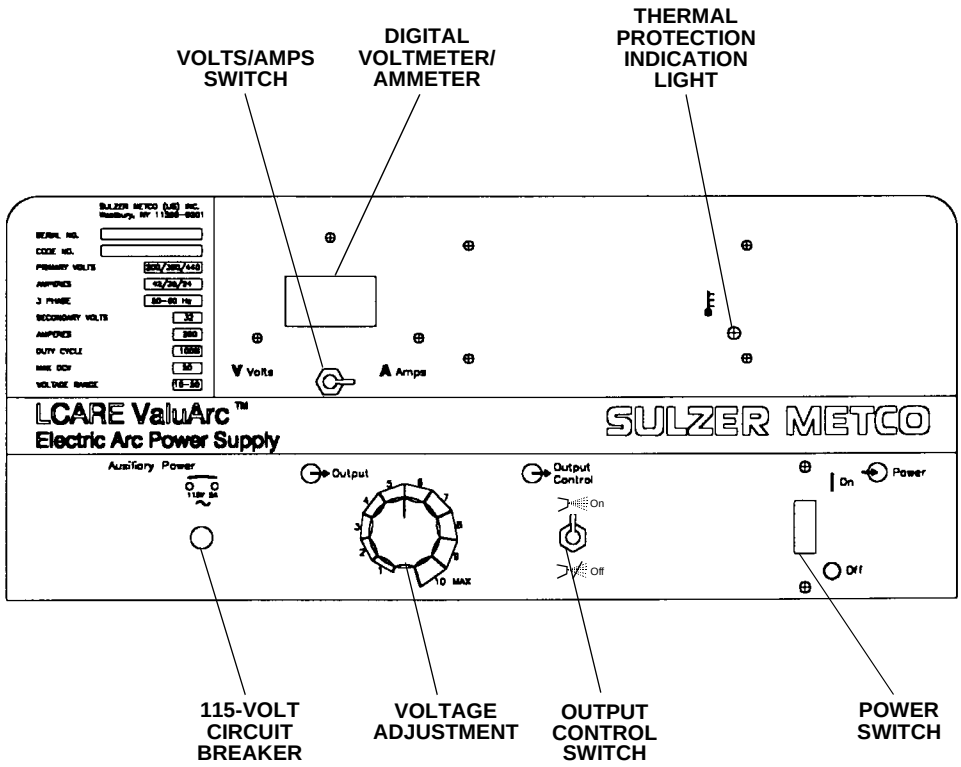
1. Turn power switch to the OFF position.

2. Correct the condition that caused the short circuit.

3. Set the power switch to the ON position.

CONTROLS AND INDICATORS

The function of the controls and indicators, located on the control panel, are described below.



CONTROL PANEL

POWER SWITCH
A two-position toggle switch that controls the input power to the LCARE.

VOLTAGE ADJUST
Controls the LCARE output voltage. Refer to spray parameters, this manual.

THERMAL PROTECTION INDICATION LIGHT
Indicates that the protection thermostat has activated. The digital meter will then display “E10”. When the light goes out, the power supply is then capable of supplying spraying output power again.

Leaving the power switch in the ON position results in the most rapid cooling.

VOLTS/AMPS SWITCH
Selects either output current or arc voltage for display on the digital meter.

DIGITAL VOLTMETER/AMMETER
Displays the LCARE output voltage/current.

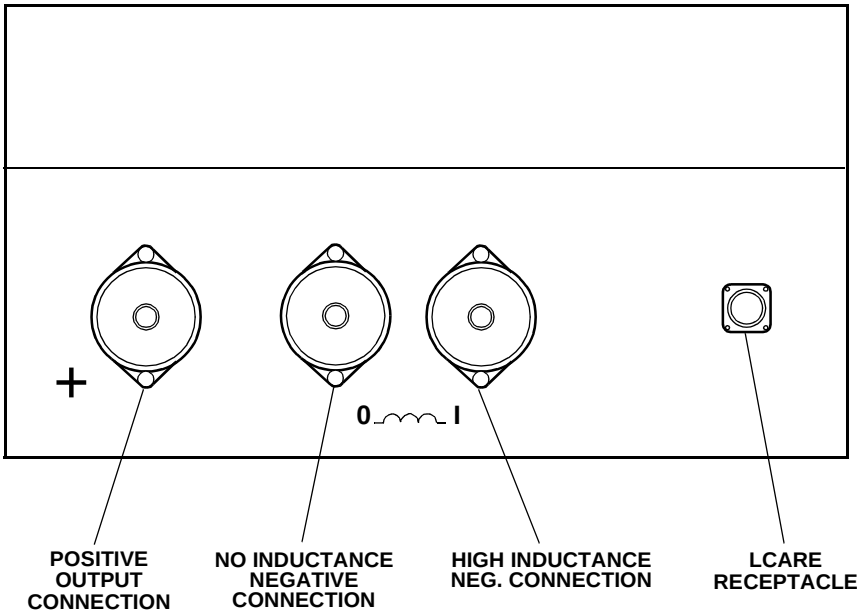
Due to meter board adjustments, the actual arc voltage may be higher than that displayed on the voltmeter.

115-VOLT CIRCUIT BREAKER
Protects the 115 volt 31-32 circuit in the receptacle from overloads and shorts. If this circuit breaker opens, the LCARE will work normally. However, any equipment powered by the 115 volt circuit will not work.

OUTPUT CONTROL SWITCH
When set to the ON (spray) position, arc voltage available when gun trigger is once pressed and held. When set to the OFF position, no arc voltage is available.

OUTPUT PANEL CONNECTIONS

The function of the output panel connectors is provided below.



OUTPUT PANEL

POSITIVE OUTPUT CONNECTION Magnum Twist-Mate receptacle. Insert a mating Twist-Mate plug and twist clockwise to secure. **NO INDUCTANCE NEGATIVE CONNECTION** Used for low amperage spraying (below 80 A) of zinc and aluminium. This is a Magnum Twist-Mate receptacle. Insert a mating Twist-Mate plug and twist clockwise to secure	**HIGH INDUCTANCE NEGATIVE OUTPUT CONNECTION** Used for normal 80 A and above spraying. This is a Magnum Twist-Mate receptacle. Insert a mating Twist-Mate plug and twist clockwise to secure. **LCARE RECEPTACLE** 16-pin receptacle. Provides all power to LCAE Control Unit. See page 11, for pin designations.

TROUBLESHOOTING

The following tables provide troubleshooting procedures. If you do not understand any part of these procedures, or are unable to perform these procedures/repairs safely, contact Sulzer Metco field service for assistance.

Built-in Diagnostic Routines and Error Codes

The LCARE meter pc board displays the following error codes in response to the associated trouble condition listed below.

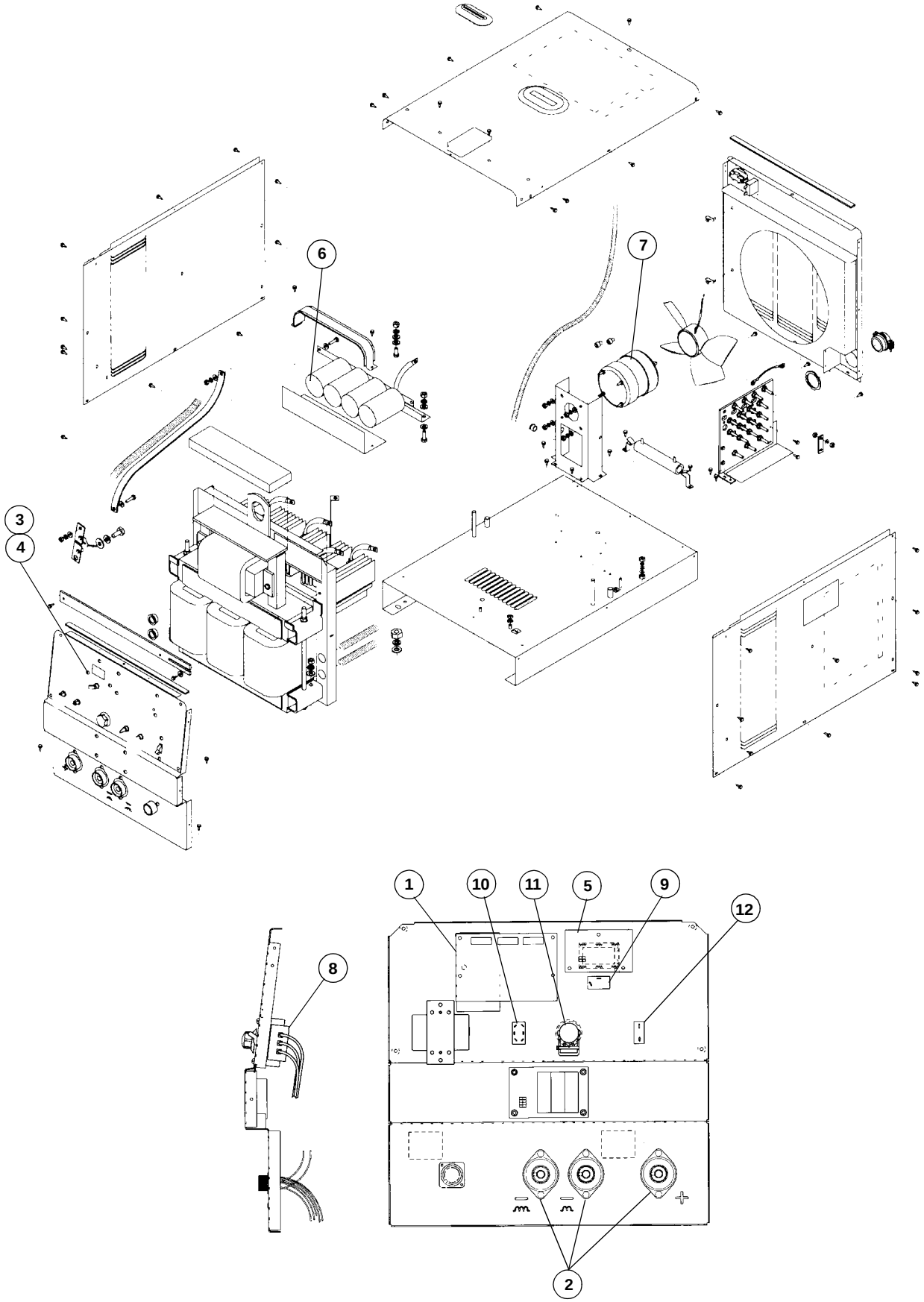
ERROR CODE	TROUBLE	REMEDY
E00	1. Output short circuited 2. May occur while starting or spraying with 1/16" aluminum wire	1. Turn power off. Remove short circuit. 2. Turn power off to clear error. Use recommended parameters, voltage settings, and angle of approach of wire to work. If problem still persists, contact Sulzer Metco field service.
E10	Thermostat circuit has opened	Allow machine to cool. Be sure to provide adequate ventilation for machine.
E20	Memory error	Contact Sulzer Metco field service
E30	1. Voltage adjust potentiometer not connected 2. Remote control not functioning correctly	1. Check wiring between voltage adjust and the control PC board. 2. Contact Sulzer Metco field service
E40	Input line voltage too low	Turn power off. Insure machine input voltage is within specifications. Turn power back on.
E50	Input line voltage too high	Turn power off. Insure machine input voltage is within specifications. Turn power back on.
E60	Overload condition	Reduce load on machine

Machine Troubleshooting Guide

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Machine has no output	1. Secondary contactor circuit (2 and 4 wire feeder receptacle) not working	1. Check 2 and 4 circuit wiring.
	2. Defective PC board	2. Contact Sulzer Metco field service
	3. Protective circuits operating due to output short circuit	3. Turn power off. Remove output short circuit
Machine has minimum output and no control	Voltage control connected incorrectly	Voltage control wiring
Machine has low output and no control	1. Open circuit in feedback circuitry	1. Check wiring and control and PC board wiring harness plugs.
	2. Faulty PC board	2. Contact Sulzer Metco field service.
	3. Voltage adjust potentiometer circuit open (lead 75)	3. Check and replace potentiometer if faulty. Check wiring of lead #75.
Thermal protection indicator light is on	1. Thermostat circuit has opened	1. Allow machine to cool. Be sure to provide adequate ventilation for machine.
	2. Faulty control PC board	2. Contact Sulzer Metco field service
Machine does not have maximum output	1. Faulty control PC board.	1. Contact Sulzer Metco field service
	2. Voltage adjust potentiometer defective	2. Check and replace if faulty
	3. Voltage adjust potentiometer leads open.	3. Check and repair broken leads
Machine will not shut off	Defective power switch	Replace
Digital meters do not light or Digital meter display is incorrect	1. Faulty meter PC board	1. Contact Sulzer Metco field service
	2. Faulty control PC board	2. Contact Sulzer Metco field service

Options Troubleshooting Guide

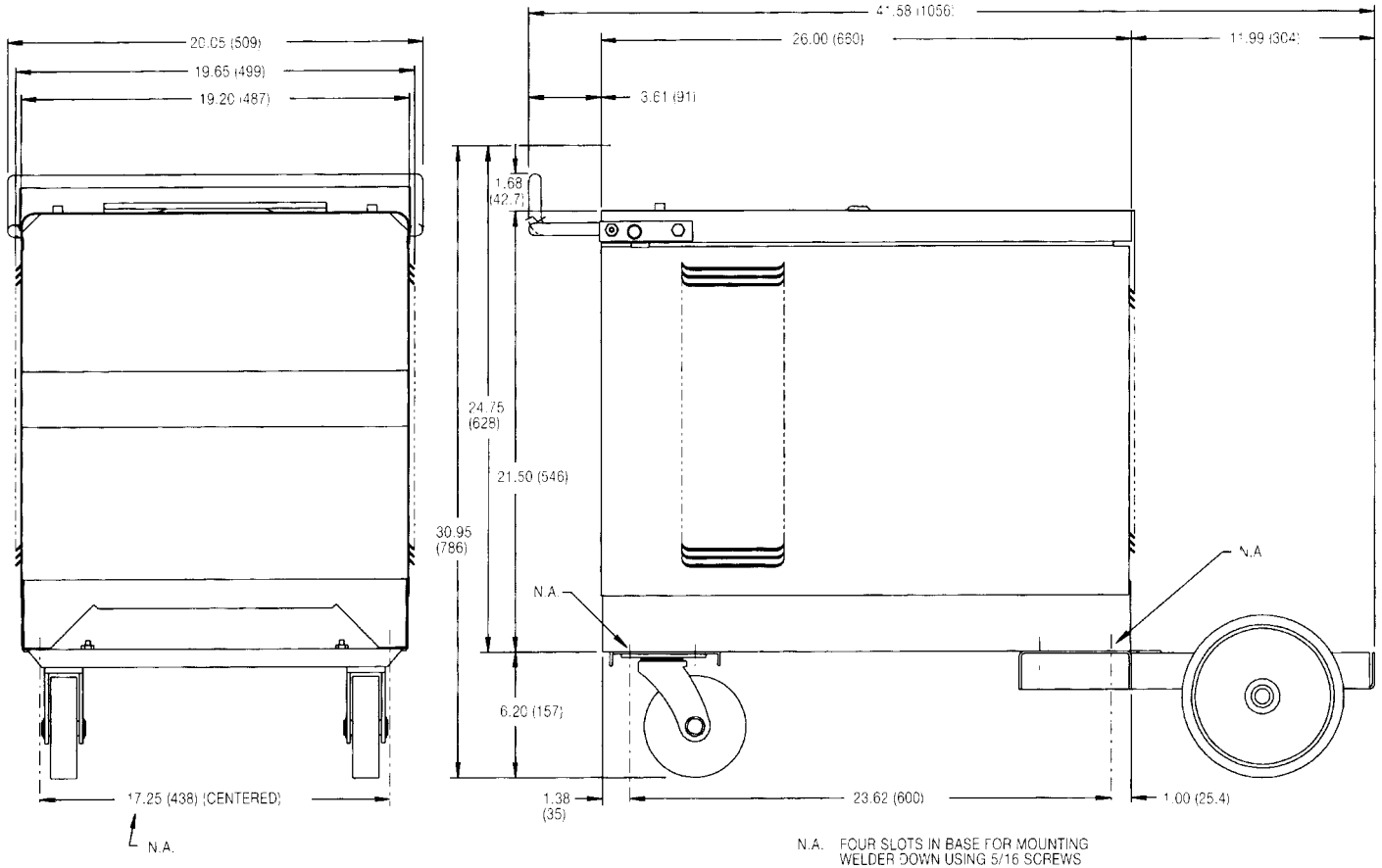
PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	REMEDY
Voltage adjust not functioning	1. Local/Remote switch in the wrong position	1. Place switch in Local position
	2. Faulty Local/Remote switch	2. Check and replace, if faulty
	3. Faulty Voltage Adjust potentiometer	3. Check and replace, if faulty
	4. Leads or connections open in control circuit	4. Check all leads and connections, internal and remote, for continuity. Repair if necessary
	5. Faulty control PC board	5. Contact Sulzer Metco field service
Arc voltage not available at gun when handle switch pressed once and held.	1. Output control switch set to OFF (no spray)	1. Set output control switch to ON (spray)



LCARE POWER SUPPLY

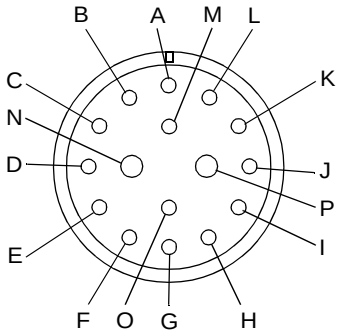
LCARE POWER SUPPLY

Index No.	Cat. No.	Description
-	LCARE55029	Rectifier Bridge (not shown)
1	LCARE55030	Control PC Board
-	LCARE55031	SCR (not shown)
2	LCARE55032	Output Terminal
3	LCARE55033	Voltmeter
4	LCARE55034	Ammeter
5	LCARE55035	Meter PC Board
6	LCARE55036	Capacitor Bank
7	LCARE55037	Fan Motor
-	LCARE55038	Diode (not shown)
8	LCARE55039	Line Switch
9	LCARE55040	Switch
10	LCARE55041	Switch
11	LCARE55042	Potentiometer
12	LCARE55043	Circuit Breaker
13	LCARE55044	Switch



LCART POWER SUPPLY TRUCK WITH HANDLE (OPTIONAL)

LCARE RECEPTACLE PIN DESIGNATIONS



LCARE RECEPTACLE PIN DESIGNATIONS

PIN	DESIGNATION
A	Output Contact Cl
B	Return Output Contact Cl
D	115 Vac Return
E	115 Vac
C, F, N, O, P	Ground
G	Remote Amperage Connection (-)
H	Remote Amperage Connection (+)
I	High (Remote Voltage Control)
J	Wiper (Remote Voltage Control)
K	Min (Remote Voltage Control)
L	Remote Voltage Connection (+)
M	Remote Voltage Connection (-)

SECTION 9

RECOMMENDED SPARE PARTS

List of Tables

LCAG/LCAGM GUN

Qty	Cat. No.	Description
1	LCAG49673	INSERT CAP AIR (HV)
1	LCAG50661	INSERT CAP AIR (FINE)
1	LCAG51351	KIT CONTACT TIP 14GA (QTY 10)
1	LCAG51415	RING (TIP LOCATOR)
1	LCAG51418	CENTERING POST
1	LCAG51496	KIT CONTACT TIP 14GA (SOFT) (QTY 10)
1	LCAG51523	KIT CONTACT TIP 2.0 MM (QTY 10)
1	LCAG51524	KIT CONTACT TIP 11GA (QTY 10)
1	LCAG51920	KIT CONTACT TIP 14GA LONG LIFE (QTY 2)
1	LCAG51921	KIT CONTACT TIP 2.0 MM LONG LIFE (QTY 2)
2	LCAG54935	CONTACT TUBE (QTY 1)
1	LCAG55010	KIT RESEAL (contains an assortment of O-rings used in guns)
2	LCAG55095	CONTACT TUBE 11GA

LCA/LCAE CONTROLLER

Qty	Cat. No.	Description
2	LCA51879	GUIDE (SOFT WIRE, CONTROLLER)
1	LCA55859	FUSE KIT (5A, 250V, FAST-ACTING, QTY OF 10)
1	LCA55860	SWITCH KIT
1	LCA55862	BULB KIT
1	LCA56066	WIRE GUIDE (SOFT)

LCACE CONTROLLER

Qty	Cat. No.	Description
1	LCACE55862	BULB KIT
1	LCACE56282	SWITCH KIT
1	LCACE56332	FUSE KIT (5A, 250V, SLO-BLO, QTY OF 10)

LCAD DRIVE UNIT

Qty	Cat. No.	Description
2	LCAD51879	GUIDE (SOFT WIRE, CONTROLLER)
2	LCAD56066	WIRE GUIDE (SOFT)

LCAH HOSE AND CABLE PACKAGE

Qty	Cat. No.	Description
2	LCAH56067	WIRE GUIDE (SOFT)

SECTION 10

REPLACEMENT PARTS

List of Tables

LCAG/LCAGM Electric Arc Spray Gun (Figure 10.1)

Qty	Cat. No.	Description
1	2M182	RINGLUBE *
2	6RC235	WIRE STRAIGHTENER ASSEMBLY (adjustable)
1	6P299	TOOL POST FIXTURE ASSEMBLY *
1	LCAG49673	AIR CAP INSERT, HIGH VELOCITY * ~
1	LCAG50661	AIR CAP INSERT, FINE SPRAY >
1	LCAG51351	KIT, CONTACT TIP, 14GA (pkg. of 10) * ^ ☐
2	PPH51364	WIRE GUIDE (HARD WIRE) * ☐
1	LCAG51415	LOCATING RING (TIP LOCATOR)
1	LCAG51416	AIR CAP BODY, FINE (includes LCAG50661) >
1	LCAG51417	ARC SHIELD
1	LCAG51418	CENTERING POST
2	PPC51472	ROLLER (2.0mm), GROOVED (WIRE FEEDER) * ☐
2	PPC51473	ROLLER (2.3mm), GROOVED (WIRE FEEDER) * ☐
1	LCAG51496	KIT, CONTACT TIP 14GA SOFT (pkg. of 10) * ^ ☐
1	LCAG51523	KIT, CONTACT TIP 2.0mm (pkg. of 10) * ^ ☐
1	LCAG51524	KIT, CONTACT TIP 11GA (pkg. of 10) * ^ ☐
1	PPG51539	RETAINER (FAN) * ☐
1	PPG51540	AIR CAP INSERT (FAN) * ☐
1	PPG51541	FAN AIR ADAPTER * ☐
1	LCAG51592	SWITCH ON/OFF ASSY W/PLUG
1	PPG51680	RETAINING RING * ☐
1	LCAG51732	FAN AIR CAP ASSY * ^ ☐
1	LCAG51735	AIR CAP ASSY (HIGH PROFILE) * ^ ☐
1	PPG51740-20	HOSE ASSY 3/8 ID, AIR *
1	PPG51740-38	HOSE ASSY 3/8 ID, AIR *
1	PPG51740-55	HOSE ASSY 3/8 ID, AIR *
1	LCAG51777	HIGH VELOCITY AIR CAP INSERT (includes LCAG49673) * ^ ~
1	PPG51819	CABLE (US handle to control unit) *
1	LCAG51843	GUN HANDLE (US) (includes LCAG51819)
2	PPC51878	WIRE GUIDE (HARD WIRE) (CONTROLLER) * ~
1	PPG51920-10	KIT, CONTACT TIP 14GA LONG LIFE (pkg. of 2) * ^ ~
1	PPG51920-20	KIT, CONTACT TIP 14GA LONG LIFE (pkg. of 2) * ^ ~
1	LCAG51921	KIT, CONTACT TIP 2mm LONG LIFE (pkg. of 2) * ^ ☐
1	LCAG51946	KIT, HARDWARE 2mm HARD WIRE AND ALUMINUM * ☐
1	6A	6A AIR CONTROL UNIT * ~
1	LCAG54865	REAR GUN BODY
1	LCAG54866	GUN COVER, LOWER
1	LCAG54926	AIR FITTING
1	LCAG54930	GUN HEAD
2	LCAG54934	ELECTRODE POST

* Not Shown ^ See Section 4 for contact tip and air cap identification
~ LCAG Option > LCAGM Option ☐LCAG/LCAGM Option

NOTE: LCAGM prefix not shown for clarity

Continued on next page

LCAG/LCAGM Electric Arc Spray Gun (Figure 10.1)- continued

Qty	Cat. No.	Description
2	LCAG54935	CONTACT TUBE
1	LCAG54938	UPPER COVER, GUN
1	LCAG54943	SKY BRACKET *
1	G54955	GUN HEAD ASSEMBLY (Includes: LCAG54935, 51416, 54167, 51417, 51415, 51418, 6131, 54934) **NOTE:** Gun Head assy parts are identified in figures with the symbol Δ
2	LCAG54957	KNOB*
1	LCAG54967	TOOL POST MOUNTING STUD (LCAG) **~**
1	LCAG55010	KIT, RESEAL *(Includes an assortment of O-rings used in the guns)
2	LCAG55095	CONTACT TUBE, 11GA ☐
1	LCAG55326	KIT, HARDWARE (LCAG) * ☐
1	LCAG55362	KIT, TOOL (LCAG) * ☐
1	LCAG55831	KIT, 14GA HARD WIRE * ☐
1	LCAG55832	KIT, 2MM HARD WIRE * ☐
1	LCAG55833	KIT, 11GA SOFT WIRE * ☐
2	LCAE55846	WIRE STRAIGHTENER ASSY (FIXED), LEFT ☐
2	LCAE55847	WIRE STRAIGHTENER ASSY (FIXED), RIGHT ☐
1	LCAG55864	KIT, FAN AIR CAP * ☐
1	LCAG56321	KIT, 2mm ZINC HARDWARE * ☐

* Not shown **^** See Section 4 for contact tip and air cap identification
~ LCAG Option **>** LCAGM Option ☐LCAG/LCAGM Option

NOTE: LCAGM prefix not shown for clarity

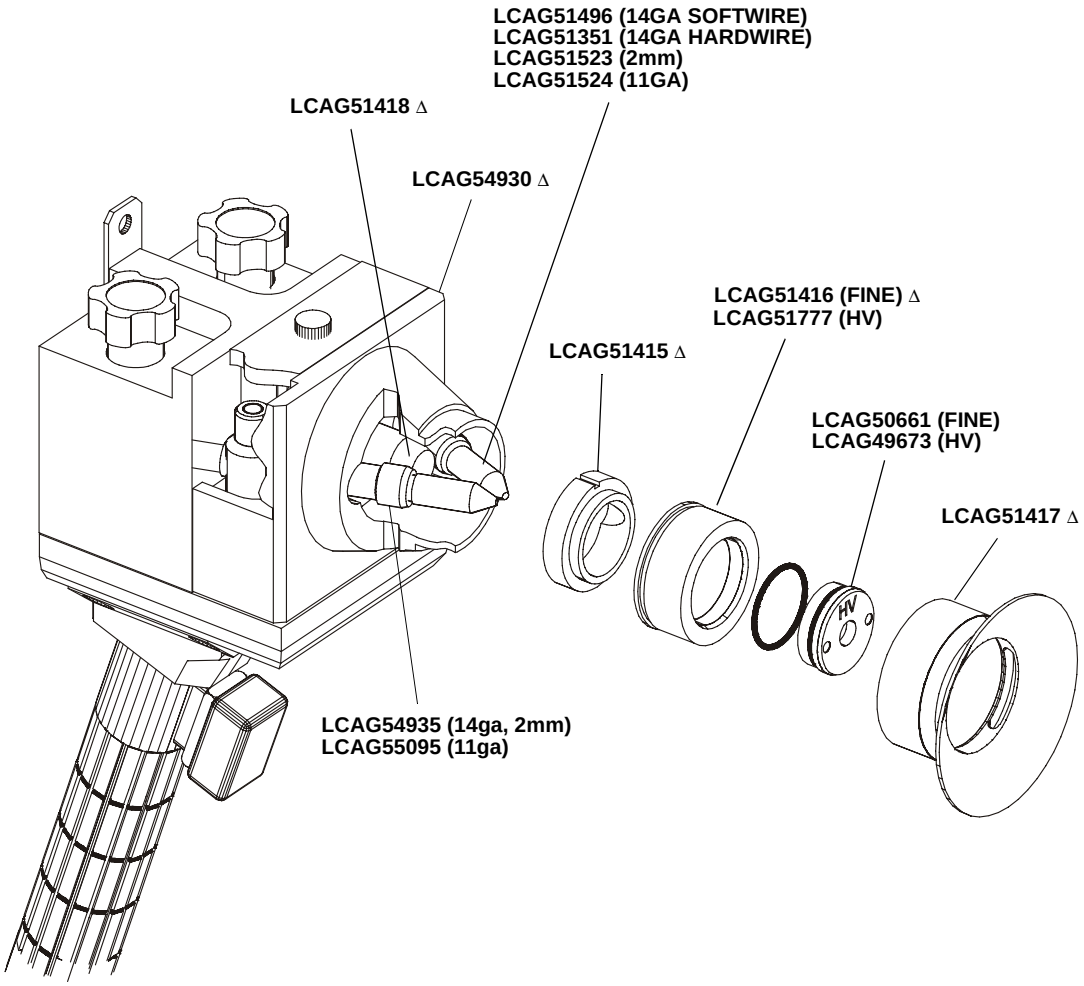
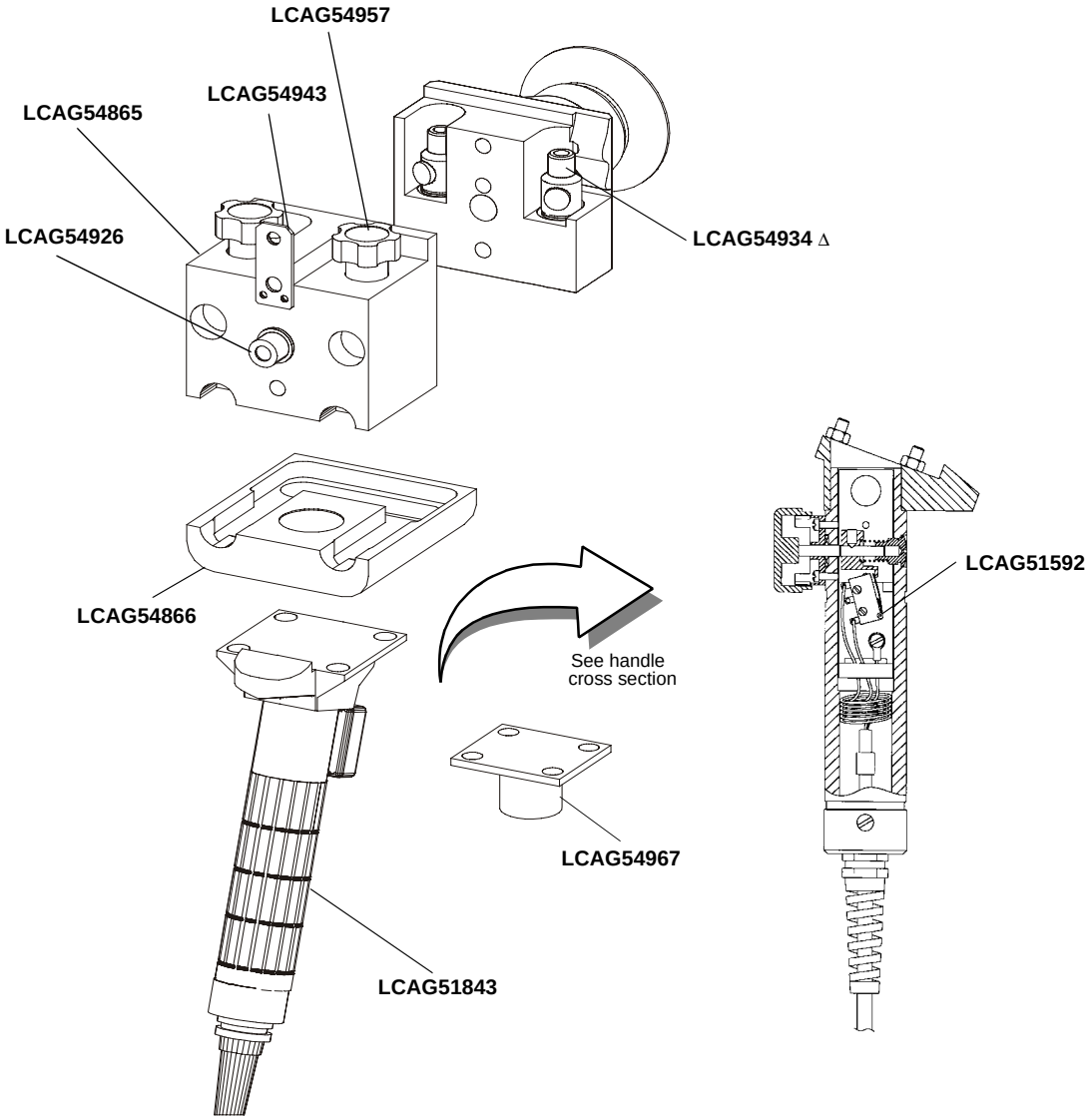


FIGURE 10.1 LCAG/LCAGM ELECTRIC ARC SPRAY GUN (Sheet 1 of 2)



△ INDICATES GUN HEAD ASSY PARTS

NOTE: LCAGM PREFIX NOT SHOWN
FOR CLARITY

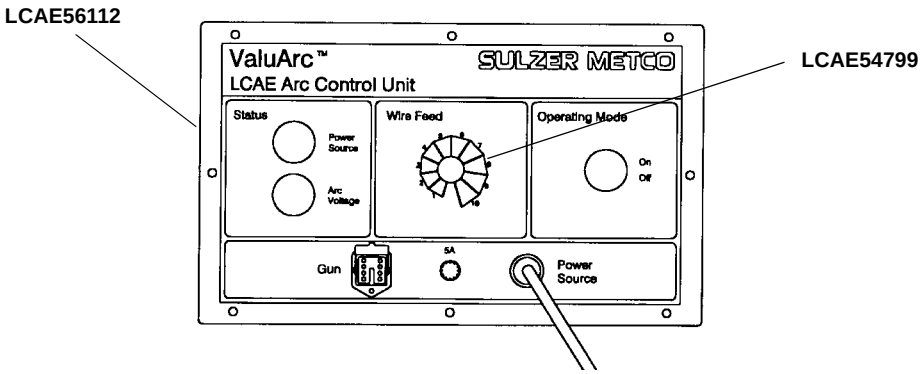
FIGURE 10.1 LCAG/LCAGM ELECTRIC ARC SPRAY GUN (Sheet 2 of 2)

LCA/LCAE Electric Arc Control Unit (Figure 10.2)

Qty	Cat. No.	Description
1	LCAE1882	HOSE FITTING (NITROGEN) * ☐
1	LCAE4069	SWITCH, PRESSURE (SPDT ADJ 0-90 PSI)
1	LCAE23208	GAUGE, PRESSURE (100 PSI)
2	LCAE40648	WIRE STRAIGHTENER ASSY (INCLUDES SPACER), ADJUSTABLE ☐
1	LCAE50843	FILTER ASSY ☐
2	LCAE51468	COUPLING
2	LCAE51471	ROLLER, 1.6mm GROOVED (WIRE FEEDER) ☐
2	LCAE51472	ROLLER, 2.0mm GROOVED (WIRE FEEDER) ☐
2	LCAE51473	ROLLER, 2.3mm GROOVED (WIRE FEEDER) ☐
1	LCAE51493	REGULATOR, AIR
2	LCAE51518	BEARING, 3/4 ID (PILLOW BLOCK)
2	LCAE51631	SHAFT (MOTOR SHAFT EXTENSION)
2	LCAE51878	WIRE GUIDE (HARD WIRE, CONTROLLER) * ☐
2	LCAE51879	WIRE GUIDE (SOFT WIRE, CONTROLLER)
2	LCAE51975	WIRE FEEDER ASSY
1	LCAE54799	POTENTIOMETER ASSY
2	LCAE54831	COVER
1	LCAE54916	MOTOR
1	LCAE54921	MOTOR CONTROLLER
1	LCAE54933	RELAY BOARD
1	LCAE55846	WIRE STRAIGHTENER ASSY (INCLUDES SPACER), LEFT ☐
1	LCAE55847	WIRE STRAIGHTENER ASSY (INCLUDES SPACER), RIGHT ☐
1	LCAE55859	FUSE KIT(LCA/LCAE) (5A/250V, qty 10) * ☐
1	LCAE55860	SWITCH KIT (LCAE) * ☐
1	LCAE55861	KIT, HARDWARE * ☐
1	LCAE55862	BULB KIT ☐
1	LCAE56019	CONN SUPPRESSOR MODULE *
1	LCAE56066	WIRE GUIDE (SOFT WIRE)
2	LCAE56092	DRIVE WHEEL 1.6mm (LOWER CUPPED) * ☐
2	LCAE56093	IDLER WHEEL 1.6mm (UPPER CUPPED)* ☐
2	LCAE56094	WIRE FEED LUBRICATOR PADS W/CLIPS *
1	LCAE56096	SOLENOID VALVE
1	LCAE56541	BRUSH (MOTOR) * ☐

* Not Shown ☐ Option

NOTE: LCA prefix not shown for clarity



NOTE: ONLY LCAE SHOWN FOR CLARITY

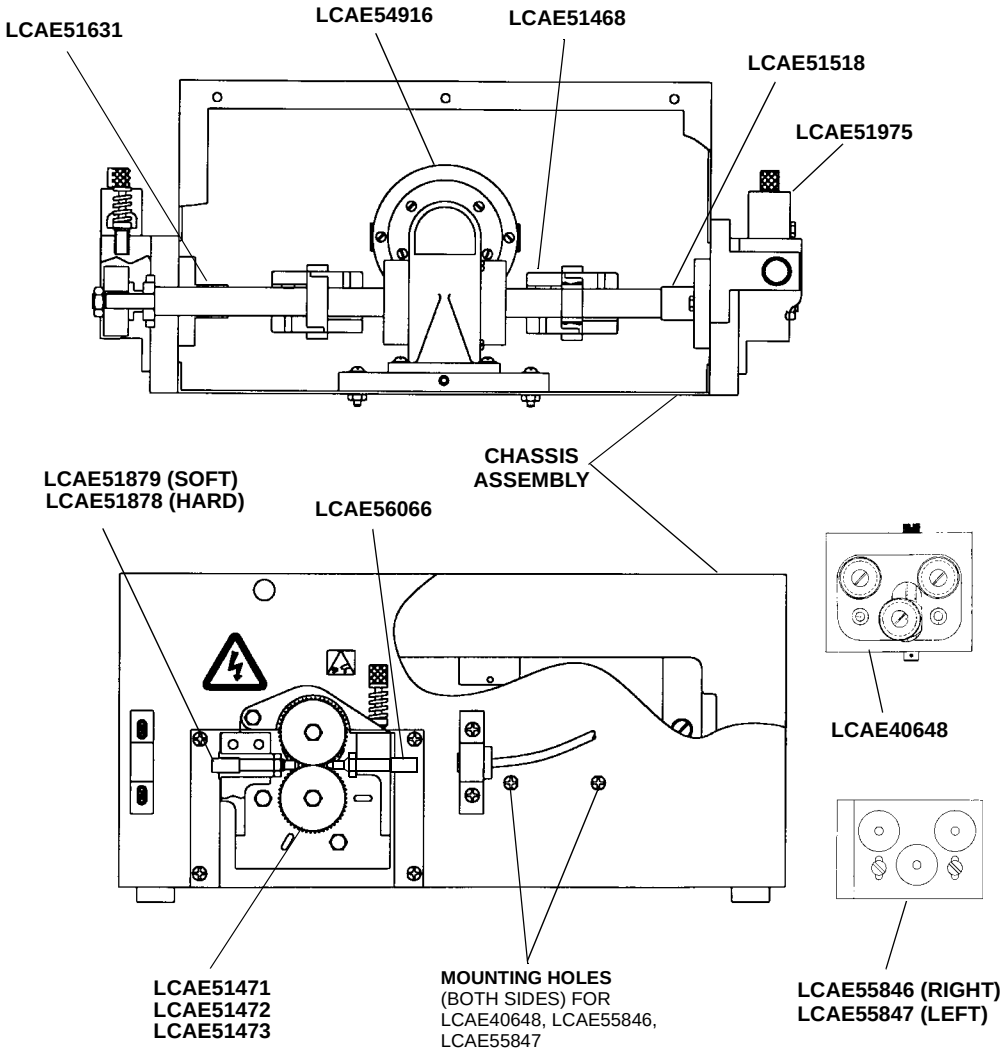
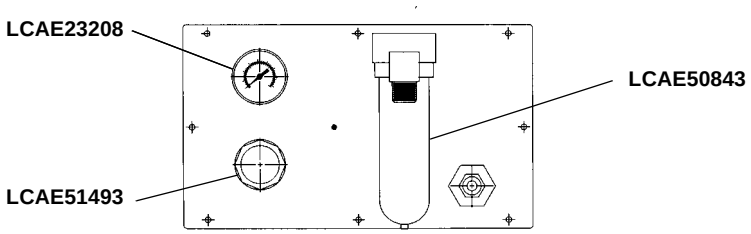
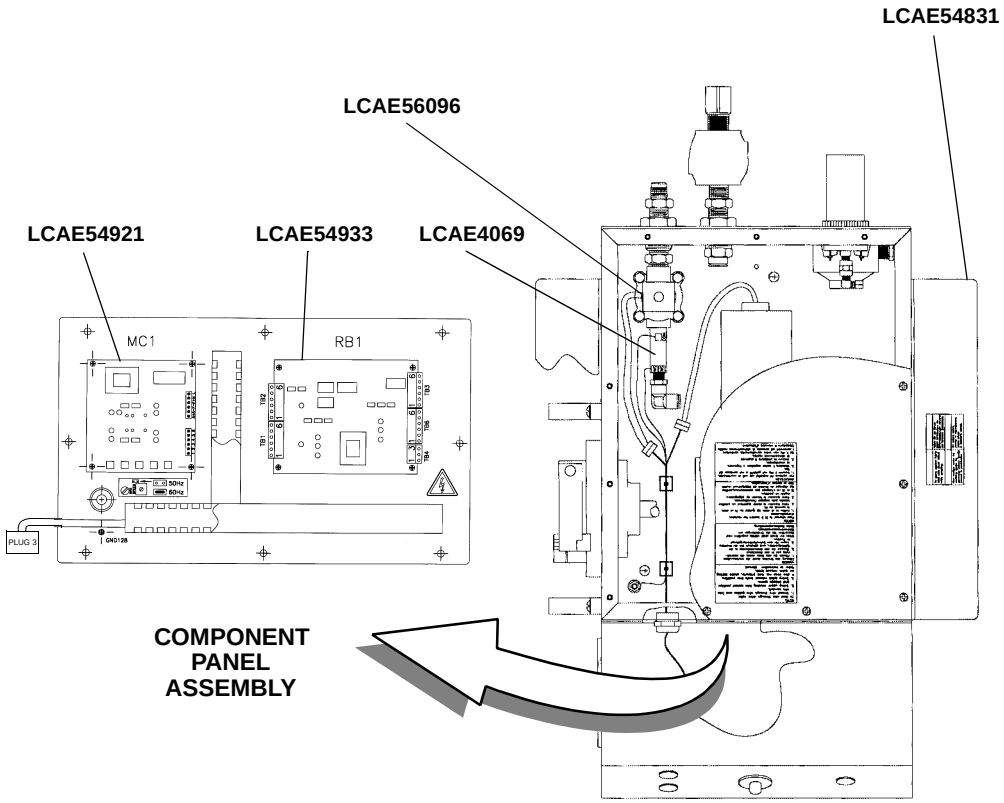


FIGURE 10.2 LCA/LCAE ELECTRIC ARC CONTROL UNIT (Sheet 1 of 2)



LCAE - REAR PANEL



LCAE - TOP VIEW

NOTE: ONLY LCAE SHOWN FOR CLARITY

FIGURE 10.2 LCA/LCAE ELECTRIC ARC CONTROL UNIT (Sheet 2 of 2)

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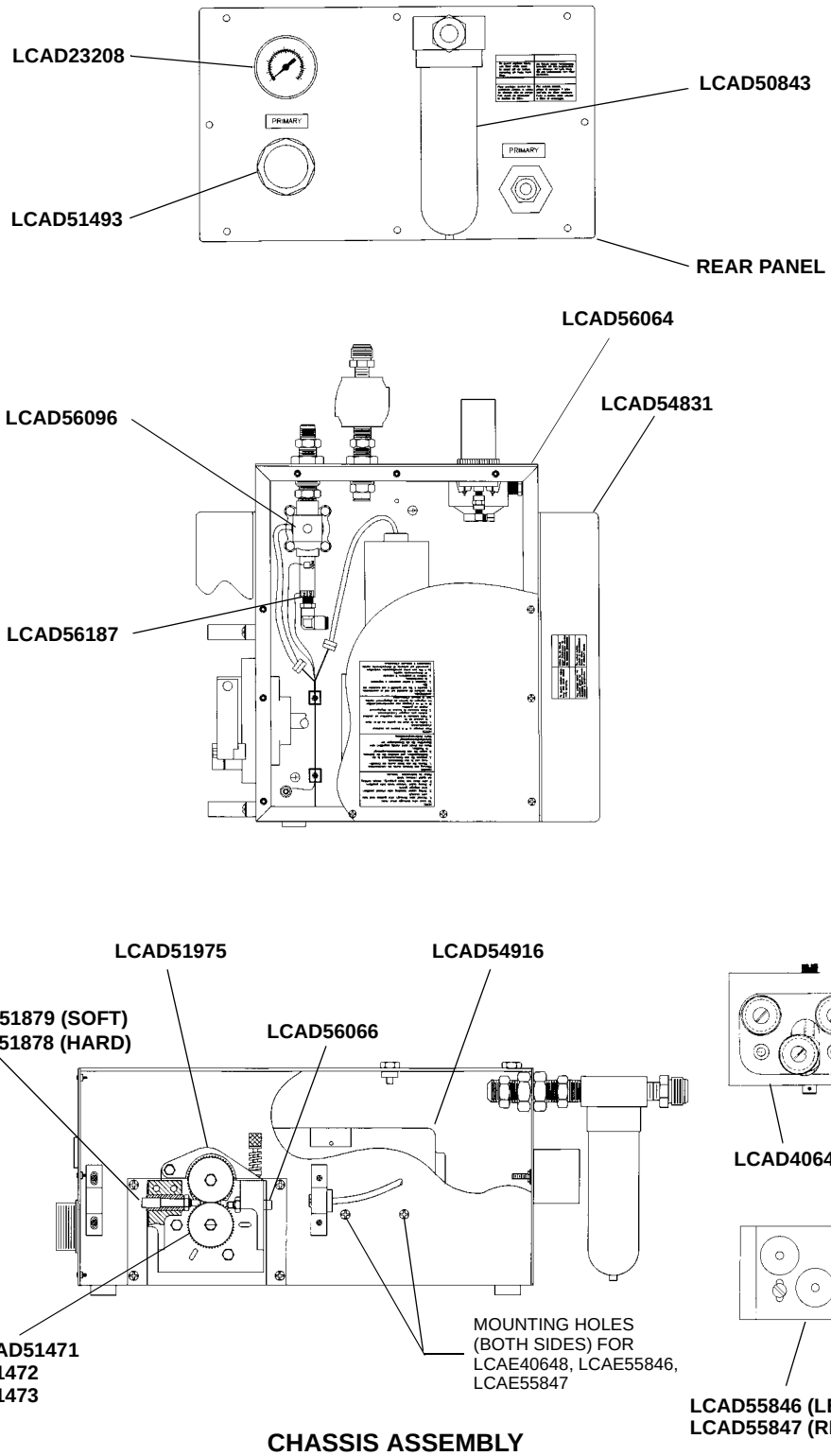
LCAD Drive Unit (Figure 10.3)

Qty	Cat. No.	Description
1	LCAD1882	HOSE FITTING (NITROGEN) * ☐
1	LCAD23208	GAUGE, AIR PRESSURE (100 PSI)
2	LCAD40648	WIRE STRAIGHTENER ASSY, ADJUSTABLE (INCLUDES SPACER) ☐
1	LCAD50843	FILTER ASSY ☐
2	LCAD51468	COUPLING *
2	LCAD51471	ROLLER, 1.6mm GROOVED (WIRE FEEDER) ☐
2	G51472	ROLLER, 2mm GROOVED (WIRE FEEDER) ☐
2	G51473	ROLLER, 2.3mm GROOVED (WIRE FREEDER) ☐
1	LCAD51493	REGULATOR
2	LCAD51518	BEARING, 3/4 ID (PILLOW BLOCK) *
2	LCAD51631	SHAFT (MOTOR SHAFT EXTENSION) *
2	PPC51878	WIRE GUIDE (HARD WIRE, CONTROLLER) ☐
2	LCAD51879	WIRE GUIDE (SOFT WIRE, CONTROLLER) *
2	LCAD51975	WIRE FEEDER ASSY
2	LCAD54831	COVER *
1	LCAD54916	MOTOR
1	LCAD55846	WIRE STRAIGHTENER ASSY, LEFT (INCLUDES SPACER) ☐
1	LCAD55847	WIRE STRAIGHTENER ASSY, RIGHT (INCLUDES SPACER) ☐
1	G56019	CONNECTION SUPPRESSOR MODULE *
2	LCAE56066	WIRE GUIDE (SOFT)
2	LCAD56092	DRIVE WHEEL, 1.6mm (LOWER CUPPED) * ☐
2	LCAD56093	IDLER WHEEL, 1.6mm (LOWER CUPPED) * ☐
2	LCAD56094	WIRE FEED LUBRICATOR PADS W/CLIPS *
1	LCAD56096	SOLENOID VALVE
1	LCAD56216	HARDWARE KIT * ☐
1	LCAD56541	BRUSH (MOTOR) * ☐

* Not Shown ☐ Option



CHASSIS ASSEMBLY

FIGURE 10.3 LCAD DRIVE UNIT

LCACE Electric Arc Control Unit (Figure 10.4)

Qty	Cat. No.	Description
1	6C139	FILTER, LINE *
1	PPC50762	EMERGENCY STOP OPERATOR
1	G50765	SWITCH, 2-POSITION KEY MAINTAINED
2	G54799	POTENTIOMETER ASSY
1	LCAE55862	BULB KIT (130V, qty 10) * ☐
1	LCACE56054	INTELLIGENT BOARD MAIN ASSY (includes: LCACE56281, 56232, 56233, 56277, 56278, and 56279)
1	LCACE56232	MESSAGE BOARD ☐
1	LCACE56233	MOTOR CONTROLLER BOARD ASSY ☐
1	LCACE56277	RIBBON CABLE * ☐
1	LCACE56278	CPU ☐
1	LCACE56279	EMERGENCY STOP RELAY * ☐
1	LCACE56280	HARDWARE KIT * ☐
1	LCACE56281	INTELLIGENT BOARD ☐
1	LCACE56282	SWITCH KIT (LCACE) * ☐ (Includes contact block n.o. [qty 2], contact block n.c. [qty 2], socket lamp [qty 3], lens blue [qty 5], lens green [qty 5], lens amber [qty 5], operator pushbutton white [qty 2])
1	LCACE56332	FUSE KIT (5 AMP 250V, pkg of 10) * ☐
1	LCACE56738	CONTROL CABLE (LCACE 350 RU RECTIFIER) * ☐
1	LCACE56739	ANALOG BOARD ☐

* Not Shown ☐ Option

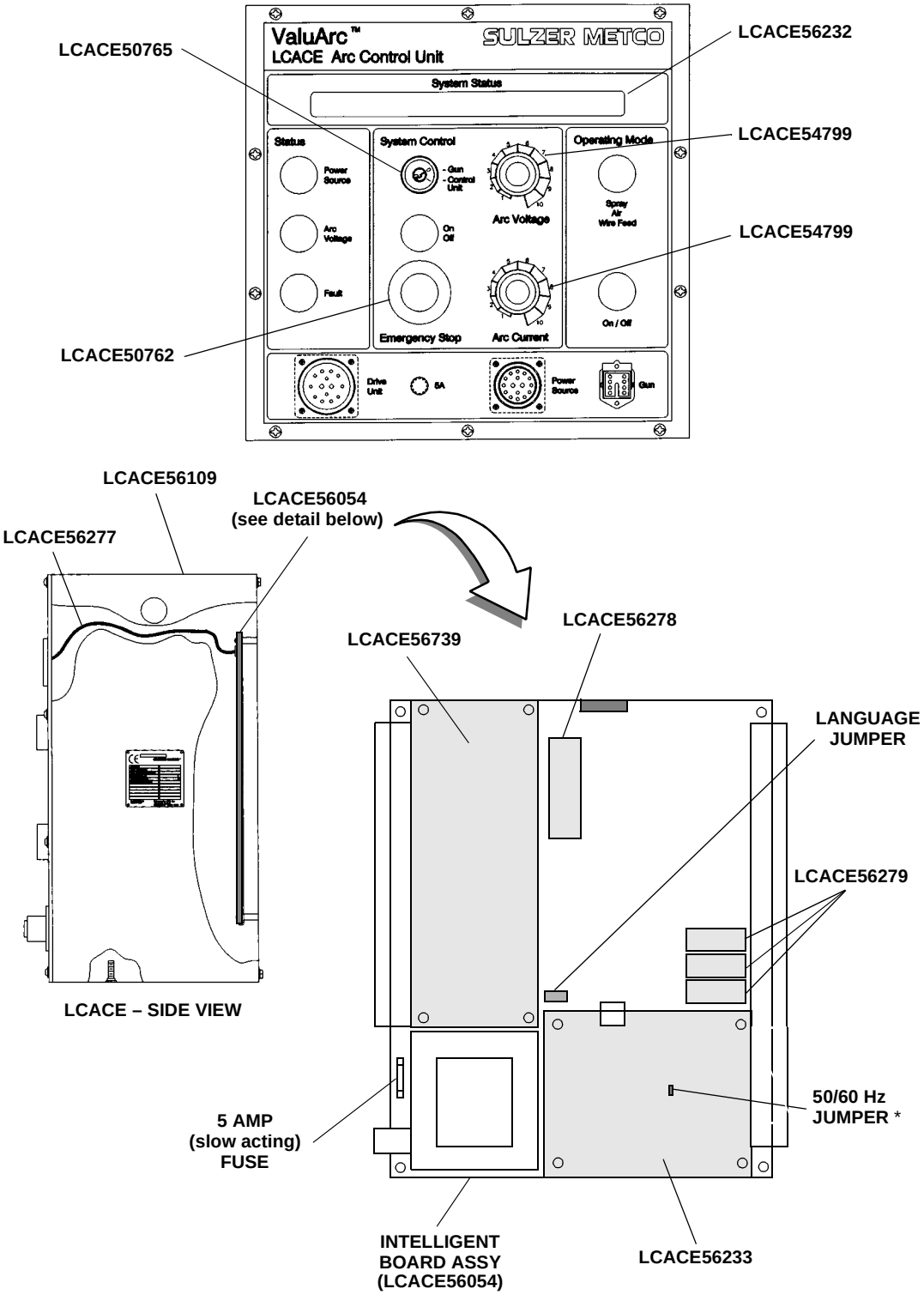


FIGURE 10.4 LCACE ELECTRIC ARC CONTROL UNIT

LCAH100 Arc Hose And Cable Package (Figure 10.5)

Qty	Cat. No.	Description
1	LCAH23091	AIR HOSE ASSY, 15FT (4.6m)
2	LCAH51364	WIRE GUIDE (HARD WIRE) * ☐
2	LCAH54917	DC POWER CABLE, 15FT (4.6m) *
1	LCAH54924	AIR HOSE ASSY (LCAH), 20FT (6m)
1	LCAH55009	WIRE FEED CONDUIT (TWIN-LINE CABLE)
1	LCAH55812	WIRE FEED LINER PKG☐ (includes tubing (120 ft, 36.4m), ferrule/sleeve, qty 10)
1	LCAH55886	DC POWER CABLE (LCARE RECTIFIER, 25FT, 7.6m) ☐
1	LCAH55887	DC POWER CABLE (LCARE RECTIFIER, 50FT, 15.2m) ☐
2	LCAH56067	WIRE GUIDE (SOFT WIRE)

* Not Shown ☐ Option

LCAH200 Arc Hose And Cable Package (Figure 10.5)

Qty	Cat. No.	Description
1	LCAH13571	AIR HOSE ASSY, 25FT (7.6m) *
2	LCAH51364	WIRE GUIDE (HARD WIRE) * ☐
1	LCAH54924	AIR HOSE ASSY (LCAH), 20FT (6m)
1	LCAH55009	WIRE FEED CONDUIT (TWIN-LINE CABLE), 13.2FT (4m)
1	LCAH55812	WIRE FEED LINER PKG ☐ (includes tubing (120 ft, 36.4m), ferrule/sleeve, qty 10)
2	LCAH55978	DC POWER CABLE (LCARE RECTIFIER, 33FT, 10m)
2	LCAH56067	WIRE GUIDE (SOFT WIRE)
1	LCAH56071	CONTROL CABLE (EXTENSION), 25FT (7.6m) * ☐
1	LCAH56072	CONTROL CABLE (EXTENSION), 50FT (15.2m) * ☐
1	LCAH56119	CONTROL CABLE (EXTENSION), 33FT (10m)

* Not Shown ☐ Option

LCAH300 Arc Hose And Cable Package (Figure 10.5)

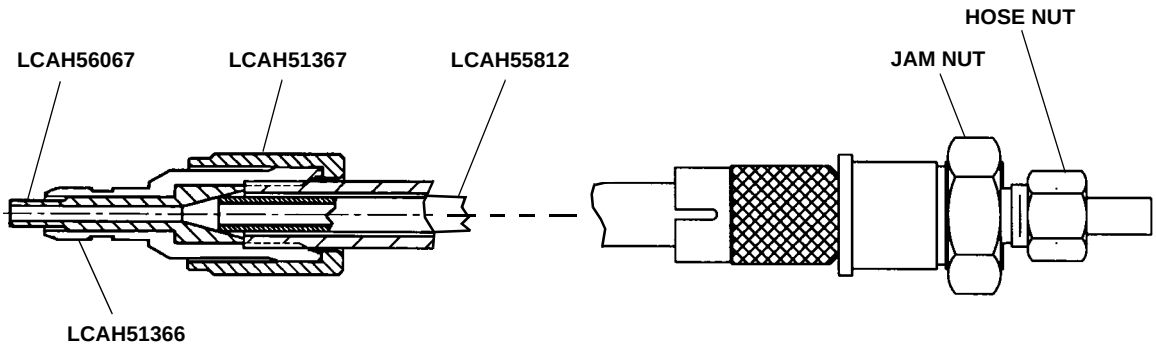
Qty	Cat. No.	Description
1	LCAH23091	AIR HOSE ASSY 15FT (4.6m)
2	LCAH51364	WIRE GUIDE (HARD WIRE) * ☐
1	LCAH54924	AIR HOSE ASSY (LCAH), 20FT (6m)
1	LCAH55009	CABLE, WIRE FEED CONDUIT (TWIN-LINE CABLE), 13.2FT (4m)
1	LCAH55812	WIRE FEED LINER PKG ☐ (includes tubing (120 ft, 36.4m), ferrule/sleeve, qty 10)
2	LCAH55978	DC POWER CABLE (LCARE RECTIFIER, 33FT,10m)
2	LCAH56067	WIRE GUIDE (SOFT WIRE)
1	LCAH56147	CONTROL CABLE, 33FT (10m)
1	LCAH56148	CONTROL CABLE, 33FT (10m).

* Not Shown ☐ Option

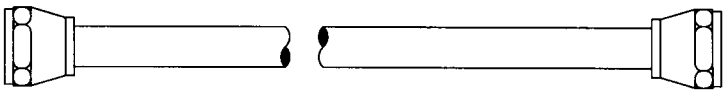
LCAHHD Hardware Kit (Figure 10.5)

Qty	Description
4	HOSE NUT
4	JAM NUT
5	HOSE BRACE *
10	FERRULE/SLEEVE 1/4 TUBE BRS *

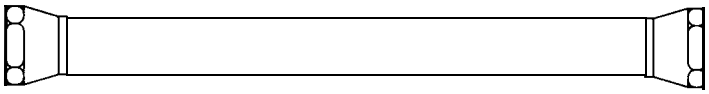
* Not Shown



WIRE FEED CONDUIT CABLE (LCAH55009), 13.1 FT (4m)



GUN AIR HOSE ASSEMBLY (LCAH54924), 20 FT (6m)

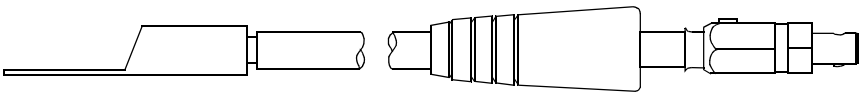


MAIN AIR HOSE ASSEMBLY (LCAH23091), 15 FT (4.6m)
MAIN AIR HOSE ASSEMBLY (LCAH13571), 25 FT (7.6m)

Figure 10.5 Conduit Cable/Hose Assemblies

VALUARC CONTROL CABLES

VALUARC 300	DRIVE UNIT CONTROL CABLE (LCAH56147), 33 FT (10m)
	POWER SUPPLY CONTROL CABLE (LCAH56148), 33 FT (10m)
VALUARC 100/200	POWER SUPPLY CONTROL EXTENSION CABLE (LCAH56071), 25 FT (7.6m)
	POWER SUPPLY CONTROL EXTENSION CABLE (LCAH56072), 50 FT (15.2m)
	POWER SUPPLY CONTROL EXTENSION CABLE (LCAH56119), 33 FT (10m)



DC POWER CABLE TO GUN (LCAH54917),15 FT (4.6m)

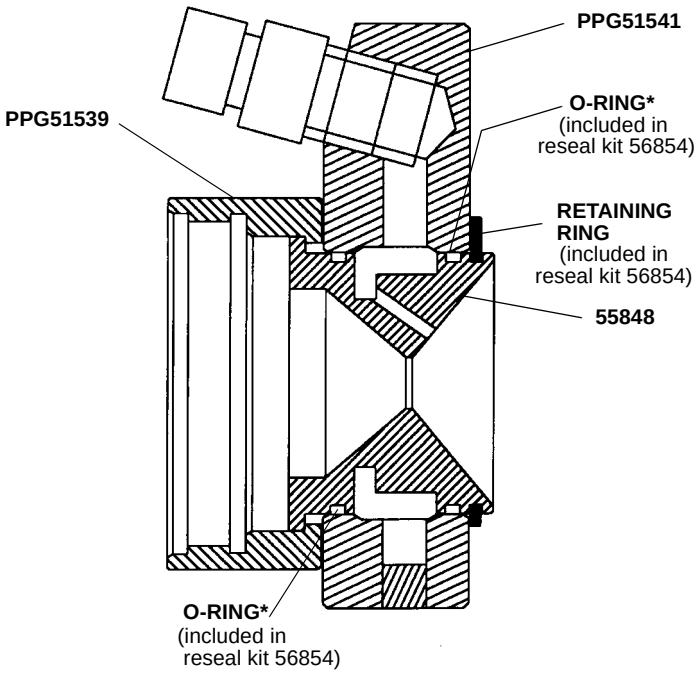
DC POWER CABLE TO GUN (LCAH55886), 25 FT (7.6m)

DC POWER CABLE TO GUN (LCAH55978), 33 FT (10m)

DC POWER ABLE TO GUN (LCAH55887), 50FT (15.2m)

PPGFA COMPLETE UNIT (Focused Arc Air Cap Assembly)

Cat. No.	Description
56844	PPGFA Complete Unit
PPG51539	Retainer (fan)
PPG51541	Fan Air Adapter
PPG51740-20	Air Hose Assy, 3/8 ID (20 FT.) (not shown)
55848	Focused Arc Air Cap Insert
56854	Reseal Kit (o-rings, qty 10; retaining ring, qty 5)



*Lubricate with Sulzer Metco Ringlube

FIGURE 10.6 Focused Arc Air Cap Assembly

The following table lists air hoses of different lengths for use with the PPGFA Complete Unit.

Cat. No.	Description
PPG51740-38	Air Hose Assy 3/8 ID (38 FT.)
PPG51740-55	Air Hose Assy 3/8 ID (55 FT.)

Documentation

Cat. No.	Description
LCAE55991	MANUAL, VALUARC (FRENCH)
LCAE55992	MANUAL, VALUARC (GERMAN)
LCAE56424	MANUAL, VALUARC (ITALIAN)

SECTION 11

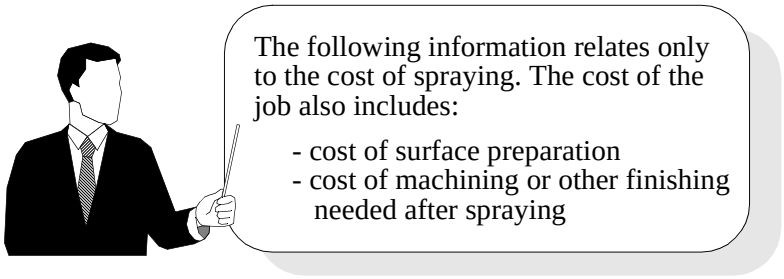
SPRAYING TABLES AND GENERAL COST DATA

Table of Contents

Spraying Tables

HOW TO USE THE TABLES

The spraying tables on the following pages list the information needed to set up and operate the Sulzer Metco ValuArc™ LCAG Electric Arc Gun. The tables give the basic data for figuring accurate costs and also approximate figures which are helpful in making rough estimates of cost and coating weights.



HOW TO COMPUTE SPRAYED AREA

When estimating surface area, an allowance for loss at the edges must be made. A good rule is to add one inch (25.4mm) to each dimension where there is an edge. When estimating the cost of spraying a shaft, add two inches (50.8mm) to the length – one inch at each end.

Area Formulas

Circumference of a circle	$= \pi D$
Area of a circle	$= \pi R^2$
Area of a cylinder	$= \pi DL$
Area of sphere	$= \pi D^2$
Area of a triangle	$= bh \div 2$
Area of a parallelogram	$= bh$
Area (lateral) of a cone	$= \pi r (r^2 + h^2)^{1/2}$

Where $\pi = 3.14$, R = radius, D = diameter, b = base, L = length,
h = height, r = radius of base.

CALCULATING COSTS

An important factor to take into account when calculating the cost of a coating is the normal variation in thickness between the thinnest and the thickest spot. The extent of this variation depends on the job and the manner in which it is sprayed. For ordinary corrosion-resistant coatings, use average thickness of the coating in calculating cost. However, if minimum thickness

is specified, be sure to spray the coating thick enough so that no spot will be thinner than the specified minimum. If this thickness is not known from experience, spray a test area to determine average thickness required.

When spraying shafts less than four inches (101.6mm) in diameter, overspray becomes a factor in cost. For production jobs involving such parts, tests to establish overspray losses are recommended.

Example (U.S. System)

Calculate the cost of spraying a shaft with the following parameters:

Shaft length	45.5”
Shaft diameter	4.75”
Desired increase in shaft diameter	0.110”
Coating thickness required*	0.075”
Wire type	Metcoloy # 2, 14ga
Amperage	200A
*Where machining or grinding of the coating is required, allow for the material to be removed when calculating the thickness of coating to be sprayed.	

Perform steps 1 through 8 below:

1. Compute the area to be sprayed: First, compensate for edge loss by adding 2" to the length of the shaft, making it 45.5” + 2” = 47.5”. Then compute the area

Area = πDL = 3.14 x 4.75 x 47.5” = 708 square inches (approx)

2. Calculate volume of coating:

Coating volume = area x coating thickness = 708 x 0.075” = 53 cubic inches (approx)

3. Calculate volume deposited per hour:

Volume = Coverage (spraying table) x 144 in^2/ft^2 x 0.001 in = 510 (144) (0.001) = 73.44 in^3/hr

4. Calculate time required:

Time = Coating volume divided by the volume deposited per hour = 53÷73.44 = 0.72 hr

5. Calculate weight of wire required:

Weight = time required multiplied by spray rate in spraying table = 0.72 x 18 = 13 lbs (approx)

.

6. Calculate air used:

Air = time required multiplied by consumption in cubic feet per min (see note 3) = 0.72 x 41= 30 cubic feet (approx.) or 1800 cubic feet per hour.

7. Calculate electricity used:

Electricity= time required multiplied by Hourly Consumption in KW Input (spraying table) = 0.72 x 6 = 4.3 KWH (approx.)

8. Calculate total cost of spraying, which includes wire cost, electricity cost, air cost, and labor cost:

Wire cost = cost per pound x lb used.

Electricity cost = cost per KWH x KWH used

Air cost = cost per cubic foot x cubic feet used

Labor cost = labor cost per hour x time required

Example (Metric System)

Calculate the cost of spraying a shaft with the following parameters:

Shaft length	1150mm
Shaft diameter	120mm
Desired increase in shaft diameter	4mm
Coating thickness required*	2mm (0.2cm)
Wire type	Metcoloy # 2, 14ga
Amperage	200A
*Where machining or grinding of the coating is required, allow for the material to be removed when calculating the thickness of coating to be sprayed.	

Perform steps 1 through 8 below:

1. Compute the area to be sprayed: First, compensate for edge loss by adding 50mm to the length of the shaft making it 1150 + 50 = 1200mm. Then compute the area

Area = πDL = 3.14 x 120 x 1200mm = 452,160mm^2 or 4522cm^2 (approx)

2. Calculate volume of coating.:

Coating volume = area x coating thickness = 4522 x 0.2cm = 904cm^3 (approx).

3. Calculate volume deposited per hour:

Volume = Coverage (spraying table) x 1 x 10^4 cm^2 /m^2 x (0.1mm) x 0.1cm/mm = 1210cm^3

4. Calculate time required:

Time = Coating volume divided by the volume deposited per hour = 904÷1210 = 0.75 hr.

5. Calculate weight of wire required:

Weight = time required multiplied by spray rate in spraying table = 0.74 x 8.2 = 6.1kg (approx)

.

6. Calculate air used:

Air = time required multiplied by consumption in cubic meter per min = 0.74 x 1.2 = 0.88m^3 or 52.8m^3 per hour (approx).

7. Calculate electricity used:

Electricity= time required multiplied by Hourly Consumption in KW Input (spraying table) = 0.74 x 6 = 4.4 KWH (approx.)

8. Calculate total cost of spraying, which includes wire cost, electricity cost, air cost, and labor cost:

Wire cost = cost per kg x kg used.

Electricity cost = cost per KWH x KWH used

Air cost = cost per cubic meter x cubic meter used

Labor cost = labor cost per hour x time required

SPRAYING TABLES

Spraying Table - ValuArc™ LCAG Electric Arc Gun
FINE AIR CAP (Metric System)

Sulzer Metco Wire (notes 4, 5)	Air Pressure (bar)	Operating Parameters		Hourly Consumption		kg Wire per m^2/ 0.1mm deposited	Coverage (note 6) m^2/h/ 0.1mm
	Primary (notes 2, 3)	Amps	Volts (note 1)	kg Wire	kW Input (Approx)		
Metcoloy #2	2.76-4.48	200	28-32	8.2	6.0	0.73	12.10
Metcoloy #5	2.76-4.48	200	26-28	9.1	5.5	0.87	10.48
Sprabronze AA	2.76	200	28-32	6.8	6.0	0.93	7.33
Aluminum AW,14 ga. (note 7)	2.76-4.48	200	26-28	4.5	5.5	0.42	10.86
Aluminum AW, 11 ga. (note 7)	2.76	200	32-34	5.0	7.0	0.35	14.11
Aluminum SF AW, 14 ga	2.74	200	28	4.5	5.8	0.19	23.62
Zinc AW, 14 ga. (note 7)	2.76	150	21-23	13.6	4.5	0.99	17.70
Zinc AW, 11 ga. (note 7)	3.45	150	21-23	18.1	4.5	1.09	16.64
Sprababbitt A (note 7)	2.76	150	22-26	18	3.75	1.05	23.78
Copper	2.76	200	26-30	11.3	5.5	0.93	12.22
SM8222	2.74	200	28	5.9	5.8	0.58	10.24
SM8223	2.74	200	28	8.2	5.8	0.58	14.17
SM8228	4.2	200	32-34	4.5	7.0	1.09	4.17
SM8234	2.4	100-200	26-28	2.5 @ 100A/4.1 @ 200A	2.7	0.383	6.51@ 100A/10.7 @ 200A
SM8276	2.4	200	30-34	9.1	6.5	0.99	9.08
SM8400	2.76-4.48	200	26-28	9.1	5.5	0.99	9.09
SM8443	2.74	200	28	9.5	5.8	0.77	12.4
SM8447	2.74	200	25	9	5.8	0.77	11.8
SM8500	2.4-2.7	200	28-30	8.2	6.0	0.78	10.4
SM8625	2.74	200	28	7.3	5.8	0.77	9.4
SM8718	2.74	150	28	6.8	4.4	0.77	8.9
470AW	2.4-4.1	200	26-28	6.8	5.5	1.013	6.71

Spraying Table - ValuArc™ LCAG Electric Arc Gun

FINE AIR CAP (English System)

Sulzer Metco Wire (notes 4, 5)	Air Pressure (psi)	Operating Parameters		Hourly Consumption		lb Wire Required per ft^2/ 0.001 in. deposited	Coverage (note 6) ft^2/h/ 0.001 in
	Primary (notes 2, 3)	Amps	Volts (note 1)	lb Wire	kW Input (Approx)		
Metcoloy #2	40-65	200	28-32	18	6.0	0.04	510.0
Metcoloy #5	40-65	200	26-28	20	5,.5	0.05	443.52
Sprabronze AA	40	200	28-32	15	6.0	0.05	310.46
Aluminum AW,14 ga. (note 7)	40-65	200	26-28	10	5.5	0.02	459.59
Aluminum AW, 11 ga. (note 7)	40	200	32-34	11	7.0	0.02	597.46
Aluminum SF AW, 14 ga	40	200	28	10	5.8	0.01	1000
Zinc AW, 14 ga. (note 7)	40	150	21-23	30	4.5	0.05	749.54
Zinc AW, 11 ga. (note 7)	50	150	21-23	40	4.5	0.06	704.70
Sprababbitt A (note 7)	40	150	22-26	40	3.8	0.06	1,006.71
Copper	40	200	26-30	25	5.5	0.05	517.44
SM8222	40	200	28	13	5.8	0.03	433.33
SM8223	40	200	28	18	5.8	0.03	600
SM8228	60	200	32-34	10	7.0	0.057	177
SM8234	35	100-200	26-28	5.5 @ 100A/ 9.0 @ 200A	2.8 @ 100A/5.5 @ 200A	0.020	276 @ 100A/451 @ 200A
SM8276	35	200	30-34	20	6.5	0.05	384.38
SM8400	40-65	200	26-28	20	5.5	0.05	384.62
SM8443	40	200	28	21	5.8	0.04	525
SM8447	40	200	25	20	5.8	0.04	500
SM8500	35-40	200	28-30	18	6.0	0.04	441
SM8625	40	200	28	16	5.8	0.04	400
SM8718	40	150	28	15	4.4	0.04	375
470AW	35-60	200	26-28	15	5.5	0.053	284.23

FINE AIR CAP NOTES

1. The voltage range shown under Operating Parameters should be adjusted to provide a smooth and stable arc. If the voltage is set too high, the spray pattern may be poor causing large particles to be deposited on the spray surface. If the voltage is set too low, particularly with the hard wires, the arc may be erratic and make a popping sound. Under this condition, raise the arc voltage until the popping stops, then increase one to two more volts.

    - For ValuArc™ 100/100E and 200/200E, voltage is recorded at meter PC board and is lower than voltage at power supply. Voltage is displayed at power supply when toggle switch is set to VOLTS.

    - For ValuArc™ 300E, voltage is recorded at power supply output connection and displayed on controller message display.

2. Pressure range indicated (40-65 psi) (2.74-4.45 bar) gives you a range of coating properties. Using higher air pressures may improve coating properties, i.e., increase hardness, finer surface finish and increased density. However, the oxide content of the coating will also increase as will the stress level within the coating.

3. Air consumption for fine air cap at 40 psi (2.74 bar) is 41 CFM (1160 liter/min) and at 65 psi (4.45 bar) is 70 CFM.

4. Standard spray distance 4"- 6" (101.6mm - 152.4mm).

5. Unit is packaged with standard hardware to spray 14 ga. soft wires. For other wires, see Arc Wire Setup Hardware Table, this section.

6. Wire required and coverage figures are based on spraying large, flat surfaces with little overspray loss.

7. Use wire cleaner and lubricator pads (LCAE56094) for 14 ga., 2mm, and 11 ga. aluminum, zinc, and babbitt wire.

Spraying Table - ValuArc™ LCAG Electric Arc Gun
FAN AIR CAP (Metric System)

Sulzer Metco Wire (notes 3, 4)	**Air Pressure (bar)**		**Operating Parameters**		**Hourly Consumption**		**kg Wire Required per m^2/ 0.1mm deposited**	**Coverage** (note 6) **m^2/h/0.1mm**
	Primary (note 2)	**Secondary**	**Amps**	**Volts** (note 1)	**kg Wire**	**kW Input (Approx)**		
Metcoloy #2	2.76	1.72	200	28-32	8.2	6.0	0.73	12.10
Metcoloy #5	2.76	1.72	200	26-28	9.1	5.5	0.87	10.48
Sprabronze AA	2.76	1.72	200	28-32	6.8	6.0	0.93	7.33
Aluminum AW, 14 ga. (note 7)	2.76	1.72	200	26-28	4.5	5.5	0.46	9.87
Aluminum AW, 11 ga. (note 7)	1.7	1.72	200	32-34	5.0	7.0	0.38	13.03
Zinc AW, 14 ga. (note 7)	2.76	1.72	150	21-23	13.6	4.5	0.99	17.70
Zinc AW, 11 ga. (note 7)	2.76	1.72	200	21-23	18.1	4.5	1.09	16.64
Copper	2.76	1.72	200	26-30	11.3	5.5	0.99	11.35
SM 8400	2.76	1.72	200	26-28	9.1	5.5	0.99	9.09
SM 8276	2.76	1.72	200	30-34	9.1	6.5	1.07	8.47
470AW	2.4	1.7	200	26-28	6.8	5.5	1.013	6.71

Spraying Table - ValuArc™ LCAG Electric Arc Gun
FAN AIR CAP (English System)

Sulzer Metco Wire (notes 3, 4)	Air Pressure (psi)		Operating Parameters		Hourly Consumption		lb Wire Required per ft^2/ 0.001 in. deposited	Coverage (note 6) ft^2/h/0.001 in.
	Primary (notes 2)	Secondary	Amps	Volts (note 1)	lb Wire	kW Input (Approx)		
Metcoloy #2	40	25	200	28-32	18	6.0	0.04	510.00
Metcoloy #5	40	25	200	26-28	20	5.5	0.05	443.52
Sprabronze AA	40	25	200	28-32	15	6.0	0.05	310.46
Aluminum AW, 14 ga. (note 7)	40	25	200	26-28	10	5.5	0.02	417.81
Aluminum AW, 11 ga. (note 7)	30	25	200	32-34	11	7.0	0.02	551.50
Zinc AW, 14 ga. (note 7)	40	25	150	21-23	30	4.5	0.05	749.54
Zinc AW, 11 ga. (note 7)	40	25	200	21-23	40	4.5	0.06	704.70
Copper	40	25	200	26-30	25	5.5	0.05	480.48
SM 8400	40	25	200	26-28	20	5.5	0.05	384.62
SM 8276	40	25	200	30-34	20	6.5	0.06	358.76
470AW	35	25	200	26-28	15	5.5	0.053	284.23

FAN AIR CAP NOTES

1. The voltage range shown under Operating Parameters should be adjusted to provide a smooth and stable arc. If the voltage is set too high, the spray pattern may be poor causing large particles to be deposited on the spray surface. If the voltage is set too low, particularly with the hard wires, the arc may be erratic and make a popping sound. Under this condition, raise the arc voltage until the popping stops, then increase one to two more volts.

    • For ValuArc™ 100/100E and 200/200E voltage is recorded at meter PC board and is lower than voltage at power supply. Voltage is displayed at power supply when toggle switch is set to VOLTS.

    • For ValuArc™ 300E, voltage is recorded at power supply output connection and displayed on controller message display.

2. Fan air cap provides the capability of producing a wide spray pattern ranging from 2"- 6" (50 - 150mm) at a 6" (150mm) spray distance, by adjusting the secondary air pressure. The spray pattern width can be increased to 12" (300mm) by increasing the spray distance to 12" (300mm). This may, however, adversely affect the coating properties, i.e., hardness, density/porosity and deposit efficiency.

3. Standard spray distance 4"- 6" (101.6mm - 152.4mm).

4. Unit is packaged with standard hardware to spray 14 ga. hard wires. For other wires see Arc Wire Setup Hardware Table, this section.

5. For further material coating characteristic information, refer to appropriate tech bulletin.

6. Wire required and coverage figures are based on spraying large, flat surfaces with little overspray loss.

7. Use wire cleaner and lubricator pads (LCAE56094) for 14 ga., 2mm, and 11 ga. aluminum, zinc, and babbitt wire.

Spraying Table - ValuArc™ LCAG Electric Arc Gun
HIGH VELOCITY AIR CAP (Metric System)

Sulzer Metco Wire (notes 3, 4)	**Air Pressure (bar)**	**Operating Parameters**		**Hourly Consumption**		**kg Wire Required per m^2/ 0.1mm deposited**	**Coverage** (note 6) **m^2/h/ 0.1mm**
	Primary (notes 2)	**Amps**	**Volts** (note 1)	**kg Wire**	**kW Input (Approx)**		
Metcoloy #2	2.76	200	28-32	8.2	6.0	0.73	12.10
Metcoloy #5	2.76	200	26-28	9.1	5.5	0.87	10.48
SM 8400	2.76	200	26-28	9.1	5.5	1.08	8.48
SM 8276	2.76	200	30-34	9.1	6.5	0.99	9.08
Sprabronze AA	2.76	200	28-32	6.8	6.0	0.99	6.81
Aluminum AW, 14 ga. (note 8)	2.76	200	26-28	4.5	5.5	0.42	10.86
Zinc AW,14 ga. (note 8)	2.76	150	21-23	13.6	4.5	1.09	16.23
Copper	2.76	200	26-30	11.3	5.5	0.93	12.22
470AW	2.4	200	26-28	6.8	5.5	1.013	6.71

Spraying Table - ValuArc™ LCAG Electric Arc Gun
HIGH VELOCITY AIR CAP (English System)

Sulzer Metco Wire (notes 4, 5)	**Air Pressure (psi)**	**Operating Parameters**		**Hourly Consumption**		**lb Wire Required per ft^2/ 0.001 in. deposited**	**Coverage** (note 7) **ft^2/h/0.001 in.**
	Primary (notes 2, 3)	**Amps**	**Volts** (note 1)	**lb Wire**	**kW Input** (Approx)		
Metcoloy #2	40	200	28-32	18	6.0	0.04	510.00
Metcoloy #5	40	200	26-28	20	5.5	0.05	443.52
SM 8400	40	200	26-28	20	5.5	0.06	358.97
SM 8276	40	200	30-34	20	6.5	0.05	384.38
Sprabronze AA	40	200	28-32	15	6.0	0.05	288.29
Aluminum AW,14 ga. (note 8)	40	200	26-28	10	5.5	0.02	459.59
Zinc AW, 14 ga. (note 8)	40	150	21-23	30	4.5	0.06	687.08
Copper	40	200	26-30	25	5.5	0.05	517.44
470AW	35	200	26-28	15	5.5	0.053	284.23

HIGH VELOCITY AIR CAP NOTES

1. The voltage range shown under Operating Parameters should be adjusted to provide a smooth and stable arc. If the voltage is set too high, the spray pattern may be poor causing large particles to be deposited on the spray surface. If the voltage is set too low, particularly with the hard wires, the arc may be erratic and make a popping sound. Under this condition, raise the arc voltage until the popping stops, then increase one to two more volts.

    - For ValuArc™ 100/100E and 200/200E, voltage is recorded at meter PC board and is lower than voltage at power supply. Voltage is displayed at power supply when toggle switch is set to VOLTS.

    - For ValuArc™ 300E, voltage is recorded at power supply output connection and displayed on controller message display.

2. High velocity air cap reduces the spray pattern width compared to the Fine Air Cap.

3. Air consumption for high velocity air cap at 40 psi (2.76 bar) is 30 CFM (850 liter/min).

4. Standard spray distance is 4" - 6" (101.6mm - 152.4mm).

5. Unit is packaged with standard hardware to spray 14 ga hard wires. For all other wires, see Arc Wire Setup Hardware table.

6. Do not spray 11 ga. arc wire with the high velocity air cap.

7. Wire required and coverage figures are based on spraying large, flat surfaces with little overspray loss.

8. Use wire cleaner and lubricator pads (LCAE56094) for 14 ga., 2mm, and 11 ga. aluminum, zinc, and babbitt wire.

Spraying Table - ValuArc™ LCAG Electric Arc Gun

HIGH PROFILE AIR CAP (English System)

Sulzer MetcoWire	Air Pressure (psi)	Operating Parameters	
		Amps	Volts
Aluminum (14 ga.)	20-25 psi (1.4-1.8 bar)	200	28-32
Steels (14 ga.)	40	200	26-28

HIGH PROFILE AIR CAP NOTES

1. High profile air cap assembly part no. LCAG 51735.

2. Start out at the higher air pressure, then reduce the air pressure until spitting occurs. Raise the air pressure 2-3 psi (0.l14 - 0.21 bar) to stop spitting.

3. The voltage range shown under Operating Parameters should be adjusted to provide a smooth and stable arc. If the voltage is set too high, the spray pattern may be poor causing large particles to be deposited on the spray su4rface. If the voltage is set too low, particularly with the hard wires, the arc may be erratic and make a popping sound. Under this condition, raise the arc voltage until the popping stops, then increase one to two more volts (voltage is recorded at the gun).

4. High profile air cap produces a rough surface finish.

5. Standard spray distance is 6" - 8" (2.4 - 3.1cm).

6. Do not spray 11 ga or 2mm arc wire with the high profile cap.

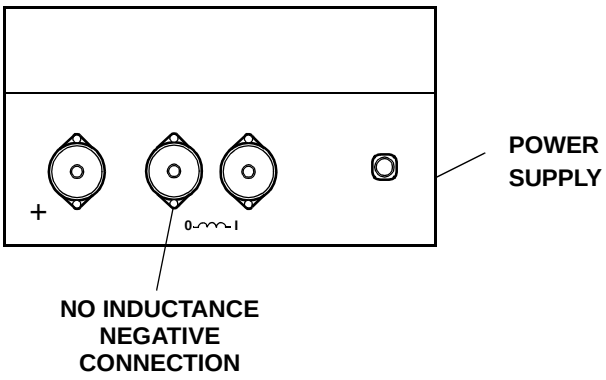
7. Use wire cleaner and lubricator pads (LCAE56094) for 14 ga., 2mm, and 11 ga. aluminum, zinc, and babbitt wire.

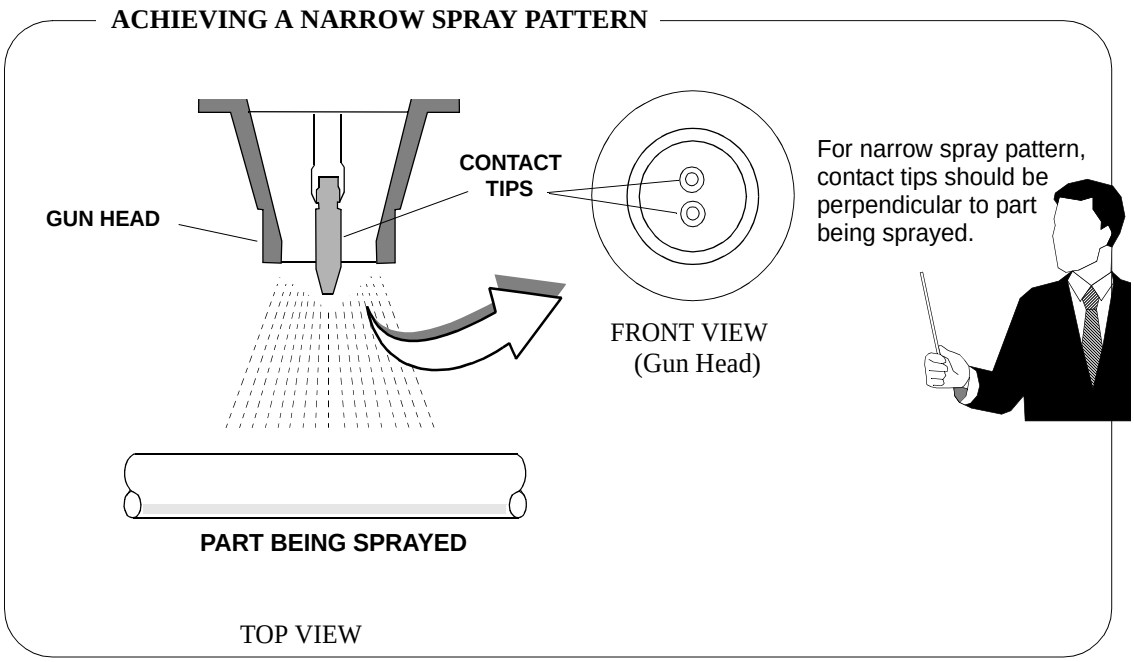
Spraying Table - ValuArc™ LCAG Electric Arc Gun

HIGH VELOCITY AIR CAP - Low Amperage Parameters

	Amps	Volts	Air Pressure (psi)	Spray Distance (in.)
Zinc (14ga)	30-60	13-18	40-60	1.25 - 4
Aluminum (14ga)	30-60	13-18	40-60	1.25 - 4

For low amperage spraying, connect power supply DC cable to NO INDUCTANCE NEGATIVE CONNECTION.





Spraying Table - ValuArc™ LCAG Electric Arc Gun

FOCUSED ARC AIR CAP (Metric System)

Sulzer Metco Wire (Notes)	**Air Pressure (bar)**		**Operating Parameters**		**Surface Speed** (mm/sec)	**Deposit Efficiency** (%)	**Macro Hardness**	**Surface Roughness** (Ra mi)
	Primary	Secondary	Amps	Volts				
Metcoloy #2 (14ga.) (note 2)	4.46	4.11	200	32	710/5mm step	80	82.1 15N	663
SM8276 (note 2)	4.46	4.11	200	32	710/5mm	73	73.7 15N	453
SM8400 (note 1)	4.46	4.11	200	27	710/5mm	67	78.6 15T	720
ALUMINUM AW (note 1)	4.46	4.11	200	27	710/5mm step	59	72.7 Rh	815
ZINC AW (note 1)	4.46	4.11	200	27	710/5mm step	48	33.8 Rh	266

NOTES:

1. Focused arc air cap used to narrow pattern to < 1" @ 5" spray distance.
2. Focused arc air cap used to increase hardness levels. Spray distance = 5"

Spraying Table - ValuArc™ LCAG Electric Arc Gun

FOCUSED ARC AIR CAP (English System)

Sulzer Metco Wire	**Air Pressure (bar)**		**Operating Parameters**		**Surface Speed** (in./sec)	**Deposit Efficiency** (%)	**Macro Hardness**	**Surface Roughness** (Ra mi)
	Primary	Secondary	Amps	Volts				
Metcoloy #2 (14ga.) (note 2)	65	60	200	32	28/0.2" step	80	82.1 15N	663
SM8276 (note 2)	65	60	200	32	28/0.2" step	73	73.7 15N	453
SM8400 (note 1)	65	60	200	27	28/0.2" step	67	78.6 15T	720
ALUMINUM AW (note 1)	65	60	200	27	28/0.2" step	59	72.7 Rh	815
ZINC AW (note 1)	65	60	200	27	28/0.2" step	48	33.8 Rh	266

NOTES

1. Focused arc air cap used to narrow pattern to < 1" @ 5" spray distance.
2. Focused arc air cap used to increase hardness levels. Spray distance = 5"

SPRAY KIT/HARDWARE TABLES

The following tables provide applicable kits and hardware items for soft, hard, and cored arc wire being sprayed according to wire type and size and the type of gun (PPG/LCAG) used in spraying.

SOFT ARC WIRE SPRAY KIT/HARDWARE TABLE

WIRE	WIRE SIZE	GUN	SPRAY KIT (Optional) (NOTE 8)	GUN ROLLERS (Upper/Lower) (NOTES 2 & 9)	LCAD/PPC/LCAE ROLLERS (Lower) (NOTES 2 & 7)	GUN CONTACT TIPS (NOTE 1)	GUN CONTACT TUBES (NOTE 3)	GUN WIRE GUIDE (NOTES 4 & 9)	LCAD/PPC/LCAE WIRE GUIDE (Front/Rear) (NOTES 4 & 9)	PPH/LCAHWIRE FEED CABLE WIRE GUIDE (NOTE 4)	PPC/LCD/LCAE WIRE STRAIGHTENER (Left/Right) (NOTES 5 & 9)
	14 ga	PPG	PPG51944	PPG51395/PPG51397	PPC51471	**PPG51496**	PPG51352	**PPG51384**	**PPC51879/NA**	**PPH51365**	STANDARD
	14 ga	LCAG	-	NA	PPC51471	PPG51496	LCAG54935	NA	LCAE51879/LCAE56066	LCAH56067	NA
ALUMINUM	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	*PPG51384	*PPC51879/NA	*PPH51365	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	PPC51879/NA	LCAH56067	**PPC40648/PPC40648**
	11 ga	PPG	PPG51948	**PPG11410/PPG51398**	**PPC51473**	**PPG51524**	**PPG51923**	*PPG51384	*PPC51879/NA	*PPH51365	**PPC40648/PPC40648**
	11 ga	LCAG	LCAG55833	NA	**PPC51473**	**PPG51524**	**LCAG55095**	NA	PPC51879/NA	LCAH56067	**PPC40648/PPC40648**
	14 ga	PPG	PPG51945	**PPG51393/PPG51390**	PPC51471	**PPG51496**	PPG51352	**PPG51384**	**PPC51879/NA**	PPH51365	STANDARD
	14 ga	LCAG	-	NA	PPC51471	PPG51496	LCAG54935	NA	PPC51879/PPC56066	LCAH56067	NA
ZINC	2 mm	PPG	PPG51947	**PPG51393/PPG51392**	**PPC51472**	**PPG51523**	PPG51352	*PPG51384	*PPC51879/NA	*PPH51365	STANDARD
	2 mm	LCAG	LCAG56321	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	PPC51879/NA	LCAH56067	NA
	11 ga	PPG	PPG51948	**PPG51394/PPG51391**	**PPC51473**	**PPG51524**	**PPG51923**	*PPG51384	*PPC51879/NA	*PPH51365	**PPC40648/PPC40648**
	11 ga	LCAG	LCAG55833	NA	**PPC51473**	**PPG51524**	**LCAG55095**	NA	PPC51879/NA	LCAH56067	**PPC40648/PPC40648**
	14 ga	PPG	PPG51945	**PPG51393/PPG51390**	PPC51471	**PPG51496**	PPG51352	**PPG51384**	**PPC51879/NA**	**PPH51365**	STANDARD
	14 ga	LCAG	-	NA	PPC51471	PPG51496	LCAG54935	NA	PPC51879/PPC56066	LCAH56067	NA
	2 mm	PPG	PPG51947	**PPG51393/PPG51392**	**PPC51472**	**PPG51523**	PPG51352	*PPG51384	*PPC51879/NA	*PPH51365	STANDARD
SPRABABBITT	2 mm	LCAG	LCAG56321	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	PPC51879/NA	LCAH56067	NA
	11 ga	PPG	PPG51948	**PPG51394/PPG51391**	**PPC51473**	**PPG51524**	**PPG51923**	*PPG51384	*PPC51879/NA	*PPH51365	**PPC40648/PPC40648**
	11 ga	LCAG	LCAG55833	NA	**PPC51473**	**PPG51524**	**LCAG55095**	NA	PPC51879/NA	LCAH56067	**PPC40648/PPC40648**

NOTES:

1. Contact tips are in quantities of 10.
2. Rollers are in quantities of 2.
3. Contact tubes are in quantities of 2.
4. Wire guides are in quantities of 2.
5. Wire straighteners include spacers. The PPC standard unit includes fixed wire straighteners.
6. For improved wire feed, use lubricator pads (LCAE56094).
7. To reduce scuffing of soft wires, use optional upper and lower cupped rollers LCAE56093 and LCAE56092, respectively.
8. Part numbers in bold are included in spray kit.
9. NA - not applicable for that unit spraying that particular wire.

* Optional parts (not included with standard unit or the optional spray kit. Order separately).

HARD ARC WIRE SPRAY KIT/HARDWARE TABLE

WIRE	WIRE SIZE	GUN	SPRAY KIT (Optional) (NOTE 8)	GUN ROLLERS (Upper/Lower) (NOTES 2 & 9)	LCAD/PPC/ LCAE ROLLERS (Lower) (NOTES 2 & 7)	GUN CONTACT TIPS (NOTE 1)	GUN CONTACT TUBES (NOTE 3)	GUN WIRE GUIDE (NOTES 4 & 9)	LCAD/PPC/LCAE WIRE GUIDE (Front/Rear) (NOTES 4 & 9)	PPH/LCAHWIRE FEED CABLE WIRE GUIDE (NOTE 4)	PPC/LCD/LCAE WIRE STRAIGHTENER (Left/Right) (NOTES 5 & 9)
METCOLOY #2	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**
METCOLOY #5	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**
SM 8400	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	LCAG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**

NOTES:

1. Contact tips are in quantities of 10.
2. Rollers are in quantities of 2.
3. Contact tubes are in quantities of 2.
4. Wire guides are in quantities of 2.
5. Wire straighteners include spacers. The PPC standard unit includes fixed wire straighteners.
6. For improved wire feed, use lubricator pads (LCAE56094).
7. To reduce scuffing of soft wires, use optional upper and lower cupped rollers LCAE56093 and LCAE56092, respectively.
8. Part numbers in bold are included in spray kit.
9. NA - not applicable for that unit spraying that particular wire.

* Optional parts (not included with standard unit or the optional spray kit. Order separately).

HARD ARC WIRE SPRAY KIT/HARDWARE TABLE

WIRE	WIRE SIZE	GUN	SPRAY KIT (Optional) (NOTE 8)	GUN ROLLERS (Upper/Lower) (NOTES 2 & 9)	LCAD/PPC/LCAE ROLLERS (Lower) (NOTES 2 & 7)	GUN CONTACT TIPS (NOTE 1)	GUN CONTACT TUBES (NOTE 3)	GUN WIRE GUIDE (NOTES 4 & 9)	LCAD/PPC/LCAE WIRE GUIDE (Front/Rear) (NOTES 4 & 9)	PPH/LCAHWIRE FEED CABLE WIRE GUIDE (NOTE 4)	PPC/LCD/LCAE WIRE STRAIGHTENER (Left/Right) (NOTES 5 & 9)
SPRABRONZE AA	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	PPG54935	NA	**LCAE51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	PPG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**
COPPER	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	PPG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	PPG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**
SM 8276	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	PPG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
	2 mm	PPG	PPG51946	PPG51395/PPG51397	**PPC51472**	**PPG51523**	PPG51352	PPG51736	PPC51878/NA	PPH51364	**PPC40648/PPC40648**
	2 mm	LCAG	LCAG51946	NA	**PPC51472**	**PPG51523**	PPG54935	NA	*PPC51878/NA	*PPH51364	**PPC40648/PPC40648**

NOTES:

1. Contact tips are in quantities of 10.
2. Rollers are in quantities of 2.
3. Contact tubes are in quantities of 2.
4. Wire guides are in quantities of 2.
5. Wire straighteners include spacers. The PPC standard unit includes fixed wire straighteners.
6. For improved wire feed, use lubricator pads (LCAE56094).
7. To reduce scuffing of soft wires, use optional upper and lower cupped rollers LCAE56093 and LCAE56092, respectively.
8. Part numbers in bold are included in spray kit.
9. NA - not applicable for that unit spraying that particular wire.

* Optional parts (not included with standard unit or the optional spray kit. Order separately).

CORED ARC WIRE SPRAY KIT/HARDWARE TABLE

WIRE	WIRE SIZE	GUN	SPRAY KIT (Optional) (NOTE 8)	GUN ROLLERS (Upper/Lower) (NOTES 2 & 9)	LCAD/PPC/LCAE ROLLERS (Lower) (NOTES 2 & 7)	GUN CONTACT TIPS (NOTE 1)	GUN CONTACT TUBES (NOTE 3)	GUN WIRE GUIDE (NOTES 4 & 9)	LCAD/PPC/LCAE WIRE GUIDE (Front/Rear) (NOTES 4 & 9)	PPH/LCAHWIRE FEED CABLE WIRE GUIDE (NOTES 4)	PPC/LCD/LCAE WIRE STRAIGHTENER (Left/Right) (NOTES 5 & 9)
SM 8222	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
SM 8443	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**
SM 8447	14 ga	PPG	-	PPG51395/PPG51397	PPC51471	PPG51351	PPG51352	PPG51736	PPC51878/NA	PPH51364	STANDARD
	14 ga	LCAG	LCAG55831	NA	PPC51471	**PPG51351**	LCAG54935	NA	**PPC51878/NA**	**PPH51364**	**LCAE55847/LCAE55846**

NOTES:

1. Contact tips are in quantities of 10.
2. Rollers are in quantities of 2.
3. Contact tubes are in quantities of 2.
4. Wire guides are in quantities of 2.
5. Wire straighteners include spacers. The PPC standard unit includes fixed wire straighteners.
6. For improved wire feed, use lubricator pads (LCAE56094).
7. To reduce scuffing of soft wires, use optional upper and lower cupped rollers LCAE56093 and LCAE56092, respectively.
8. Part numbers in bold are included in spray kit.
9. NA - not applicable for that unit spraying that particular wire.

* Optional parts (not included with standard unit or the optional spray kit. Order separately).

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